Response to Comments on the Draft Master Environmental Impact Report General Plan and Development Code Update City of Fresno, Fresno County, California

Prepared for:

City of Fresno
2600 Fresno Street
Fresno, CA 93721

Contact: Jennifer Clark, AICP

Prepared by:

FirstCarbon Solutions
1234 O Street
Fresno, CA 93721
888.826.5814

Contact: Michael Houlihan, AICP

December 5, 2014

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

Section 1: Introduction 1-1

Section 2: List of Commenters 2-1

Section 3: Responses to Comments 3-1

Section 4: Errata 4-1

List of Appendices

Appendix 1: Plan Land Use Request Environmental Evaluation

Appendix 2: Attachments to Comment Letter Y

Appendix 3: Attachments to Comment Letter JJ

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 1: INTRODUCTION

In accordance with Section 15088 of the State of California Environmental Quality Act (CEQA) Guidelines, the City of Fresno as the lead agency for the City of Fresno General Plan and Development Code Update has evaluated the comments received on the Draft Master Environmental Impact Report (Draft Master EIR), State Clearinghouse No. 2012111015. The Draft Master EIR was released for an extended public review and comment from July 23, 2014 through October 8, 2014. This Response to Comments (including the Errata) and the Draft Master EIR comprise the Final Master EIR for use by the City of Fresno and responsible agencies in their review of the proposed project.

This Response to Comments document is organized as follows:

- **Section 1: Introduction.**
- **Section 2: List of Commenters.** Provides a list of agencies, organizations, and individuals that commented on the Draft Master EIR.
- **Section 3: Responses to Comments.** Includes a copy of all of the letters received and provides responses to comments on environmental issues describing the disposition of the issues, explaining the Draft Master EIR analysis, supporting the Draft Master EIR conclusions, and/or providing clarifying information or corrections, as appropriate. This section is organized with a copy of the comment letter followed by the corresponding responses.
- **Section 4: Errata.** Includes errata, clarifications, and additions to the Draft Master EIR.

Additionally, these Responses to Comments and Errata clarify, amplify, and expand on the fully adequate analysis and significance conclusions that were already set forth in the Draft Master EIR for public review. CEQA Guidelines Section 15088.5 makes clear that such clarifications and amplifications are appropriate under CEQA and do not require recirculation of the Master EIR. Specifically, Section 15088.5 states:

a) A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. "Significant new information" requiring recirculation includes, for example, a disclosure showing that:

   1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.

3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.

4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

b) Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.

As set forth in more detail in these Responses to Comments and Errata, none of the clarifications or amplifications set forth herein change the significance conclusions presented in the Draft Master EIR or the substantially alters the analysis presented for public review. Furthermore, the Draft Master EIR circulated for public review was fully adequate under CEQA such that meaningful public review was not precluded. Thus, the clarifications provided in these Responses to Comments and Errata do not constitute significant new information that might trigger recirculation.

In addition, an environmental evaluation of requested land use changes was conducted and provided in Appendix 1 of this Response to Comments Document. The evaluation determined which land use requests resulted in no new significant or substantial changes to the environmental issues addressed in the Draft Master EIR.

SECTION 2: LIST OF COMMENTERS

A list of public agencies, organizations, and individuals who provided comments on the Draft Master EIR through the close of the public review period ending October 8, 2014 is presented below. Additional comments were received after the close of the public review period, and these are also presented below. Each comment has been assigned a code. Individual comments within each correspondence have been numbered so comments can be crossed-referenced with responses. The text of the correspondence is reprinted in Section 3, Responses to Comments, immediately followed by the corresponding response.

Table 2-1: List of Commenters

Code	Commenter	Comment Date
State Agencies		
A	State Clearinghouse, Office of Planning and Research, Scott Morgan	October 10, 2014
B	California Department of Conservation, Molly A. Penberth	October 21, 2014
C	California Department of Toxic Substances Control, Dick Jones	September 8, 2014
D	California Public Utilities Commission, Ken Chiang	October 6, 2014
E	Caltrans, District 6, Michael Navarro	October 9, 2014
Other Agencies, Organizations, and Persons		
F	Allen Matkins, Patrick A. Perry	October 9, 2014
G	American Farmland Trust, Daniel O'Connell	October 9, 2014
H	Baker Manock & Jensen, Robert Wilkinson	August 18, 2014
I	Baker Manock & Jensen, Lauren D. Layne	October 8, 2014
J	Bakman Water Company, Richard Tim Bakman	October 9, 2014
K	Baseline Environmental Consulting, Patrick Sutton	October 7, 2014
L	Building Industry Association, Mike Prandini	October 3, 2014
M	Central Unified School District, Bert Contreras	August 18, 2014
N	City of Fresno, Council District 6 Committee	October 8, 2014
O	Community Medical Centers, Robyn Tusan-Jinkerson	October 9, 2014
P	Diane Merrill	October 9, 2014
Q	Dirk Poeschel	October 10, 2014
R	Fresno Building Healthy Communities, Sandra Celedon-Castro	August 17, 2014
S	County of Fresno Department of Public Works and Planning, Briza Scholars	October 9, 2014
T	Fresno Irrigation District, Laurence Kimura	October 8, 2014

Table 2-1 (cont.): List of Commenters

Code	Commenter	Comment Date
U	Fresno Metro Ministries, Sarah Sharpe	October 9, 2014
V	Granville Homes, Inc.	October 9, 2014
W	Historic Preservation Commission, Karana Hattersley-Drayton	August 26, 2014
X	Jeff Reid	No Date
Y	Leadership Counsel for Justice & Accountability, Ashley Werner	October 9, 2014
Z	Madera County Community and Economic Development, Brent Gibbons	October 9, 2014
AA	Michael P. Paoli	October 8, 2014
BB	MRO Engineers, Neal K. Liddicoat	September 10, 2014
CC	Pacific Gas and Electric Company, Andrew Smith	October 8, 2014
DD	Richard Harriman	August 18, 2014
EE	Robert Merrill	October 9, 2014
FF	San Joaquin River Conservancy, Melinda Marks	August 18, 2014
GG	San Joaquin River Parkway and Conservation Trust, Inc., Dave Koehler	August 18, 2014
HH	San Joaquin Valley Air Pollution Control District, Arnaud Marjollet	October 9, 2014
II	Shute Mihaly & Weinberger, Tamara S. Galanter	September 25, 2014
JJ	Shute Mihaly & Weinberger, Tamara S. Galanter	October 8, 2014
KK	Sunnyside Property Owners Association, Sue Williams	August 18, 2014
LL	SWAPE, Matt Hagemann	October 8, 2014

SECTION 3: RESPONSES TO COMMENTS

In accordance with Section 15088 of the California Environmental Quality Act (CEQA) Guidelines, the City of Fresno (City), as the lead agency, evaluated the comments received on the Draft EIR (State Clearinghouse No. 2012111015) for the proposed General Plan and Development Code Update and has prepared the following responses to the comments received. Due to a large volume of attachments to two comment letters (comment letters Y and JJ), these attachments are included in Appendix 2 (Attachments to Comment Letter Y), and Appendix 3 (Attachments to Comment Letter JJ).

THIS PAGE INTENTIONALLY LEFT BLANK

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

October 10, 2014

Eric VonBerg
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721-3604

Subject: City of Fresno General Plan and Development Code Update
SCH#: 2012111015

Dear Eric VonBerg:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on October 9, 2014, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

A-1

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2012111015
Project Title City of Fresno General Plan and Development Code Update
Lead Agency Fresno, City of

Type EIR Draft EIR

Description Note: Extended Review per lead

The proposed project is comprised of two components: the General Plan Update and the Development Code Update. The updates will accommodate projected growth and development through the buildout of the General Plan and Development Code which will be approximately the year 2056. The anticipated population at buildout is approximately 970,000 people in the Planning Area.

Lead Agency Contact

Name Eric VonBerg
Agency City of Fresno
Phone 559 621 8181 **Fax**
email
Address 2600 Fresno Street, Room 3065
City Fresno **State** CA **Zip** 93721-3604

Project Location

County Fresno
City Fresno
Region
Lat / Long 36° 44' 23.2" N / 119° 47' 04.5" W
Cross Streets Numerous
Parcel No. Numerous
Township 14S **Range** 20E **Section** 3 **Base** Mt.Diabl

Proximity to:

Highways SR-99, -41, -180, -168
Airports FYI, FCH, Sierra Sky Park
Railways BNSF, Union Pacific
Waterways San Joaquin River, Millerton Lake, Irrigation Canals
Schools K-12, Colleges
Land Use Various

Project Issues Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects; Aesthetic/Visual

Reviewing Agencies Resources Agency; Department of Conservation; Department of Fish and Wildlife, Region 4; Department of Parks and Recreation; Central Valley Flood Protection Board; Department of Water Resources; Office of Emergency Services, California; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 6; Department of Housing and Community Development; Air Resources Board; Regional Water Quality Control Bd., Region 5 (Fresno); Native American Heritage Commission; Public Utilities Commission

Date Received 07/23/2014 **Start of Review** 07/23/2014 **End of Review** 10/09/2014

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

October 23, 2014

Eric VonBerg
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721-3604

Subject: City of Fresno General Plan and Development Code Update
SCH#: 2012111015

Dear Eric VonBerg:

The enclosed comment (s) on your Draft EIR was (were) received by the State Clearinghouse after the end of the state review period, which closed on October 9, 2014. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

A-2

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (2012111015) when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

THIS PAGE INTENTIONALLY LEFT BLANK

Letter A: State Clearinghouse, Office of Planning and Research, Scott Morgan, October 10, 2014 and October 23, 2014

Response to Comment A-1

This comment acknowledged the close of the public review period was October 9, 2014. The comment also stated that the Draft Master EIR was forwarded to the Resources Agency, Department of Conservation, Department of Fish and Wildlife (Region 4), Department of Parks and Recreation, Central Valley Flood Protection Board, Department of Water Resources, Office of Emergency Services, Caltrans (Division of Aeronautics), California Highway Patrol, Caltrans (District 6), Department of Housing and Community Development, Air Resources Board, Regional Water Quality Control Board, Region 5), Native American Heritage Commission, and the Public Utilities Commission. No specific comments on the environmental issues presented in the Draft Master EIR were provided. Thus, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment A-2

This comment stated that an additional comment was received by the State Clearinghouse and has been forwarded to the City. The comment is identified as Comment B. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no further response is required. (CEQA Guidelines, Section 15088.)

THIS PAGE INTENTIONALLY LEFT BLANK

NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., GOVERNOR

DEPARTMENT OF CONSERVATION

Managing California's Working Lands

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEB SITE conservation.ca.gov

October 21, 2014

late
10/9/14
c

RECEIVED
OCT 22 2014
STATE CLEARING HOUSE

Via Email: newplan@fresno.gov
Jennifer K. Clark, Director
Reg: DMEIR
Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93722

CITY OF FRESNO GENERAL PLAN AND DEVELOPMENT CODE UPDATE, DRAFT MASTER ENVIRONMENTAL IMPACT REPORT (SCH #2012111015)

Dear Ms. Clark:

The Department of Conservation's (Department) Division of Land Resource Protection (Division) monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act and other agricultural land conservation programs. The Division has reviewed the Draft Master Environmental Impact Report (DMEIR) for the City of Fresno General Plan and Development Code Update project and offers the following comments and recommendations.

PROJECT DESCRIPTION

The proposed project is a comprehensive update and implementation of the City of Fresno's General Plan and Development Code, providing new policy guidelines for future physical development and conservation of resources in the City through the year 2056. B-1

The project site consists of a planning area that encompasses all land within the City of Fresno and the City's Sphere of Influence, which equals approximately 106,027 acres. The project area contains approximately 1,615 acres of land under active Williamson Act contracts. Full build-out of designated urban areas within the proposed planning area would result in the loss of 15,903 acres of Important Farmland.

DIVISION COMMENTS

WILLIAMSON ACT

The DMEIR notes that the Planning Area contains 1,650 acres under active Williamson Act Contract. Pursuant to Government Code §51230 the general plan and zoning applied to lands subject to Williamson Act contracts, as well as lands located within an agricultural preserve (which may have a greater extent than those areas under contract), must be consistent with Williamson Act statute and be compatible with the agricultural use of the land. The project proposes 82 acres of agricultural land designated for Open Space Conservation, and allows existing agricultural uses to continue as legal non-conforming land uses[1]. The Department recommends that the Final MEIR clarify how the General Plan and Development Code Update will remain consistent with the conditions set upon existing Williamson Act contracts as potentially legal, non-conforming uses; particularly while parcels remain under active contracts. If the update will not remain consistent, the document should describe the steps the City will take to resolve the inconsistencies, and evaluate how any proposed contract cancellations that may be involved in this project would (or would not) meet the required findings for cancellation under Government Code § 51282[2]. B-1 CONT

In addition, the Final MEIR should include information, to the degree possible, regarding the anticipated dates that contracted land in the Planning Area will either be cancelled or will complete the non-renewal period. If there will be conflicts with scheduled development, the Final MEIR must explain the impact and identify any feasible actions which would reduce the significance, such as prohibiting the issuance of grading and building permits until the contracts have expired via nonrenewal[3] or terminated via cancellation.[4] The Department's preferred method of contract termination is via nonrenewal.

MITIGATION MEASURES

The DMEIR's discussion regarding mitigation measures for agricultural land conversion states:

> *No feasible measures in addition to the above policy are available.*[5] B-2

In response to the project's Notice of Preparation, the Department's December 17, 2012 comment letter emphasized that the General Plan Update process provides the best

[1] Agricultural Resources, City of Fresno General Plan and Development Code Update Master Environmental Impact Report (DMEIR), page 5.2-14. City of Fresno, July 2014.
[2] or Government Code § 51297 for Farmland Security Zone contracts.
[3] Government Code §51245
[4] Government Code §51280 et seq.
[5] Agricultural Resources, DMEIR at 5.2-13. The policy referenced, Policy RC-9-b, states that the City will express opposition to premature conversion of agricultural land outside the City's Sphere of Influence, but within or adjacent to the Planning Area.

opportunity for the City to incorporate General Plan Policies and Ordinances to create agricultural mitigation programs. These Policies and Ordinances create a blanket approach for all subsequent projects that provide for compensatory mitigation as the later site-specific projects move through individual review[6] (see attached). The Department recommends the agricultural mitigation program found in Merced County's 2030 General Plan as a template to provide compensatory mitigation[7] (see attached).

Direct conversion of agricultural land is often an unavoidable impact under CEQA. However, the impact is not addressed merely by avoiding agricultural land conversion (either via purchase or by relocating the project). Rather, the criterion is any feasible mitigation that lessens a project's impacts. Pursuant to CEQA Guideline §15370, mitigation includes measures that avoid, minimize, rectify, reduce or eliminate, or compensate for the impact (emphasis added). Therefore, all potentially feasible mitigation measures which could lessen a project's impacts should be included in the Final MEIR for the City's General Plan and Development Code Update project. A measure brought to the attention of the lead agency should not be left out unless it is infeasible based on its elements. The Department has brought to the City's attention the recommendation to include agricultural conservation easements as feasible mitigation measures in the previous comment letter[8]. B-2 CONT

The Department understands that various factors can affect the feasibility of potential mitigation measures. Because agricultural conservation easements have become more commonly accepted by jurisdictions at the local and state level, they are an available mitigation tool that should be considered. The Department highlights this measure because of its acceptance and use by lead agencies as an appropriate mitigation measure under CEQA. As such, the Division recommends that the City review permanent agricultural easements as a mechanism to protect remaining land resources in Fresno County and lessen project impacts in accordance with CEQA Guideline §15370.

Should the Final MEIR choose not to analyze any mitigation measures for farmland conversion, then the City must consider mitigation measures when subsequent Focused EIRs are reviewed, i.e. during a Specific Plan proposal CEQA analysis. As the Master EIR would not contemplate any mitigation measures, the City would then need to analyze them on a project-by-project basis for any subsequent project. CEQA Guidelines § 15178(c)(1) states that a Focused EIR must include the following:

---

[6] Letter from Molly Penberth, Manager of Conservation Program Support Unit, Cal. Dep't of Conservation, to Keith Bergthold, Assistant Dir., City of Fresno (December 17, 2012) (on file with author).

[7] Implementation Program AG-J: Agricultural Conservation Easement Program. CEQA Findings of Fact and Statement of Overriding Considerations of the Merced County Bd. of Supervisors for the 2030 Merced County General Plan Program EIR, pages 29-30. December 2013, *available at* http://www.co.merced.ca.us/pdfs/planning/generalplan/AdoptedGP/findings_mcgpu_121013_final.pdf

[8] Letter from Molly Penberth, Manager of Conservation Program Support Unit, Cal. Dep't of Conservation, to Keith Bergthold, Assistant Dir., City of Fresno (December 17, 2012) (on file with author).

> *The focused EIR shall incorporate by reference the Master EIR and analyze only the subsequent project's additional significant environmental effects and any new or additional mitigation measures or alternatives that were not identified and analyzed by the Master EIR.* (emphasis added)

In addition, the 6th District Court of Appeals found in *Save Panoche Valley v. County of San Benito* (43 ELR 20143. No. H037599, (Cal. Ct. App. 6th Dist., 06/25/2013)):

> *Save Panoche Valley's insistence that the mitigation measures fail because there is no creation of additional agricultural lands to compensate for the ones utilized for the project site are unsubstantiated. We are unaware of any case law that supports Save Panoche Valley's position. The goal of mitigation measures is not to net out the impact of a proposed project, but to reduce the impact to insignificant levels. (See Banning Ranch Conservancy, supra, 211 Cal.App.4th at p.1233).*

Mitigation via agricultural conservation easement can be implemented by at least two alternative approaches: the outright purchase of easements or the donation of mitigation fees to a local, regional, or statewide organization or agency whose purpose includes the acquisition and stewardship of agricultural conservation easements. The California Council of Land Trusts (CCLT) and the California Farmland Conservancy Program (CFCP) are two sources of information on the mechanisms and fees associated with conservation easements as well as their use in mitigating for agricultural land conversion. Their web site addresses are:

B-2
CONT

http://www.calandtrusts.org
http://www.conservation.ca.gov/DLRP/CFCP/Pages/Index.aspx

The conversion of agricultural land should be deemed an impact of at least regional significance. Hence, the search for replacement lands need not be limited strictly to lands within the surrounding area, but should be roughly equivalent in proximity, acreage, and agricultural characteristics to the affected property.

Of course, the use of conservation easements is only one form of mitigation that should be analyzed. Any other feasible mitigation measures should also be considered, analyzed on record, and presented in the Final MEIR.

Finally, when presenting any mitigation measures in the Final MEIR, it is important to note that mitigation should consist of specific, measurable actions that allow monitoring to ensure their implementation and evaluation of success. A mitigation consisting only of a statement of intention or an unspecified future action may not be adequate pursuant to CEQA.

Thank you for the opportunity to provide comments. Please provide this Department with notices of any future hearing dates as well as any staff reports pertaining to this project. If you have any questions regarding our comments, please contact Heather

Anderson, Environmental Planner at (916) 324-0869 or via email at Heather.Anderson@conservation.ca.gov.

Sincerely,

Molly A Penberth, Manager
Division of Land Resource Protection
Conservation Support Unit

cc: State Clearinghouse

NATURAL RESOURCES AGENCY

EDMUND G. BROWN, JR., GOVERNOR

DEPARTMENT OF CONSERVATION

Managing California's Working Lands

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

December 17, 2012

Keith Bergthold, Assistant Director
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721-3604

Subject: Notice of Preparation for the City of Fresno General Plan and Development Code Update – SCH # 2012111015

Dear Mr. Bergthold:

The Department of Conservation's (Department) Division of Land Resource Protection (Division) has reviewed the Notice of Preparation (NOP) for the City's General Plan and Development Code Update. The Division monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act and other agricultural land conservation programs. We offer the following comments and recommendations with respect to the proposed project's potential impacts on agricultural land and resources.

Project Description

The project consists of a planning area that encompasses 106,000 acres and includes the current City limits, the City's Sphere of Influence, and several other areas, all within Fresno County. The proposed project is a comprehensive update and implementation of the City of Fresno's General Plan and Development Code. Development of the project within the proposed study area will result in the loss of 10,978 acres of farmland.

The project also contains land under Williamson Act contract, and the NOP acknowledges that the Development Code update will remove agricultural zoning districts from the planning area. This will result in potential impacts to contracted land. Implementation of the proposed project would convert this farmland to urban uses and would preclude future agricultural uses on the site.

Division Comments

Per the 2008 Important Farmland Map for Fresno County, produced by the Farmland Mapping and Monitoring Program (FMMP), the planning area contains approximately 11,000 acres of Prime Farmland, 2,700 acres of Farmland of Statewide Importance, and 3,200 acres of Unique Farmland. The conversion of this land is a material consideration for the California Environmental Quality Act (CEQA). Therefore, the Division recommends that the Draft EIR address the following items to provide a comprehensive discussion of potential impacts of the project on agricultural land and activities:

Agricultural Setting of the Area

- Location and extent of FMMP Important Farmland in the project area and other types of agricultural land adjacent to the project area.
- Current and past agricultural use of the project areas. Please include data on the types of crops grown.

To help describe the full agricultural resource value of the soils on the site, the Department recommends the use of economic multipliers to assess the total contribution of the site's potential or actual agricultural production to the local, regional, and state economies. Two sources of economic multipliers can be found at the University of California Cooperative Extension Service and the United States Department of Agriculture (USDA).

Impacts on Agricultural Land

Land use conversion statistics from the Important Farmland Data Availability webpage[1] documents a net decrease of more than 102,000 acres of irrigated Important Farmland[2] in Fresno County between 2000 to 2008; an average loss of more than 12,750 acres per year. This cumulative loss represents a significant impact to the agricultural resources of the County and the State, and shows why the remaining prime agricultural resources should be protected whenever feasible.

When determining the agricultural value of the land, it is important to recognize that the value of a property may have been reduced over the years due to inactivity, but it does not mean that there is no longer any agricultural value. The inability to use the land for agriculture, rather than the choice not to do so, is what could constitute a reduced agricultural value. The Division recommends the following discussion under the Agricultural Resources section of the DEIR:

- Type, amount, and location of farmland conversion resulting directly and indirectly from the General Plan and Development Code updates.
- Impacts on any current and future agricultural operations; e.g., land-use conflicts, loss of agricultural support infrastructure such as processing facilities, increases in land values and taxes, etc.
- Incremental impacts leading to cumulative impacts on agricultural land. This would include impacts from projects in process at the time the Master EIR is analyzed, as well as impacts from past and likely future projects.

In 2010, approximately $ 5.9 billion in farm sales was generated in Fresno County[3], which demonstrates the high productivity of available agricultural lands in this top-ranked region. The

[1] http://redirect.conservation.ca.gov/dlrp/fmmp/product_page.asp
[2] Important Farmland consists of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland.
[3] California Agricultural Resource Directory 2010-2011
http://www.cdfa.ca.gov/statistics/PDFs/ResourceDirectory_2011-2012.pdf

City of Fresno proposes changes to, and adjacent to, some of the highest quality and longest producing agricultural land in the County.

Any loss of this agricultural land should be avoided or mitigated whenever possible. Under Title 14 of the California Code of Regulations, Section 15064.7, impacts on agricultural resources may also be both quantified and qualified by use of established thresholds of significance. As such, the Department has developed a California version of the USDA Land Evaluation and Site Assessment (LESA) Model. The California LESA model is a semi-quantitative rating system for establishing the environmental significance of project-specific impacts on farmland. The model may also be used to rate the relative value of alternative project sites. The LESA Model is available on the Division's website at:

http://www.consrv.ca.gov/DLRP/qh_lesa.htm

Williamson Act

The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or compatible uses. California Government Code § 51230 enables local governments to enter into Williamson Act contracts, which have an initial term of 10 years. Section 51296 enables local governments to enter into Farmland Security Zone (FSZ) contracts (also known as "super Williamson Act" contracts), which have an initial term of 20 years. Both kinds of contracts are entered into between private landowners and the County, and both are present in Fresno County. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use (i.e. farming, grazing, and/or open space), as opposed to potential market value.

We recommend that the Draft EIR include a discussion of how the Development Code Updates will remain consistent with the conditions set upon existing Williamson Act contracts, and if not, how any cancellations that may be involved in this project would (or would not) meet the required findings of Government Code § 51282 Cancellation, or § 51297 Cancellation of Farmland Security Zone Contract.

Mitigation Measures

Although direct conversion of agricultural land may be an unavoidable impact under CEQA analysis, mitigation measures, including compensatory mitigation, must be considered and adopted if feasible. This Master EIR has noted that at least 10,978 acres of agricultural land would be developed, with full buildout within the Planning Area sometime after the year 2035[4].

The document states that there will be a further analysis of these potential impacts, and that "mitigation measures will be provided, if available"[5]. This interpretation of the City's responsibility for the Master EIR does not address Public Resources Code § 21100(b)(3), which

[4] Introduction, Section 1.4.4 – Comparison of Existing Development to the City of Fresno General Plan update, page 28, Table 4. City of Fresno General Plan and Development Code Update, Initial Study. November 6, 2012.
[5] Discussion of Environmental Evaluation, Section 3 – 2. Agriculture and Forestry Resources, page 45. City of Fresno General Plan and Development Code Update, Initial Study. November 6, 2012.

mandates the inclusion of "mitigation measures proposed to minimize significant effects on the environment" in the CEQA document. The approval and use of a Master EIR provides a mechanism for mitigating the overall project, thus allowing subsequent, identified projects to meet a lower threshold when examining irreversible significant environmental impacts.

CEQA Guidelines § 15370 defines mitigation measures as those that "avoid, minimize, rectify, reduce or eliminate, or compensate" for project impacts. Given the City's location, it may not be feasible to completely avoid agricultural land conversion; nor does CEQA require that impacts be reduced to a level below significance. Rather, CEQA's criterion is feasible mitigation that lessens a project's impacts.

The General Plan Update stage of the land use planning process provides the best opportunity for the City to incorporate General Plan Policies and Ordinances to create agricultural mitigation programs. These Policies and Ordinances create a blanket approach for all subsequent projects that provide for compensatory mitigation as the later site-specific projects move through their individual review. Mitigations such as conservation easements and in-lieu mitigation fee banking are considered viable tools for achieving impact reduction under CEQA.

Should the City decide not to incorporate available, feasible mitigation measures into their Master EIR, then they must consider mitigation measures when a subsequent Focused EIR is reviewed, i.e. during a Specific Plan proposal CEQA analysis. As the Master EIR would not contemplate any mitigation measures, the City must analyze them on a project-by-project basis for any anticipated subsequent project. CEQA Guidelines § 15178(c)(1) states that a Focused EIR must include the following:

> *The focused EIR shall incorporate by reference the Master EIR and analyze only the subsequent project's additional significant environmental effects and any new or additional mitigation measures or alternatives that were not identified and analyzed by the Master EIR. "Additional significant environmental effects" are those project-specific effects on the environment which were not addressed as significant in the Master EIR.* (emphasis added)

Therefore, all potentially feasible mitigation measures which could lessen impacts from the General Plan and Development Code Update should be included in the Master EIR for the City of Fresno. A measure brought to the attention of the Lead Agency should not be left out unless it is infeasible based on its elements. Agricultural conservation easements are an available mitigation tool that should be considered in the CEQA process. Finally, when presenting mitigation measures in the Master EIR, it is important to note that a mitigation consisting only of a statement of intention or an unspecified future action may not be adequate pursuant to CEQA.

The loss of agricultural land represents a permanent reduction in the State's agricultural land resources. As such, the Department recommends the use of permanent agricultural conservation easements on land of at least equal quality and size as compensation for the direct loss of agricultural land. Conservation easements will protect a portion of those remaining

land resources and lessen project impacts in accordance with CEQA Guideline § 15370. The Department highlights this measure because of its acceptance and use by lead agencies as an appropriate mitigation measure under CEQA and because it follows an established rationale similar to that of wildlife habitat mitigation.

Mitigation via agricultural conservation easements can be implemented by at least two alternative approaches: the outright purchase of easements or the donation of mitigation fees to a local, regional, or statewide organization or agency whose purpose includes the acquisition and stewardship of agricultural conservation easements. The conversion of agricultural land should be deemed an impact of at least regional significance. Hence, the search for replacement lands need not be limited strictly to lands within the project's surrounding area, but should be roughly equivalent in proximity, acreage, and agricultural characteristics to the affected property.

A number of agricultural conservation easements currently exist in Fresno County; additional easement projects are potentially feasible. If the City were not able to make arrangements for easement mitigation through one of these or many other land trusts operating in California, the Department would be glad to help. Of course, the use of conservation easements is only one form of mitigation that should be considered. Any other feasible mitigation measures should also be considered.

Thank you for giving us the opportunity to comment on the NOP for the City of Fresno's General Plan and Development Code Update. Please provide this Department with the date of any hearings for this particular action, and any staff reports pertaining to it. If you have questions regarding our comments, or require technical assistance or information on agricultural land conservation, please contact Meri Meraz, Associate Environmental Planner, at 801 K Street, MS 18-01, Sacramento, California 95814, or by phone at (916) 445-9411.

Sincerely,

Molly A. Penberth, Manager
Division of Land Resource Protection
Conservation Program Support Unit

cc: State Clearinghouse

development. As a result, it is inevitable that some farmland conversion would occur to accommodate long-term development needs. Proposed policies would permit the loss of farmland to urban development both within designated urban areas and as a result of the growth of developed uses at scattered locations outside designated communities. While some proposed policies would fully protect the amount of farmland equal to that removed, no policy would prohibit urban development of farmlands or result in an increase in the acreage of protected agricultural land. Although the Agricultural Land Mitigation Program (Program AG-B) would mitigate the loss of productive agricultural land, the actual viability of such a program remains unknown because the program has not yet been developed or adopted. Until the details of the mitigation land management program that would oversee and monitor the mitigated land is developed and approved, the proposed 2030 General Plan is assumed to continue to lead to the conversion of agricultural uses to non-agricultural uses and result in a net loss of important farmland over time (Draft PEIR and RDPEIR, p. 6-28).

Finding on Significance of Impact

Based on the analysis contained within the Draft PEIR, RDPEIR and Final PEIR, other considerations in the record, and the impact evaluation criteria, the Board finds that while the 2030 General Plan would protect the majority of important farmlands, specifically under the Agricultural land use designation and via the Agricultural Element goals and policies, because the 2030 General Plan would allow for some conversion of farmlands to non-agricultural use to accommodate future urban development, infrastructure necessary to serve such development, and developed rural land uses (energy facilities, agriculturally related industries, mining, scattered rural residences) located on farmlands, this would be a significant impact. The Board has been presented with no evidence to contradict its conclusion in this regard.

Proposed Mitigation

Mitigation Measure AG-1a:

Amend Policy AG-2.2: Agricultural Land Mitigation, as follows:

> Protect productive agricultural areas from conversion to non-agricultural and urban uses by establishing and implementing an agricultural mitigation program that matches acres converted with farmland acres of similar quality to those converted preserved at a 1:1 ratio. Coordinate with the six cities in Merced County and the Merced Local Agency Formation Commission (LAFCo), consistent with LAFCo's statutory mission to preserve agricultural land and open space, to establish consistent standards and mitigation for the loss of farmland. In addition, the Land Evaluation and Site Assessment Model (LESA model) may be used to determine whether the conservation land is of equal or greater value than the land being converted.

Mitigation Measure AG-1b:

Add the following program:

> Implementation Program AG-J: Agricultural Conservation Easement Program
>
> In conjunction with the Policies AG-2.2, AG 2.4, and AG 2.8 and Program AG-B, the County shall develop and adopt and Agricultural Land Mitigation Program ordinance. The ordinance shall ensure that agricultural mitigation is required for the conversion or change from an agricultural use to a predominantly non-agricultural use prior to, or concurrently with, approval

of a zone change from agricultural to non-agricultural zoning designation, or other discretionary action by the County. Additionally, the ordinance shall require that for each acre of agricultural land changed or converted, one acre of equivalent agricultural land shall be preserved (1:1 ratio). The ordinance shall define the term "equivalent agricultural land." The ordinance shall provide for mitigation via a conservation easement. The ordinance shall outline that where a conservation easement is funded or dedicated, an endowment for the on-going monitoring and maintenance of the agricultural conservation easement must also be required. Finally, the ordinance shall require that prior to the approval of a final subdivision map, or issuance of the first building permit, whichever comes first, a project proponent shall provide written evidence to the County that a conservation easement and endowment has been secured (by the County or other qualifying entity) to mitigate for the permanent loss of agricultural land.

Mitigation Measure AG-1c:

Amend Policy NR-3.13: Agricultural Land Disturbance, as follows:

Require mining projects to obtain agricultural conservation easements consistent with Implementation Program AG-J at a minimum of 1:1 ratio for each acre of productive agricultural land converted as a result of mining and not returned to agricultural production.

Mitigation Measure AG-1d:

Amend Policy AG-3.11, Solar and Wind Energy Production Facilities, as follows:

Encourage the installation of solar and wind energy production facilities in agricultural areas so long as they do not result in a tax burden to the County, do not result in permanent water transfers off of productive agricultural land, ~~or~~ do not require cancellation of Williamson Act contracts, and do not conflict with sensitive habitats or other biological resources. In addition, approval of such facilities shall require dedications of agricultural land and habitat mitigation when impacts to these resources have been determined to be significant pursuant to CEQA, and measures to control erosion, and assurances for financing decommissioning activities.

Mitigation Measure AG-1e:

Amend Policy NR-2.3, Biomass-to-Energy Production, as follows:

Encourage the use of biomass facilities to capture untapped local energy sources from dairies, farmland, and other industrial sources, provided that such uses do not interfere with agricultural practices, or conflict with sensitive habitats or other biological resources consistent with Policies AG-3.11 and LU-2.7.

Findings on Proposed Mitigation

The Board finds that the above-stated mitigation measures are incorporated into the 2030 General Plan project. The Board further finds that the above measures are appropriate and feasible, and would substantially lessen, but not avoid the adverse environmental effects associated with the 2030 General Plan project by amending existing policies and adding a new program that would promote the preservation of agricultural lands. However, the agricultural land use designations and the policies would not prevent the overall net loss of important farmlands within the county associated with future urban and rural development within agricultural areas. There are no additional or technically feasible mitigation measures available to reduce the net loss of farmland and reduce this impact below a level of significance (Public Resources Code Section 21002; CEQA Guidelines Sections 15091, 15126.4, subd. (a)(2)). The Board has been presented with no evidence to contradict

Letter B: California Department of Conservation, Molly A. Penberth, October 21, 2014

Response to Comment B-1

This comment acknowledges the project description and asks how the General Plan will remain consistent with the conditions set upon existing Williamson Act contracts. These contracts have specific provisions in accordance with state law that need to be followed prior to cancelling the contracts. The City will ensure these provisions are followed for projects under the City's purview. As of January 2014, none of the lands under a Williamson Act contract (approximately 1,615 acres) has been issued a notice of non-renewal based on requests of the property owners. The City does not have information regarding anticipated near-term cancellation of existing Williamson Act contracts.

Response to Comment B-2

This comment suggests that agricultural mitigation programs be incorporated into the General Plan or Ordinances. The City has considered a preservation policy and the following policy has been added to the General Plan and is added after Policy RC-9-b on pages 5.2-12 and 5.2-13 of the Draft Master EIR.

> **RC-9-C: Farmland Preservation Program.** In coordination with regional partners or independently, establish a Farmland Preservation Program. When Prime Farmland, Unique Farmland, or Farmland of State Importance is converted to urban uses, this program would require that the developer of such a project permanently protect an equal amount of similar farmland elsewhere through easement.

After the implementation of the policies regarding agricultural uses for project impacts (Policy RC-9-b and RC-9-c and for cumulative impacts (Objective RC-9, Policy RC-9-a, Policy RC-9-b, and Policy RC-9-c), the potential project and cumulative impacts to farmland is still considered significant. The addition of this policy does not change the findings in the Draft Master EIR.

THIS PAGE INTENTIONALLY LEFT BLANK

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Miriam Barcellona Ingenito
Acting Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Edmund G. Brown Jr.
Governor

September 8, 2014

Ms. Jennifer K. Clark, Director
Reg: DMEIR
Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, California 93721

NOTICE OF PREPARATION AND INITIAL STUDY FOR THE PROJECT DRAFT MASTER ENVIRONMENTAL IMPACT REPORT

Dear Ms. Clark:

The Department of Toxic Substances Control (DTSC) has reviewed the document described above that proposes rezoning some agricultural properties to residential and building residential housing on the land. DTSC recommends that additional research be conducted to determine whether pesticides were used on the proposed development sites. The sites should be evaluated to determine if and where storage, mixing, rinsing and disposal of pesticides may have occurred and whether contamination exists.

C-1

In addition, although DTSC does not regulate pesticides legally applied to crops, they have historically been used on some agricultural properties. We strongly recommend that these areas be tested for environmentally persistent pesticides such as organic pesticides and metals prior to development. The results of any testing should be evaluated to determine if concentrations present in soils will be protective of residents and workers.

Printed on Recycled Paper

Please contact me by email at dick.jones@dtsc.ca.gov or by telephone at (916) 255-3953 if you have any questions.

Sincerely,

Dick Jones

Dick Jones
Environmental Scientist
San Joaquin Branch

cc. State Clearinghouse
Office of Planning and Research
1400 10th Street, Room 121
Sacramento, California 95814-0613
state.clearinghouse@opr.ca.gov

Letter C: California Department of Toxic Substances Control, Dick Jones, September 8, 2014

Response to Comment C-1

This comment includes a recommendation that additional research be conducted to determine whether pesticides were used within past agricultural areas of the Planning Area. Impact HAZ-1 addresses future grading and excavation of sites for new development and any potential contaminated areas be remediated prior to the commencement of construction activities. The City has included Policy NS-4-c to require an investigation of soil and groundwater contamination whenever justified by past site uses. Therefore, areas that have previously been farmed are candidates for additional evaluation.

THIS PAGE INTENTIONALLY LEFT BLANK

PUBLIC UTILITIES COMMISSION
320 WEST 4TH STREET, SUITE 500
LOS ANGELES, CA 90013
(213) 576-7083

October 6, 2014

Eric Vonberg
City of Fresno
2600 Fresno Street
Fresno, California 93721

Dear Mr. Vonberg:

SUBJECT: SCH 2012111015 Fresno (Fresno) General Plan Update - DEIR

The California Public Utilities Commission (Commission) has jurisdiction over the safety of highway-rail crossings (crossings) in California. The California Public Utilities Code requires Commission approval for the construction or alteration of crossings and grants the Commission exclusive power on the design, alteration, and closure of crossings in California. The Commission Rail Crossings Engineering Branch (RCEB) is in receipt of the draft *Environmental Impact Report (DEIR)* for the proposed City of Fresno (City) General Plan and Development Code Update project.

The project area includes the active rail tracks. RCEB recommends that the City add language to the General Plan Update so that any future development adjacent to or near the planned railroad right-of-way (ROW) is planned with the safety of the rail corridor in mind. New developments may increase traffic volumes not only on streets and at intersections, but also at any planned at-grade crossings. This includes considering pedestrian circulation patterns or destinations with respect to railroad ROW and compliance with the Americans with Disabilities Act. Mitigation measures to consider include, but are not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade crossings due to increase in traffic volumes, and continuous vandal resistant fencing or other appropriate barriers to limit the access of trespassers onto the railroad ROW. D-1

If you have any questions in this matter, please contact me at (213) 576-7076, ykc@cpuc.ca.gov.

Sincerely,

Ken Chiang, P.E.
Utilities Engineer
Rail Crossings Engineering Branch
Safety and Enforcement Division

C: State Clearinghouse

THIS PAGE INTENTIONALLY LEFT BLANK

Letter D: California Public Utilities Commission, Ken Chiang, October 6, 2014

Response to Comment D-1

The commenter asked that the City add language to the General Plan Update so that any future development adjacent to or near the planned right-of-way is planned with the safety of the rail corridor in mind. The City currently follows state and federal regulations for railroad crossing. These regulations include the California Manual on Uniform Traffic Control Devices, federal regulations, and the regulations set forth by the California Public Utilities Commission. Following these regulations would reduce potential impacts associated with railroad crossings to less than significant.

THIS PAGE INTENTIONALLY LEFT BLANK

DEPARTMENT OF TRANSPORTATION
DISTRICT 6
1352 WEST OLIVE AVENUE
P.O. BOX 12616
FRESNO, CA 93778-2616
PHONE (559) 445-5868
FAX (559) 445-5875
TTY 711
www.dot.ca.gov

Serious drought.
Help save water!

October 9, 2014

2131-IGR/CEQA
06-FRE-GEN
CITY OF FRESNO
2035 DRAFT GENERAL PLAN & DRAFT EIR
SCH# 2012111015

Mr. Arnoldo Rodriguez
Planning Manager
City of Fresno
2600 Fresno Street 3rd Floor
Fresno, California 93721

Dear Mr. Rodriguez:

Caltrans has completed its review of the City of Fresno Draft 2035 General Plan dated 7/2/14 and prepared by Dyett & Bhytia for the City of Fresno (City). This document serves to outline a long-range vision for the physical development of the city. The last comprehensively updated General Plan was completed in 2002.

The City's General Plan proposes a balanced transportation system that serves transit, bikes and pedestrians as well as automobiles. This multi-modal system should support a more compact development pattern, which in turn will support other goals, including preserving farmland and making neighborhoods more walkable. Caltrans applauds the City in their efforts to reduce the reliance on the automobile. However, with the projected population growth, the future demand on State facilities and interchanges will exacerbate current conditions. Therefore, the City should continue to work with its stakeholders to maintain its public streets and roads and work with Caltrans to identify funding strategies for the State Highway System in absence of inclusive program. E-1

Caltrans recognizes that we live in an area where our population is very automobile dependent. As the population grows we do not have the capability to move people solely on the State Highway System thus creating the need for an integrated transportation system with our various local partners, such as the City, that offers multi-modal options. This understanding has created a cultural change within Caltrans. For example we have recently endorsed the National Association of City Transportation Officials (NACTO) Urban Street Design Guide and the Urban Bikeway Design Guide. Caltrans also developed the Main Street, California and the 2040 California Transportation Plan.

The following comments are based on a focused review of the "Mobility and Transportation" portion of the Draft General Plan document:

1. On Page 1-13, Section 1.2, under *Regional Location*, the second paragraph, first sentence should include a statement that describes State Route (SR) 99 as a designated *High Emphasis Focus Route* on the Interregional Transportation Strategic Plan. E-1 CONT

2. On Page 1-19, Section 1.2, under *Planning Process* subheading *Alternative A with Modification*, Alternative A focuses on rebuilding the primary corridors as a series of neighborhood and regional mixed-use centers surrounded by higher density housing, with roughly half of the future housing in the City Limits and roughly half in growth areas on the urban edge. Alternative A shifted more development to single-family housing and with more focus on growth west and southwest of SR 99. SR 99 is an interregional facility that is already under tremendous strain in the existing condition. Directing growth west and southwest of SR 99 may significantly increase traffic to SR 99 due to the addition of local commuter traffic that would occur on this interregional goods movement corridor, therefore the City should work with Caltrans on Intelligent Transportation Systems in an effort to minimize impacts. E-2

    a. Development west of SR 99 may also impact SR 180. The General Plan proposes light industrial development in the path of the future freeway extension of SR 180. The City should work with Caltrans to preserve the right-of-way for the future SR 180 corridor as well as the interchanges. This sort of planning will drive the need for the SR 180 west extension but currently there is no funding in place.

3. On Page 3-16, under *BRT Corridors & Centers, Clovis Avenue-SR 180/Belmont Corridor*, the City should consider a Park and Ride in this area particularly near the SR 180/Clovis Avenue interchange.

4. On Page 3-58, LU-7-a, *Incentives for a Diversity of Industries, Increased Food Processing and Manufacturing, and related Employment Opportunities in Fresno*, in the commentary section, both SR 41 and SR 99 are currently impacted at the North/Cedar Avenue interchanges. Collaborate with Caltrans and the City to identify funding sources to allow for interchange improvements to accommodate the future growth. E-3

5. On Page 4-3, it is indicated that General Plan Goal 13 includes emphasizing the City as a role model for environmental quality. However, later in the document it is indicated that the City proposes to allow selected locations in the city to operate at unsatisfactory traffic levels-of-service. Allowing increasing traffic congestion would appear to act against General Plan Goal 13. Increasing congestion would negatively impact air quality by increasing the travel time a vehicle takes to complete the same trip distance. The increased time would result in an increase in the amount of air pollutants that the vehicle discharges.

6. On Page 4-3, it is indicated that General Plan Goal 14 includes providing a network of walking and biking trails to benefit the health of residents. Caltrans supports guidance meant to provide flexibility for bicycle facility design. The American Association of State Highway Transportation Officials and the National Association of City Transportation Officials publications help as a guide to Caltrans' philosophy and flexible approach toward designing multimodal transportation projects. These guides promote a network of Class I, Class II and Class III bicycle facilities that connect major origins and destinations. These guides should be considered in all transportation system developments so as to include flexibility in future design options. For information on these guides, please see: http://www.dot.ca.gov/Documents/2014-4-2-Flexibility-in-Design.pdf.

7. On Page 4-7, in the first partial paragraph, last sentence, it states the reliance of both inter-regional and local goods movement on SR 99 is an important issue for the City and the San Joaquin Valley, and plans for future development will need to avoid loading unnecessary personal traffic (i.e. local traffic) onto this crucial corridor when possible. Caltrans agrees with this statement.

8. On Page 4-7, in the last paragraph, it is indicated that 7.4 percent of the daily average trips are made by walking and bicycling, and 0.86 percent of the daily average trips are made with transit. The Regional Transportation Mitigation Fee (RTMF) and Traffic Signal Mitigation Impact (TSMI) fee programs are still necessary to provide mitigation for improvements necessary to accommodate projected future demand on State and local facilities (these need to be updated to keep up with future needs).

E-3
CONT

9. On Page 4-9, under *Street Typologies, Freeways*, Caltrans prepares and periodically updates the Transportation Concept Report (TCR). The TCR is a long-range system-planning document that establishes a planning concept for a state highway corridor through the future year. The TCR provides the route, traffic data, and operating characteristics for Caltrans District 6 State highway corridors and should be referred to when development occurs near the State facility.

10. On Page 4-13, end of the third paragraph, indicates that purposefully designed congestion incentivizes the use of transit or other modes of transportation that more efficiently move people and is better for air quality. However, as previously commented, the data would seem to suggest that even with significant increases in pedestrian, bike, and transit use, the future demand on the freeways and interchanges would nevertheless continue to increase due to natural increases in population. It is thus unlikely that the number of trips that would convert from individual motor vehicles to these other modes of transportation could be offset by the projected increase of population. Additionally, increasing congestion would negatively impact air quality by increasing the travel time a vehicle takes to complete the same trip distance. The increased time would result in an increase in the amount of air pollutants that the vehicle discharges.

11. On Page 4-13, the last sentence of the last paragraph, it is indicated that the General Plan envisions a context-sensitive LOS system that can be developed which will be more responsive to the City's needs and support achieving the urban form concepts of the Plan. Caltrans is charged with the responsibility of safeguarding the substantial investment that the citizens of California have made in the State's transportation system and ensuring the safety of the motoring public. It should be noted that those facilities under State jurisdiction would need to be analyzed using methods and assumptions approved by Caltrans.

12. On Page 4-14, the first paragraph, the argument is presented that there should be a greater tolerance for peak-hour congestion. The argument presents a scenario where, in order to achieve a satisfactory peak-hour level-of-service, there would be a need to increase the capacity of a roadway segment by adding a significant number of lanes. It continues the argument by stating that this would lead to wider roadways that would be unfriendly to pedestrian and bicycle traffic. The City should be aware that the level-of-service for intersections is different than the level-of-service for segments.

13. On Page 4-26, Implementing Policy MT-1-c, directs the Director of Transportation to prepare and adopt official plan lines or other documentation needed to preserve or obtain right-of-way (ROW) for planned improvements to transportation corridors, roadways, and bike/pedestrian paths. However, there does not appear to be any similar implementing policy that would preserve right-of-way for possible future improvements to State facilities. Caltrans recognizes the importance of preserving ROW; we suggest incorporating similar policy in regard to State facilities. This could be accomplished by including Caltrans' Transportation Concept Reports (TCRs) and other documentation (http://www.dot.ca.gov/dist6/planning/tcrs/) as part of the City's policies.

E-3
CONT

14. On Page 4-29, Implementing Policy MT-1-l, indicates that vehicle LOS F conditions would be acceptable during peak hours for segments and intersections within the Downtown Planning Area. However, as previously commented, those facilities under State jurisdiction would need to be analyzed using methods and assumptions approved by Caltrans. Also, Caltrans will determine measures and standards that facilities under its jurisdiction shall employ.

15. On Page 4-37, Implementing Policy MT-4-g, the City should include the following language: Caltrans has indicated that California's transportation system cannot meet the State's needs with just highways and supports guidelines meant to improve Caltrans' design of bicycle facilities. The guidelines were developed by the American Association of State Highway Transportation Officials and the National Association of City Transportation Officials. These guidelines promote a network of Class 1 bicycle facilities that connect major origins and destinations linked with a network of Class 2 facilities on all possible streets. A Class 1 bicycle facility is situated on a separate right-of-way or with some sort of physical barrier placed on the street between the bicycle and motor vehicle, while a Class 2 facility shares the travel way with motor vehicles separated by striping. These standards

should be considered as transportation system developments so as not to preclude future design options. E-3 CONT

The following comments are based on a focused review of the "Transportation and Traffic" portion of the General Plan Draft Environmental Impact Report document:

16. On Page 5.14-4, it is noted in the first paragraph that the analysis of traffic operations was conducted on roadway segments representative of the City's overall transportation network, and that the roadway segment analysis is based on traffic counts taken at a single location or link that is intended to be representative of the entire segment. However, while this approach of examining segments and relying on data collected at spot locations to represent that entire segment is satisfactory for very broad planning applications, it is too simplistic for determining the operation of specific elements of a freeway segment or freeway interchange. Analysis of the freeway interchange would require intersection, queuing, and stopping distance analysis. E-4

17. On Page 5.14-15, under the section titled "Caltrans", it is indicated that the data used to identify possibly congested freeway segments (State Routes (SR) 41 and 99) was obtained from 2008-2009 data sources (Highway Congestion Monitoring Program). This data shows locations of recurrent congestion (condition lasting for 15 minutes when demand exceeds capacity and speeds are less than 35 mph on incident free weekday); however, because this data may be out of date, Caltrans made various improvements to segments of SRs 41 and 99 which might have addressed some of the recurrent congestion. E-5

18. On Page 5.14-18, the last sentence states that there are no federal plans, policies, regulations, or laws pertaining to transportation that are applicable to this general plan; however, to receive federal funding, transportation projects nominated by the cities, counties, and agencies must be consistent with the Regional Transportation Plan (RTP). E-6

19. On Page 5.14-19, the second sentence of the first paragraph, SR 168 has been omitted from the list of State Routes in the project vicinity that fall under Caltrans jurisdiction.On Page 5.14-20, under the section titled "Senate Bill 743", it is indicated that changes to the California Environmental Quality Act (CEQA) require the development of a new approach for analyzing transportation impacts under CEQA. The new approach will eliminate vehicle delay and level-of-service for CEQA impacts for many parts of California. However, it should be noted that safety will remain the priority for all State facilities. As previously commented, a true analysis of a freeway segment is much more complex than simply equating the number of lanes to a level-of-service. It would require a weaving analysis, merging analysis, and diverging analysis. Analysis of the freeway interchange would require intersection analysis, queuing analysis, and stopping distance analysis. Queuing on ramps can result in severe safety deficiency due to reduced stopping distances and traffic backed up onto the mainline through lanes. E-7

20. On Page 5.14-21, in the first paragraph under the title "2011 Fresno Council of Governments (FCOG) Regional Transportation Plan", it is indicated that this area is designated a federal non-attainment area for ozone. This requires that the transportation system meet stringent air quality emissions targets to reduce pollutant levels that contribute to ozone formation. To receive federal funding, transportation projects nominated by the cities, counties, and agencies must be consistent with the RTP. Also, the seventh and eleventh bulleted FCOG RTP policies listed on Page 5.14-21 indicate that the transportation system should be managed in a manner to increase operational efficiency, reduce air pollution, and provide for effective and safe movement of people and goods. Therefore, the general plan's strategy of a downtown level-of-service of LOS F appears to be inconsistent with the Fresno COG RTP policy. This would thus appear to jeopardize federal funding for transportation projects nominated by the City. It should also be noted that FCOG has adopted a 2014 RTP. E-8

21. On Page 5.14-23, Policy E-2-b indicates minimizing vehicular and vehicular-pedestrian conflicts on major streets and adjacent land uses through use of traffic design and control measures that reduce congestion and increase safety. For the downtown area, the City should employ some type of mechanism or trigger for improvements. E-9

22. On Page 5.14-24, under the title "City of Fresno Traffic Impact Study Report Guidelines", it is indicated that the guidelines include preferred traffic analysis methodologies, significance criteria, and documentation requirements. However, it should be noted that the City's traffic study guidelines do not apply to State facilities. Caltrans will have preferred analysis methodologies and significance criteria for facilities under State jurisdiction. E-10

23. On Page 5.14-26, it is indicated that a CEQA threshold of significance would be substantially increase hazards due to design features or incompatible uses. Therefore, as previously commented, stopping distance on exit-ramps will be a feature that would need to be analyzed. If a project increases the queuing at an exit-ramp, the available stopping distance would be impacted, thus creating a potential safety concern. E-11

24. On Page 5.14-26, the two bullets under the title "Caltrans Thresholds" relate to acceptable level-of-service and applicable measures of effectiveness on State facilities. However, it should be noted that these measures are also include intersections in addition to freeway segments. Failure tends to occur at the connections well before failure occurs on the links. The connections, intersections and interchanges are the weak points, and failure will be noticed at these points well before the segments begin to fail. E-12

25. On Page 5.14-42, it is indicated that Traffic Impact Zone I (TIZ-I) represents the Downtown Planning Area. A peak hour LOS standard of F or better would be maintained for all intersections and roadway segments. However, as previously commented, those facilities under State jurisdiction would need to be analyzed using methods and assumptions approved by Caltrans. Also, Caltrans will determine measures and standards that facilities under its jurisdiction shall employ. E-13

26. On Page 5.14-42, in the last paragraph, it is noted that the General Plan Update accepts lower LOS values. This reflects a change in policy that acknowledges that transportation planning based solely on roadway LOS fails to acknowledge users other than those in personal vehicles. Also, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equality, economic development, pedestrians, bicyclists, and transit users. Additionally, a higher LOS results in greater expenditure on infrastructure. E-14

27. On Pages 5.14-54 and 5.14-55 the tables list freeway segments that the DEIR has identified as currently operating at unsatisfactory levels-of-service. The tables listed on Pages 5.14-74, 5.14-75 and 5.14-76 list freeway segments that the DEIR has identified as operating at unsatisfactory levels-of-service at build-out. However, as previously commented, this approach of merely examining segments and relying on data collected at spot locations to represent that entire segment is too simplistic for determining the true operation of specific elements of a freeway segment or freeway interchange. A true analysis of a freeway segment is much more complex than simply equating the number of lanes to a level-of-service. It would require a weaving, merging, and diverging analysis. Analysis of the freeway interchange would require intersection, queuing and stopping distance analysis. E-15

28. On Page 5.14-57, in the second paragraph, the phenomenon of "induced travel" is discussed. It also states that expansion of the regional freeway system, consistent with the 2011 Regional Transportation Plan (RTP), will contribute to induced travel and therefore may complete with the objectives of the City of Fresno General Plan update that foster more compact multi-modal development. Caltrans goal is to utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for all travelers. E-16

29. On Pages 5.14-57 and 5.14-78, in the last two sentences of the third paragraph, it is stated that improvements to the freeway system are under Caltrans' jurisdiction, thus the impacts to the freeways are significant and unavoidable. However, decisions made by the City may impact the freeways and freeway elements. Therefore, the City should work with Caltrans to mitigate impacts to a level of less than significant. E-17

30. On Page 5.14-80, it is twice indicated that impacts to State facilities are significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policies MT-2-j and MT-2-l are applicable. Therefore, the City should work with Caltrans to mitigate impacts to a level of less than significant. E-18

31. On Page 5.14-82 & 86, Impact TRANS-4 and Policy MT-1-0, states that the project would not substantially increase hazards due to a design feature or incompatible uses. Acceptance of vehicle LOS E or F conditions outside of identified multi-modal districts only if provisions commensurate with the level of impact and approved by the City Traffic engineer are made to sufficiently improve the overall transportation system and promote non-vehicular E-19

transportation as part of a development project. However, as previously commented, Caltrans will determine measures and standards that facilities under its jurisdiction shall employ. Additionally, Caltrans would be concerned with the possibility of congested ramp intersections causing traffic to back up onto the freeway mainlines. This could result in the creation of potential situations where vehicles exiting the freeway mainline at a high speed do not have adequate stopping distance on the ramp due to backup. Also, if the ramp queue backs up all the way to the freeway mainline, there could be additional concern due to the expectation of continuously moving traffic on the freeway mainline lanes.

E-19 CONT

SB 375 formalized the connection between land use planning and transportation. Population growth is eminent. The General Plan is indicating that the "Vehicle Miles Traveled (VMT)" is projected to more than double (9,395,800 to 19,883,400 weekday) with full build-out. Furthermore, with the funding constraints in transportation that we are compelled to contend with, we are learning that we cannot necessarily afford to build our way out of congestion. While there is still opportunity to expand infrastructure in our region, we will also need to manage our transportation infrastructure more efficiently. This can only be done by working together, maximizing funding opportunities (i.e. all-inclusive Regional fee programs) to develop a well-integrated system that offers various alternative modes for our residents.

E-20

Should you have any questions or concerns, please feel free to contact me at (559) 445-5868 or michael.navarro@dot.ca.gov.

Sincerely,

p.p.

MICHAEL NAVARRO
Senior Transportation Planner, Northern Region
District Office 6

C: Gail Miller, Deputy District Director, Caltrans District 6

Letter E: Caltrans, District 6, Michael Navarro, October 9, 2014

Response to Comment E-1
This comment states that the City should continue to work with its stakeholders to maintain its public streets and roads and work with Caltrans to identify funding strategies for the State Highway System. As reflected in Section 5.14, Transportation and Traffic, of the Draft Master EIR, Policy MT-2-j (Funding for Multi-Modal Transportation Systems) and Policy MT-2-l (Region-wide Transportation Impact Fees) are proposed to assist in future funding of improvement to the transportation system. The City has been a strong advocate for ballot measures generating revenue for transportation improvements, including state highway projects, and has been an active participant in the Council of Fresno County Governments (COG) Regional Transportation Impact Fee (RTIP) steering group.

This comment also provides a request to revise a reference to Regional Location within the General Plan Update. This comment is noted; however, this specific comment is not on the environmental conclusions of the Draft Master EIR. Therefore, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment E-2
This comment provides a concern that the General Plan Update proposes light industrial development in the path of the future freeway extension of SR 180. The freeway currently terminates at North Brawley Avenue, a signalized intersection. While the north side of SR 180 between North Brawley and North Blythe Avenues, is within the City's Sphere of Influence, the land is unincorporated, thus it is under the purview of the County of Fresno. Regardless, the City is committed to partnering with Caltrans and/or the County of Fresno upon Caltrans' adoption of a plan to expand SR 180 west. Upon adoption of a future right-of-way, the City is committed to coordinating with Caltrans as they acquire land for an extension.

Response to Comment E-3
These comments are provided on the General Plan Update and not on the contents of the Draft Master EIR. Therefore, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment E-4
This comment acknowledges that the roadway segment analysis based on traffic counts taken at a single location or link is satisfactory for very broad planning applications. However, the commenter states that the use of this very broad application is too simplistic in determining the operation of specific elements of a freeway segment or freeway interchange. The analysis is appropriate to represent potential worst-case impacts. The City acknowledges that analysis of freeway interchanges would require intersection, queuing, and stopping distance analysis. The level of analysis applicable for the different types of facilities would be determined in consultation with Caltrans during individual project developments.

Response to Comment E-5
The commenter stated that the use of the 2008-2009 data sources (Highway Congestion Monitoring Program) may be out of date because Caltrans made various improvements to segments of SR 41 and SR 99 which may have addressed some of the recurrent congestion. This comment is noted. The use of the 2008-2009 data resulted in a worst-case evaluation.

Response to Comment E-6
The comment notes that on Page 5.14-18, there are no federal plans, policies, regulations, laws pertaining to transportation that are applicable to the project, but clarifies that for a transportation project to received funding, projects nominated by the cities, counties, and agencies must be consistent with the Regional Transportation Plan. Regional Transportation Plans are addressed on Page 5.14-21 of the Draft Master EIR under the heading Regional and Local Plans, Policies, Regulations, and Ordinances.

Response to Comment E-7
The comment notes the omission of SR 168 on Page 5.14-19 from the list of state routes in the planning area. SR 168 is revised as follows in the second sentence in the first paragraph on page 5.14-19:

> "In the project vicinity, State Routes 41, 99, 168, and 180, along with the freeway ramp terminal intersections, fall under Caltrans jurisdiction."

In addition, the comment also discusses recent developments with Senate Bill 743 (SB 743), including guidance provided by the Governor's Office of Planning and Research (OPR) regarding SB 743 implementation. Since preparation of the Draft Master EIR, OPR has provided guidance on SB 743, including recommendation on significance thresholds. The recommendations would eliminate the use of level of service as a significance threshold statewide and include significance threshold related to safety, including a project that contributes to queuing on freeway off-ramps where queues extend onto the mainline or contribute to speed differential of greater than 15 miles per hour between adjacent travel lanes. The comment identifies that more detailed analysis may be required to determine potential impacts related to safety. Chapter 4 of the General Plan, Mobility and Transportation, includes Policy MT-2-h that identified the update of the City's transportation impact study guidelines, which would include appropriate thresholds related to implementation of SB 743. Projects that result in an impact would be required to provide mitigation measures to reduce the significance of identified impacts. It should be noted that the preliminary guidelines from OPR regarding SB 743 that have been released recognize lead agency discretion to set thresholds.

Response to Comment E-8
The comment concerns an apparent inconsistency of Policy MT-2-i relating to the City's desire to allow level of service (LOS) F operations for drivers in Traffic Impact Zone I (representing the Downtown Planning Area) and the potential to jeopardize federal funding for transportation projects in the City.

As discussed in Impact TRANS-1, the General Plan Update accepts lower LOS values, which reflect the change in policy for the City to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protections, social equity, economic development, and consideration of pedestrian, bicyclist, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure cost. A higher LOS results in greater expenditure of infrastructure for wider roadways

that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update. With the General Plan Update, impacts to roadways within TIZ I were determined to be less than significant.

Policy MT-1-p addresses the continued coordination with the Fresno Council of Governments in developing and updating the Sustainable Communities Strategy and Regional Transportation Plan (SCS/RTP), consistent with the goals, objectives and policies of the General Plan Update. This coordination will ensure consistency of the General Plan Update and SCS/RTP policy.

Response to Comment E-9
The comment concerns Policy E-2-b of the City of Fresno 2025 General Plan and recommends that the City should employ some type of mechanism or trigger for improvements in the downtown area. While not a comment on the Draft Master EIR, the commenter is referred to Chapter 4 of the General Plan, Mobility and Transportation, which includes several policies related to implementation of the General Plan Update, including MT-1-b (Circulation Plan Diagram Implementation) and MT-1-d (Integrate Land Use and Transportation Planning).

Response to Comment E-10
The comment states that the City's traffic study guidelines do not apply to State Facilities. This comment is correct and noted.

Response to Comment E-11
The comment concerns CEQA thresholds of significance relating to increase hazards due to design features or incompatible uses. As summarized in Impact TRANS-4, the project would not substantially increase hazards due to design feature or incompatible uses. As discussed, the analysis was based on a review of the General Plan Update policy and potential internal policy inconsistencies or discrepancies related to hazards. In addition, Chapter 4 of the General Plan, Mobility and Transportation includes Policy MT-2-i that requires transportation impact studies to assess impact of new development, which may include the type of safety analysis referenced in the comments, depending on the project and its location relative to the state highway system.

Response to Comment E-12
The commenter states that the Caltrans Thresholds provided on page 5.14-26 of the Draft Master EIR are also applicable to intersections and freeway segments. The City of Fresno acknowledges the thresholds. This comment is noted.

Response to Comment E-13
The commenter was concerned that the LOS threshold for TIZ-1 did not refer to Caltrans facilities. The LOS threshold for TIZ-1 refers to only City of Fresno transportation facilities. The City understands that the thresholds established by Caltrans for their facilities would need to be satisfied. Intersection evaluations would be required as individual projects are proposed for implementation.

Response to Comment E-14
The commenter restates the information regarding the City's change in policy to acknowledge that transportation planning based solely on roadway LOS is not desirable since it fails to acknowledge other users of the circulation system and other community values. This comment is noted.

Response to Comment E-15
The commenter states that the approach of merely examining segments and relying on data collected at spot locations to represent the entire segment is too simplistic. Please see Response to Comment E-4 and E-7.

Response to Comment E-16
The commenter makes reference to the phenomenon of "induced travel", but no specific comment on the contents of the Draft Master EIR is provided. No further response is required.

Response to Comment E-17
The comment concerns Impact TRANS-1 in the Draft Master EIR and the findings relative to the State Highway System. Specifically, impacts to the State Highway System were identified and determined to be significant and unavoidable, since improvements to the State Highway System are under Caltrans' jurisdiction and the City of Fresno does not have control over their timing or implementation. As discussed in Impact TRANS-1, the General Plan Update includes Policy MT-2-j and MT-2-l, related to regional cooperation for implementation and funding of regional transportation improvements. Therefore, the City will work with Caltrans to reduce the significance of project impacts through mitigation for project impacting the State highway System.

Response to Comment E-18
The commenter suggested that the City should work with Caltrans to mitigate impacts to Caltrans facilities. This suggestion is consistent with Policy MT-2-l provided within Section 5.14 in the Draft Master EIR. Please also see Response to Comment E-17 related to working with Caltrans.

Response to Comment E-19
Please refer to Response to Comment E-11 for discussion of Impact TRANS-4 in the Draft Master EIR. Policy MT-1-o applies only to facilities under the jurisdiction of the City of Fresno.

Response to Comment E-20
This comment discusses the need to maximize funding opportunities to develop a well-integrated system that offers alternative transportation modes for residents. The City of Fresno acknowledges the need for funding multi-modal transportation systems and a regional fee program. These funding discussions are provided in Policy MT-2-j and Policy MT-2-l in Section 5.14.5, Transportation and Traffic, of the Draft Master EIR.

Allen Matkins

Allen Matkins Leck Gamble Mallory & Natsis LLP
Attorneys at Law
515 South Figueroa, 9th Floor | Los Angeles, CA 90071-3309
Telephone: 213.622.5555 | Facsimile: 213.620.8816
www.allenmatkins.com

Patrick A. Perry
E-mail: pperry@allenmatkins.com
Direct Dial: 213.955.5504 File Number: 373594-00004/LA1000412.01

Via Electronic and First Class Mail

October 9, 2014

Jennifer K. Clark, AICP
Director of Development and Resource Management Department
City of Fresno
2600 Fresno Street, Room 3065
Fresno, California 93722

Re: City of Fresno General Plan Update Draft Master Environmental Impact Report

Dear Ms. Clark:

This firm represents The McCaffrey Group in connection with its review of the City of Fresno Draft General Plan and Development Code update process. The McCaffrey Group submitted a letter dated August 18, 2014 commenting on the Draft General Plan Update. This letter provides comments regarding the Draft Master Environmental Impact Report ("MEIR") for the General Plan Update and expands on the comments set forth in the letter of August 18, 2014. As set forth in further detail below, the MEIR does not adequately consider and mitigate all potentially significant environmental impacts associated with the General Plan Update pursuant to the requirements of the California Environmental Quality Act ("CEQA"). The MEIR should therefore be revised and recirculated for additional public review and comment prior to certification.

A. The Project Description is Inconsistent and Confusing.

F-1

It has long been the rule that an "accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR." *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193. Here, the project description for the MEIR identifies the Planning Area as the City's current sphere of influence plus an area north of the most northeasterly portion of the City. The project description further divides the Planning Area into two Growth Areas and three Development Areas, and identifies 17 subsequent projects.

The project description defines Growth Areas as "areas located outside the existing City limits and within the Planning Area" but excluding the existing County islands and the North Area. The project description identifies Growth Area 1 as "areas where future growth could occur based

on planned infrastructure expansion, public service capacity, and fiscal considerations." Growth Area 2 is described as areas that require critical infrastructure improvements for which the City does not anticipate that funding can be committed in the near term.

The project description defines Development Areas as "areas contemplated for Complete Neighborhoods that are connected with a range of housing types, employment, supporting retail and service uses, parks and open space, and public/civic uses." The West Development Area includes properties that are located in both Growth Area 1 and Growth Area 2. The South Development Area includes properties located in Growth Area 1, and the Southeast Development Area ("SEDA") (formerly the Southeast Growth Area) includes properties located entirely within Growth Area 2.

Of the 17 subsequent projects identified in the project description, Subsequent Project Area 1 is the Downtown Area, which is treated in the Draft General Plan Update as the separate Downtown Planning Area, and Subsequent Projects 10 through 17 are all located in the SEDA, which is located entirely within Growth Area 2, for which the project description identifies a lack of funding for infrastructure in the near term. Subsequent Projects 10 through 17 contain 48,403 dwelling units, which constitute more than a third of the 145,164 new dwelling units projected to be constructed at full buildout under the Draft General Plan Update. F-1 CONT

Objective UF-13 in the Urban Form, Land Use, and Design Element of the Draft General Plan Update provides that roughly one-half of future residential development will be located in the Growth Areas. Neither the project description nor other sections of the MEIR explain how approximately one-third of the total number of new dwelling units projected by the Draft General Plan Update will be developed with insufficient funding for infrastructure improvements to support such development. This issue is especially significant because, as discussed in more detail below, the MEIR identifies significant deficiencies in City infrastructure for which no effective solutions are provided. The project description fails to adequately address these inconsistencies and therefore cannot form the basis for a legally adequate EIR.

B. The MEIR Fails to Adequately Consider Impacts Related to Utilities and Service Systems.

According to Section 5.15 of the MEIR, the City's water demand in 2010 was 132,347 acre-feet per year ("AFY"), and the projected water demand at full build-out of the General Plan Update is projected to be 271,594 AFY. The City currently relies on groundwater for 87 percent of its water supply, which has resulted in a significant overdraft of the existing groundwater basin. The City's use of groundwater in 2010 was partially offset by 24,400 AF of natural recharge, 22,500 AF of subsurface inflow, and 53,100 AF of intentional recharge. The MEIR projects that subsurface inflow will no longer be available after 2025 but that natural recharge will increase to 27,000 AFY, and natural recharge will increase to 75,100 AFY. F-2

The projected increase in natural recharge is attributed to the City's future annexation of areas within the Planning Area, which will increase the amount of natural recharge allocated to the City. Because the study area in the MEIR for cumulative impacts regarding water supply is the

Planning Area and the groundwater basins from which the Planning Area derives water, annexation of additional area within the Planning Area will not increase the amount of natural recharge entering the groundwater basin. It will merely increase the amount for which the City takes credit but will not offset a greater amount of the current overdraft of the existing basin. Any projected increase in the amount of natural recharge is therefore illusory.

The 75,100 AFY of intentional recharge is similarly illusory because it relies on an increase in the City's capacity for surface water treatment. According to the MEIR, the City anticipates the need to increase existing surface water treatment capacity by 179,222 AFY, which will still be insufficient to accommodate all of the projected surface water supply anticipated by the City. Even if the City were to provide sufficient surface water treatment capacity, the MEIR states that specific groundwater recharge projects and locations have not yet been identified. The MEIR therefore fails to adequately mitigate existing and projected impacts on depletion of groundwater resources. F-2 CONT

The MEIR similarly fails to adequately address deficiencies in the City's wastewater treatment facilities. According to the MEIR, the City currently has a permitted treatment capacity of up to 94.71 million gallons per day ("MGD") of average dry weather flow discharge with an additional 30 MGD of capacity currently under preliminary design. At full buildout projected in the General Plan Update, the City will require a wastewater treatment capacity of 183.6 MGD. The General Plan Update proposes to accommodate the additional wastewater treatment capacity through construction of a 79.6 MGD expansion of the Fresno/Clovis Regional Wastewater Treatment Facility ("Regional Treatment Facility"), a 0.49 MGD expansion of the North Fresno Wastewater Reclamation Facility, a new 24 MGD wastewater treatment facility to be located in the SEDA, and a 25,000 AFY recycled water facility at the Regional Treatment Facility. F-3

To mitigate impacts associated with insufficient surface water and wastewater treatment capacity, the MEIR proposes that the City would not approve new development that exceeds available capacity until sufficient capacity is provided. The MEIR fails, however, to identify funding for such new treatment facilities. On August 21, 2014, the Fresno City Council voted to repeal scheduled water rate increases, thereby eliminating a potential source of revenue for new water treatment facilities. Moreover, the Economic Development and Fiscal Sustainability Element of the General Plan Update calls for the elimination of developer subsidies for infrastructure and reductions in public services and maintenance costs in growth areas, along with increased development impact fees. The MEIR fails to analyze and account for the consequences of the City's inability to accumulate sufficient revenues to construct the necessary infrastructure to meet the growth projections of the General Plan Update. Adequate analysis of this issue would constitute significant new information requiring recirculation of the MEIR for public review and comment. F-4

C. <u>The MEIR Does Not Adequately Consider Cumulative Impacts Associated with Regional Growth</u>.

The McCaffrey Group submitted comments on the Initial Study and Notice of Preparation of the Draft MEIR identifying, among other things, the failure of the Initial Study to coordinate F-5

preparation of the General Plan Update with the efforts of the Fresno Council of Governments ("Fresno COG") to formulate the Regional Transportation Plan ("RTP") and Sustainable Communities Strategy ("SCS") required pursuant to the provisions of SB 375. The Fresno COG adopted the RTP and SCS on June 26, 2014. Although the MEIR acknowledges adoption of the RTP and SCS, it fails to describe how the goals and objectives of the General Plan Update conform to the regional planning process set forth in the RTP and SCS.

Section 5.3 of the MEIR briefly describes the RTP and SCS in connection with its discussion of potential impacts of the General Plan Update on air quality. The air quality analysis nevertheless omits any discussion of whether or how the General Plan Update conforms to the provisions of the RTP and SCS. Section 5.7 of the MEIR similarly discusses the RTP and SCS in connection with its discussion of potential impacts of the General Plan Update on greenhouse gas emissions. However, aside from a brief statement that modeling by the Fresno COG used land use scenarios consistent with the proposed General Plan Update, there is no discussion in the MEIR regarding consistency of the General Plan Update with the RTP and SCS. Policy RC-5-d of the General Plan Update requires the City to include analysis of a project's conformity to an adopted regional SCS and any other regional greenhouse gas reduction strategies in effect at the time of project review. The General Plan Update is a project for purposes of CEQA yet fails to comply with the City's own proposed policy regarding conformity with the adopted RTP and SCS. F-5 CONT

Section 5.10 of the MEIR regarding land use and planning analyzes whether the General Plan Update would conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect yet omits any discussion of the RTP or SCS. Section 5.14 of the MEIR regarding transportation and traffic relies for its analysis on the 2011 Fresno COG Regional Transportation Plan. The MEIR's analysis of the conformity of the General Plan Update with the regional planning policies of the RTP and SCS is completely inadequate. Adequate analysis of this issue would constitute significant new information requiring recirculation of the MEIR for public review and comment.

D. The MEIR Impermissibly Segments the Projects Traffic Impacts.

"A public agency is not permitted to subdivide a single project into smaller individual subprojects in order to avoid the responsibility of considering the environmental impact of the project as a whole." *Orinda Association v. Board of Supervisors* (1986) 182 Cal.App.3d 1145, 1171. On March 20, 2014, the City Council awarded a contract in the amount of $1,481,230 to Parsons Brinkerhoff, Inc. for project management services for the design, engineering, and construction of the revised Blackstone and Ventura/King's Canyon BRT Project (the "BRT Project"). The City Council relied on a Supplemental Mitigated Negative Declaration ("SMND") in connection with its approval of the contract for the BRT Project. F-6

The McCaffrey Group objected to proceeding with the approval of the contract for the BRT Project, in part because the City was proceeding with a component of the General Plan Update without adequately studying the BRT Project in conjunction with the MEIR for the overall General

Plan Update of which it forms a part. The City's adoption of the SMND and approval of the BRT Project separately from its consideration of the MEIR and General Plan Update constitutes illegal project splitting under CEQA. The City is therefore required to suspend all work on the design, engineering, and construction of the BRT Project until it has conducted full environmental review and ensured full consistency of the BRT Project with the objectives and policies of the General Plan Update in the context of the MEIR. A copy of the letter submitted on behalf of The McCaffrey Group dated March 20, 2014 is enclosed for your reference and is incorporated by reference as though fully set forth herein.

F-6
CONT

E. Conclusion.

Based on the foregoing information, the MEIR fails to adequately consider the potentially significant environmental effects of the General Plan Update. Additional analysis should therefore be conducted, and the MEIR should be recirculated for public review and comment. The McCaffrey Group reserves the right to provide additional comments regarding the General Plan Update and MEIR as they proceed through the approval process.

Thank you very much for your careful attention to this matter. Please contact me with any questions regarding these issues.

Very truly yours,

Patrick A. Perry

PAP
cc: Mayor Ashley Swearingen
Councilmember Blong Xiong
Councilmember Steve Brandau
Councilmember Oliver L. Baines III
Councilmember Paul Camprioglio
Councilmember Sal Quintero
Councilmember Lee Brand
Councilmember Clint Oliver
Mr. Bruce Rudd
Mr. Robert A. McCaffrey
Mr. Brent McCaffrey

Allen Matkins

Allen Matkins Leck Gamble Mallory & Natsis LLP
Attorneys at Law
515 South Figueroa, 9th Floor | Los Angeles, CA 90071-3309
Telephone: 213.622.5555 | Facsimile: 213.620.8816
www.allenmatkins.com

Anthony J. Oliva
E-mail: toliva@allenmatkins.com
Direct Dial: 213.955.5626 File Number: 110045-00136/LA985218.01

Via Email/U.S. Mail

March 20, 2014

Mr. Keith Bergthold
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721

Re: Revised FAX Q Bus Rapid Transit Project

Dear Mr. Bergthold:

This firm represents The McCaffrey Group in connection with its review of the City of Fresno General Plan and Development Code update process in general and, in particular, the environmental compliance for the current proposed BRT Project.

As you may be aware, The McCaffrey Group has been supportive of the City's General Plan and Development Code update and has previously submitted correspondence to Mark Scott in April of 2012, and to you in December of 2012, supporting the Planning Commission's approval of proposed Alternative A. As a longtime developer of residential projects in the City and the surrounding region, The McCaffrey Group has continued to monitor the City's progress in updating its General Plan with a particular focus on the cumulative regional impacts of various aspects of the proposed plan. In this context, we have reviewed the staff report regarding the current proposal to award a contract in the amount of $1,481,230 for project management services for the design, engineering and construction of the revised Blackstone and Ventura/King's Canyon BRT Project. This proposal raises serious concerns from both a practical planning standpoint as well as a CEQA compliance standpoint.

A. **The Project description is inconsistent with the Project description in the SMND.**

The fourth page of the Staff Report reflects that environmental compliance with regard to the Revised BRT project consists of the Supplemental Mitigated Negative Declaration (SMND) approved by the Council on January 30, 2014 in connection with the original FAX Q BRT project. The Council declined to approve that original project back in January and the project has now been revised as reflected in the Staff Report's project description. That description notes that while the original Project operated along a 15.7 mile BRT line connecting the major north south corridor

("Blackstone Avenue") and a major east west corridor ("Ventura Avenue and Kings Canyon Road"), the revised Project also includes expanded bus service along a 5 mile segment of Shaw Avenue. The SMND includes a detailed substantive description of the original BRT Project but does not include any description nor obviously any analysis of the service along Shaw. Any potential impacts that might arise from the revision to the BRT Project and, in particular, the aspects of the Project related to Shaw Avenue, have not been studied in any fashion. As we have noted in the past, an accurate Project description is critical to the adequacy of any CEQA analysis and in this case the Project description, while originally accurate, is no longer accurate.

The Staff Report does not attempt to explain how the Supplemental Mitigated Negative Declaration approved on January 30, 2014 by this Council in connection with a different project could be adequate for the revised project. Rather, it simply states that the Council approved the SMND on January 30, 2014. It does not even discuss whether additional environmental review to identify impacts on Shaw is necessary or unnecessary. The analysis of the original BRT project appeared to be thorough but the revised project has not received the same treatment. The obvious disconnect between the revised project description and the SMND analysis renders the analysis deficient under CEQA.

B. **The SMND fails to include any discussion of land use consistency with the updated General Plan.**

As noted above, we aware that the City is in the midst of its General Plan and Development Code update and we are supportive of that process. The SMND for the original BRT project contains a rather extensive "Land Use Policy Consistency Analysis" (as reflected in Table 4 and running from page 45 to 48 of the SMND) detailing the manner and extent to which the BRT furthers the objectives of the existing General Plan. While it is fully appropriate and commendable to have done a consistency analysis with the existing General Plan, it is obviously imperative that a transportation project such as the BRT be analyzed for its consistency with the updated General Plan – especially in light of the reference in the staff report to the fact that the BRT is "intended to complement the City's General Plan Update". As reflected in our prior correspondence to you, we are aware that the City has prepared a review draft of the 2035 General Plan, dated August, 2012. Thus, it is not merely reasonably foreseeable that there will soon be an updated General Plan, it is a certainty and the staff has already commented that the BRT project is intended to complement that new plan. It is impossible to know from the SMND whether the BRT is consistent with Alternative A and the updated General Plan (or whatever the currently contemplated updated General Plan might be, because there is no analysis of that consistency. It is not merely violative of CEQA but, in fact, poor planning practice to simply ignore that there is an updated General Plan in the works when considering a project that will involve the expenditure of over $76,000,000 in state and federal funds and impact transportation in the City and the Region for years to come. Consistenccy

with a soon to be obsolete General Plan is maddeningly irrelevant. CEQA demands that appropriate thought and consideration be given to whether this $76 million project will be tailored to the goals and objectives of the updated plan.

The proposed action by the Council to move forward with the design, engineering and construction of a revised BRT prior to any analysis that such BRT will be consistent with the updated General Plan is a classic case of putting the cart before the horse. As all are aware, the initial study for the General Plan's Master Environmental Impact Report purported to rely on the preferred draft General Plan Alternative for purposes of analysis in the MEIR. It may be that the BRT should be analyzed for consistency with the preferred draft General Plan Alternative or it may be that another alternative will eventually be selected. In either case, analysis of the BRT's consistency with the updated General Plan (or at least what the updated General Plan is likely to be), is the only way that the Council can act in a manner consistent with CEQA and proper planning practice.

As this letter reflects, we have serious concerns that the Council is considering moving forward with the design, engineering and construction of a revised BRT prior to performing the necessary analysis. At a minimum, the City must settle upon a General Plan alternative and analyze this project for its consistency with that alternative. We will be seeking, through a Public Records Act request, all documents relating to the funding sources for the Revised BRT which appear to include, but are not limited to, approximately $38,000,000 in a Federal Transit Administration Very Small Starts grant and $38,000,000 in matching funds from the State of California Proposition 1B grant funds. It makes no sense to move forward with the design and engineering of a BRT Project that may or may not be consistent with the City's much debated General Plan.

Very truly yours,

Anthony J. Oliva

AJO:gag

cc: Mr. Brent McCaffrey
Mr. Robert McCaffrey
Fresno City Council

Letter F: Allen Matkins, Patrick A. Perry, October 9, 2014

Response to Comment F-1

This comment states that the Master EIR does not adequately consider and mitigate all potentially significant environmental impacts associated with the General Plan Update pursuant to CEQA. This comment also states that the Master EIR should be revised and recirculated. The commenter refers to inadequacies in Comments F-2 through F-6 below and responses to these comments are provided below and demonstrate that the evaluations provided in the Master EIR are adequate to address the potential environmental effects associated with the General Plan Update.

This commenter first raises a concern that the Southeast Development Area, which is identified as part of Growth Area 2, is considered an area with insufficient funding for infrastructure improvement. The commenter asks how can development occur and provide necessary infrastructure improvements if there is insufficient funding.

The intent of Objective UF-13 is to provide a direction for future growth within the Planning Area. Commentary to Objective UF-13 has been revised to provide more clarity in the City's intent as identified below.

> **Objective UF-13:** Locate roughly one-half of future residential development in the Growth Areas—defined as unincorporated land as of December 31, 2012 SOI—which are to be developed with Complete Neighborhoods that include housing, services, and recreation; mixed-use centers; or along future BRT corridors.
>
> ***Commentary:*** *The Planning Director will provide an annual report describing the City's compliance with the Plan and progress toward meeting the goals and objectives to City Council and every five years prepare an updated plan for achieving this goal, with recommended appropriate policy amendments and also new implementation strategies necessary to meet this goal by 2035. The rate of progress toward meeting this goal is not expected to occur in a linear or "one-to-one" pattern. Development in infill areas versus growth areas may progress in an uneven pattern, depending upon the schedule of relevant key incentive programs (such as those related to BRT) and the impact of market forces. However, the City expects to make steady progress toward all the goals and objectives and anticipates meeting them at or near the close of General Plan Horizon in 2035. See the Implementation Element for additional implementation strategies for this objective.*

As identified in Section 3.4 of the General Plan Update, the City intends to pace new development in the designated Growth Areas, including the Southeast Development Area (SEDA, previously referred to as the Southeast Growth Area (SEGA)), to be balanced with the City's goals for achieving significant reinvestment within the 2012 City Limits. As a result, timing of development within the Growth Areas is generally provided.

Response to Comment F-2
This comment raises a concern that natural recharge will not increase water supply in the new annexation areas because the natural recharge is already occurring within these areas. Without intentional recharge via ponding basins sited and maintained for high percolability and supplied by surface water to supplement rainfall, not all unincorporated areas can be assumed to provide more recharge than urbanized areas. The use of furrow irrigation has decreased dramatically over past decades and agricultural operations in the unincorporated area have increasingly used sophisticated water conservation techniques that minimize percolation of applied water below the root zones of crops. Northerly and westerly portions of the City's sphere of influence are also affected by the presence of "hardpan," naturally cementitious subsurface soil strata that impede percolation.

The water supply evaluation provided in Impact HYD-2 in Section 5.9 and in Impact USS-4 in Section 5.15 in the Draft Master EIR identifies water supply sources that are available to the City for future development within the future City limits (i.e., the Planning Area) and these were evaluated based on water demand projected from the future buildout within the Planning Area through the year 2056. To accurately account for available natural recharge water supply available to the City, the future annexations into the City would increase the water supply available to the City.

This comment also raises a concern that the projected increases in intentional groundwater recharge to 75,100 AF is based on an increase in the City's capacity for surface water treatment. Conversion to treated surface water has long been a City strategy for in-lieu groundwater recharge. As stated in the second paragraph on page 5.9-23 of the Draft Master EIR, the objective of balancing the City's groundwater operations includes a host of strategies, including an increase in intentional recharge of 75,100 AF by the year 2035. This evaluation also states that reducing groundwater pumping can occur with an increase in the use of treated surface water.

This comment also provides a concern that the Master EIR concludes a significant groundwater impact without adequately mitigating the potential impact. The mitigation measures provided for Impact HYD-2 (Groundwater Supplies and Recharge) on pages 5.9-28 and 5.9-29 of the Draft Master EIR are USS-5 and USS-21, as revised below, HYD-1, and HYD-2. The reference to USS-17 under Mitigation Measures on page 5.9-28 of the Draft Master EIR is a typographical error and is revised as follows:

> "Implementation of Mitigation Measure USS-5 and ~~USS-17~~ <u>USS-21</u> is required."

As stated on page 5.9-29, the level of significant after mitigation is less than significant. The evaluation found that the mitigation measures could reduce the potential impact on groundwater to less than significant.

Response to Comment F-3
This comment raises a concern that the City's wastewater treatment facilities will be deficient to treat the anticipated generation of wastewater within the Planning Area. The analysis under Impacts USS-1 and USS-5 in Section 5.9 of the Draft Master EIR found that the implementation of Mitigation Measures USS-1 through USS-3 would reduce impacts to wastewater treatment facilities to less than significant.

For clarification, the discussion under Impact USS-2 in Section 5.15 of the Draft Master EIR includes an evaluation of the potential environmental effects during the construction of new facilities. These potential impacts are focused on construction impacts.

Response to Comment F-4

This comment raises a concern that the Master EIR did not identify the funding for future surface water or wastewater treatment facilities. It is acknowledged that in August 2014, the City Council voted to repeal schedule water rate increases that removed a potential source of revenue for new water treatment facilities. The action in August 2014 by the City Council removed a potential source of revenue at this time, but after conducting a series of public workshops to solicit expert and public opinion on future water supply outlook and the most feasible and cost-efficient means to provide for future water demands and protect resources, the Council is scheduled to re-adopt the Metropolitan Water Resource Management Plan adopted in mid-2014 and to again consider the rate structure required to construct and operate water supply and recharge infrastructure. The General Plan Update is a long-range plan that will require various funding sources to implement future facilities through the buildout of the Plan (Year 2056). It is not possible for all available funding sources, including rate structures, to be anticipated that far in the future. For this reason, the CEQA Guidelines do not mandate identification of funding sources. Rather, they require that mitigation measures be fully enforceable, and they allow for mitigation measures to be incorporated into a plan, policy, regulation, or project design. (CEQA Guidelines section 15126.4(a)(2).)

Response to Comment F-5

This comment expresses a concern that the Master EIR did not include a discussion of the consistency of the General Plan Update with the recently adopted Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS). Please see Response to Comments JJ-31 and JJ-31 regarding the RTP, SCS, and Senate Bill 375.

Response to Comment F-6

This comment states that the City's previous approval of the BRT Project constitutes piece-mealing or splitting under the General Plan Update. Since the BRT Project was approved while the existing 2025 General Plan was in effect, the environmental evaluation of the BRT Project was not required to be evaluated for consistency with the General Plan Update since the General Plan Update was not an approved plan in March 2014.

THIS PAGE INTENTIONALLY LEFT BLANK

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

San Joaquin Valley Office
894 East Divisadero Street #201
Fresno California 93721

October 9, 2014

Mayor Ashley Swearengin and Fresno City Councilmembers
2600 Fresno Street
Fresno, CA 93721

Re: City of Fresno General Plan Update, Infill Development and Farmland Conservation Policies

Since the inception of the City of Fresno's 2035 General Plan Update (GPU) process, American Farmland Trust (AFT) has recognized the precedent-setting potential offered when the San Joaquin Valley's largest metropolitan area meaningfully engages its residents in their city's strategy for long term economic development, setting land use policies and overall planning process. With Fresno at the center of the world's most productive agricultural region, Fresno's GPU offers a unique opportunity to improve farmland conservation policy and practice while structurally adjusting for past urban planning oversights that transformed the city from one of the nation's most livable places to one of its most impoverished.

As the foremost farmland conservation organization in the country, American Farmland Trust's work links the growth of the San Joaquin Valley's cities and urbanized areas to the need to conserve its natural and agricultural resources. For decades, we have championed these objectives throughout the region where historic precedent and recent trends prioritized the short-term financial gain of private interests at the expense of public policy for long-term sustainable growth. This scenario plays out most dramatically when prime farmland is converted into inefficient residential development. This pattern of development redirects investments away from existing urbanized areas while destabilizing real estate values throughout the county – thus, undermining the value of urban property while causing speculation in farmland. Decreased tax revenue and increased costs then undercut the fiscal foundation of municipalities, limiting their ability to provide adequate public services over time to ever more dispersed geographies. G-1

The City of Fresno General Plan is an ideal opportunity to envision a new pattern of development and galvanize consensus around how future growth should be planned. Indeed, this process is well underway, represented in the broad, diverse coalition that advocated for "Alternative A" earlier in the process.

Infill Development

American Farmland Trust broadly supports the values and direction of the city's currently proposed General Plan Update. In particular, the plan's emphasis on mixed-use, transit-oriented infill development is a welcome change in a city that has historically been known for its inefficient pattern of development. The most recent draft document, however, has moderated the implementing language to the point where it threatens to undermine the integrity of the plan.

Originally, under Alternative A, a firm infill percentage was fixed at 57%, but Objective UF-12 states that "roughly one-half of future residential development" will be located in infill areas. This change in the framing of the infill policy is so vague that it undermines the infill development goal for the Plan. A clear and unequivocal infill percentage will assist future staff's interpretation of the objective.

In addition, the implementation mechanisms for achieving infill development can be improved. The concurrent City of Visalia General Plan Update, by comparison, has a unique way to achieve infill development priorities through three tiers of concentric growth rings within the city's current sphere of influence (the first being the existing city limit and the second and third being reserved for future development). The policy, as it is being finalized, will set a firm infill development target for each growth ring before opening the next to development. The City of Fresno's proposed GPU policy is currently premised upon Growth Areas 1 and 2, with the Plan stating, "Growth Area 2 needs critical infrastructure improvements, and the City does not anticipate that funding for Growth Area 2 can be committed in the near-term. To this end, the City will need to establish a way to monitor investment within the city limits and Growth Area 1 before approving the opening of Growth Area 2." This policy, as drafted, is passive and unclear as to how infill development will be implemented. Ideally, firmer policy mechanisms and triggers should designate when and how the city is going to achieve and monitor the Plan's infill development objectives. G-1 CONT

Infill development is the foundation of reinvestment, renewal and renaissance which the City of Fresno is striving for in its General Plan Update. While General Plans are broad economic constitutions of how development is going to occur, they benefit from precise and detailed structures, particular for objectives that have historically been problematic to achieve. If the infill development policies in the GPU are too vague, unspecific or watered down to be implemented, then the integrity of the Plan as a whole is undermined from its inception.

Farmland Conservation and Mitigation

Agricultural conservation complements and strengthens the City of Fresno's infill development goals. One way to illustrate this is the City of Fresno's historic pattern of development, where rapid development of inexpensive farmland resulted in an oversupply of residential homes and commercial properties. Home values in the southern half of the city were subsequently undermined while abandoned storefronts became G-2

characteristic of a number of the city's previously thriving business corridors. Today, illustrated by the city's own GPU mapping, its inner core has some of the highest poverty rates in the country.

A straightforward way to alleviate some of this market imbalance is to apply the California Environmental Quality Act's mitigation requirements to the conversion of farmland. A farmland mitigation program will not only incentivize infill development, but also address the current inadequacy of the Master Environmental Impact Report (EIR) for this General Plan Update to appropriately mitigate for the conversion of farmland. In the EIR, 15,903 acres of farmland are anticipated to be converted to urban uses. This is identified as a "significant impact" yet "no mitigation measures" are called for beyond an amorphous proposal for regional cooperation and enrollment of farmland into undefined agricultural land conservation programs.

Throughout the San Joaquin Valley and State of California, AFT recognizes the requirement of farmland mitigation for the conversion of productive farmland to non-agricultural uses on a permanent or long-term basis. These programs generally set a minimum standard of farmland mitigation at a one-to-one, like-kind basis (i.e. for every acre of developed farmland an equal number of acres of farmland will be permanently protected through agricultural conservation easements), and require that the acreage permanently protected through easement must be comparable to the converted lands in soil quality and water availability. An accredited, regional agricultural land trust—such as Sequoia Riverlands Trust or Central Valley Farmland Trust in the San Joaquin Valley—is the usual entity to provide mitigation services to developers, leverage local mitigation funds with other public funding sources, and then offer these funds to farmers and ranchers willing to sell their development rights by granting agricultural conservation easements.

G-2
CONT

Farmland mitigation programs are increasingly included in the General Plans of cities and counties throughout California. In the southern San Joaquin Valley, a precedent setting program recently was authorized on October 7, 2014 when the Tulare City Council passed its 2035 General Plan Update with a 1:1 farmland conservation program. Such farmland mitigation programs can be innovative and flexible. Yolo County, for example, has a farmland mitigation ordinance that requires agricultural conservation easements funded through their program be located within two miles of the development that is being mitigated in order to prioritize protection of lands close to urban areas as they are seen as more at risk of conversion. Both the City of Davis (Yolo County) and City of Hughson (Stanislaus County) have functional, straightforward farmland mitigation programs that increase the mitigation ratio to 2:1, though most communities currently use a 1:1 ratio.

There is also legal precedent establishing farmland mitigation programs and corresponding agricultural conservation easement acquisitions for the conversion of farmland, such as in the November 29, 2010 unanimous decision by the Fifth District Court of Appeals in *Building Industry Association of Central California vs. the County of Stanislaus*, where the court upheld Stanislaus County's Farmland Mitigation Program. In that decision, the Court of Appeals found that "mitigating for the future loss of farmland through conservation easements bears a reasonable relationship to the burden caused by residential development."

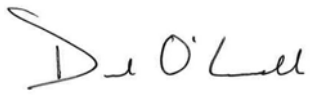
The court's decision clarifies a number of legal positions and can be directly reviewed at: http://caff.org/wp-content/uploads/2010/07/BIA-v.-County-of-Stanislaus1.pdf.

A farmland mitigation program will enhance and strengthen the values and objectives already expressed within City of Fresno's General Plan Update. Farmland conservation policy and practice reinforces the city's intent to focus business development in its historic downtown, along transit-oriented development corridors and within existing neighborhoods. Linking farmland conservation with infill development objectives relieves pressure and counters incentives to develop farmland in inefficient ways while protecting property values of homeowners. Moreover, as illustrated in Joe Minicozzi's September 5, 2013 presentation "The Dollars and Sense of Development" to the city, these policies and practices result in more tax revenue per acre for both the city and county as higher assessed property values associated with high value, mixed-use and transit-oriented development garner increased tax revenue.

G-2
CONT

With its 2035 General Plan Update, the City of Fresno is poised to be nationally recognized for its planning practice to revitalize the city while conserving the most important agricultural region in the world. Please consider the suggested changes to further solidify the infill development and conservation objectives of the General Plan, so that the final document can be heralded for its precedent setting standards.

Sincerely,



Daniel O'Connell
San Joaquin Valley Program Manager
American Farmland Trust

Letter G: American Farmland Trust, Daniel O'Connell, October 9, 2014

Response to Comment G-1

This comment expresses support for the pattern of development envisioned in the General Plan Update. However, the comment states that Objective UF-12 potentially undermines the integrity of the Plan. Commentary to Objective UF-12 has been modified in the General Plan to clarify the City's intent regarding infill development through commentary. Objective UF-12 is revised as follows:

> **Objective UF-12:** Locate roughly one-half of future residential development in infill areas—defined as being within the City on December 31, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land.
>
> **Commentary:** The Planning Director will provide an annual report describing the City's compliance with the Plan and progress toward meeting the goals and objectives to City Council, and prepare, every five years, an updated plan for achieving this goal, with recommended appropriate policy amendments and also new implementation strategies necessary to meet this goal by 2035. The rate of progress toward meeting this goal is not expected to occur in a linear or "one-to-one" pattern. Development in infill areas versus growth areas may progress in an uneven pattern, depending upon the schedule of relevant key incentive programs (such as those related to BRT) and the impact of market forces. However, the City expects to make steady progress toward all the goals and objectives and anticipates meeting them at or near the close of General Plan Horizon in 2035. See the Implementation Element for additional implementation strategies for this objective.

Please also see Response to Comment F-1 regarding a clarification of Objective UF-13 related to future residential development in the Growth Areas.

Response to Comment G-2

See Response to Comment B-2 regarding agricultural conservation easements.

THIS PAGE INTENTIONALLY LEFT BLANK

Baker Manock
& Jensen PC
ATTORNEYS AT LAW

Robert D. Wilkinson
Attorney at Law
rwilkinson@bakermanock.com

Fig Garden Financial Center
5260 North Palm Avenue
Fourth Floor
Fresno, California 93704
Tel: 559.432.5400
Fax: 559.432.5620
www.bakermanock.com

August 18, 2014

VIA HAND DELIVERY & ELECTRONIC MAIL

Jennifer K. Clark, AICP
Director
City of Fresno - Development and Resource
Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93722
E-Mail: trai.her@fresno.gov

RECEIVED
AUG 18 2014
DEVELOPMENT DEPARTMENT
CITY OF FRESNO

Re: City of Fresno - General Plan Update

Dear Ms. Clark:

Please accept the following comments on behalf of our client Vie-Del Company. Thank you for your consideration.

The City of Fresno ("City") is required to evaluate the totality of actions one could reasonably expect to occur as a result of adopting its General Plan. One of those actions, in fact, one of the goals of the City's General Plan, is to support the development of the high speed rail ("HSR"). However, the City's evaluation of the HSR project in its draft General Plan is currently nothing more than stating what the HSR is and, if the project is developed, what benefits there may be to the community. This analysis is vague and does not adequately inform the public of the impacts the HSR will have on the City's General Plan.

Additionally, the City's General Plan does not adequately analyze how the HSR, and its impacts to the City, will affect the City's General Plan. Specifically, the impacts to Vie-Del Company's Assessor Parcel Number ("APN") 508-020-04S (the "Property"), are not mentioned or even considered. Furthermore, the pictures in the City's draft General Plan are at such a large scale that it is difficult to identify where on my client's Property the realignment of North Golden State Boulevard is proposed. A few inches could drastically change the impacts such realignment would have on my client's Property. H-1

For your reference, attached and incorporated herein is the comment letter that we submitted to Mr. Bergthold on December 6, 2012, as part of the Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update. As we stated in that comment letter, City staff should be fully aware that the exercise of relocating the route of North Golden State Boulevard should only occur if the HSR is built. Furthermore, the alignment of North Golden State Boulevard identified in the HSR's

Environmental Impact Report ("EIR") is not the same as that identified in the City's General Plan or draft master EIR. This should be clarified in both the City's draft General Plan and the City's draft master EIR for the General Plan Update.

Again, we strongly request that the City include in its analysis and General Plan Update that if the HSR is not constructed, then the current North Golden State Boulevard orientation would not change. We also urge the City to analyze the impacts the HSR will have on the changes to its General Plan and the City as a whole.

H-1
CONT

Thank you for your consideration.

Very truly yours,

Laurie Blayne for

Robert D. Wilkinson
BAKER MANOCK & JENSEN, PC

LDL:LDL
Attachment
cc: Ms. Dianne S. Nury, Vie-Del Company
Mr. Dirk Poeschel

RECEIVED
AUG 18 2014
DEVELOPMENT
CITY OF

RECEIVED
AUG 1 8 2014
DEVELOPMENT DEPARTMENT
CITY OF FRESNO

ATTACHMENT

RECEIVED
AUG 1 6 2014
DEVELOPMENT DEPARTMENT
CITY OF FRESNO

Baker Manock & Jensen PC
ATTORNEYS AT LAW

Robert D. Wilkinson
Attorney at Law
rwilkinson@bakermanock.com

Fig Garden Financial Center
5260 North Palm Avenue
Fourth Floor
Fresno, California 93704
Tel 559.432.5400
Fax: 559.432.5620
www.bakermanock.com

December 6, 2012

VIA ELECTRONIC MAIL AND U.S. MAIL

Mr. Keith Bergthold
Assistant Director
City of Fresno
2600 Fresno Street, Room 365
Fresno, CA 93721
E-Mail: Keith.Bergthold@fresno.gov

Re: Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update

Dear Mr. Bergthold:

Please accept the following comments on behalf of our client Vie-Del Company. Thank you for your consideration.

I. INTRODUCTION

Vie-Del Company ("Vie-Del") owns Assessor Parcel Number ("APN") 508-020-04S (the "Property"), which is located southwest of the existing North Golden State Boulevard between Veterans Boulevard and the Herndon Canal in north Fresno. Vie-Del is a family owned business established in 1946. It is a majority woman-owned manufacturing and food processing business.

On the Property, Vie-Del maintains the largest industrial site and largest industrial building north of downtown Fresno. The property is unique in terms of its size, location and fixtures, which include cranes and high capacity electrical outlets that make it particularly well suited for manufacturing. Currently the Property is occupied by three tenants, two of whom are also majority woman-owned businesses. One of the businesses manufactures agricultural harvesters and is one of the few domestic manufacturers of this type competing in an international market. A second tenant manufactures road repair equipment. These two tenants take advantage of the facility's unique properties. The third tenant stores agricultural products at the site.

RECEIVED
AUG 1 8 2014
DEVELOPMENT DEPARTMENT
CITY OF FRESNO

II.
BACKGROUND

A. California High Speed Train

Earlier this year, the California High Speed Rail Authority ("CHSRA") certified the Merced to Fresno Final Environmental Impact Report/ Environmental Impact Statement (Final EIR/EIS) and approved the Hybrid Route as the Preferred Alternative. An aerial map with engineering designs dated February 24, 2012, is attached hereto as Exhibit "A" and was included in the Final EIR/EIS. Exhibit "A" shows the proposed California High Speed Train ("HST") route, the existing right of ways for North Golden State Boulevard, the proposed right of ways for the HST, and the property that would be affected by a realignment of North Golden State Boulevard. This map covers an area along the existing North Golden State Boulevard from southwest of Veterans Boulevard (not identified on the map) to just past the Herndon Canal, at North Market Street.

The right of way shown as "proposed" in Exhibit "A" was approved by the CHSRA based on the certification of the Final EIR/EIS for the HST. As shown in Exhibit "A," this right of way to the southwest of the railway does have impacts on parcels that are currently located adjacent to the southwest side of North Golden State Boulevard. However, in the HST Final EIR/EIS the CHSRA determined that such impacts were less than significant.

Exhibit "A" also shows the planned new alignment of North Golden State Boulevard, which would generally run adjacent and parallel to the HST, on the southwest side. The proposed new alignment of North Golden State Boulevard as shown in Exhibit "A," and as approved by the CHSRA, will impact those same parcels as the right of way. Of course, the new North Golden State Boulevard alignment will impact those parcels to a greater degree than the right of way for the HST, but the impact is still less than significant.

Among the parcels impacted by the approved HST right of way and new North Golden State Boulevard alignment (as identified in the Final EIR/EIS), is property owned by Vie-Del. Specifically, Assessor's Parcel Number ("APN") 508-020-04S is impacted. The area of the Property impacted by the HST and new alignment of North Golden State Boulevard is currently used as a temporary drainage basin by the Fresno Metropolitan Flood Control District. There are no existing structures on this area of the Property.

The CHSRA, in the HST Final EIR/EIS has already evaluated and made a determination about the impacts to all the properties along the HST right of way and within the area of the proposed new North Golden State Boulevard. The CHSRA concluded that the alignment of North Golden State Boulevard adjacent and parallel to the HST is the preferred route. Therefore, no party can make further comments on the impacts and findings of the CHSRA concerning the HST and the associated relocation of Golden State Boulevard.

RECEIVED
AUG 1 8 2014
DEVELOPMENT DEPARTMENT
CITY OF FRESNO

III.
ISSUES

A. City of Fresno General Plan Update

On October 26, 2012, we obtained a copy of the City of Fresno's ("City") proposed Golden State and West Barstow Businesses and Owners site plan dated September 25, 2012 ("Golden State Site Plan"), which is attached hereto as Exhibit "B." Unlike the HST Final EIR/EIS, the Golden State Site Plan shows two different alignments for North Golden State Boulevard. Shown on Exhibit "B" with a solid black line and teal outline, is the path of the North Golden State Boulevard alignment as identified in the Final EIR/EIS and as adopted by the CHSRA. Shown on Exhibit "B" with two red lines, is the City's new proposed alignment for North Golden State Boulevard ("Proposed Alignment"). This Proposed Alignment is to be evaluated in the City of Fresno 2035 General Plan Master Environmental Impact Report ("Master EIR"). Vie-Del was very disappointed to learn that the Proposed Alignment was the product of meetings with its neighbors, meetings to which Vie-Del was not invited. Vie-Del only learned of the Proposed Alignment indirectly from City staff after it was already decided the Proposed Alignment would be included in the 2035 General Plan Update.

Notably, the Proposed Alignment no longer runs adjacent to the HST, but instead creates a new route from north of Veterans Boulevard to Herndon Canal. This new Proposed Alignment cuts through the middle of larger APNs, including property owned by Vie-Del. If this Proposed Alignment is adopted, it would cut through the biggest industrial site north of downtown Fresno and severely restrict the job generating activities that could utilize this site at its current size and state of development. These impacts negatively affect the economic development in and fiscal sustainability of the City. In particular, the current facility is very unique as it is one of the few manufacturing facilities left in Fresno. Most other large commercial facilities in the City are dedicated to storage and warehousing. With the turnaround of the economy, Vie-Del intends to further develop and expand the facility and market it to additional outside manufacturing businesses.

The Proposed Alignment would dramatically adversely impact current and future activities on the Property. In particular, the impacts of the Proposed Alignment are much greater than those illustrated in Exhibit "A." In addition to the roadway, there would be landscaping and zoning setbacks which would further destroy the site and its current use as a manufacturing facility. Among other concerns Vie-Del has are that in response to the Proposed Alignment, Vie-Del would have to create new traffic access, circulation and parking on the site, all of which would diminish the site's utility. The Proposed Alignment also completely wipes out a 50,000 square-foot building. All of this would adversely impact current manufacturing at the site and the site's potential for additional manufacturing and commercial activity.

City staff should be fully aware that the exercise of relocating the route of North Golden State Boulevard should only occur if and when the HST is built. We strongly request

RECEIVED
AUG 1 8 2014
DEVELOPMENT DEPARTMENT
CITY OF FRESNO

that the City include in its analysis that if the HST is not constructed, then the currently North Golden State Boulevard orientation would not change.

Furthermore, the Proposed Alignment should not be implemented and included in the 2035 General Plan Update. As noted above, it has a significant potential to cause harm to the area. Moreover, drainage in the area is already an issue and will become a greater concern. The Proposed Alignment indisputably causes a greater public impact than the North Golden State Boulevard alignment adopted by the CHSRA in the Final EIR/EIS. In addition, although not necessarily an environmental issue, the CHSRA is supposed to cover the costs of realigning North Golden State Boulevard. If the City changes that realignment, the costs for construction will have to come out of the City's budget and the local taxpayer's pockets. In this regard, the overall costs of cutting though Vie-Del's unique, large industrial parcel are significantly higher than pursuing the adopted HST plan.

B. Evaluation of the Proposed Alignment in the Master EIR

We request that the City of Fresno adopt the findings of the CHSRA and the HST Final EIR/EIS and incorporate the new North Golden State Boulevard alignment as it is shown in Exhibit "A" into the City's 2035 General Plan. However, if the City still plans to evaluate the Proposed Alignment, at least the following must be adequately addressed in the Master EIR: (1) a comparison between the North Golden State Boulevard alignment as proposed and adopted by the CHSRA, and the Proposed Alignment, especially as to which alignment has the greatest public impact; (2) an analysis of the effect of reducing the size of the largest industrial site in north Fresno and its affect on the economic development and fiscal sustainability of the City; (3) an analysis of the impacts the Proposed Alignment will have on drainage in the area described above; (4) public safety; (5) costs associated with the project; (6) traffic impacts; (7) the setback and zoning impacts that will affect the use of the facility; and (8) all other analyses required by the California Environmental Quality Act ("CEQA").

Although it is appropriate to evaluate alternatives as part of the CEQA analysis, we believe that on a basic analysis of the two alternatives, the City should reject the Proposed Alternative and not include it in the draft Master EIR that is released for public comment. We also strongly request the City analyze the comparative impacts and costs of these two routes. The costs should include the contribution, or lack thereof, from the CHSRA for construction of the new North Golden State Boulevard. Of course, the CHSRA cannot provide funding for a road that it did not authorize and did not analyze as part of its own CEQA/NEPA analysis.

IV.
CONCLUSION

Vie-Del strongly urges the City of Fresno to use the North Golden State Boulevard alignment, between Veterans Boulevard and the Herndon Canal, as it was adopted by the CHSRA and as identified in Exhibit "A," attached hereto. As evaluated in the CHSRA Final

RECEIVED
AUG 1 8 2014
DEVELOPMENT DEPARTMENT
CITY OF IRVINE

EIR/EIS, this alignment causes the least public impact. However, if the City decides to proceed with evaluating the Proposed Alignment in the 2035 General Plan Update Master EIR, we strongly request that the City fully analyze all the impacts the Proposed Alignment will have on the Property and the dramatically adverse affect it will have on the City by destroying such a unique parcel. We also expect the City to fully address the increased cost this Proposed Alignment will have on the City and its residents.

Thank you for your consideration.

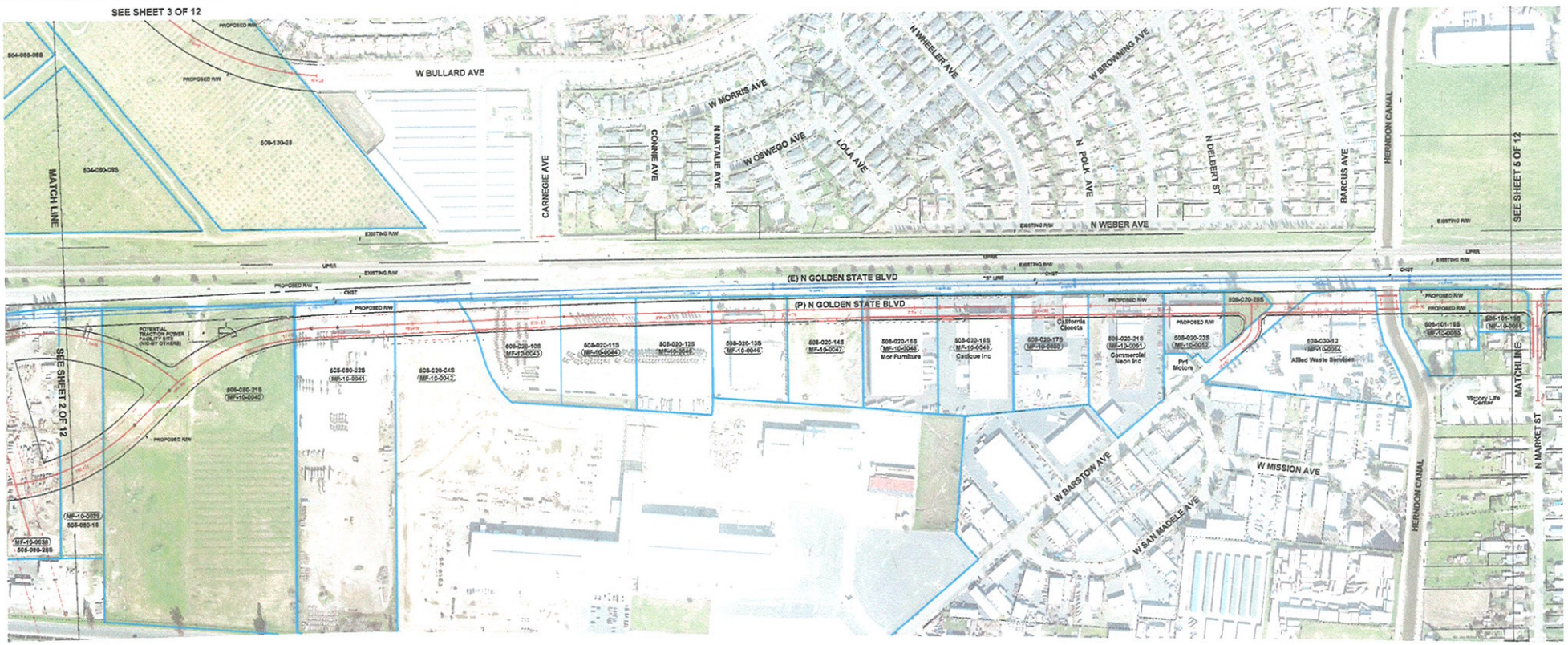
Very truly yours,

Laurie Layne for

Robert D. Wilkinson
BAKER MANOCK & JENSEN, PC

LDL:LDL
Attachments
cc: Ms. Dianne S. Nury, Vie-Del Company
Mr. Dirk Poeschel

EXHIBIT A



RECEIVED

AUG 18 2014

DEVELOPMENT DEPARTMENT
CITY OF FRESNO

Legend

- Impacted Parcel
- Proposed Drainage Basin
- Caltrans R/W (Access Prohibited)
- Caltrans R/W (Relinquished)
- Proposed R/W
- Existing R/W

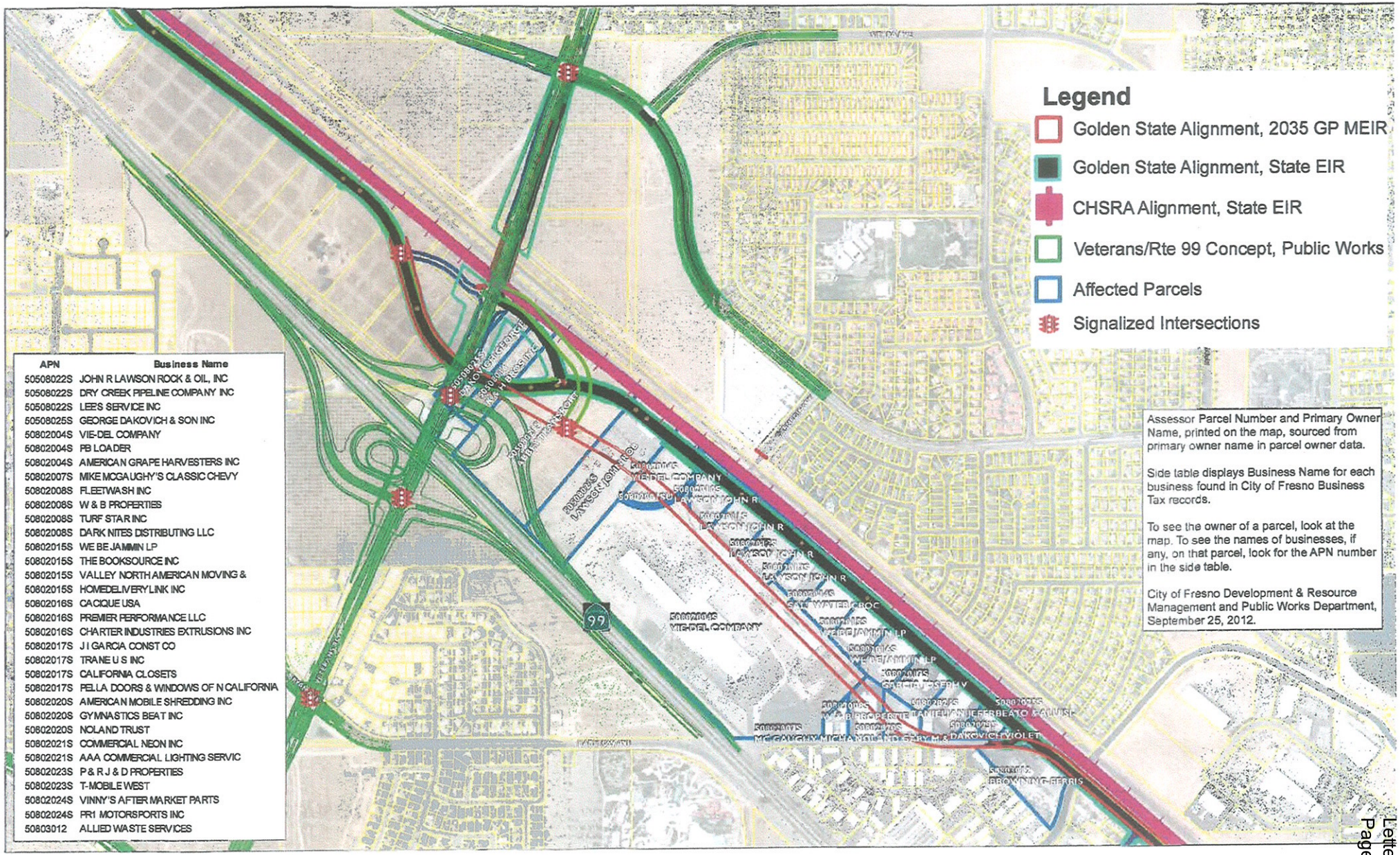
2-24-12
30% DESIGN
SUBJECT TO CHANGE

AECOM

CALIFORNIA HIGH-SPEED RAIL AUTHORITY

CALIFORNIA HIGH-SPEED TRAIN PROJECT
SIERRA SUBDIVISION - PACKAGE 1A & 1B
RIGHT-OF-WAY EXHIBIT
4 OF 12
FEBRUARY 2012

EXHIBIT B
GOLDEN STATE AND WEST BARSTOW BUSINESSES AND OWNERS



APN	Business Name
50508022S	JOHN R LAWSON ROCK & OIL, INC
50508022S	DRY CREEK PIPELINE COMPANY INC
50508022S	LEES SERVICE INC
50508025S	GEORGE DAKOVICH & SON INC
50802004S	VIE-DEL COMPANY
50802004S	PB LOADER
50802004S	AMERICAN GRAPE HARVESTERS INC
50802007S	MIKE MCGAUGHY'S CLASSIC CHEVY
50802008S	FLEETWASH INC
50802008S	W & B PROPERTIES
50802008S	TURF STAR INC
50802008S	DARK NITES DISTRIBUTING LLC
50802015S	WE BE JAMMIN LP
50802015S	THE BOOKSOURCE INC
50802015S	VALLEY NORTH AMERICAN MOVING &
50802015S	HOMEDELIVERY LINK INC
50802016S	CACIQUE USA
50802016S	PREMIER PERFORMANCE LLC
50802016S	CHARTER INDUSTRIES EXTRUSIONS INC
50802017S	J I GARCIA CONST CO
50802017S	TRANE U S INC
50802017S	CALIFORNIA CLOSETS
50802017S	PELLA DOORS & WINDOWS OF N CALIFORNIA
50802020S	AMERICAN MOBILE SHREDDING INC
50802020S	GYMNASTICS BEAT INC
50802020S	NOLAND TRUST
50802021S	COMMERCIAL NEON INC
50802021S	AAA COMMERCIAL LIGHTING SERVIC
50802023S	P & R J & D PROPERTIES
50802023S	T-MOBILE WEST
50802024S	VINNY'S AFTER MARKET PARTS
50802024S	PR1 MOTORSPORTS INC
50803012	ALLIED WASTE SERVICES

Letter H: Baker Manock & Jensen, Robert Wilkinson, August 18, 2014

Response to Comment H-1

This comment expresses concern that the High Speed Rail (HSR) Project is not included in the General Plan Update. As discussed in Section 4.2 in the Draft Master EIR, the HSR Project is considered a cumulative project and the potential effects associated with the HSR Project has been incorporated with all other cumulative development as defined in Section 4.2.

This comment also expresses concern that the General Plan Update included the circulation system changes needed to accommodate the HSR Project. These system changes have been incorporated in the cumulative evaluations such as the traffic, noise, air quality, and greenhouse gas evaluations within the Master EIR.

To date, the California High Speed Rail Authority (CHSRA) and the Federal Rail Authority (FRA) approved an alignment of Northern Golden State Boulevard in the immediate vicinity of the Vie-Del Company's Assessor Parcel Number 508-020-04S along the existing alignment of North Golden State Boulevard, adjacent to the existing railroad tracks along with the HSR project in 2012 and an addendum in 2013. In June 2014, the CHSRA and FRA conducted an environmental re-examination of further refinements, including the realignment of North Golden State Boulevard through the Vie-Del Company's Assessor Parcel Number 508-020-04S. Both the CHSRA and FRA determined that the right-of-way design refinements did not constitute a substantial change to the findings in the EIS/EIR prepared for the Merced to Fresno HSR Project. The CHSRA and FRA approved the new alignment for Northern Golden State Boulevard.

Based on the environmental review, the CHSRA, FRA and the City of Fresno anticipate entering into a Facilities Relocation Agreement wherein the CHSRA would agree to relocate Golden State Boulevard consistent with the alignment identified in the June 2014 environmental re-examination, which passes through the Vie-Del Company's Assessor Parcel Number 508-020-04S. The approval of the Agreement will utilize the environmental re-examination.

Therefore, it is the approval of the Facility Relocation Agreement and approval of construction drawings that will result in the relocation of North Golden State Boulevard, not the approval of the General Plan Update.

THIS PAGE INTENTIONALLY LEFT BLANK

Baker Manock & Jensen PC
ATTORNEYS AT LAW

Lauren D. Layne
Attorney at Law
llayne@bakermanock.com

Fig Garden Financial Center
5260 North Palm Avenue
Fourth Floor
Fresno, California 93704
Tel: 559.432.5400
Fax: 559.432.5620
www.bakermanock.com

October 8, 2014

VIA ELECTRONIC MAIL AND U.S. MAIL

Jennifer K. Clark, AICP, HDFP
Director, Development and Resource Management Department
City of Fresno
2600 Fresno Street, Room 3065
Fresno, California 93721
Email: newplan@fresno.gov

Re: City of Fresno – Draft Master EIR

Dear Ms. Clark:

Please accept the following comments on behalf of our client Vie-Del Company.

I. INTRODUCTION

Vie-Del Company ("Vie-Del") owns Assessor Parcel Number ("APN") 508-020-04S (the "Property"), which is located southwest of the existing North Golden State Boulevard between Veterans Boulevard and the Herndon Canal in north Fresno. On December 6, 2012, we submitted a comment letter on behalf of Vie-Del for the Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update (the "2012 Comment Letter"). A true and correct copy of the 2012 Comment Letter is attached hereto as Exhibit "A," and incorporated herein by this reference.

II. ISSUES

I-1

As we discussed in the 2012 Comment Letter, the California High Speed Rail Authority ("CHSRA") certified the Merced to Fresno Final Environmental Impact Report/ Environmental Impact Statement ("Final EIR/EIS") and approved that portion of the California High Speed Train ("HST") project in 2012. The approved path for the HST and the approved realignment of North Golden State Boulevard were analyzed in the Final EIR/EIS. However, the realignment of North Golden State Boulevard approved by the CHSRA is different than that identified in the Draft Master Environmental Impact Report ("DMEIR") for the City of Fresno's General Plan Update. As such, we asked the City of Fresno ("City") to evaluate in its DMEIR the effects of the City's proposed alignment for North Golden State Boulevard that no longer runs adjacent to the HST, but instead creates a new route from north of Veterans Boulevard to Herndon Canal ("Proposed Alignment"). This was not done.

A. City's Response to the Vie-Del's 2012 Comment Letter was Inadequate.

In the Introduction section of the DMEIR, the City attempts to respond to comments. However, the response in the DMEIR to our 2012 Comment Letter simply states:

> The realignment is required with the construction of the HSR project. Environmental issues such as traffic access, circulation, and drainage would need to be specifically evaluated when the specific realignment plans are proposed to determine the level of impact. The HSR project is considered a cumulative project as discussed in Section 4, General Description of Environmental Setting and qualitatively evaluated in Section 5, Environmental Impact Analysis.

The deferral of analysis by the City is of great concern. The City admits that it has not done any analysis for the Proposed Alignment, but yet the Proposed Alignment is still identified in the City's General Plan Update. There appears to be a misunderstanding of the California Environmental Quality Act ("CEQA") here. Specifically, the City cannot include an alignment of North Golden State Boulevard that has never been evaluated under CEQA or the National Environmental Policy Act ("NEPA"). The CHSRA has not analyzed the Proposed Alignment in its Final EIR/EIS. In fact, the CSHRA selected and approved a different re-alignment of North Golden State Boulevard. Secondly, the City cannot defer the analysis of the Proposed Alignment until some date in the future, but still include that Proposed Alignment in this General Plan Update. This is simple unacceptable. I-1 CONT

1. The Proposed Alignment Is Not Required by CSHRA.

We do not believe this Proposed Alignment is required by the HST. In fact, the CHSRA approved a different re-alignment of North Golden State Boulevard and has not approved the Proposed Alignment that is in the City's General Plan Update. Secondly, we agree that traffic access, circulation, and drainage still need to be evaluated for the Proposed Alignment, in addition to biological, noise, and aesthetic concerns, among others. However, the City's DMEIR does not analyze any of these concerns. Therefore, the City must do a separate and additional environmental review and circulate a separate environmental document for the Proposed Alignment, or not approve the Proposed Alignment until there is a supplemental CSHRA EIR/EIS that provides such analysis.

2. Environmental Issues For The Proposed Alignment Still Need To Be Evaluated

As the City has not conducted any review of the impacts the Proposed Alignment will have on the environment or the landowners whose property it affects, we expect that the

City will be revising this DMEIR to remove the drawings of the Proposed Alignment, and, at least, adequately responding to this comment letter, guaranteeing the City will prepare an additional CEQA document for the Proposed Alignment. More specifically, the Proposed Alignment will have to be evaluated as an addendum to the General Plan Update. As such, we request that at a minimum the following are adequately addressed in such a document: (1) a comparison between the North Golden State Boulevard alignment as proposed and adopted by the CHSRA, and the Proposed Alignment, especially as to which alignment has the greatest public impact; (2) an analysis of the effect of reducing the size of the largest industrial site in north Fresno and its affect on the economic development and fiscal sustainability of the City; (3) an analysis of the impacts the Proposed Alignment will have on drainage in the area described above; (4) public safety; (5) costs and funding sources associated with the project; (6) traffic impacts; (7) the setback and zoning impacts that will affect the use of the facility; and (8) all other analyses required by CEQA. The City already admits in its DMEIR that there will be noise, transportation and traffic impacts that will exceed the City's existing standards.

Furthermore, there needs to be a blight analysis if the City is going to refocus access to existing buildings as Vie-Del has been told, because this may not be successful. The CHSRA's approved realignment of North Golden State Boulevard does not change the entrance to the existing businesses in the area. However, the City's Proposed Alignment will require the businesses on North Golden State Boulevard to change the entrance to their businesses from one end to the other. This will cause serious impacts to those businesses and such impacts need to be analyzed in an environmental document and addressed by the City.

I-1 CONT

However, Vie-Del still strongly urges the City to use the North Golden State Boulevard alignment, between Veterans Boulevard and the Herndon Canal, as it was adopted by the CHSRA. Because it appears the City is considering the Proposed Alignment instead, as evidenced by the drawings in the DMEIR, we expect the City will be conducting a thorough environmental review of the Proposed Alignment. As stated, as of this date, there has been no environmental review of the Proposed Alignment. The City's DMEIR does not analyze the Proposed Alignment, but includes pictures/drawings of it in the maps included in the DMEIR. The City's DMEIR also does not address the realignment that was approved by the CHSRA. It simply ignores the issue.

3. The HST Is Not Adequately Addressed In The DMEIR

The City's response to Vie-Del's 2012 Comment Letter states that the HST is considered a cumulative project that is quantitatively evaluated in the DMEIR. The City barely addresses the HST in its DMEIR. The City does not even incorporate the CSHRA's Final EIR/EIS into its DMEIR. The City says that the HST has been incorporated into the cumulative evaluations in its DMEIR as appropriate. However, the CSHRA's Final EIR/EIS is not listed with the other documents that are incorporated in the DMEIR, and any mention of the HST is not only rare, but there is generally only one sentence. The most reference to the HST is when the

I-2

City states that if a CHSRA maintenance facility is put in Fresno, then the City will have to approve a General Plan amendment, a zone change, and obtain approval from the Fresno Local Agency Formation Commission ("LAFCo") for an annexation of such property into the City.

If the HST is going to influence Fresno, it should be evaluated in the City's General Plan Update DMEIR. Furthermore, if the portions of the CHSRA Final EIR/EIS are incorporated into the City's DMEIR, then the City should also have included an analysis as to why is it planning to change the realignment of North Golden State Boulevard from that identified in the Final EIR/EIS, to the Proposed Alignment, which has yet to be studied by anyone. The City's alternative to the CHSRA's realignment of North Golden State Boulevard is simply an "alternative" under CEQA that has yet to be analyzed, and, therefore, cannot be implemented. I-2 CONT

B. <u>The Comparative Impacts and Costs to the Citizens Are Greater For the Proposed Alignment</u>

Vie-Del does not wish to repeat everything here that it said as part of its 2012 Comment Letter, which is why the letter is attached as Exhibit "A". However, we believe the impacts of the Proposed Alignment on the property owners surrounding the area are greater than the impacts of the CSHRA's realignment of North Golden State Boulevard. Not only is Vie-Del going to be very negatively affected by the City's Proposed Alignment, but so are neighboring landowners. I-3

Furthermore, we believe that the financial impacts of these two routes need to be considered. CHSRA cannot provide funding for the Proposed Alignment because it did not authorize such a realignment of North Golden State Boulevard and did not analyze the Proposed Alignment as part of its own CEQA/NEPA analysis. Therefore, instead of the CHSRA bearing some, if not all, of the cost for the realignment of North Golden State Boulevard, now the City must spend local taxpayers' dollars to build the Proposed Alignment.

III.
CONCLUSION

Once again, Vie-Del strongly urges the City of Fresno to use the North Golden State Boulevard realignment, between Veterans Boulevard and the Herndon Canal, as it was adopted by the CHSRA. Additionally, if the City still wants the Proposed Alignment, before anything is done, the City needs to evaluate the environmental and economic costs of its Proposed Alignment and compare those to the CHSRA's realignment. In any such environmental review, we also expect the City to fully analyze all the effects the Proposed Alignment will have on Vie-Del and the surrounding property owners. We also expect the City to fully address the additional costs to the City and the funding sources the City will need to implement the Proposed Alignment. I-4

Thank you for your consideration.

Very truly yours,

Lauren D. Layne
BAKER MANOCK & JENSEN, PC

LDL:LDL
Attachments
cc: Ms. Dianne S. Nury, Vie-Del Company
Mr. Dirk Poeschel

EXHIBIT A

Baker Manock
& Jensen PC
ATTORNEYS AT LAW

Robert D. Wilkinson
Attorney at Law
rwilkinson@bakermanock.com

Fig Garden Financial Center
5260 North Palm Avenue
Fourth Floor
Fresno, California 93704
Tel: 559.432.5400
Fax: 559.432.5620
www.bakermanock.com

December 6, 2012

VIA ELECTRONIC MAIL AND U.S. MAIL

Mr. Keith Bergthold
Assistant Director
City of Fresno
2600 Fresno Street, Room 365
Fresno, CA 93721
E-Mail: Keith.Bergthold@fresno.gov

Re: Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update

Dear Mr. Bergthold:

Please accept the following comments on behalf of our client Vie-Del Company. Thank you for your consideration.

I. INTRODUCTION

Vie-Del Company ("Vie-Del") owns Assessor Parcel Number ("APN") 508-020-04S (the "Property"), which is located southwest of the existing North Golden State Boulevard between Veterans Boulevard and the Herndon Canal in north Fresno. Vie-Del is a family owned business established in 1946. It is a majority woman-owned manufacturing and food processing business.

On the Property, Vie-Del maintains the largest industrial site and largest industrial building north of downtown Fresno. The property is unique in terms of its size, location and fixtures, which include cranes and high capacity electrical outlets that make it particularly well suited for manufacturing. Currently the Property is occupied by three tenants, two of whom are also majority woman-owned businesses. One of the businesses manufactures agricultural harvesters and is one of the few domestic manufacturers of this type competing in an international market. A second tenant manufactures road repair equipment. These two tenants take advantage of the facility's unique properties. The third tenant stores agricultural products at the site.

II.
BACKGROUND

A. California High Speed Train

Earlier this year, the California High Speed Rail Authority ("CHSRA") certified the Merced to Fresno Final Environmental Impact Report/ Environmental Impact Statement (Final EIR/EIS) and approved the Hybrid Route as the Preferred Alternative. An aerial map with engineering designs dated February 24, 2012, is attached hereto as Exhibit "A" and was included in the Final EIR/EIS. Exhibit "A" shows the proposed California High Speed Train ("HST") route, the existing right of ways for North Golden State Boulevard, the proposed right of ways for the HST, and the property that would be affected by a realignment of North Golden State Boulevard. This map covers an area along the existing North Golden State Boulevard from southwest of Veterans Boulevard (not identified on the map) to just past the Herndon Canal, at North Market Street.

The right of way shown as "proposed" in Exhibit "A" was approved by the CHSRA based on the certification of the Final EIR/EIS for the HST. As shown in Exhibit "A," this right of way to the southwest of the railway does have impacts on parcels that are currently located adjacent to the southwest side of North Golden State Boulevard. However, in the HST Final EIR/EIS the CHSRA determined that such impacts were less than significant.

Exhibit "A" also shows the planned new alignment of North Golden State Boulevard, which would generally run adjacent and parallel to the HST, on the southwest side. The proposed new alignment of North Golden State Boulevard as shown in Exhibit "A," and as approved by the CHSRA, will impact those same parcels as the right of way. Of course, the new North Golden State Boulevard alignment will impact those parcels to a greater degree than the right of way for the HST, but the impact is still less than significant.

Among the parcels impacted by the approved HST right of way and new North Golden State Boulevard alignment (as identified in the Final EIR/EIS), is property owned by Vie-Del. Specifically, Assessor's Parcel Number ("APN") 508-020-04S is impacted. The area of the Property impacted by the HST and new alignment of North Golden State Boulevard is currently used as a temporary drainage basin by the Fresno Metropolitan Flood Control District. There are no existing structures on this area of the Property.

The CHSRA, in the HST Final EIR/EIS has already evaluated and made a determination about the impacts to all the properties along the HST right of way and within the area of the proposed new North Golden State Boulevard. The CHSRA concluded that the alignment of North Golden State Boulevard adjacent and parallel to the HST is the preferred route. Therefore, no party can make further comments on the impacts and findings of the CHSRA concerning the HST and the associated relocation of Golden State Boulevard.

III.
ISSUES

A. City of Fresno General Plan Update

On October 26, 2012, we obtained a copy of the City of Fresno's ("City") proposed Golden State and West Barstow Businesses and Owners site plan dated September 25, 2012 ("Golden State Site Plan"), which is attached hereto as Exhibit "B." Unlike the HST Final EIR/EIS, the Golden State Site Plan shows two different alignments for North Golden State Boulevard. Shown on Exhibit "B" with a solid black line and teal outline, is the path of the North Golden State Boulevard alignment as identified in the Final EIR/EIS and as adopted by the CHSRA. Shown on Exhibit "B" with two red lines, is the City's new proposed alignment for North Golden State Boulevard ("Proposed Alignment"). This Proposed Alignment is to be evaluated in the City of Fresno 2035 General Plan Master Environmental Impact Report ("Master EIR"). Vie-Del was very disappointed to learn that the Proposed Alignment was the product of meetings with its neighbors, meetings to which Vie-Del was not invited. Vie-Del only learned of the Proposed Alignment indirectly from City staff after it was already decided the Proposed Alignment would be included in the 2035 General Plan Update.

Notably, the Proposed Alignment no longer runs adjacent to the HST, but instead creates a new route from north of Veterans Boulevard to Herndon Canal. This new Proposed Alignment cuts through the middle of larger APNs, including property owned by Vie-Del. If this Proposed Alignment is adopted, it would cut through the biggest industrial site north of downtown Fresno and severely restrict the job generating activities that could utilize this site at its current size and state of development. These impacts negatively affect the economic development in and fiscal sustainability of the City. In particular, the current facility is very unique as it is one of the few manufacturing facilities left in Fresno. Most other large commercial facilities in the City are dedicated to storage and warehousing. With the turnaround of the economy, Vie-Del intends to further develop and expand the facility and market it to additional outside manufacturing businesses.

The Proposed Alignment would dramatically adversely impact current and future activities on the Property. In particular, the impacts of the Proposed Alignment are much greater than those illustrated in Exhibit "A." In addition to the roadway, there would be landscaping and zoning setbacks which would further destroy the site and its current use as a manufacturing facility. Among other concerns Vie-Del has are that in response to the Proposed Alignment, Vie-Del would have to create new traffic access, circulation and parking on the site, all of which would diminish the site's utility. The Proposed Alignment also completely wipes out a 50,000 square-foot building. All of this would adversely impact current manufacturing at the site and the site's potential for additional manufacturing and commercial activity.

City staff should be fully aware that the exercise of relocating the route of North Golden State Boulevard should only occur if and when the HST is built. We strongly request

that the City include in its analysis that if the HST is not constructed, then the currently North Golden State Boulevard orientation would not change.

Furthermore, the Proposed Alignment should not be implemented and included in the 2035 General Plan Update. As noted above, it has a significant potential to cause harm to the area. Moreover, drainage in the area is already an issue and will become a greater concern. The Proposed Alignment indisputably causes a greater public impact than the North Golden State Boulevard alignment adopted by the CHSRA in the Final EIR/EIS. In addition, although not necessarily an environmental issue, the CHSRA is supposed to cover the costs of realigning North Golden State Boulevard. If the City changes that realignment, the costs for construction will have to come out of the City's budget and the local taxpayer's pockets. In this regard, the overall costs of cutting though Vie-Del's unique, large industrial parcel are significantly higher than pursuing the adopted HST plan.

B. Evaluation of the Proposed Alignment in the Master EIR

We request that the City of Fresno adopt the findings of the CHSRA and the HST Final EIR/EIS and incorporate the new North Golden State Boulevard alignment as it is shown in Exhibit "A" into the City's 2035 General Plan. However, if the City still plans to evaluate the Proposed Alignment, at least the following must be adequately addressed in the Master EIR: (1) a comparison between the North Golden State Boulevard alignment as proposed and adopted by the CHSRA, and the Proposed Alignment, especially as to which alignment has the greatest public impact; (2) an analysis of the effect of reducing the size of the largest industrial site in north Fresno and its affect on the economic development and fiscal sustainability of the City; (3) an analysis of the impacts the Proposed Alignment will have on drainage in the area described above; (4) public safety; (5) costs associated with the project; (6) traffic impacts; (7) the setback and zoning impacts that will affect the use of the facility; and (8) all other analyses required by the California Environmental Quality Act ("CEQA").

Although it is appropriate to evaluate alternatives as part of the CEQA analysis, we believe that on a basic analysis of the two alternatives, the City should reject the Proposed Alternative and not include it in the draft Master EIR that is released for public comment. We also strongly request the City analyze the comparative impacts and costs of these two routes. The costs should include the contribution, or lack thereof, from the CHSRA for construction of the new North Golden State Boulevard. Of course, the CHSRA cannot provide funding for a road that it did not authorize and did not analyze as part of its own CEQA/NEPA analysis.

IV.
CONCLUSION

Vie-Del strongly urges the City of Fresno to use the North Golden State Boulevard alignment, between Veterans Boulevard and the Herndon Canal, as it was adopted by the CHSRA and as identified in Exhibit "A," attached hereto. As evaluated in the CHSRA Final

EIR/EIS, this alignment causes the least public impact. However, if the City decides to proceed with evaluating the Proposed Alignment in the 2035 General Plan Update Master EIR, we strongly request that the City fully analyze all the impacts the Proposed Alignment will have on the Property and the dramatically adverse affect it will have on the City by destroying such a unique parcel. We also expect the City to fully address the increased cost this Proposed Alignment will have on the City and its residents.

Thank you for your consideration.

Very truly yours,

Laurie Layne for

Robert D. Wilkinson
BAKER MANOCK & JENSEN, PC

LDL:LDL
Attachments
cc: Ms. Dianne S. Nury, Vie-Del Company
Mr. Dirk Poeschel

EXHIBIT A

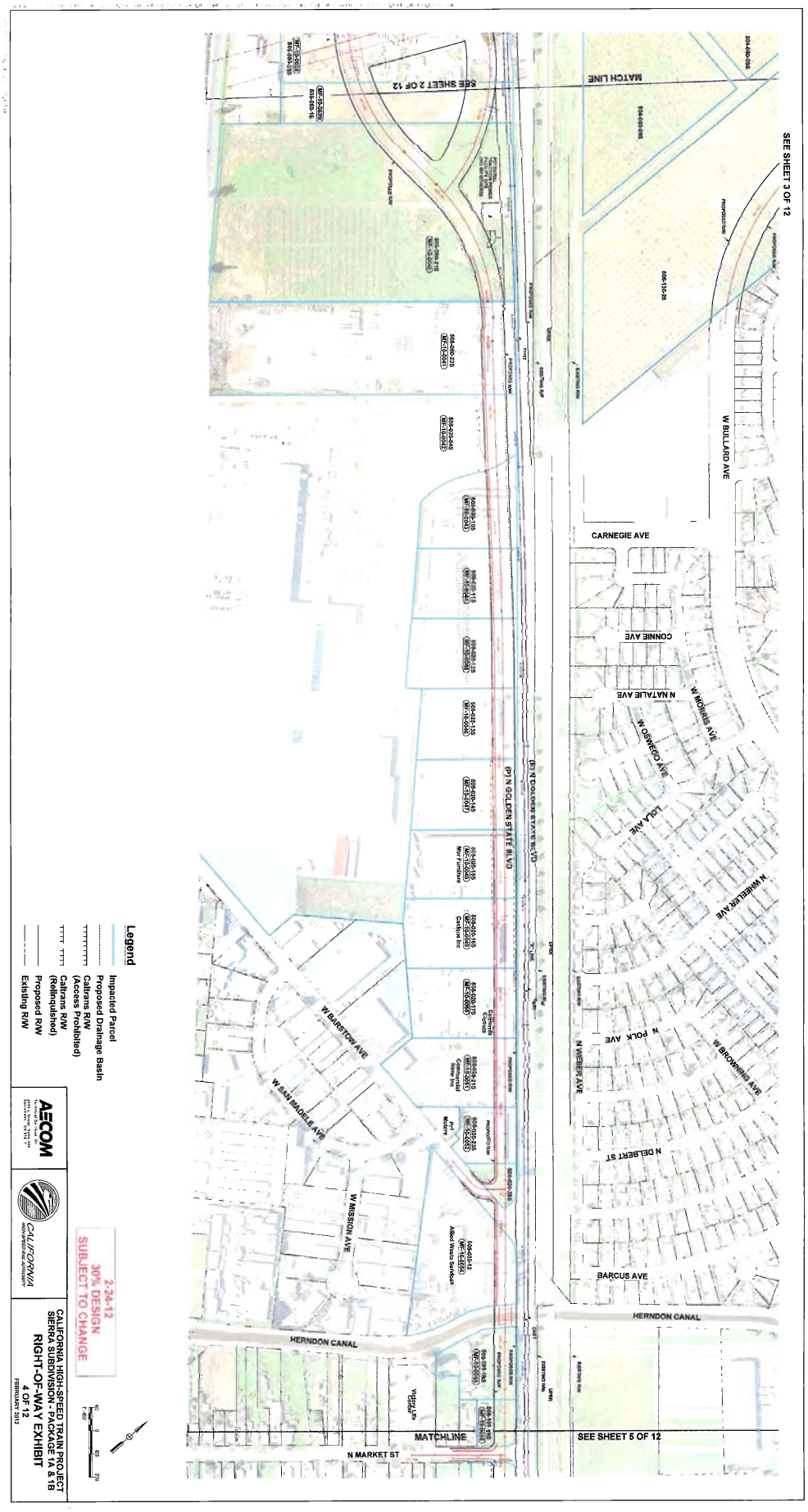
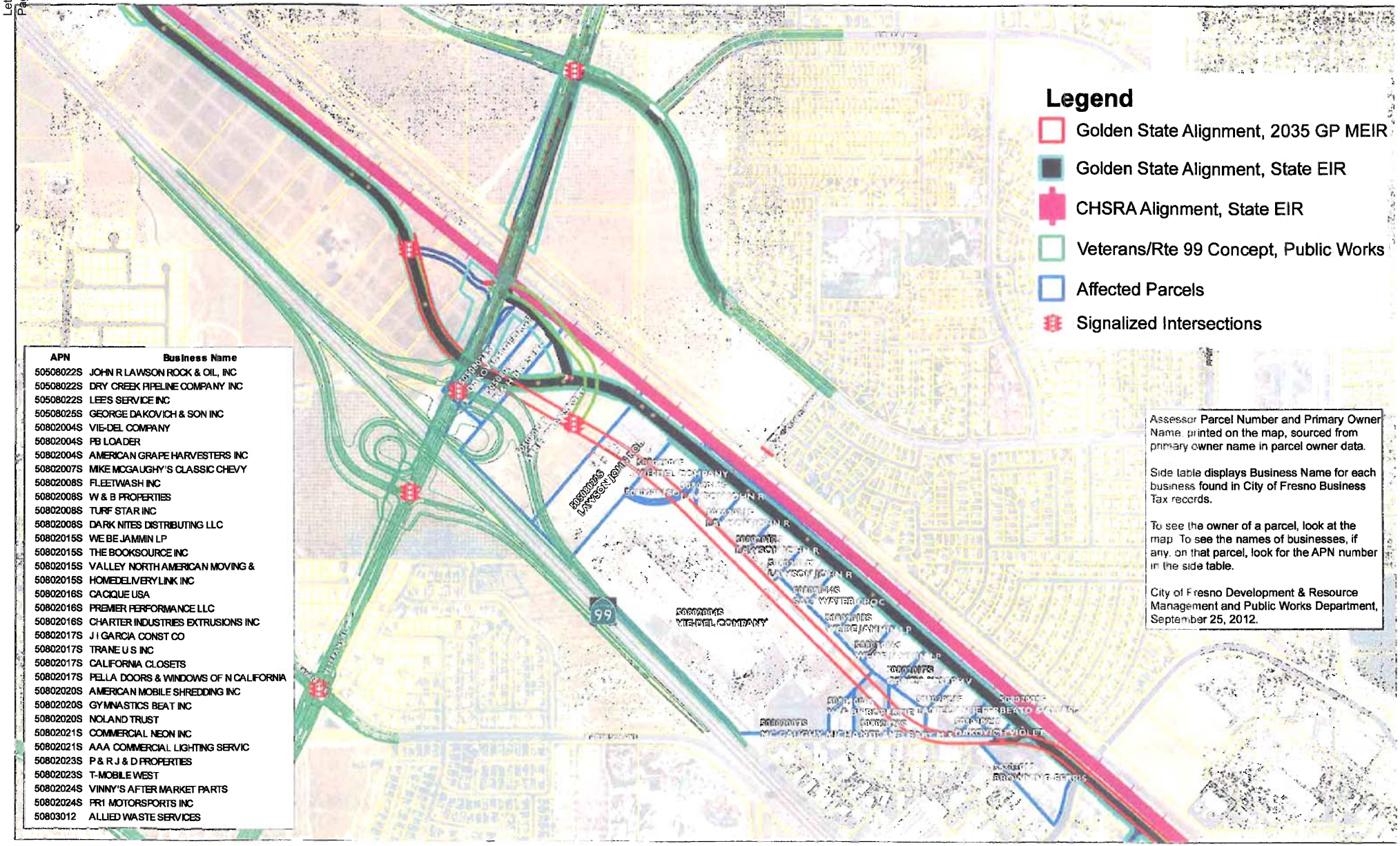

SEE SHEET 2 OF 12
MATCH LINE
SEE SHEET 3 OF 12
W BULLARD AVE
CARNEGIE AVE
CONNIE AVE
N NATALIE AVE
W MONTE AVE
W OSWEGO AVE
LOLA AVE
N WHELAN AVE
(P) N GOLDEN STATE BLVD
(E) GOLDEN STATE BLVD
UPRR
W BARSTOW AVE
W SAN ANGELO AVE
N FOLK AVE
W BROWNING AVE
N WEBER AVE
N DELBERT ST
W MISSION AVE
BARCUS AVE
HERNDON CANAL
HERNDON CANAL
MATCHLINE
SEE SHEET 5 OF 12
N MARKET ST
Legend
Impacted Parcel
Proposed Drainage Basin
Caltrans R/W (Access Prohibited)
Caltrans R/W (Relinquished)
Proposed R/W
Existing R/W
AECOM
CALIFORNIA HIGH-SPEED RAIL AUTHORITY
2-24-12
30% DESIGN
SUBJECT TO CHANGE
CALIFORNIA HIGH-SPEED TRAIN PROJECT
SIERRA SUBDIVISION - PACKAGE 1A & 1B
RIGHT-OF-WAY EXHIBIT
4 OF 12
FEBRUARY 2013

EXHIBIT B
GOLDEN STATE AND WEST BARSTOW BUSINESSES AND OWNERS



APN	Business Name
50508022S	JOHN R LAWSON ROCK & OIL, INC
50508022S	DRY CREEK PIPELINE COMPANY INC
50508022S	LEES SERVICE INC
50508025S	GEORGE DAKOVICH & SON INC
50802004S	VIE-DEL COMPANY
50802004S	PB LOADER
50802004S	AMERICAN GRAPE HARVESTERS INC
50802007S	MIKE MCGAUGHY'S CLASSIC CHEVY
50802008S	FLEETWASH INC
50802008S	W & B PROPERTIES
50802008S	TURF STAR INC
50802008S	DARK NITES DISTRIBUTING LLC
50802015S	WE BE JAMMIN LP
50802015S	THE BOOKSOURCE INC
50802015S	VALLEY NORTH AMERICAN MOVING &
50802015S	HOMEDELIVERYLINK INC
50802016S	CACIQUE USA
50802016S	PREMIER PERFORMANCE LLC
50802016S	CHARTER INDUSTRIES EXTRUSIONS INC
50802017S	J I GARCIA CONST CO
50802017S	TRANE U S INC
50802017S	CALIFORNIA CLOSETS
50802017S	PELLA DOORS & WINDOWS OF N CALIFORNIA
50802020S	AMERICAN MOBILE SHREDDING INC
50802020S	GYMNASTICS BEAT INC
50802020S	NOLAND TRUST
50802021S	COMMERCIAL NEON INC
50802021S	AAA COMMERCIAL LIGHTING SERVIC
50802023S	P & R J & D PROPERTIES
50802023S	T-MOBILE WEST
50802024S	VINNY'S AFTER MARKET PARTS
50802024S	PR1 MOTORSPORTS INC
50803012	ALLIED WASTE SERVICES

Assessor Parcel Number and Primary Owner Name printed on the map, sourced from primary owner name in parcel owner data.

Side table displays Business Name for each business found in City of Fresno Business Tax records.

To see the owner of a parcel, look at the map. To see the names of businesses, if any, on that parcel, look for the APN number in the side table.

City of Fresno Development & Resource Management and Public Works Department, September 25, 2012.

THIS PAGE INTENTIONALLY LEFT BLANK

Letter I: Baker Manock & Jensen, Lauren D. Layne, October 8, 2014

Response to Comment I-1

This comment identifies a concern that the General Plan Update includes an alignment of North Golden State Boulevard that is different than the alignment evaluated as part of the HSR EIS/EIR and approved by the California High Speed Rail Authority. The re-alignment of Golden State Boulevard was evaluated by an environmental re-examination of the new footprint. The change in footprint was approved by CHSRA and FRA and the City anticipates entering into a Facilities Relocation Agreement wherein the CHSRA would agree to relocate the existing Golden State Boulevard consistent with the new alignment in order to accommodate the HSR facilities. For further discussion, see Response to Comment H-1 above.

Response to Comment I-2

This comment expresses a concern that the High Speed Rail Project was not adequately addressed in the Draft Master EIR. The comment states that the Draft Master EIR states that the HSR Project is quantitatively evaluated. As discussed on page 1-10 of the Draft Master EIR, the HSR Project is considered one of the cumulative projects and qualitatively, not quantitatively, evaluated in Section 5 of the Draft Master EIR.

Please see Response to Comment H-1 regarding the realignment of North Golden State Boulevard.

Response to Comment I-3

Please see Response to Comment H-1 regarding the alignment of North Golden State Boulevard.

Response to Comment I-4

Please see Response to Comment H-1 regarding the alignment of North Golden State Boulevard.

THIS PAGE INTENTIONALLY LEFT BLANK

RECEIVED
2014 OCT -9 AM 9:45
PURCHASING DIVISION
CITY OF FRESNO

BAKMAN WATER COMPANY
TELEPHONE (559) 255-0324 · P.O. BOX 7965 · 5105 E. BELMONT · FRESNO, CA 93747

October 9, 2014

Jennifer K. Clark, AICP
Director Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, Ca 93721

RE: Fresno Draft General Plan and Draft Master Environmental Impact Report Comments from Bakman Water Company

Dear Ms. Clarke:

Please consider this as Bakman Water Company's ("Bakman") comments to the City of Fresno's (the "City") Draft Environmental Impact Report (the "DEIR") for the City of Fresno's General Plan Update (the "Plan"). While the comments submitted herein are similar in many respects to previous comments submitted by Bakman to City of Fresno projects under CEQA, including the Recycled Water Master Plan and the DEIR prepared there for, this Plan perpetuates the same problems. It continues to appear that this Plan could, and most likely will, impact Bakman and its customers without adequate discussion or study.

Specifically, Bakman is a Class "B" water utility that provides water service to a population of approximately 14,000 people in southeast Fresno. Bakman's California Public Utilities Commission authorized service area and territory boundary is defined in Bakman's Tariff Book as, "The area bounded by Olive Avenue, East Kings Canyon Road, Winery Avenue and Fowler Avenue, located approximately 1-1/2 miles east of Fresno and vicinity, Fresno County." Despite the fact that Bakman's authorized service area is within the area studied in the DEIR, the DEIR and the Plan ignore Bakman and its 14,000 customers, who will be undoubtedly impacted by the Plan, and only provides cursory references to Bakman's existence. J-1

Bakman has the following comments to the Plan and the DEIR:

Bakman Service Area. The environmental baseline used in the DEIR is based on the non-existence of Bakman and its wells, distribution lines, and affected customers, as opposed to the conditions that existed at the time the NOP was issued or present conditions. While CEQA

conditions that existed at the time the NOP was issued or present conditions. While CEQA provides some *limited* flexibility for a lead agency to utilize a baseline not based on the issuance of the NOP, the baseline must include the "real conditions on the ground. . ." (*Save Our Peninsula Comm. v. Monterey County Board of Supers.* (2001) 87 Cal.App.4th 99, 125). Bakman serves 14,000 customers and pumps water from 11 ground wells to provide water service to its customers. Additionally, Bakman has installed infrastructure to service its customers, including distribution lines, water tanks, pumping stations, etc. Bakman would be more than willing to provide any and all information required regarding its operations to enable the lead agency to provide a clear picture of the exisiting conditions on the ground and to enable the lead agency to perform the required analyses.

Because the EIR "must focus on impacts to the existing environment, not hypothetical situations," (*County of Amador v. El Dorado Counter Water Agency* (1999) 76 Cal.App.4th 931, 955), the DEIR should identify and describe Bakman, its operations and service area; explain how the Plan may affect the Bakman service area; and identify, analyze and mitigate the potential environmental effects of the Plan on Bakman and its customers, including, but not limited to, the effects on Bakman's water quality and quantity. The DEIR should also describe any impacts associated with the installation of new infrastructure adjacent to Bakman's territory boundaries and the cumulative impacts with any such work in and around Bakman's system. Specific impacts that should be addressed include, but are not limited to, impacts associated with grading, disruption of service, water quality, and water supply.

J-1 CONT

As stated, Bakman presently serves 14,000 customers within its service area. As a regulated utility under the PUC, Bakman has the obligation to provide service to each and every commercial, residential, or industrial customer within this service area for residential, commercial, industrial, landscape, or other use. To that end, Bakman has installed utility service consisting of pipelines, wells, treatment facilities, etc. to not only serve its present customers but with excess capacity to account for the expansion of such service to future customers. The City of Fresno's Existing Water Distribution System as described in the Plan and as depicted in Figure PU-2 of the DEIR, appears to be a duplication of Bakman's service within Bakman's service area, which would necessitate that Bakman be compensated. Further, should the City of Fresno have any future plans to install pipelines in or around Bakman's service area to distribute potable or recycled water to customers within Bakman's service area for which Bakman has already installed such service, this would be an additional impact to Bakman that would need to be analyzed in the DEIR.

Groundwater Impact. Bakman has worked with the City in the past in regards to the construction of new wells and the monitoring of the aquifer. For example, for the Fancher Creek development, Bakman agreed to utilize a 400,000 gallon storage tank as opposed to constructing a new well. Bakman also agreed to work with the City on well use scheduling if Bakman wells were to affect City wells and vice-versa in its current eastern boundary.

J-2

Most importantly, Bakman requests its current operations be taken into consideration more, including well placement and production considerations, as much of the growth and construction

is planned for the Southeast Fresno area. Bakman has met with the City on a number of different occasions to discuss how they could get involved with the surface water treatment plant planned to be built in southeast Fresno through bond acquisition, but no concrete plan has yet to be set. Unless these multi-million dollar bonds are to be funded through City water customers' utility rates with no financial encumbrances by any other City services, including sewer, then Bakman customers will inadvertently share in these costs and deserve the right to be participants in its projects that could not only be of benefit to them but for the smart water and aquifer management practices of the entire City and County.

Although Bakman customers are represented by the jurisdictions of both City and County governments, the City's sphere of influence encompasses and drives most of the future water resource management that would affect them. A Private-Public-Partnership is not only an interesting proposition, but if instituted properly, will set precedence for other communities and Cities to join in like considerations for better regional resource planning. With the acquisitions of many underserved and resource burdened service districts by privately owned utility companies, much to the benefit of the customers, the time has come to embrace the benefits that present themselves through cooperation and coordination by all jurisdictions involved. J-2 CONT

Bakman has taken its responsibility for groundwater recharge seriously and has instituted and plans to institute in the near future several groundwater recharge programs that will help to advance Bakman towards its ultimate goal of obtaining the greatest water balance that it is able to obtain. We hope that this realization along with Bakman's continued willingness to engage the City in discussions to make the southeast Fresno surface water treatment plant a reality through a private-public partnership is not lost as both the City and Bakman continue to grow and face challenges in providing the highest level of service to each of its customers. This ever-increasingly difficult circumstance does not need to be made any more difficult by either party needing to worry about the other's intentions. Bakman will continue to be open and available to discuss any issues with the City and hopes that the City is as well.

Bakman Water Company has and will continue to be a good neighbor to the City of Fresno's water system. By providing the information requested herein and allowing meaningful input and dialogue, that relationship can continue at the highest level.

Best Regards,
BAKMAN WATER COMPANY

By: Richard Tim Bakman
Its: President

THIS PAGE INTENTIONALLY LEFT BLANK

Letter J: Bakman Water Company, Richard Tim Bakman, October 9, 2014

Response to Comment J-1

The commenter expressed concern that the Draft Master EIR did not evaluate the potential water supply effects of implementing the General Plan Update throughout the Planning Area including the area that is currently served by the Bakman Water Company. As described in Impact HYD-2 in Section 5.9 of the Draft Master EIR, the City has a key objective of balancing its groundwater operations and by the year 2035, groundwater withdrawals would be at approximately 85,000 acre-feet per year (AF/year). This reduction in groundwater withdrawal is substantially less than the 2010 withdrawal of 128,578. As discussed on pages 5.9-4 and 5.9-5 of the Draft Master EIR, this reduction in groundwater pumping will recharge the aquifer by approximately 15,000 AF/year because the safe yield is approximately 100,000 AF/year (as revised in Response to Comment T-13). In order to supply water within the Planning Area and reduce groundwater pumping, the City is planning to rely on expanding their delivery and treatment of surface water supplies and groundwater recharge activities.

The commenter also expressed a concern regarding the City's intent in providing City facilities within the Bakman Water Company's service area. The intent of depicting the Existing Water Distribution System in Figure PU-2 in the General Plan Update was to represent the existing primary water facilities throughout the Planning Area. The City of Fresno understands that as future growth occurs within the Planning Area and not within the City's water service area, future development will need to coordinate with the water service provider for that area. As discussed in Impact USS-2 in Section 5.15 of the Draft Master EIR, the full buildout of the General Plan Update could result in significant impacts on existing water conveyance facilities throughout the Planning Area. Mitigation Measure USS-8 in Section 5.15 states that the City shall not approve additional development that would exceed the capacity of water facilities, whether that facility is within the City of Fresno's water service area or within another water district's service area, such as the Bakman Water Company.

Response to Comment J-2

The commenter expresses the desire for the Bakman Water Company to work with the City of Fresno as development occurs in the Bakman service area located in southeast Fresno. No specific comment on the environmental conclusions of the Draft EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

THIS PAGE INTENTIONALLY LEFT BLANK

BASELINE ENVIRONMENTAL CONSULTING

7 October 2014
14213-00.02262

Ms. Carmen Borg
Shute, Mihaly, and Weinberger
396 Hayes Street
San Francisco, CA 94102

Subject: Review and Comment on Air Quality Analysis, City of Fresno General Plan and Development Code Update Draft Master Environmental Impact Report

Dear Ms. Borg:

At your request, BASELINE Environmental Consulting ("BASELINE") has reviewed the "Air Quality" section of the Draft Master Environmental Impact Report ("DMEIR") prepared for the City of Fresno's General Plan and Development Code Update ("General Plan Update"). BASELINE's review of the DMEIR specifically focused on the adequacy of the information presented to support the significance determinations for air quality impacts and the identification of feasible mitigation measures. This letter documents the results of our review.

1. Inadequate Analysis of Consistency with Applicable Air Quality Plans

Under Impact AIR-1, the DMEIR reports that the General Plan Update would have a less-than-significant impact on the implementation of applicable air quality plans (AQPs). The applicable AQPs adopted by the San Joaquin Valley Air Pollution Control District ("SJVAPCD") include the following:

- The 2004 *Extreme Ozone Attainment Demonstration Plan;*
- The *2007 Ozone Plan;*
- The *2007 PM10 Maintenance Plan and Request for Redesignation;*
- The *2008 PM2.5 Plan*;
- The *2012 PM2.5 Plan*; and
- The *2013 Plan for the Revoked 1-hour Ozone Standard.*

K-1

The DMEIR evaluated the significance of the General Plan Update's impact on implementing the applicable AQPs based on the following two criteria (DMEIR page 5.3-32):

1) If development proposed by the General Plan exceeds the growth projections used in the applicable attainment plan, it would produce a potentially significant impact; and
2) If the project includes goals, policies, and development standards that are in conflict with the development related control measures in the attainment plans, the project would be potentially significant.

On page 5.3-32, the DMEIR states compliance with criterion 1) as follows:

> *The growth projections used for the General Plan assume that growth in population, vehicle use and other source categories will occur at historically robust rates that are consistent with the rates used to develop the SJVAPCD's attainment plans.*

The DMEIR does not provide a summary of the quantified population, vehicle use, and other source category growth projections used in the six applicable AQPs or the General Plan Update. By not providing a comparison of the data, the consistency of the plan's growth projections with the applicable AQPs cannot be substantiated. Furthermore, MRO Engineers, Inc. has reported that the analysis of traffic growth projections used in the DMEIR are deficient, because the travel demand forecasting model used in the DMEIR was not properly calibrated to existing conditions. As a result, the future traffic growth estimates for the General Plan Update were underestimated. In addition, insufficient traffic model details were provided regarding how projected daily vehicle miles traveled (VMT) would increase.[1] An increase in traffic growth beyond the projections used in the applicable AQPs could result in a potentially significant impact. Therefore, the current analysis of the General Plan Update's consistency with growth projections used in the applicable AQPs is neither transparent nor adequate to support the finding of a less-than-significant impact.

K-1 CONT

On page 5.3-33, the DMEIR states compliance with criterion 2) as follows:

> *Review of the proposed goals and policies of the General Plan Update found them to be consistent with the applicable control measures of the SJVAPCD attainment plan.*

No evidence of the review process is documented to substantiate this opinion. There is no discussion of the primary goals and control measures contained in the six applicable AQPs and how they compare to the goals and policies of the General Plan Update. Therefore, the current analysis of the plan's consistency with control measures used in the applicable AQPs is inadequate.

2. Inadequate Analysis of Baseline and Forecasted Criteria Air Pollutant Emissions

Criteria air pollutant emissions for carbon monoxide ("CO"), sulfur dioxide ("SO2), ozone precursors, and particulate matter ("PM") are estimated under Impact AIR-2 and Impact AIR-3. The DMEIR estimated and forecasted annual emissions of CO, SO2, ozone precursors, and PM based on various models and inventories. The ozone precursors included reactive organic gases ("ROG") and nitrogen oxides ("NOx"). There are two fractions of PM emissions that are regulated based on aerodynamic resistance, diameters equal to or less than 10 microns (PM10) and 2.5 microns (PM2.5). As summarized in Tables 5.3-7 and 5.3-9 (DMEIR pages 5.3-36 and 5.3-42, respectively), baseline emissions of criteria pollutants from 2010

K-2

[1] MRO Engineers, Inc., 2014. *Review of "Transportation and Traffic" Analysis – Draft Master Environmental Impact Report General Plan and Development Code Update City of Fresno, Fresno County, California*. 10 September.

and future emissions under the General Plan Update were estimated for stationary, area, mobile (on-road and off-road vehicles), electricity, and natural gas sources.

The 2010 baseline estimates of pollutant emissions in the DMEIR were reviewed by comparing the total emissions from all sources to similar estimates provided by the California Air Resources Board ("CARB") in the 2013 edition of *The California Almanac of Emissions and Air Quality.* Each year, CARB publishes a new Almanac that summarizes existing criteria pollutant emissions trends in each county and forecasts emissions from all stationary (including fuel combustion), area, and mobile sources. The forecasts take into account the most recent emissions data, projected growth rates, and future adopted control measures to estimate emissions in future years. The CARB's California Emissions Projection Analysis Model ("CEPAM") was used to extract the 2010 emissions for Fresno County from the current Almanac for stationary, area, and mobile sources.

According to CEPAM for the 2013 Almanac, the 2010 total annual emissions of ROG from stationary, area[2], and mobile sources in Fresno County was about 20,200 tons. Since the City of Fresno's Planning Area represents about 60% of the County's population (DMEIR page 5.3-40), approximately 12,000 tons of ROG emissions could potentially be attributed to the City of Fresno. This estimate of ROG emissions is about four times greater than the 2010 baseline estimate of 3,105 tons reported in Table 5.3-9 (DMEIR page 5.3-42). This major discrepancy indicates that significant deficiencies are likely present in the methods applied by the preparers of the DMEIR to estimate the baseline pollutant emissions. These potential deficiencies are described under Section 3, below.

K-2 CONT

The estimates of future emissions in the DMEIR are not representative of the changes in emissions that would result from the proposed land uses changes in the General Plan Update. With the exception of emissions from on-road mobile vehicles, forecasted emissions are based on population growth estimates that are independent of the General Plan Update (i.e., the population growth estimates would be the same without the General Plan Update). For instance, there is not evaluation of how changing existing General Industrial (M-2) Zone to a Heavy Industrial (IH) Zone under the General Plan Update will change the net emissions of criteria pollutants in the City. As a result, the forecast of criteria pollutant emissions is not representative of the General Plan Update and the air quality analysis is incomplete.

3. Deficient Modeling Techniques Applied to Estimate Criteria Air Pollutant Emissions

In addition to the inadequate analysis of both baseline and forecasted criteria pollutant emissions discussed in Section 2, above, there are apparent deficiencies in the modeling techniques applied to estimate the criteria pollutant emissions in the DMEIR. These potential deficiencies are further described below for each air pollutant source.

K-3

3.1 Construction Emissions

Estimates of "worst-case" annual pollutant emissions from construction activities under the General Plan Update are summarized on DMEIR page 5.3-40 based on an inventory of 2008 emissions

[2] Emissions from farming operations were excluded from the area-source estimate, because the land use is not representative of the City of Fresno.

reported in the CARB's 2009 edition of *The California Almanac of Emissions and Air Quality.* As discussed above, the current Almanac is from 2013 and the CARB's CEPAM provides forecasts of pollutant emissions based on the current Almanac. According to CEPAM for the 2013 Almanac, the "worst-case" construction emissions of ROG would be about 1,500 tons per year, which is almost two times greater than the estimate of 812.6 tons per year reported in in the DMEIR (Table 5.3-8, page 5.3-40). Therefore, the current analysis of construction-related pollutant emissions in the DMEIR fails to analyze the worst-case scenario.

K-3 CONT

3.2 On-Road Motor Vehicle Emissions

Pollutant emissions from on-road motor vehicles were estimated by the preparers of the DMEIR using emission factors from the CARB's EMFAC2011 model and the DMEIR's traffic analysis data. As described above, the traffic analysis for the DMEIR underestimated future increases in VMT.[3] Therefore, the DMEIR's estimates of pollutant emissions from on-road motor vehicles are underestimated.

K-4

3.3 Electricity and Natural Gas Emissions

Pollutant emissions from electricity and natural gas were estimated by the preparers of the DMEIR using 2010 emission data reported by PG&E for residential and commercial properties and then projecting future emissions based on population growth. The emissions from industrial properties were not included in the analysis; therefore, the analysis is incomplete.

K-5

3.4 Stationary and Area Source Emissions

The preparers of the DMEIR combined estimates of pollutant emissions from stationary and area sources by using the CARB's CEIDARS database. However, emissions reported from the CEIDARS database are only representative of individual facilities and do not include most area sources, such as natural gas combustion from heating. In addition, the CEIDARS database does not include inventories of PM2.5 emissions, which were excluded from the air quality analysis.

The preparers of the DMEIR did not forecast future changes in pollutant emissions from stationary and area sources. Instead, the 2010 emissions reported from the CEIDARS database were assumed to remain constant over time because "*it would be impossible to predict if the emissions would increase or decrease in the future*"[4]. The CEIDARS database includes consecutive annual inventories of pollutant emissions from individual facilities in the City of Fresno from 1995 to 2012, which could be used to evaluate existing trends. However, no historical emission data or trend analysis was provided to support the opinion that forecasting emissions is impossible.

K-6

As discussed above, the CARB's CEPAM for the 2013 Almanac provides forecasts out to 2035 of pollutant emissions from stationary and area sources, including the emissions of PM2.5. For instance, emissions of PM2.5 from stationary sources between 2010 and 2035 are forecasted to steadily increase at a rate of about 7.2 tons per year. Based on the existing trends and forecasts of

[3] *Ibid*.

[4] Note at the bottom of DMEIR summary tables 5.3-7 and 5.3-9, on pages 5.3-36 and 5.3-42, respectively.

BASELINE ENVIRONMENTAL CONSULTING

pollutant emissions provided by CARB, the DMEIR's assumption that pollutant emissions from stationary and areas sources cannot be analyzed is invalid and the current analysis of stationary and area source pollutant emissions is substantially inadequate.

K-6 CONT

4. Invalid Application of Project-Level Thresholds of Significance

The DMEIR used the project-level thresholds of significance adopted by the SJVAPCD in the *Guide for Assessing and Mitigating Air Quality Impacts* ("GAMAQI") to evaluate the significance of estimated ROG, NOx, PM10, and PM2.5 emissions from construction and operation under the General Plan Update. As described on DMEIR page 5.3-38, the project-level thresholds of significance were used because "*no other quantitative plan level thresholds have been adopted*". The use of project-level thresholds does not provide any meaningful context to evaluate the total pollutant emissions estimated for all existing and future projects under the General Plan Update. As summarized in Table 5.3-9 on page 5.3-42, the estimated emissions of criteria pollutants from all sources in the City of Fresno are one to two orders of magnitude greater than project-level thresholds, which further emphasizes the misuse of these thresholds to properly evaluate the scale and severity of emissions. Therefore, the use of project-level thresholds to evaluate the significance of ROG, NOx, PM10, and PM2.5 emissions in the DMEIR is invalid.

K-7

Since the GAMAQI does not provide guidance for evaluating the significance of criteria pollutant emissions for plans, the SJVAPCD should be consulted to determine an appropriate approach to analysis. For consideration, the Bay Area Air Quality Management District ("BAAQMD") has recommended[5] the following thresholds of significance[6] to evaluate operational-related criteria pollutants emissions for plans:

- Consistency with current AQP control measures; and
- A proposed plan's projected VMT or vehicle trips (either measure may be used) increase is less than or equal to its projected population increase.

As discussed above, the DMEIR has not adequately analyzed the General Plan Update's consistency with applicable AQP control measures and the traffic analysis has underestimated the increase in VMT. Therefore, the evaluation of ROG, NOx, PM10, and PM2.5 emissions in the DMEIR relative to the BAAQMD's recommended criteria remains inadequate.

[5] BAAQMD, 2010. *California Environmental Quality Act Air Quality Guidelines*. May.

[6] On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA before adopting the 2010 thresholds of significance, because the thresholds are considered a "project" subject to CEQA review. The court issued a writ of mandate ordering BAAQMD to set aside and cease dissemination of the adopted 2010 thresholds until approved under CEQA. In view of the court's order, the BAAQMD updated the *CEQA Air Quality Guidelines* in 2012 to exclude the recommended use of the 2010 thresholds for CEQA analysis. On August 13, 2013, the California First Appellate District Court of Appeal reversed the trial court's decision by finding that the adoption of the 2010 thresholds was not itself a "project" requiring CEQA review. Since the adoption process and scientific soundness of the 2010 thresholds of significance have not been challenged, the thresholds provide a meaningful context to evaluate air quality impacts.

5. Inadequate Evaluation of Feasible Mitigation Measures

Under Impact AIR-3, the DMEIR reports that the General Plan Update would have a significant impact on ambient air quality standards from the cumulative emissions of ozone precursors and PM. On page 5.3-50, the DMEIR states the following:

> *No mitigation measures beyond the General Plan policies, ordinances, and regulations are available to further reduce this impact*.

While the DMEIR provides a brief summary of applicable General Plan Update policies on Page 5.3-48, there is no evaluation of how effectively these policies would lessen the significance of the air quality impact. The SJVAPCD's GAMAQI recommends incorporating as many of the policies from the SJVAPCD's *Air Quality Guidelines for General Plans* (AQGGP) into a General Plan as possible. The AQGGP, which was adopted in 1994 and amended in 2005, is a guidance document that contains 75 examples of policies that the cities can directly incorporate into their General Plan. While many of the policies from the AQGGP were incorporated into the 2009 Air Quality Update of the 2025 Fresno General Plan Resources Conservation Element, there is no discussion in the DMEIR regarding the adequacy of the General Plan Update policies to incorporate remaining policies from the AQGGP. K-8

The SJVAPCD's GAMAQI also recommends evaluating plan-level mitigation measures by quantifying the reductions that would result in mobile and area source emissions. There is no discussion or quantification in the DMEIR of how applicable policies would reduce air quality impacts. Since the adequacy of the General Plan Update policies relative to the AQGGP was not evaluated and the potential effect of policies on reducing air quality impacts was not quantified, the evaluation of feasible mitigation measures in the DMEIR is deficient.

6. Inadequate Analysis of Air Quality Impacts to Sensitive Receptors

The DMEIR does not provide an analysis of local community risks from air quality impacts relative to land use changes proposed under the General Plan Update. The location of existing sources of toxic air contaminants ("TACs") (e.g., freeways and gasoline dispensing facilities) are not mapped or evaluated to determine if proposed land use changes under the General Plan Update could potentially increase the exposure of sensitive receptors to TAC sources. As summarized in DMEIR Table 5.3-5, CARB recommends siting new sensitive land uses up to 1,000 feet away from TAC sources. The CARB's recommended setback distances can be used to evaluate if land uses changes under the General Plan Update would result in an increase exposure of sensitive receptors to existing TAC sources. K-9

The SJVAPCD's GAMAQI recommends that General Plans identify intersections and corridors requiring CO hot spot analysis based on the results of the traffic analysis. A CO hot spot analysis includes the quantification of CO emissions and modeling of air dispersion to assess health risks to nearby receptors. The DMEIR does not include any evaluation of local CO impacts on sensitive receptors.

Based on the absence of an analysis of TAC and CO impacts on local communities relative to land use changes in the General Plan Update, the DMEIR analysis of air quality impacts to sensitive receptors is deficient.

BASELINE ENVIRONMENTAL CONSULTING

7. Conclusions

Our review of the Air Quality section of the DMEIR identified inadequate analysis of feasible mitigation measures and impacts on applicable AQPs, ambient air quality standards, and sensitive receptors. Our review also identified the inappropriate use of project-level thresholds of significance to evaluate air quality impacts under the General Plan Update. These issues should be resolved prior to the City of Fresno's approval of the proposed General Plan Update. K-10

Should you have any questions or comments, please contact us at your convenience.

Sincerely,

Patrick Sutton
Environmental Engineer

631386.1

THIS PAGE INTENTIONALLY LEFT BLANK

Letter K: Baseline Environmental Consulting, Patrick Sutton, October 7, 2014

Response to Comment K-1

The commenter states that analysis of consistency with applicable air quality attainment plans is inadequate. He indicates that a data comparison is required to substantiate consistency.

CEQA only requires quantitative analysis when necessary to support a conclusion. In this case, no quantitative analysis is needed to confidently conclude that the population data used for General Plan growth is consistent with the data used by the San Joaquin Valley Air Pollution Control District (SJVAPCD) in its attainment plans. This is because the growth projections for both come from the same source, Fresno Council of Governments (FCOG) projections. Further evidence of consistency is provided by reviewing Federal Transportation Conformity analyses prepared by the Regional Transportation Planning Agencies. The Conformity findings prepared for the 2014 FCOG Regional Transportation Plans indicate that emissions accounting for growth through the last required analysis year for each pollutant conform with all applicable attainment plans. After attainment, emissions must remain below the emission budget necessary to maintain attainment indefinitely by continued application of regulations on mobile sources. The Draft Master EIR explains this relationship on page 5.3-24. Conformity analyses must use the latest planning assumptions to determine conformity. Another factor that eliminates plan consistency as an issue is that growth forecasts have been substantially reduced to account for slower growth that occurred during the recession. Forecasts used for the General Plan Update predict that an additional decade will be required to reach the population forecasted in the existing General Plan 2025. This provides a substantial margin of safety for plan consistency.

The commenter also indicates that an analysis of goals and control measures from the six applicable air quality plans (AQPs) should be included. The applicable air quality attainment plans do not rely upon emission reductions from local land use related measures to achieve attainment. The 2003 PM10 Plan included transportation control measures to control fugitive dust; however, those measures were incorporated into SJVAPCD Regulation VIII – Fugitive Dust Prohibitions. All other applicable plans do not include transportation control measures (TCMs) or land use measures applicable to local governments, so no analysis of specific control measures is needed. The SJVAPCD has pursued regulations within its authority that reduce impacts from development. SJVAPCD Rule 9510 – Indirect Source Review (ISR) is the primary measure to reduce the impacts of new development that is accommodated by the General Plan Update. Rule 9410 – Employer Based Trip Reduction applies to new and existing employers and provides reductions from this source of emissions. The SJVAPCD encourages local land use agencies to plan new development such that it produces fewer trips and vehicle miles traveled. As shown on page 5.3-25 of the Draft Master EIR, the proposed General Plan Update includes numerous policies and objectives that are intended to reduce air quality impacts in a very comprehensive manner.

The commenter indicates that a summary is needed of the growth projections for population, vehicle use, and other source categories used in the six applicable attainment plans to demonstrate General Plan consistency. The Draft Master EIR analysis used population projections as a surrogate for growth for most sources of emissions as is normal practice by the SJVAPCD in preparing attainment year projections for the air quality plans. VMT projections are from the regional traffic

model adjusted to account only for VMT that would be the responsibility of the City of Fresno. For example, through traffic with no origin or destination within the City is not included in the VMT estimates. Air quality analyses prepared at the plan level are not required to have the level of detail requested by the commenter. The General Plan covers development through 2056. Growth of any one emission source category is highly uncertain at that time scale. Therefore, estimates based on proportionality with projected population growth for each source category are reasonable. In addition, several rounds of regulation and rulemaking to further reduce emissions from most source categories can be expected between now and the Plan horizon year making population based estimates conservative.

The commenter also states that traffic growth projections are deficient. The traffic modeling follows accepted professional practices for describing the traffic model and modeling assumptions. The traffic consultant, Fehr and Peers, verified that the model was correctly calibrated for existing conditions. The modeling assumptions in the Draft Master EIR traffic study meet professional standards and provide the level of transparency needed for adequate disclosure.

Response to Comment K-2
The commenter prepared an alternative analysis using the ARB Almanac of Emissions and Air Quality and California Emissions Projection Analysis Model (CEPAM) that produced higher emissions than the results in the Draft Master EIR.

The Draft Master EIR used activity data and projections that were refined to reflect emissions that would occur in the City of Fresno. CEPAM provides County-level data that does not account for the physical location or responsibility for the emission sources. For example, the mobile source emissions inventory from CEPAM include trips passing through Fresno without stopping and agricultural trucking that would not occur in the City. The Draft Master EIR uses travel data from the traffic study that is tailored to trips with an origin or destination within the City and reflect impacts that the City has the ability to influence. Stationary fuel combustion was analyzed based on actual consumption data provided by Pacific Gas and Electric Company within the City of Fresno. Although PG&E is prevented from providing data for some large customers due to state regulations regarding customer privacy, the data is the best available and provides a better assessment for residential and non-residential use than use of the County numbers from CEPAM. The large users are regulated by the SJVAPCD as stationary sources with impacts mitigated through permitting and source specific regulations. The SJVAPCD permitting program is designed to reduce emissions from all stationary sources through application of best available control technology (BACT) on new sources and emission offsets for large source and prohibitory rules on existing sources. The SJVAPCD must demonstrate to the EPA that stationary source emissions will continue to decline even with growth. So even though some sources may not be counted in the inventory, they are fully regulated and would be subject to further controls by the SJVAPCD in the future.

The commenter also states that future emissions are not representative of changes in emissions that would result from changes in land use. The example of changing from General Industrial to Heavy Industrial was provided. The City disagrees. The Draft Master EIR used population and employment projections as the best surrogate for most future year emission estimates. The specific example of

the proposed change to consolidate General Industrial and Heavy Industrial designations mentioned by the commenter is a special case. Emissions from industrial sources are process specific. The emissions may be primarily mobile source from employees and trucking or from combustion or volatile compounds from stationary sources or both. The future mix of industrial uses is uncertain. Therefore, use of general forecasts based on population and employment are reasonable. Localized impacts from industrial projects are also process dependent. The requirement to perform health risk analyses for new projects that exceed screening criteria allows impacts of specific uses and process at specific location to be determined at the appropriate time. Assessing localized impacts of unknown projects would be speculative.

Response to Comment K-3
The commenter states there are apparent deficiencies in the modeling of construction emissions. He states that the 2013 ARB Almanac and CEPAM show higher worst-case ROG emissions. The Draft Master EIR used data from the 2009 ARB Almanac as a basis for assessing construction emissions. Although CEPAM forecasts emissions to be slightly higher for ROG from architectural coatings in later years (607 tons/year in 2020 vs. 532 tons/year in 2008), it makes no difference in the conclusions of the analysis. Construction ROG emissions were estimated in the Draft Master EIR at 813 tons per year which is over 8 times the 10 tons per year threshold. Construction would remain a significant impact in any case due to the amount of construction expected during the General Plan buildout. The analysis provides a reasonable estimate based on a source that was valid at the time the analysis was prepared and is not required to perform worst-case assessment using data that was not available.

Response to Comment K-4
The commenter states that the analysis of on-road motor vehicle emissions are underestimated. This assertion is incorrect. The VMT provided by the traffic study used well-accepted professional practices to determine the VMT attributable to the City of Fresno from the regional traffic model. This comment amounts to disagreement among experts. Mobile source emissions are accurately depicted in the Draft Master EIR.

Response to Comment K-5
The commenter states that the analysis of electricity and natural gas is incomplete because it doesn't include industrial emissions. The consumption data used to prepare the analysis was provided by PG&E. PG&E provides data for residential and non-residential energy customers. PG&E was not able to provide separate industrial data because utilities are prohibited from providing data for some large customers due to state regulations regarding customer privacy under the 15/15 Rule. The 15/15 Rule was adopted by the CPUC in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers and a single customer's load must be less than 15 percent of an assigned category. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released. The Rule further requires that if the 15/15 Rule is triggered for a second time after the data has been screened once already using the 15/15 Rule, the customer be dropped from the information provided. If Industrial Electric usage fails the 15/15 rule once, the

usage is combined with Commercial Electric. If it fails the 15/15 rule yet again, the Industrial Usage is omitted altogether. Therefore, some industrial data may be included with the aggregated commercial data used in the analysis and some may not. Even with this limitation, using actual energy usage data from PG&E as the analysis provides a more accurate basis than using general County emission data. Natural gas combustion in industrial sources is subject to SJVAPCD permitting requirements. New industrial sources of emissions will be required to install best available control technology and to offset emissions exceeding SJVAPCD thresholds. The emissions estimates used the best data available. Separately estimating emissions from industrial combustion would not result in different significance findings or mitigation measures.

Response to Comment K-6

The commenter indicates that the Draft Master EIR analysis should have forecasted growth in emissions for stationary and area source emissions using CEPAM. CEPAM data was not available at the time the analysis was prepared. Providing projections based on CEPAM growth rates could result in higher emissions for these sources; however, no change in significance findings or additional mitigation measures would result from using CEPAM projections. As stated in Response to Comment K-2 above, these source categories are regulated by the SJVAPCD and ARB. Stationary sources are required to comply with Rule 2201 – New and Modified Stationary Source Review BACT and offset requirements that prevent regional emissions of stationary sources from increasing over time.

Response to Comment K-7

The commenter disagrees with the comparison of construction and operational emissions under the General Plan Update with SJVAPCD project level thresholds and recommends using the plan consistency approach used by the Bay Area Air Quality Management District. The Draft Master EIR provides a project level analysis and a cumulative analysis for each impact area. The SJVAPCD normally recommends a comparison to the project level thresholds even for very large projects such as a General Plan Update. The Draft Master EIR also includes a plan consistency analysis that assesses the impacts of growth accommodated by the General Plan Update on the SJVAPCD's attainment plans (see Response to Comment K-1). The Fresno COG 2014 RTP includes an analysis based on the same growth rates in population and the same regional model as is used in the Draft Master EIR that demonstrated conformity with the SJVAPCD's attainment plans. Therefore, no additional analysis using BAAQMD Guidelines is necessary to show that although the emissions increase from new development is large and would exceed project thresholds, it would not interfere with attainment of air quality standards as envisioned by the applicable air quality plans. However, due to the size and long duration of the project (General Plan buildout), these impacts are considered significant and unavoidable.

Response to Comment K-8

The commenter claims that the evaluation of feasible mitigation measures is inadequate and that the SJVAPCD's Air Quality Guidelines for General Plans should be reviewed to identify additional air quality policies that could be added to the General Plan Update. The City disagrees with this conclusion. The evaluation of mitigation measures is adequate. The 2009 Air Quality Update of the 2025 General Plan was reviewed by the SJVAPCD and subject to public review. The SJVAPCD found that the Air Quality Update fulfilled requirements AB 170 for Air Quality Elements in the San Joaquin

Valley. The General Plan Update provides additional air quality and greenhouse gas policies that clarify and expand upon the policies of the 2009 Air Quality Update. The air quality consultant who prepared the Draft Master EIR air analysis is the primary author of the SJVAPCD Air Quality Guidelines for General Plans and reviewed the General Plan Update policies and found them to include all of the most important land use and transportation strategies encouraged by the Guidelines. The City is pursuing a comprehensive sustainability strategy that will provide a strong framework for reducing emissions from new development.

The commenter states that the SJVAPCD's GAMAQI recommends quantifying plan level mitigation measures. Although quantification of the benefits of air quality policies is possible on a sketch planning level based on changes in development patterns, the amount of reduction is difficult to assign to individual policies. Fresno COG prepared an analysis of per capita VMT as part of its Sustainable Communities Strategy (SCS) for SB 375 compliance that was included in the 2014 RTP. The results of that analysis show that a 9 percent reduction in per capita GHG emissions will be achieved by 2020 and 11 percent by 2035. The SCS analysis relies upon the planned land uses in the Fresno General Plan to achieve these reductions. Although the analysis was intended to address GHG emissions, criteria pollutants are also reduced by the SCS and the City's land use plan. The City of Fresno Draft Greenhouse Gas Reduction Plan provides a greater level of detail regarding the effects of land use and transportation measures and includes estimates for all local measures.

Response to Comment K-9
The commenter states that the Draft Master EIR does not provide an analysis of local community risks from air quality impacts relative to land use changes proposed under the General Plan Update. The freeway corridors were already designated for development in the 2025 General Plan. The amount of industrial land is reduced in the General Plan Update by 2,494 acres compared to the 2025 General Plan. Review of SJVAPCD risk data for stationary sources identified no facilities that exist that exceed SJVAPCD risk thresholds. The location of new sources of toxic emissions cannot be determined from its land use designation. Gasoline stations may be located in commercial areas, and the potential impact from any facility is dependent on the throughput and the location of sensitive receptors, both of which are not known until a specific site and project are identified. The impact of new industrial projects is dependent on the amount of trucking required by the facility and emissions from any manufacturing processes which are also not known until proposed. For this reason, it is premature to assess localized impacts from changes in land use. The Draft Master EIR includes assessment criteria for future development to ensure that potential toxic sources and new sensitive receptors near toxic sources such as the freeways are properly identified and evaluated. ARB Land Use Air Quality Handbook criteria will be used to screen projects to determine if a potential impact exists that would require detailed evaluation.

Carbon monoxide (CO) is one of the best success stories in pollution control. Dramatic reductions in motor vehicle tailpipe CO emissions have reduced measured concentrations to a fraction of the ambient air quality standard. This success means that the entire State has attained the CO standard and localized CO hotspots are increasingly unlikely to occur. To verify that no localized CO hotspots would occur, FCS identified the highest volume intersection in Fresno at buildout and then multiplied the volume by four and modeled the result using the CALINE 4 Model. Even at this unrealistically

high volume, the ambient concentration remained below state and Federal standards. Therefore, this potential impact was dismissed from further consideration.

Response to Comment K-10

The commenter concludes his letter with a summary of the previous comments. The City disagrees with his conclusions. The Draft Master EIR adequately assessed the General Plan Update policies that impact air quality and concluded that they address this issue comprehensively and that the proposed land use plan is supportive of air quality goals. The Draft Master EIR assessment of air quality plans, ambient air quality standards, and sensitive receptors addressed these issues at the level appropriate for a General Plan Update. The Draft Master EIR use of a project level threshold is consistent with SJVAPCD guidance and provides a conservative finding of significance for regional air quality impacts.

Building Industry Association
of Fresno/Madera Counties, Inc.

To: Jennifer Clark, Director
Development and Resource Management

From: Mike Prandini

Date: October 3, 2014

Subject: Comments on the Fresno General Plan Update and MEIR

The following are the BIA comments on the implementing policies contained in the 2035 General Plan and the Master Environmental Impact Report. Every effort has been made to comment on those policies and mitigation measures important to the building industry and, as such, these comments may not be all inclusive. We may have additional comments when the General Plan and MEIR are considered by the Planning Commission and City Council during the Public Hearings on the documents.

General Plan Goals

General Plan Goal #8 – Develop Complete Neighborhoods and districts with an efficient and diverse mix of residential densities, building types, and affordability which are designed to be healthy, attractive and centered by schools, parks, and public and commercial services to provide a sense of place and that provide as many services as possible within walking distance.
Intentionally plan for Complete Neighborhoods as an outcome and not a collection of subdivisions which do not result in Complete Neighborhoods.

L-1

Comment – This Goal is problematic for the development industry as it does not consider fragmented land ownership in large portions of the growth areas, market demands, or the autonomy of school districts in locating new schools, usually along collectors to enhance access. This Goal should be deleted or modified to recognize real world issues.

General Plan Goal #13 – Positively influence the same attributes in other jurisdictions of the San Joaquin Valley-and thus the potential for regional sustainability-and improve the standing and credibility of the City to pursue appropriate State, LAFCo, and other regional policies that would curb sprawl and prevent new unincorporated community

L-2

1530 E. Shaw Ave., Ste. 113 • Fresno, California 93710
(559) 226-5900 • FAX (559) 226-5903
www.biafm.org

development which compete with and threaten the success of sustainable policies and development practices in Fresno.

Comment – This goal is directed at other cities in the county, the County of Fresno and the County of Madera. The goal encourages litigation against other jurisdictions. The phrase "to pursue appropriate State, LAFCo, and other regional policies that would curb sprawl and prevent new unincorporated community development which compete with and threaten" should be stricken. L-2 CONT

Economic Development and Fiscal Sustainability

Policy ED-5-b – Fair and Proportional Payments - Require new residential and commercial development that requires annexation to the City (not including County Islands) to pay its fair and proportional share of needed community improvements through impact fees, assessment districts, and other mechanisms. Approve new residential and commercial development projects that require annexation to the City (not including County Islands) after making findings that all the following conditions are met:

- No City revenue will be used to replace or provide developer funding that has or would have been committed to any mitigation project;
- The development project will fully fund public facilities and infrastructure as necessary to mitigate any impacts arising from the new development. L-3
- The development project will pay for public facilities and infrastructure improvements in proportion to the development's impact; and
- The development will fully fund ongoing public facility and infrastructure maintenance and public safety and public service costs.

Comment – The development industry is accustomed to paying its fair share of infrastructure costs through impact fees and for ongoing maintenance through service delivery fees. However, the wording to prohibit City contributions to a project will limit the ability to attract investment in areas of the City that require economic assistance and incentives to be developed. The participation by the City should be subject to negotiation between the City and the developer so that the objectives of the City can be met. The phrase "unless waived by the City Council" should be added. The phrase "proportionate share" should be added to bullets 1, 2 and 4.

Policy ED-5-e - Fiscal Impact Analyses – Require fiscal impact analyses for development proposals requiring a General Plan amendment or annexation to assess citywide impacts and to identify any burden such projects might create for the City, any school district, and other public agencies with the City's Sphere of Influence.

Comment – The fiscal impact analysis should be restricted to major projects that require a General Plan amendment. Requiring such analysis for annexations is unnecessary since annexations with not change the General Plan area or its expected impacts and identified by the MEIR. This Policy could effectively eliminate small projects that require annexation. If that is the City's desire, then it should be stated clearly that projects L-4

requiring annexation of less than a minimum acreage need not apply. This condition should be eliminated or changed to apply to projects greater than one-half mile from the City's existing City limits. L-4 CONT

Urban Form, Land Use, and Design

Policy UF-1-a – Diverse Neighborhoods. Encourage development projects that provide a diversity of urban and suburban neighborhood opportunities. L-5

Comment – The phrase "and accommodate market and cost constraints" should be added.

Policy UF-1-d – Range of Housing. Encourage and provide for a diversity of building types, density and scale to reinforce neighborhood identity and foster a variety of options for living and working. L-6

Comment – The phrase "and accommodate market and cost constraints" should be added.

Policy UF-1-f – Complete Neighborhoods, Densities, and Development Standards – Use Complete Neighborhood design concepts, development standards, and project reviews outside the Downtown Planning Area to achieve the development of Complete Neighborhoods and the residential density targets of the General Plan. L-7

Comment - This comment is the same as for General Plan Goal 8.

Objective UF-12 – Locate roughly one-half of future development in infill areas – defined as being within the City on December 12, 2012 – including the Downtown core areas and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land. L-8

Comment – This is an unrealistic objective given the market in this area and should be changed to a goal instead of an absolute statement.

Growth Areas – This part of the Plan reemphasizes Policy UF-1a – Diverse Neighborhoods. The plan proposes that each quarter section with have a park, school, a mix of medium high single family and multi-family and with retail/commercial at the center of the section. L-9

Comment – This is an effort by the City to force development of a specific type in each section of the City regardless of market conditions or cost and should be modified.

Objective UF-13 - Locate roughly one-half of future development in in the Growth Areas – defined as being unincorporated land as of December 12, 2012 SOI – which are L-10

to be developed with Complete Neighborhoods that include housing, services, and recreation; missed-use centers; or along future BRT corridors.

Comment – This is the flip side of Objective UF-12. This is also an unrealistic Objective given the market in this area and should be changed to a goal instead of an absolute statement.

L-10 CONT

Policy UF-13-a – Master Planning to Require Design Principles – Utilize sub-area master planning for growth areas and BRT transit villages.

Comment – This should be done with major participation of the land owners and the development industry.

L-11

Policy UF-13-b – Complete Neighborhoods, Densities, and Development Standards – Complete Neighborhood design concepts, development standards and project review to achieve the development of Complete Neighborhoods and residential densities targeted for each quarter section.

Comment – This should be done with major participation of the development industry. This Policy is problematic for the development industry as it does not consider fragmented land ownership in large portions of the growth areas, market demands, or the autonomy of school districts in locating new schools, usually along collectors to enhance access. This Policy should be deleted or modified to recognize real world issues as mentioned previously.

L-12

Policy UF-14-a – Design Guidelines for Walkability – Use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists as well as transit and autos.

Policy UF-14-b – Local Street Connectivity – Design local streets to connect throughout neighborhoods and large private development with adjacent major streets and pathways of existing adjacent development.

Policy UF-14-c – Block Length – Create development standards that provide desired and maximum block lengths in residential, retail, and mixed use districts to enhance walkability.

Comment – These three policies are aimed at eliminating cul-de-sacs, shorting block length, eliminating walls that separate unrelated uses, eliminating street front parking lots that separate pedestrians from commercial operations, and eliminating retail that is automobile oriented. The phrase "encourage" and "work with the development industry" should be added to these three policies.

L-13

Land Use

Comment on Density and Intensity – The Plan proposes that density be calculated on net acreage, that is, land area remaining after considering major streets, schools, or regional trails. In addition, any public facility should be removed prior to calculating net acreage. L-14

Objective LU-9 – Plan Land Uses and design development intensities to supplement and support, and compete with, the Downtown.

Comment – This Objective and its implementing provisions are intended to force development into the Downtown area and to limit additional competition with business and residential in the Downtown. The term "encourage" should be added to remove the unintended consequence of becoming a requirement. L-15

Policy LU-10-a- Regional Land Use and Transportation Planning Program – Consider participation in a coordinated Regional Land Use and Transportation Planning Program, if funding is available, with the City of Clovis, County of Fresno and the County of Madera and other cities in the region.

This Policy contains a sub-statement to preserve agricultural land and prevent its premature conversion, including a requirement for an economic assessment, phasing plan, and criteria to prevent leapfrog development. L-16

Comment – The purpose of this policy is to have the general plans of the other jurisdictions mirror and not compete with the Fresno General Plan. It needs to be made clear that this is advisory only.

Mobility and Transportation

Planned Improvements

Pedestrian – Continuous sidewalks will be required along public streets on both sides, within all new development. Sidewalks or alternative pedestrian routes will also be required within developments that utilize private street access.

Comment – The Building Industry Association opposed the requirement of sidewalks on both sides of private streets. The City for years has allowed the exclusion of sidewalks on private streets. It should be left to the discretion of the project developer. This requirement should be deleted. L-17

Bicycle – Strives to ensure that major destinations are well-served by Class II bike lanes, well-marked Class III bike routes are extended into nearly all neighborhoods and a system of Class I bike paths is provided in new development areas along key corridors where right-of-way exists. L-18

New Class I bikeways should be included as part of master planning for all new development areas and should be developed in existing parts of the city where opportunities to obtain right-of-way exist.

Comment – The result of this provision will increase development costs due to additional street construction and the reduction of net developable acres that will affect the development density. It will also increase annual maintenance costs for the Community Facilities Districts. Both of which make development more expensive and increases the cost of housing. There needs to be a commitment by the City to provide incentives to offset these cost features.

L-18 CONT

Policy MT-5-b – Sidewalk Requirement – Assure adequate access for pedestrian and people with disabilities in new residential developments, with sidewalks on both sides of the public streets and private streets or drives within residential planned developments.

L-19

Comment – This policy should be changed to allow for sidewalks on one side of the street only when subdivision design allows and not require sidewalks on private streets.

Policy MT-6-g – Path and Trail Development in Subdivisions – Require all new subdivisions to incorporate planned multi-purpose path and trail development standards and corridor linkage consistent with the General Plan, applicable law and case-by-case determinations as a condition of tentative map approval.

L-20

Comment – This policy creates design issues, especially for smaller subdivisions, with street and lot configuration and reduces the developable acreage. It is unrealistic to require all subdivisions to contain these paths and trails and "requirement" should be changed to "encouraged."

Policy MT-6-j – Variety in Path and Trail Design – Provide for different levels and types of usable pedestrian and bicycle corridors, including broad, shaded sidewalks; jogging paths; paved and all-terrain bicycle paths; through-block passageways; and hiking trails.

L-21

Comment – This policy will increase costs for construction and will increase costs for maintenance for the Community Facilities Districts and reduce developable acreage. The ultimate impact will be to increase the cost of housing. Provisions need to be made to provide offsets for these costs.

Parks, Open Space & Schools

Policy POSS-1-a – Park Standard - Implement the City's existing standard of at least three acres of public parkland per 1,000 residents for Pocket, Neighborhood, and Community parks throughout the city, while striving for a goal of five acres per 1,000 residents for all parks throughout the city, subject to identifying additional funding for regional parks and trails.

L-22

Comment – In the calculation of acres per 1,000 residents, does the City include the San Joaquin River Parkway? If not, it should since the Parkway is a public amenity. L-22 CONT

Policy POSS-2-c – Open Space Dedication for Residential Development – Ensure new residential developments provide adequate land for parks, open space, landscaping, and trails through the dedication of land or otherwise providing for Pocket Parks, planned trails, and other recreational space, maintained by an HOA, CFD, or other such entity. L-23

Comment – Not all residential developments are of sufficient size to provide these amenities. The phrase "if it is feasible to provide such amenities" should be added.

Policy POSS-5-c – Require development projects where appropriate and warranted to incorporate natural features (such as ponds, hedgerows and wooded strips) to serve as buffers for adjacent natural areas with high ecological value. L-24

Comment – This should be changed to encourage rather that require, unless the City is prepared to provide incentives for such a requirement.

Policy POSS-5-d – Establish guidelines for habitat conservation and mitigation programs.

Comment – Although guidelines are helpful in determining what the objective is of the City's program, in this highly urbanized and active agricultural area the City needs to carefully identify potential areas for habitat conservation so as not to unduly restrict planned development. L-25

Policy POSS-5-g – Assistance in Valley Arboretum Master Planning – Assist community organizations that have raised grant funds to pursue the preparation of a Valley Arboretum Master Plan and Implementation Program, including funding, to be coordinated with community groups, as well as related plans and policies for older neighborhoods and other areas with park deficiencies. L-26

Comment - It is indicated that the details need to be worked out before the concept is fully supported and will be implemented through an amendment to the General Plan. This concept should not even be considered unless the City is committed to establishing a city-wide financing mechanism on all residents to fund its implementation. The funding of this idea should not fall on the shoulders of the development community.

Public Utilities and Services

Policy PU-2-g – Community Facilities District for Emergency Services – Develop strategies to mandate Community Facilities District formations in new Development Areas to fund the staffing, operation, and maintenance of the primary response fire stations serving those areas so that such services do not overly impact the General Fund. L-27

Comment – The implementation of this policy will require a nexus analysis to justify implementation of assessments on homeowners since no other residents pay for the cost of fire and police protection services. In addition, all new residential construction is required to install fire sprinkler systems that mitigate the demand for fire protection service.

L-27 CONT

Resource Conservation and Resilience

Policy RC-1-b – Capital Improvement Program – Prepare and consider adoption of a long-term Capital Improvement Program (CIP) that describes City-sponsored capital projects related to General Plan implementation.

Commentary – The CIP will define what development areas or projects it would enable, include funding sources covering the complete cost of the projects as well as intended phasing, and be updated annually and comprehensively reviewed every five years so that it accurately reflects the City's priorities, community needs, fiscal realities, and State mandates. It also will include an analysis of how improvements implement the General Plan and how they reflect the City's commitment "environmental justice" and fair share issues relative to individual neighborhoods.

L-28

Comment – The policy on the CIP is what is currently done and has been done for a long time. However, the commentary is something new and will allow the City to delay or exclude projects that serve new Greenfield development in favor of infill development. The policy needs to be clarified that it will not adversely affect new development within the sphere of influence.

Policy RC-1-c – Prioritize Revenues – Give priority for the purpose of increasing property tax and sales tax revenues by supporting, streamlining and providing incentives for projects that create the largest impacts on property values and the city's retail base and also, to the extent feasible, support Downtown and older neighborhoods.

Commentary – These incentives could include giving priority to supporting redevelopment of vacant and underutilized land, particularly in mixed use and higher density corridors and Downtown, over the conversion of active farmland to urban uses.

L-29

Comment – This policy and the commentary have the likely potential to delay construction of projects that would serve Greenfield developments. The policy needs to be modified to state that it will not unduly delay new projects elsewhere within the sphere.

Policy RC-2-a – Land Use Link to Transportation – Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

L-30

Comment – This policy is the furtherance of other General Plan policies to discourage and delay Greenfield development in favor of infill development. The policy needs to be modified to state that it will not unduly delay new projects elsewhere within the sphere. L-30 CONT

Policy RC-2-b – Infrastructure for Mixed-Use and Infill – Promote investment in the public infrastructure needed to allow mixed-use and denser infill development to occur in targeted locations, such as expanded water and wastewater conveyance systems, complete landscapes, parks and open space amenities and trails. Discourage investment in infrastructure that would not meet these criteria.

L-31

Comment – The last sentence in this policy is further evidence that the General Plan is designed to discourage development that is not infill. This is additional rationale to further restrict the ability to develop Greenfield areas. The policy needs to be modified to state that it will not unduly delay new projects elsewhere within the sphere.

Water Resources and Farmland

Policy RC-6-e – Protect Aquifer – Oppose urban development in unincorporated areas that are not served by a wastewater treatment/management system that is capable of preventing the buildup of compounds that would degrade the aquifer.

Policy RC-6-f – Regulate Sewage Disposal Facilities – Oppose the development of new sewage disposal facilities either within the Planning Area or up gradient (north and east) of the Planning Area, unless the treatment facilities produce effluent that:

- Will not degrade the aquifer in the long term;
- Will not introduce contaminates into surface water that would negatively affect its potential economic use for drinking water;
- Will not deleteriously affect downstream agriculture and urban uses, and
- Will not degrade sensitive riparian habitat.

Policy RC-9-b – Land Outside Sphere of Influence – Express opposition to residential and commercial development proposals in unincorporated areas (excluding County islands) within or adjacent to the Planning Area when these proposals would do any of the following:

L-32

- Make it difficult or infeasible to implement the General Plan;
- Contribute to the premature conversion of agricultural, open space, or grazing land; or
- Constitute a detriment to the management of resources and/or facilities important to the Fresno Metropolitan Area (such as air quality, water quantity and quality, traffic circulation, and riparian habitat).

Policy RC-9-c – Farmland Enrollment – Advocate for the enrollment of all prime farmland outside of the City's SOI in agricultural land conservation programs.

Comment – These four policies are aimed at discouraging and possibly preventing development in the County, including expansion of existing County service areas. The

policy needs to be changed to promote cooperation amongst the public agencies to promote water conservation, development of water supply and improvement of water quality.

L-32 CONT

Historic & Cultural Resources

No Comments

Noise and Safety

Policy NS-1-a – Desirable and Generally Acceptable Exterior Noise Environment – Establish 60 dB LDN or CNEL as the standard for the desirable maximum average exterior noise levels for defined usable exterior areas of residential and noise-sensitive uses for noise, but accept 65 dB LDN or CNEL for noise generated by transportation sources.

Comment - The generally accepted noise range for residential should be 65dB. The standard should be set at 65dB.

L-33

Policy NS-1-h – Interior Noise Level Requirement – Comply with the state code requirement that any multifamily residential, hotel or dorm building exposed to exterior noise levels above 60dB must be designed to incorporate noise reduction measures to meet the 45dB interior noise criterion and apply this standard to all residential and noise sensitive uses.

Comment – The acceptable threshold needs to be set at 65dB.

L-34

Healthy Communities

Policy HC-3-a – Universal Design – Working with the Building Industry Association, update the Universal Design Standard of the Fresno Municipal Code to encourage and facilitate incorporation of universal, lifecycle design principles in new residential design options available to purchasers and to help community members stay in their homes and neighborhoods longer as they age.

Comment – This policy is acceptable as long as it remains at the option of the builder and the home buyer.

L-35

Policy HC-5-a – Healthy Grocery Incentives – Adopt regulations and incentives in the Development Code for locating healthy food grocery stores to increase communitywide healthy food access, with an emphasis on the attraction of grocery stores to established neighborhoods deficient in grocery stores and access to healthy and fresh food.

Comment – This policy is acceptable as long as it remains at the option of the developer and owner of the grocery store.

L-36

Master Environmental Impact Report

Archaeological Resource and Mitigation Measures

Impact CUL-2 - The project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

MM-CUL-2 – Subsequent to a preliminary City review of the project grading plans, if there is evidence that a project will include excavation or construction activities within previously undisturbed soils, a field survey and literature search for prehistoric archaeological resources shall be conducted.

L-37

Comment – This requirement is costly, contributes to unnecessary construction delays and is without merit. There is very little evidence that anything of archaeological value is present in any of the City's growth areas. In addition, what is meant by "undisturbed soils"? Virtually all land within the growth areas has been disturbed in the last 100 years. Some is now fallow and some is underutilized, but it has been disturbed. Therefore, this condition is unnecessary. The requirement should only provide that if something is found construction will cease.

Unique Paleontological Resource/Site or Unique Geologic Feature and Mitigation Measures

Impact CUL-3 - The project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

MM-CUL-3 - Subsequent to a preliminary City review of the project grading plans, if there is evidence that a project will include excavation or construction activities within previously undisturbed soils, a field survey and literature search for unique paleontological/geological resources shall be conducted.

L-38

Comment - This requirement is costly, contributes to unnecessary construction delays and is without merit. There is very little evidence that anything of paleontological or geologic value is present in any of the City's growth areas. In addition, what is meant by "undisturbed soils"? Virtually all land within the growth areas has been disturbed in the last 100 years. Some is now fallow and some is underutilized, but it has been disturbed. Therefore, this condition is unnecessary. The requirement should only provide that if something is found construction will cease.

THIS PAGE INTENTIONALLY LEFT BLANK

Letter L: Building Industry Association, Mike Prandini, October 3, 2014

Response to Comment L-1
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-2
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-3
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-4
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-5
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-6
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-7
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-8
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-9
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-10
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-11
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-12
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-13
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-14
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-15
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-16
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-17
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-18
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-19
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-20
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-21
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-22
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-23
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-24
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-25
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-26
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-27
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-28
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-29
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-30
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-31
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-32
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-33
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-34
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-35
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-36
This comment is provided on the General Plan Update. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment L-37
This comment states that Mitigation Measure CUL-2 is not necessary since there is little evidence that anything of archaeological value is present in any of the City's growth areas. As stated in Impact CUL-2 in Section 5.5 of the Draft Master EIR, there has been limited areas within the Planning Area that have been surveyed by a professional archaeologist (i.e., 0.3 percent of the Planning Area). Since the cultural sensitivity is uncertain for the Planning Area, there is a potential for future development to potentially impact archaeological resources.

This comment also asked what undisturbed soils mean in MM CUL-2. Undisturbed soils refer to those soils that have not been excavated or disturbed previously. As the commenter noted, most of the area within the Planning Area once was disturbed by farming practices. These past farming activities resulted in disturbed soils to certain depths. The mitigation measure refers to the soil depths that have not been previously disturbed.

Response to Comment L-38
Similar to comment L-37, above, this comment states that Mitigation Measure CUL-3 is not necessary since there is little evidence that anything of paleontological or geologic value is present in the City's growth areas. As stated in Impact CUL-3 in Section 5.5 of the Draft Master EIR, the surficial deposits that are located throughout the Planning Area are considered to have a high potential sensitivity for paleontological resources. Since there is a high potential, future excavation and/or construction activities that affect previously undisturbed soils could significantly impact paleontological resources. The implementation of MM CUL-3 would reduce these potential impacts to less than significant.

THIS PAGE INTENTIONALLY LEFT BLANK

CENTRAL UNIFIED SCHOOL DISTRICT

Facilities
4200 N. Grantland Ave. • Fresno California 93723
Phone: (559) 275-9560 • FAX: (559) 275-9565

Bert Contreras, Director

FAX

TO: Jennifer Clark

FAX NUMBER: 559-457-1316

DATE: 8/18/14

RE: Attached

TOTAL PAGES (including cover) ___4___

Please see attached Draft Fresno General Plan.

If there are any problems receiving this Facsimile, do not hesitate to call us at 559-275-9560. Thank you!

CENTRAL UNIFIED SCHOOL DISTRICT

FACILITIES PLANNING
4200 N. Grantland Avenue • Fresno California 93723
Phone: (559) 275-9560 • FAX: (559) 275-9565

Bert Contreras, Director, Facilities Planning
Joe Martinez, Facilities Planning Manager

August 18, 2014

Jennifer Clark, AICP, Director
City of Fresno
Development & Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93721

Subject: Draft Fresno General Plan

Dear Ms. Clark:

This letter provides the comments of the Central Unified School District on the Draft Fresno General Plan. We commented previously on an earlier draft of the plan in a letter to Keith Bergthold dated June 25, 2013. We indicated in that letter that there were a number of school site designations on Figure POSS-2 and the General Plan Land Use Diagram that needed to be modified. (Note: Figure POSS-2 has been changed to POSS-3 in Chapter 5, but is still labeled as POSS-2). The table below shows the previous comments and whether modifications were made in response to the comments.

Comment	Fig. POSS-2 Change Made?	GP Diagram Change Made?
1. A special school designation is shown on the east side of Veterans Boulevard, south of Barstow Avenue. The District does not own property or have plans for a school at this location.	Yes	No
2. The Deran Koligian Educational Center, located east of Grantland and north of Ashlan Avenue, is designated as a special school. This site should be designated as a high school, middle school and elementary school	Yes	No. School type not indicated.
3. The school site shown at the northwest corner of Grantland and Dakota Avenues should be designated as an elementary school rather than a special school.	Yes	No. School type not indicated.

M-1

District Administration
Michael A. Berg, Superintendent
Laurel Ashlock, Ed.D., Assistant Superintendent, Educational Services, Chief Academic Officer · Kelly Porterfield, Assistant Superintendent, Chief Business Officer
Keni Davis, Assistant Superintendent, Professional Development · Chris Williams, Assistant Superintendent, Human Resources
Jamie Russell, Administrator, Special Education and Support Services · Kevin Wagner, Administrator, Human Resources and Child Welfare & Attendance
Paul Birrell, Director, 7-12 and Adult Education · Karen Garlich, Director, K-6 Education

CENTRAL UNIFIED SCHOOL DISTRICT

FACILITIES PLANNING
4200 N. Grantland Avenue • Fresno California 93723
Phone: (559) 275-9560 • FAX: (559) 275-9565

Bert Contreras, Director, Facilities Planning
Joe Martinez, Facilities Planning Manager

4. The school site shown on the north side of Shields Avenue between Bryan and Hayes Avenues should be designated as an elementary school rather than a special school.	Yes	Yes
5. The elementary school site shown at the southeast corner of Shields and Valentine Avenues should be removed from the map. The District does not plan to build a school in the vicinity of this intersection.	Partially. Site removed but "E" remains on figure.	No
6. The elementary school site shown on the north side of McKinley Avenue between Brawley and Valentine Avenues should be removed from the map. The District owns an elementary school site nearby at the northeast corner of Valentine and Weldon Avenues; therefore, the site designation on McKinley is not needed.	Yes	No
7. Madison Elementary School, located at the northeast corner of Brawley and Madison Avenues, is designated as a special school. This site should be designated as an elementary school.	No. Shown as Middle School.	No. School type not indicated.
8. The elementary school site shown on the west side of Brawley Avenue between Belmont and Olive Avenues should be removed from the map. This site is close to another future site shown on the north side of Olive Avenue between Brawley and Blythe Avenues and is not anticipated to be needed.	Yes	No
9. The elementary school site shown on the north side of California Avenue between Belmont and Olive Avenues should be removed from the map. This site is close to Madison Elementary and is not anticipated to be needed.	Yes	No

M-1
CONT

For the changes requested in the table that were not made in response to our previous comments, we ask that the changes be made prior to plan adoption.

District Administration
Michael A. Berg, Superintendent
Laurel Ashlock, Ed.D., Assistant Superintendent, Educational Services, Chief Academic Officer · Kelly Porterfield, Assistant Superintendent, Chief Business Officer
Ketti Davis, Assistant Superintendent, Professional Development · Chris Williams, Assistant Superintendent, Human Resources
Jamie Russell, Administrator, Special Education and Support Services · Kevin Wagner, Administrator, Human Resources and Child Welfare & Attendance
Paul Birrell, Director, 7-12 and Adult Education · Karen Garlick, Director, K-6 Education

CENTRAL UNIFIED SCHOOL DISTRICT

FACILITIES PLANNING
4200 N. Grantland Avenue • Fresno Callfornia 93723
Phone: (559) 275-9560 • FAX: (559) 275-9565

Bert Contreras, Director, Facilities Planning
Joe Martinez, Facilities Planning Manager

We also have a comment on the text of Chapter 5, specifically the third full paragraph on page 5-43, which is shown below:

> Combined, the public school districts have the capacity to serve 144,000 school aged children between the grades of K-12, and private schools can serve another 4,200 students. With 136,000 students currently in the public school districts, there remains space for up to 8,000 additional students. Most of the available capacity is in Central USD while Fresno USD and Sanger USD are oversubscribed. Clovis, Fresno, and Sanger USDs are planning new schools to increase student capacities as they plan for future growth in the Fresno Planning Area.

M-2

First of all, the numbers shown in this paragraph are not consistent with the numbers in the Draft Master EIR (see Table 5.13-3). Second, the text indicates that Central Unified has most of the stated available capacity for 8,000 additional students, which is not the case. Table 5.13-3 in the EIR shows an available capacity for about half this number of students in Central Unified and we will be checking the accuracy of these numbers as we review and comment on the Draft Master EIR. Finally, in addition to Clovis, Fresno and Sanger Unified, Central Unified is also planning new schools in the Fresno Planning Area.

Thank you for the opportunity to comment. Please contact me if you have any questions regarding this letter.

Sincerely,

Bert Contreras
Director,

District Administration
Michael A. Berg, Superintendent
Laurel Ashlock, Ed.D., Assistant Superintendent, Educational Services, Chief Academic Officer · Kelly Porterfield, Assistant Superintendent, Chief Business Officer
Kerri Davis, Assistant Superintendent, Professional Development · Chris Williams, Assistant Superintendent, Human Resources
Jamie Russell, Administrator, Special Education and Support Services · Kevin Wagner, Administrator, Human Resources and Child Welfare & Attendance
Paul Birrell, Director, 7-12 and Adult Education · Karen Garlick, Director, K-6 Education

Letter M: Central Unified School District, Bert Contreras, August 18, 2014

Response to Comment M-1

This commenter raises a concern that the General Plan Land Use Diagram and Figure POSS-2 in the General Plan need to be modified to reflect the school district's revisions to the school site designations within the Planning Area.

These proposed revisions to the General Plan Update are evaluated as part of the environmental evaluation addressed in Appendix 1 of this Response to Comments Document. The proposed revisions are being provided to the City Council to decide on the inclusion of these requests within the Fresno General Plan Update.

THIS PAGE INTENTIONALLY LEFT BLANK

October 8, 2014

Jennifer K. Clark, Director
City of Fresno Development and Resource Management Department
2600 Fresno Street
Fresno, California 93721

Dear Ms. Clark,

SUBJECT: Council District 6 Plan Implementation Committee Comments on the Draft General Plan Update and Draft Master EIR

The Council District 6 Committee has reviewed these documents and most of us have attended one or more public workshops on them. After a lot of time reviewing and considering the documents, we feel that we still can't make a final recommendation on the General Plan Update because the plan has new land use categories that would be implemented by new zone districts, but the new Development Code was not released in time for anyone to know exactly what types of uses, what housing densities, and what setbacks and other development standards would apply to the areas where the new plan designations (and zone districts) are proposed. We can't vote to recommend approval of the General Plan when we don't have all the information. Once the comment deadline passes on the General Plan and Draft EIR, how would we have any input on Development Code information released afterward?

We do have some feedback on things that we have reviewed:

There is a lot of monotony in Fresno's commercial development—same chain stores, same earth-tone stucco on buildings that are designed the same.

Fresno is too open to fast food franchises (so much so that our city is a nationwide testing site for every new fried food concept). N-1

Neighborhoods are where we live, and neighborhood shopping centers should reflect local character to preserve local identity. Neighborhood shopping centers should also offer a wider range of uses to serve the residential areas around them. Single-tenant neighborhood shopping centers should not be allowed, because a single store offers an incomplete range of goods. These single-store "shopping centers" don't reduce driving trips, because most customers drive to them (the customer draw areas of these larger stores go beyond a neighborhood); also because people who live in the neighborhood have to drive to get the goods and services they need that aren't provided by the single store. That situation increases congestion and pollution.

Small lots, small setbacks, short driveways only 6 to 8 feet long, and small garages are not a good idea. They force people who cannot park in their garages to park on the street, so new home developments with these lots are littered with cars on both sides of the street. The narrow roads are even narrower with cars parked on both sides. You cannot see when backing out of your garage, and you cannot see kids running out into the street in time. You can't walk with your kids or your dog in neighborhoods built like that, without running into cars that stick out across the sidewalk and into the streets. Houses need adequate space in between each other, to protect people's privacy. Garbage containers also wind up too close to neighboring homes' windows when the side yard setbacks aren't large enough.

Fresno needs to plan for areas where fully integrated, senior communities can be built, with a requirement to include full amenities for active seniors to preserve their health in a safe setting (something on the order of a "Del Webb" community).

It might make some sense to add apartments above commercial square footage along commercial corridors, but is there enough market demand to build all these high density complexes shown in the plan?

N-1 CONT

There does not seem to be a way for the infrastructure to handle all the high density, especially on older corridors like Blackstone Avenue— the sewers can't take it, the roads can't take all the traffic, etc.

N-2

Higher density housing causes excessive traffic, especially in areas where the roads are not fully widened. Are the traffic flows and congestion being examined properly in the EIR? Traffic congestion is not desirable. High density doesn't necessarily cut down on the number or length of car trips. It is not certain that people will stop driving when congestion gets too bad. People can't always get a job near their home, and the bus system isn't capable of serving commuters. If you don't offer homes that people want to buy, with houses and yards large enough to enjoy, people will just buy homes in Madera County and the small towns around Fresno, where they don't have to fight congestion in their neighborhoods. Then they will commute many miles into Fresno to their jobs, making pollution worse in the area, and traffic worse on the highways.

N-3

The current FAX bus system is not financially self-sustaining and does not serve all areas of Fresno where public transit is needed (there are no bus lines to the Clovis Unified and State Center Community College major educational centers on North Willow Avenue, and none on the whole "Bullard Loop" area). When the initial grant funding for Bus Rapid Transit runs out, how will that level of transit service be supported financially? If Bus Rapid Transit cannot sustain its planned level of service, what will all the residents of the intensified corridor do for transportation?

N-4

Also, the General Plan should provide guidance on improving Fresno's road maintenance, which is a daily problem we all face. The General Plan has a lot of detail and strategies for new goals to improve people's health and sustainability. Those are worthy goals, but there isn't any strategy in the General Plan to improve the City's performance in addressing long-term issues like road maintenance, or landscape and median island maintenance. The appearance (streetscape) of Blackstone Avenue needs to be updated and improved. The General Plan should provide some strategy for drought-tolerant landscape rules to be enforced.

N-5

There is a need for more parks, including pocket parks. The City should keep the Naylor Act in mind when planning parks and evaluating school sites. Trails need to be planned and built in other parts of Fresno besides the north end. There have to be other useful trail routes other than old railroads.

N-6

The City should strongly consider adding a Parks & Recreation Commission to help achieve improvements in parks, trails, streetscapes, etc. Please see the attached description of things that a Parks & Recreation Commission could assist the City with.

We hope these comments are useful, and we look forward to reviewing the Development Code.

N-7

The [City of Sunnyvale] Parks and Recreation Commission is a model for what could be done in Fresno. Sunnyvale has five-member commission that acts in an advisory capacity to the City Council in matters and services pertaining to parks, open space, playgrounds, entertainment, other cultural and recreational activities. Its specific duties include:

- Study, evaluate and recommend to the City Council policies relating to parks and recreation activities, such as Community Center Use Policy, Park Building Use Policy, Picnic Facility Use Policy, and License Agreements.

- Review master plan of park development or expansion for adequacy, appearance and other appropriate criteria in an attempt to assure good design and make recommendations to the Council.

- Review and make recommendations regarding agreements with parks and recreation related outside groups and recommend funding allocations.

- Study, evaluate and recommend to the City policies relating to human rights and human relations issues that may arise when addressing issues such as inclusion in the use of City parks and recreation facilities, program accessibility and cultural diversity.

N-7
CONT

[Please also see the full web page for the Sunnyvale Parks & Recreation Commission, http://sunnyvale.ca.gov/CityGovernment/BoardsandCommissions/ParksandRecreationCommission.aspx]

THIS PAGE INTENTIONALLY LEFT BLANK

Letter N: City of Fresno, Council District 6 Committee, October 8, 2014

Response to Comment N-1
This commenter raised a concern that the Development Code Update has not been provided for public review and asked how comments can be provided on the Draft Master EIR once the Development Code Update is made available.

At this time, the General Plan Update will be submitted for deliberation to the City Council prior to the release of the Development Code Update. The City Council will not be deliberating on the Development Code Update until after the General Plan is adopted and the Master EIR is certified. After the Development Code is released for public review, the City will review the Development Code and Master EIR and consider the criteria set forth in CEQA Guidelines sections 15162 and 15177, as well as any other applicable sections. When Council considers the Development Code, it will also consider any supplemental analysis and/or mitigation that may be required for the Development Code.

Other comments on page 1 of the Committee's letter were not specific to the environmental conclusions of the Draft Master EIR; therefore, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment N-2
This commenter raised a concern that the existing sewers along Blackstone Avenue would not be able to accommodate the increased growth planned for the Blackstone Corridor. Based on the wastewater modeling results for the 2006 Wastewater Master Plan CIP Projects Planned for Construction (see Figure 1.2 in Appendix J-1 of the Draft Master EIR) and the Preliminary Wastewater Modeling Results for the General Plan Update (see Figure 1.1 in Appendix J-1 of the Draft Master EIR), the sewer facilities along Blackstone Avenue would not exceed capacity.

Response to Comment N-3
This commenter asked if traffic flows and congestion are being examined properly in the Draft Master EIR. As discussed in Section 5.14.5 of the Draft Master EIR, the General Plan Update includes Policy MT-2-I that identifies the transportation impact criteria based on the location of a project within the Planning Area. The impact criteria range from LOS D to LOS F depending on the location within the Planning Area. These criteria were used in the traffic analysis to determine if potential significant traffic impacts would occur with the implementation of the General Plan Update.

Response to Comment N-4
This commenter asked if the current FAX bus system as well as the BRT project be financially feasible in the future. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment N-5
This comment is on the General Plan Update and not the Draft Master EIR. Since there was no specific comment on the environmental conclusions of the Draft Master EIR that was provided; no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment N-6

This comment is on the General Plan Update and not the Draft Master EIR. Since there was no specific comment on the environmental conclusions of the Draft Master EIR that was provided; no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment N-7

This commenter stated that a Parks & Recreation Commission be added to the City to help achieve improvements in parks, trails, streetscapes, etc. This comment is noted. Since there was no specific comment on the environmental conclusions of the Draft Master EIR that was provided; no response is required. (CEQA Guidelines, Section 15088.)

COMMUNITY
MEDICAL CENTERS

October 9, 2014

Ms. Jennifer Clark, AICP
Director – Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93721

Re: Fresno General Plan Update and Master Environmental Impact Report Comments

Dear Ms. Clark:

Thank you for the opportunity to provide comments on the Fresno General Plan Update and Master Environmental Impact Report (EIR). On behalf of Community Medical Centers, I would like to provide additional comments and reaffirm our previously submitted requests. Our comments are focused on the Community Regional Medical Center campus in downtown Fresno.

Public Review Draft of the City of Fresno General Plan

Chapter 3: Urban Form, Land Use and Design.

We would like to confirm the City is accurately illustrating the boundary of the hospital campus, consistent with the CRMC Master Plan and previous CRMC communication with the City. It is noted that the Land Use Map *does not* accurately depict the campus master plan boundary (see attached Exhibit A). It is our understanding that downtown land uses will be refined with the approval of the Downtown Development Code. In the interim, we request the following changes:

1) Land Use Map, Figure LU-1. *"Special Hospital District for CRMC should extend from Diana Street/RR tracks on the west and south, McKenzie Avenue on the north and Fresno Street on the east and south."* We request the entire area within the master plan is given a Special District – Hospital or equivalent designation. O-1

2) Special Use Zone description, page 3-47. This description incorrectly describes the boundary of the CRMC campus (see attached Exhibit B). O-2

Draft MEIR, General Plan and Development Code Update

Chapter 5.14: Transportation and Traffic.

This section contains detailed information regarding existing and proposed roadways within the General Plan area, as well as traffic data and projections for the roadways. It is critical to the future of the CRMC campus that the City coordinates and supports future growth by addressing transportation and traffic issues in the downtown area at a regional level. As you know, CRMC has an approved master plan and EIR, which identifies allowable growth and required mitigation measures for the hospital campus. It is our intention to proceed with future growth within the prescribed build-out of those already approved documents. O-3

With that in mind, we request that the City address the Level of Service (LOS) discrepancies between City and Caltrans standards. Additionally, we would like to express our support for mitigation measures, MT-2-j and MT-2-l, which call for regional funding to mitigate impacts to Caltrans facilities.

Appendix H: Traffic Data.

The traffic study to support the MEIR looks to the Fresno County Regional Traffic Model for trip generation data. The traffic model input data defines the CRMC campus as Transportation Analysis Zone #1285, with an employee count of 3,794 for base year and cumulative conditions. The model does not address employee growth projections for the campus, although the CRMC master plan calls for growth between now and 2035. We request that the City acknowledge the potential for future growth of the CRMC campus as described in the approved hospital master plan and EIR. O-4

Chapter 5.15 Utilities and Service Systems.

The Wastewater Technical Report outlines some future sewer capacity issues in downtown sewer pipelines downstream of the CRMC campus (see attached Exhibit C). In response to the findings of the technical Wastewater Technical Report, the General Plan includes Mitigation Measure USS-7 to address this condition.

Similar to previous comments, we would like to ensure that the CRMC campus is allowed to develop to the extent provided for in its master plan and EIR. We request that the City account for this growth and consider expanding the mitigation measure to include the development of a Capital Improvement Program and funding mechanism to complete needed infrastructure improvements. O-5

If you have any questions or would like to meet to discuss our comments and request, please let me know. We look forward to working with the City to refine the General Plan and Master EIR in a manner that supports the future growth and expansion of the CRMC campus.

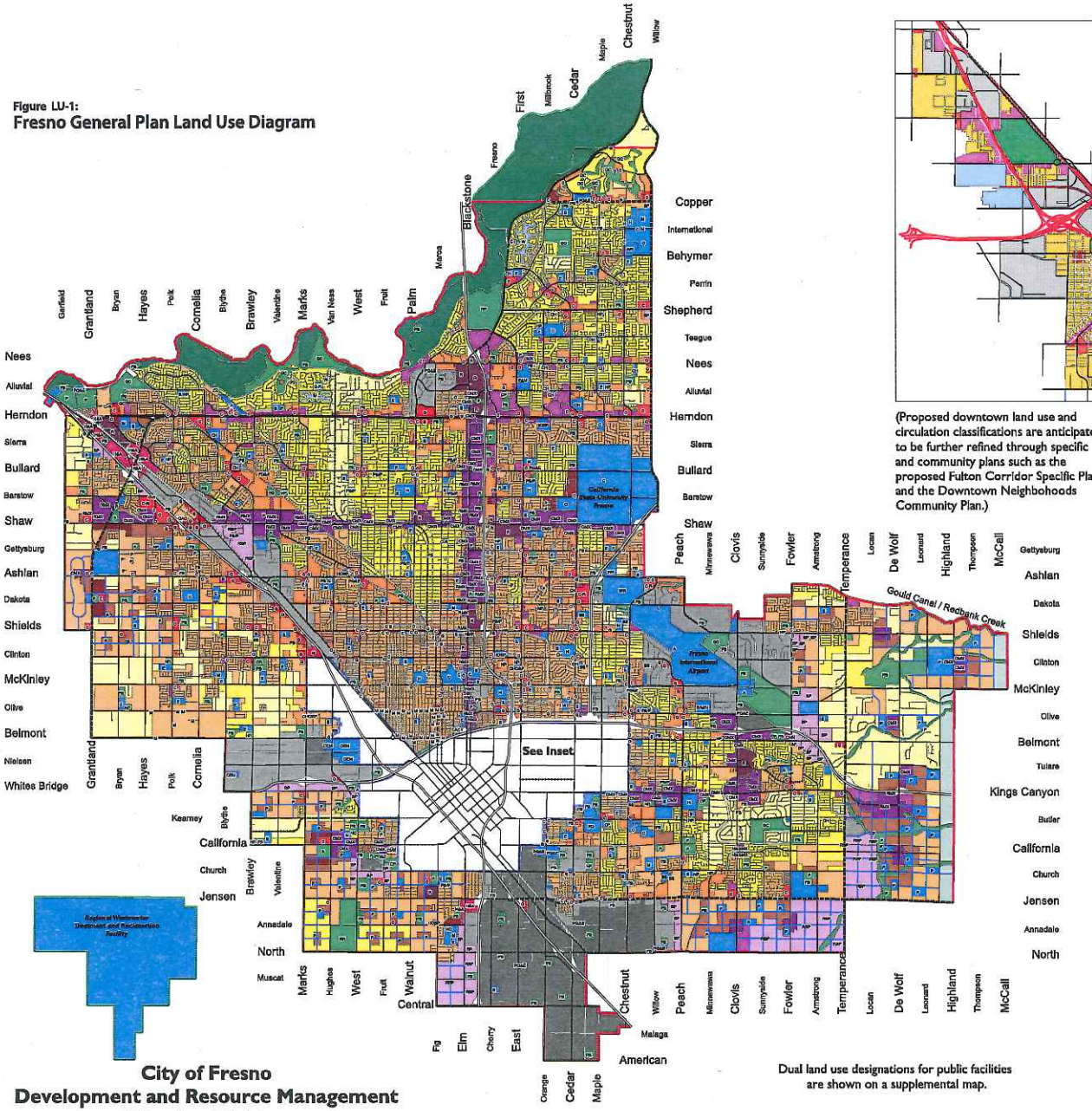
Sincerely,

Robyn Tusan-Jinkerson

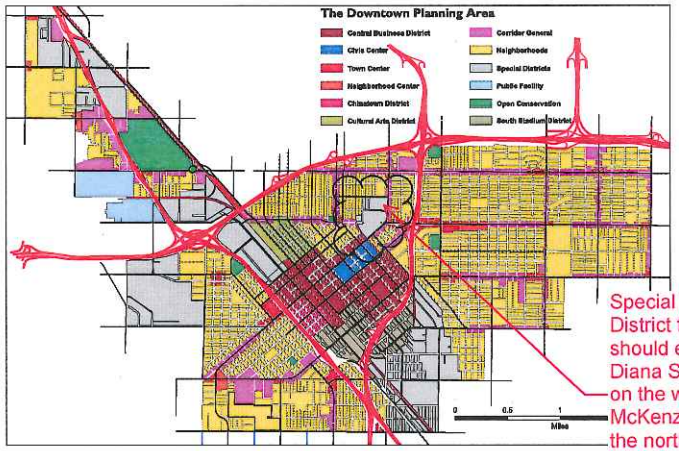
Robyn Tusan-Jinkerson
Director, Business Planning and Real Estate

EXHIBIT "A"

Figure LU-1:
Fresno General Plan Land Use Diagram



City of Fresno
Development and Resource Management
Planning Division



(Proposed downtown land use and circulation classifications are anticipated to be further refined through specific and community plans such as the proposed Fulton Corridor Specific Plan and the Downtown Neighbohoods Community Plan.)

Special Hospital District for CRMC should extend from Diana Street/RR tracks on the west and south, McKenzie Avenue on the north and Fresno Street on the east and south.

LEGEND

RESIDENTIAL
- Low Density (1-3 D.U./acre)
- Medium Low Density (3.5-6 D.U./acre)
- Medium Density (6.0-12 D.U./acre)
- Medium High Density (12-16 D.U./acre)
- Urban Neighborhood (16-30 D.U./acre)
- High Density (30-45 D.U./acre)

COMMERCIAL
- Main Street
- Community
- Recreation
- General
- Highway & Auto
- Regional

EMPLOYMENT
- Office
- Business Park
- Regional Business Park
- Light Industrial
- Heavy Industrial

MIXED USE
- Corridor/Center Mixed Use
- Regional Mixed Use
- Neighborhood Mixed Use

OPEN SPACE
- Clear Zone
- Commercial-Recreational
- Community Park
- Flood Control Project
- Golf Course
- Lake, Pond
- Multi-Use
- Neighborhood Park
- Outdoor Environmental education area
- Open Space
- Park
- Ponding Basin
- Ponding Basin (Park use)
- Regional Park

PUBLIC FACILITIES
- Public/Quasi-public Facility
- Special School
- Elementary School
- Elementary & Middle School
- Elementary, Middle & High School
- Middle School
- High School
- College
- School with Park
- Airport
- Cemetery
- Church
- Community Activity Center
- Convalescent Hospital
- Fairgrounds
- Fire Station
- Government Offices
- Hospital
- Medical Center
- Neighborhood Center
- PG & E Substation
- Police Dressing Station
- Water Recharge Basin
- Waste Water Treatment Facility

BUFFER
- Buffer

BOUNDARIES
- Existing Fresno Sphere of Influence
- Fresno Planning Boundary
- Downtown Neighborhoods

v. 11/05/2012

Circulation Legend
- Freeway
- Expressway
- Scenic Expressway
- Connector
- Super Arterial
- Arterial
- Scenic Arterial
- Ramp
- Scenic Drive
- Collector
- Scenic Collector

Dual land use designations for public facilities are shown on a supplemental map.

EXHIBIT "B"

Fresno Street. It is intended for moderate intensity housing and neighborhood services, while also accommodating automobile-oriented commercial uses. New buildings will be block-scale and house-scale, up to three stories in height, and located at or near the sidewalk to generate more pedestrian activity. Buildings will vary in size and type, but be compatible in massing and scale with adjacent buildings. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Living rooms, dining rooms, and other formal rooms will face the street. Ground floor uses will include housing, as well as commercial, retail and office uses. Upper floors will be for housing, office, or additional commercial uses.

Neighborhood (General, General Preservation, General Revitalization, Edge)

The Neighborhood designations are applied to areas outside of the Downtown CBD. These areas include the Lowell neighborhood; much of the southwest and Southeast neighborhoods; the "L" Street area and the Huntington Boulevard area east of Downtown Core; the Jefferson Neighborhood; areas south of Elm and B Streets in southwest; several Southeast neighborhoods adjacent to State Route 180; and areas west of State Route 99, including the Jane Addams area. New buildings will be house-scale, up to two stories in height, and some buildings may be up to two and one-half stories. All buildings will set back from the sidewalk to provide a buffer between the sidewalk and the dwellings. Living rooms, dining rooms, and other formal rooms will face and activate the street. Other house-scale buildings are compatible in these neighborhoods when scaled and massed in relation to the predominant single-family houses. Buildings will be occupied with residential uses, limited live/work uses, and home occupation activity.

Special Districts

The Special Districts designation is applied to areas that are best suited for a variety of moderate to intense industrial and manufacturing activity. These areas are comprised primarily of large and varied building sizes with substantial activity from large cargo vehicles. New buildings will be block-scale, up to eighteen stories in height (hospitals), and located with a portion, or all, of their frontage at or near the sidewalk. Ground floor activity will range from industrial and manufacturing uses and outdoor assembly to offices. Included in the Special Districts designation are General Industrial (1 & 2); Chandler Airport between Kearney Boulevard, and Thorne Avenue and Whitesbridge Road, and Downtown Hospital that includes the hospital campus and surrounding streets such as Fresno Street, Illinois Avenue, Clark Street, and Divisadero Street.

Special Hospital District for CRMC should extend from Diana Street/RR tracks on the west and south, McKenzie Avenue on the north and Fresno Street on the east and south.

EXHIBIT "C"

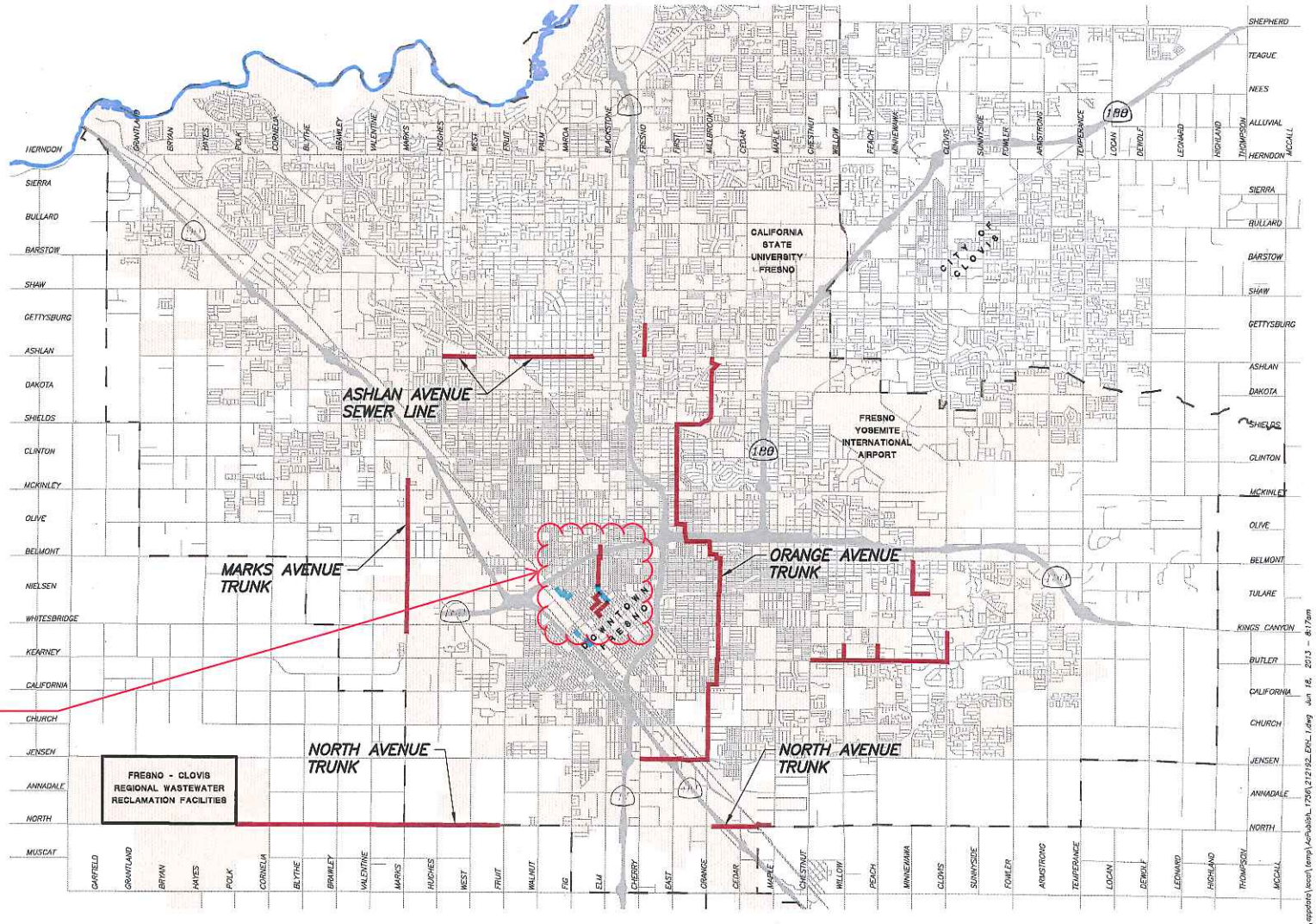
CITY OF FRESNO MEIR

PRELIMINARY WASTEWATER MODELING RESULTS

FIGURE 1.1

Blair, Church & Flynn CONSULTING ENGINEERS

Scale: 1"=1.5 mi



LEGEND:

- SEWERS WHERE PRELIMINARY MODELING INDICATES POTENTIAL CAPACITY DEFICITS
- SEWERS WHERE FULTON CORRIDOR SPECIFIC PLAN EIR TECHNICAL REPORT INDICATE POTENTIAL CAPACITY DEFICITS
- STREET CENTERLINES
- FRESNO SPHERE OF INFLUENCE
- FRESNO CITY LIMITS

NOTES:

1. FUTURE FLOWS BASED ON GENERAL PLAN UPDATE LAND USES.

The sewer modeling study of pipelines in downtown Fresno concludes that some pipes downstream of the CRMC campus will have capacity deficits in the future. Further, MM USS-7 addresses mitigation by suggesting a moratorium. "Prior to exceeding capacity within the existing 28 pipeline segments...City shall evaluate... and not approve further developing that would generate additional wastewater and exceed capacity...until capacity is provided."

This MM should be expanded to require the City to develop a Capital Improvement Program and funding mechanism to complete these improvements.

SCALE IN MILES
0 0.75 1 1.5 3.0

C:\Users\Joshua\appdata\local\temp\AcPublish_1756\212152_EXH_1.dwg Jun 18, 2013 - 8:17am

THIS PAGE INTENTIONALLY LEFT BLANK

Letter O: Community Medical Centers, Robyn Tusan-Jinkerson, October 9, 2014

Response to Comment O-1
This comment requests that the entire portion of the Community Regional Medical Center Master Plan (Master Plan) area be designated as Special District. It is correct that the entire Master Plan area is not designated on the General Plan Land Use Diagram. During the preparation of the Downtown Neighborhoods Community Plan (DNCP) which is an ongoing process, the City will refine the Community Plan land or Development Code to allow for hospital uses for this area.

Response to Comment O-2
This comment refers to the proposed land use designation for the portion of the Community Regional Medical Center Master Plan area that is not designated as Special District. Please see Response to Comment O-1 regarding the land use change.

Response to Comment O-3
This comment states that there is a Level of Service Discrepancy between the City and Caltrans standards. There is no discrepancy. The City understands that the Level of Service standard for Caltrans facilities is LOS D or better. The City will be working with Caltrans on the level of service on their facilities. However, level of service (LOS) F will be acceptable for facilities in the Downtown area identified as TAZ I under the jurisdiction of the City.

This comment also expresses support for the implementation of Policies MT-2-j and MT-2-l. This support is noted, but to clarify, these policies are not mitigation measures, but they are project design features.

Response to Comment O-4
The commenter requested that the City acknowledge the potential for future growth within the Community Regional Medical Center Master Plan area (Master Plan). The City acknowledges the potential for future growth. Since the Master Plan area is located within TAZ I zone as defined in Policy MT-2-I, the level of service (LOS) threshold for City roadways within the Downtown Neighborhoods Community Plan (DNCP) area that encompasses the Master Plan is LOS F. The addition of growth within the Master Plan area will not cause additional significant impacts on the City roadways within the DNCP area.

Response to Comment O-5
This comment requests the development of a Capital Improvement Program and funding mechanism to complete sewer improvements where needed. The development of a Capital Improvement Program is one option that the City has available to improve sewer pipelines. As detailed planning occurs during the DNCP and Fulton Corridor Specific Plan process, specific improvements will be identified and funding mechanism will be proposed.

THIS PAGE INTENTIONALLY LEFT BLANK

From: diane.b.merrill@comcast.net [diane.b.merrill@comcast.net]
Sent: Thursday, October 09, 2014 3:00 PM
To: General Plan
Subject: Comments from Diane Merrill on Draft General Plan

Date: October 9, 2014
To: Jennifer K. Clark, AICP, Director, Development and Resource Management Department
From: Diane Merrill, N Colfax Ave., Fresno 93720
Re: Comments on City of Fresno Draft General Plan
I am commenting on the City of Fresno Draft General Plan on my own behalf as a resident and taxpayer of the City of Fresno for last 32 years.

1).Traffic, Air Quality and Urban Sprawl

I live one block away from the Friant Road/Audubon Drive intersection. I am concerned that traffic safety and traffic congestion along Friant Road in the City of Fresno, will be made worse by increased urban sprawl if the City's sphere of influence (SOI) is extended beyond its current northeast SOI.
Another health and safety concern is the compromised air quality when cars idle in congested traffic conditions along Friant Road.

- The Friant/Audubon intersection's **F safety rating** is a safety concern for those living in the neighborhood that frequently pass through this intersection.
- Several years ago the off-ramp on the east side of Freeway 41 at Friant Road was enlarged. One of the reasons for the enlargement was to address a **hazardous situation** with cars on the off-ramp backing–up all the way onto the freeway. This resulted in rear end collisions involving cars that were stopped on the freeway due to the clogged off-ramp. I know of at least one teenager who totaled her family's car in one of these collisions.
- Fast-forward to the summer of 2014, and I have witnessed cars backing-up onto the freeway once again despite the enlarged off-ramp. This occurs intermittently during the evening rush hour. I could observe no other cause for the back-up other than the high volume of traffic exiting the freeway to head northeast on Friant Road. This situation has continued even after the synchronization of traffic signals along Friant Road.

P-1

The safety issues, gridlock, and poor air quality can only get worse if the General Plan allows for new development along the Friant Corridor beyond the City's current SOI.I urge the City to retain the current SOI.
I also urge the City to measure, and take into serious consideration in this General Plan, traffic and air quality conditions along Friant Road during peak morning and evening commute hours. This should be in addition to any measurements of daily air quality and traffic conditions.

2). Urban Heat Island

I would encourage the City to do more in the General Plan to address the impact of the urban heat island (UHI) effect, as evidenced by weather reports indicating that nighttime

P-2

high temperatures in the summertime in City of Fresno are frequently several degrees warmer than temperatures in other communities in the area. The urban heat island effect serves to increase nighttime air conditioning usage at the same time that electricity from solar photovoltaic installations is reduced or not available.
I support actions mentioned in the General Plan to reduce the UHI effect including:

- Green Street Tree Planting. (Buildings and Design Section 3.6)
- Complete Streets that include a substantial tree canopy. (Buildings and Design Section 3.6)
- Reduce surface parking through incentives to replace existing large surface parking lots in center with parking structures (Buildings and Design Section 3.6). This should be done in areas where the parking garages would have high levels of usage (unlike the parking garage near the Saroyan Theater).
- Placement of solar panels on shade structures over parking areas.

Note: Shading or other means of reducing heat build-up should be required in new parking lots, and encouraged through incentives or other means, in existing lots.

P-2
CONT

Trees are an important tool in reducing the UHI effect. **The City needs to implement water policies to assist residents and business owners to provide enough water to maintain valuable trees, especially street and parking lot trees, to keep them alive during drought conditions.** If the current drought continues through the winter and outside watering is prohibited during fall/winter months, many valuable trees will die. If large numbers of street trees die, will the City be faced with significant costs for removing trees to reduce the safety hazard to drivers and pedestrians?
The City should adopt General Plan policies to move away from water hogging trees, such as coastal redwoods, and toward trees that use less water and are more adapted to our climate. The City should lead this effort by taking steps to phase in water conserving trees on City-owned properties, and should encourage property owners to do the same through incentives, or other means.

Respectfully submitted,

Diane Merrill

Letter P: Diane Merrill, October 9, 2014

Response to Comment P-1

This comment raises a concern about extending the City's sphere-of-influence (SOI) beyond the current northeast (SOI) and therefore causing possible traffic safety and traffic congestion along Friant Road. The General Plan Update does not include a modification to the City's existing SOI. In addition, under a cumulative plus project scenario that includes full buildout of the General Plan Update (i.e., the year 2056). Friant Road is projected to operate at LOS D during the AM and PM peak hours as shown on Exhibits 5.14-7 and 5.14-8 in the Draft Master EIR. LOS D is the acceptable level of service for the northeast area of the Planning Area.

Response to Comment P-2

This comment requests that that the General Plan reduce the Urban Heat Island Effect and supports actions provided in the General Plan Update. This comment expresses a desire for the City to allow enough water to maintain valuable trees and include policies to promote the use of trees that use less water and are more adapted to Fresno's climate. These comments are on the General Plan Update, but are not specific comment on the environmental conclusions of the Draft EIR; therefore, no response is required. (CEQA Guidelines, Section 15088.)

THIS PAGE INTENTIONALLY LEFT BLANK

DIRK POESCHEL
Land Development Services, Inc.
923 Van Ness Avenue, Suite 200 • Fresno, California 93721
559/445-0374 • Fax: 559/445-0551 • e-mail: dpoeschel@dplds.com

October 10, 2014

Ms. Jennifer Clark, AICP
Director City of Fresno
Development & Resources Management Department
2600 Fresno Street, Room 3065
Fresno, CA93721

SUBJECT: City of Fresno 2030 General Plan Update – Draft Master EIR
Request for Analysis of the Intersection of S. Cedar and E. American Avenues

Dear Jennifer,

The intersection of S. Cedar and E. American Avenues exists at the southern boundary of the City of Fresno's Sphere of Influence. As you may be aware, as part of the California High Speed Rail Authority's project, an over crossing of State Route 99 is planned at E. American Avenue. My clients, the trustees of The KR Trust and The Sidhu Family Trust, own the property at the southeast corner of the subject intersection. They are most concerned about the ultimate configuration of that intersection and its related environmental impacts.

As you are aware, S. Cedar Avenue and American Avenue are part of your adopted General Plan Circulation element. To accommodate the aforementioned high speed rail project, it appears highly likely that the intersection will be radically changed from its current configuration requiring, among other things, additional right of way. Details of the subject intersection configuration and an assessment of potential environmental impacts were not provided in the Draft Master Environmental Impact Report prepared for the City of Fresno's General Plan Update. It is reasonable to assume increased traffic, noise, air quality and related adverse impacts may occur as a result of the aforementioned project. Q-1

Therefore, I respectfully request the City of Fresno define the necessary modifications to the subject intersection to be constructed as part of the California High Speed Rail Authority's project. I also request the city assess those modifications in the City of Fresno's current General Plan Update Draft Master Environmental Impact Report.

Thank you for your consideration of this request.

Sincerely,

Dirk Poeschel

Dirk Poeschel, AICP
cc: Lauren Layne, Esq.

THIS PAGE INTENTIONALLY LEFT BLANK

Letter Q: Dirk Poeschel, October 10, 2014

Response to Comment Q-1

This comment expresses a concern regarding the High Speed Rail Authority's project effect on the S. Cedar Avenue and American Avenue intersection. The HSR project is identified as a cumulative project in the Draft Master EIR and was evaluated in the cumulative impacts analysis in the Draft Master EIR. This analysis included an evaluation of the roadway levels of service. No intersection analysis has been conducted as part of the General Plan Update since turning movements associated with individual projects are based on specific uses proposed within the General Plan land use category. As the HSR Project is proposed, the potential impacts on the study intersections and needed improvements would be required to be assessed.

August 17, 2014

Jennifer Clark,
AICP, Director, Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93721

RE: Comments to Draft 2035 City of Fresno General Plan

Dear Ms. Clark,

Thank you for the opportunity to provide input to the Draft 2035 Fresno General Plan ("Draft Plan"). Fresno Building Healthy Communities (Fresno BHC) submits these comments and recommendations as a collaborative of community based organizations representing over 90,000 residents living in southeast, central and southwest Fresno. Fresno BHC intends to transform our neighborhoods into healthier communities. Where we live, work, learn and play has a profound impact on our health and we are taking action to create one safe and healthy community, one safe and healthy Fresno.

As you may know, Fresno BHC partners and residents have participated in the general plan update process over the last three years. We have participated in a number of community workshops hosted by community partners and City officials, planning commission meetings and City Council workshops and hearings. We look forward to continuing to work with the City to adopt a plan that truly addresses the needs and leverages the opportunities of existing neighborhoods.

We commend City of Fresno staff and officials for the tremendous amount of work to date. We recognize the importance of creating a vision for the future that invests in existing communities and plans for future population growth. While the Draft Plan contains goals aimed at creating a healthier, more equitable Fresno it does not go far enough to meaningfully address historic disparities and unequitable practices impacting existing neighborhoods.

R-1

We submit the following comments and recommendations to assist the City in adopting a final general plan that meets the needs of all City residents with a focus on Central, Southeast and Southwest Fresno. Our recommendations ensure that the City's own stated goals of creating healthy, thriving and economically vital neighborhoods become reality.

Though the comments and recommendations in this letter are relevant to the Draft Master Environmental Impact Report (Draft MEIR) for the Draft Plan and Development Code Update, the comments do not directly address the Draft MEIR. We will follow this letter with separate letter directly addressing the MEIR and related issues prior to the September 8th deadline.

The City Must Support Its Commitment to Investing in Existing Communities through Clear and Enforceable Policies and Implementation Measures

The Current Infill Policy is Vague and Unenforceable

The Draft Plan's themes of balanced growth and investment and revitalization of existing communities were embodied in General Plan Alternative A Modified that was adopted by the City Council in Spring of 2012. That alternative resulted from broad and informed community input including participation by Fresno BHC in workshops and hearings over the course of many, many months. The adoption of General Plan Alternative A Modified was heralded by many as a historic vote and a historic moment representing a commitment by the City of Fresno to prioritize infill over new growth. However, despite that vote, and despite the Draft Plan's stated intentions to achieve balanced growth it falls short of making this any more than an aspiration.

R-1
CONT

Objective UF-12, the cornerstone objective regulating growth under the Draft Plan, is vague and unenforceable and lacks real commitment from the city to truly invest in existing neighborhoods and in particular those neighborhoods that represent the focus of this correspondence. UF-12 reads:

> "Locate roughly one-half of future residential development in infill areas – defined as being within the City on December 21, 2012 – including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land."

At first view, Objective UF-12 indicates that about half of future development must occur in infill areas, keeping with the commitment made by the City with the adoption of Alternative A-Modified. However, as defined in the Draft Plan, the term "roughly" allows for broad deviation from a given figure by up to 30% or more.
Thus, infill levels under UF-12 could range from less than 20% of future residential development to over 80% of such development. Such range of permissible infill levels does not provide for

enforcement of future implementation and conflicts with the Draft Plan's stated commitment to balanced growth.[1]

The City's General Plan initiation draft called for 57% of residential units to be built within city limits[2]. To maintain the City's commitment to residents and key stakeholders and to allow for internal consistency of the Draft Plan, we recommend Objective UF-12 be revised to read:

> "57% or more of future residential development shall be located in infill areas – defined as being within the City on December 21, 2012 – including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land."

<u>The Draft Plan Fails to Specify Monitoring Programs and Requirements with Respect to New Growth</u>

The Draft Plan's Implementation Chapter adds to the inefficacy of UF-12's directive that "roughly half" of future residential growth be located in infill areas. The Implementation Chapter states:

R-1
CONT

> "Following adoption of the Fresno General Plan, the City will focus on infill development and new development within the city limits, as well as new development within Growth Area 1 based on planned infrastructure expansion, public service capacity, and fiscal considerations. Growth Area 2 needs critical infrastructure improvements, and the City does not anticipate that funding for Growth Area 2 can be committed in the near-term. To this end, the City will need to establish a way to monitor investment within the city limits and Growth Area 1 before approving the

[1] Notably, Draft Plan Objective UF-12 contrasts with UF-12 as set forth in the General Plan Land Use, Urban Form, and Design Chapter Preliminary Workshop Discussion Draft, which reads, "Locate 45% or more of future residential development in infill areas – defined as being within the boundary of the Fresno City Limits as of December 31, 2012…". The phrase "45% or more" is clear and unequivocal as compared to the phrase "roughly half" contained in Draft Plan Objective UF-12.

[2] City of Fresno General Plan Initiation Draft, pg. 7. Table 1 tracks the existing and additional housing units expected under the General Plan buildout. As shown, approximately 171,000 units currently exist in the Planning Area. The General Plan is intended to accommodate an additional 76,000 units, through both infill development and growth area development. In total, General Plan buildout will result in approximately 247,000 housing units in the Planning Area. Around 43,500 of these new units, or 57 percent, would be located in the existing City limits, including the Downtown as defined on the Land Use Diagram inset.

opening of Growth Area 2. The Administration will prepare options for the Council to consider for such a program.

"...Whatever form is ultimately adopted, the City should implement an easy-to-track, objective, transparent measurement that can be used to determine the appropriate timing for opening Growth Area 2 for new growth. The City will use "strategic phasing" to achieve the overall goals of the plan, as opposed to annual limits of some sort that place unrealistic controls on the local market" (12:27)

This discussion does not provide for any form of monitoring to track relative proportions of infill and growth area development as Growth Area 1 is developed. In fact, the discussion indicates that any development in Growth Area 1 is permissible regardless of the level of development that has occurred within infill areas. The Final Plan must contain policies to limit development in growth area 1 to fulfill stated goals of prioritizing infill development.

The Draft Plan must include implementing policies and actions that (1) clarify how levels of infill development and development in growth areas will be measured, (2) provide for ongoing monitoring and reporting as called for by UF-12's commentary[3], and (3) establish mechanisms to ensure the achievement of clear infill targets which prohibit greenfield development and development in Growth Areas 1 and 2 where it would result in or contribute to existing failures to achieve infill goals and, (3) Establish a public process by which residents and interested stakeholders can monitor progress.

R-1
CONT

Establish an Infill Opportunity Working Group to Ensure Equitable Implementation of the Final General Plan

The Final Plan should include policies and implementation necessary to create an Infill Opportunity Working Group ("Working Group"). Our work with community partners has demonstrated strong interest for new and meaningful opportunities to inform and monitor General Plan implementation. We believe that a Working Group composed of a broad range of constituents such as residents, City officials and representatives from other sectors will be critical to creating prosperous, healthy communities.

[3] The Planning Director will provide an annual report to City Council, and prepare, every five years, an updated plan for achieving this goal, with recommended appropriate policy amendments and also new implementation strategies necessary to meet this goal by 2035.

The General Plan Should Promote Affordable Housing Opportunities in Neighborhoods throughout the City

Provide Access to High-Quality Affordable Housing throughout the City including in Growth Areas

The Draft Plan recognizes the need for increased affordable housing opportunities for low and medium-income residents throughout the City and in Growth Areas. However, the Plan must do more to address Fresno's historic and ongoing racially concentrated poverty through clear policies and implementation actions to ensure that the City meets the housing needs of all of its residents.

We recommend that the final plan include the following policies to increase access to affordable housing throughout the city:

- Adopt an inclusionary zoning ordinance that requires that at least 20% of housing units in new growth areas are affordable to low, very low and extremely low income residents.
- Provide incentives for and assist developers in the pursuit of financing to support the inclusion of housing affordable to low income populations in all residential development projects.
- Undertake a nexus study to determine an affordable housing impact fee appropriate to mitigate new market-rate housing development.
- Develop and implement a housing impact fee program to support an affordable housing trust fund that can assist in the financing of affordable housing units in high opportunity neighborhoods

R-1
CONT

The General Plan Should Prevent Overconcentration of Low-Income Housing in Low-Income Neighborhoods

For many years, community partners and residents have voiced concern over the concentration of low income housing in Southeast and Southwest Fresno. Throughout various city workshops and hearings, residents from these neighborhoods expressed strong desire for increased mixed income housing opportunities. The City must ensure that the Final General Plan contains policies to both address and eliminate conditions hindering development of mixed income housing in target neighborhoods as well as proactively promote and incentivize development of mixed income housing in the same.

To achieve this, we recommend the addition of the following policies to the Draft Plan:

- Prohibit land use designations that would result in disproportionate residential density in low-income neighborhoods compared to other neighborhoods.
- Identify and mitigate impediments for the development of mixed income housing in low income neighborhoods.
- Provide incentives for the development of mixed-income housing in low-income neighborhoods.
    - *The City can draw on programs such as the Measure C Transit Oriented Development fund to create similar incentives for development of mixed income housing in low income neighborhoods.*

Protect Existing Residents from Displacement

The City will experience significant population growth over the life of the General Plan. The Draft Plan calls for increased investment in the Downtown area and surrounding neighborhoods, implementation of Bus Rapid Transit and the potential development of High Speed Rail and a High Speed Rail station in the Downtown area. These actions will likely increase housing costs that may displace existing residents in the surrounding area, particularly low income residents. The Draft Plan fails to analyze, discuss or otherwise address potential housing cost increases and resulting displacement. The final plan must include specific, measurable policies and implementation actions that will prevent physical and economic displacement of existing low income residents.

R-1
CONT

The Plan Must Promote High-Quality Parks and Open Space in Underserved Neighborhoods

Fresno BHC places great importance on access to parks and open space to improve the overall health of our communities. Established neighborhoods south of Shaw are areas with the least access to parks and open space when compared to neighborhoods north of Shaw. In cases where parks and recreational opportunities are available, community residents experience malfunctioning or non-existent sports equipment, closed and/or poorly maintained public restrooms and poorly maintained field or grass areas.

The Draft Plan fails to prioritize and identify concrete implementation actions that address such deficiencies. In fact, policy POSS-2 calls for recreation opportunities near freeway corridors. Such a policy must be eliminated or significantly modified as it threatens the health and well-being of city residents and unnecessarily increases exposure to poor air quality and particulate matter.

While the Draft Plan includes policies aimed at improving park access in established neighborhoods, it falls short of prioritizing efforts for neighborhoods with least access to parks and open space.

The City must prioritize improving access to parks and open space in established communities, particularly for low income neighborhoods. The final plan must call for permanent funding sources and financing mechanism to properly plan for, design, construct and maintain park land. The City must also seek to address deficiencies in neighborhoods with the greatest need in the next 5-10 years as opposed to the proposed 10-20 year timeline proposed in the implementation chapter. Addressing deficiencies in the near term will assist the City's efforts to create complete and healthy neighborhoods in historically neglected areas.

Mitigate and Prevent Over-Concentration of Business Park and Industrial Land Uses in and Disproportionately Burdened Communities

For decades, community residents have expressed to city officials that Southeast and Southwest neighborhoods are disproportionately burdened by industrial uses and continue to be disproportionately zoned for industrial facilities, agricultural uses, solid waste facilities, hazardous waste sites and other polluting land uses as compared to other neighborhoods. In fact, the recently released Communities Environmental Health Screening Tool ("CalEnviroScreen") created by the California Communities Health California Environmental Protection Agency ("CalEPA") and the California Office of Environmental Health Hazard identifies California communities that are disproportionally burdened by multiple sources of pollutions. South Fresno neighborhoods are among the top 5% of most impacted communities in the entire state. As evidenced by the CalEnviroScreen findings among other data and studies, current land-use patterns in South Fresno, and West Fresno in particular, pose a significant hazard to human health and safety.

R-1
CONT

Despite decades of numerous requests by community residents to the City to mitigate unhealthy land uses and rezone their neighborhoods to promote healthier land uses, the Draft Plan proposes to continue to disproportionately site industrial uses in and around Southeast and Southwest Fresno. The heavy industrial land use designations in South Fresno comprise all of the heavy industrial land use designations on the General Plan's Land Use Diagram, with the exception of a relatively small area in central east Fresno south of the Fresno Yosemite International Airport (which is bordered by light industrial, mixed use, and open space designations). The Land Use Diagram includes all three industrial land use categories - heavy industrial, light industrial, and business park - in the midst of only one Fresno neighborhood – West Fresno.

While the Draft Plan attempts to use Regional Business Park and Business Park land use designations as buffers between industrial and residential land uses, such designation allows for a variety of uses

associated with environmental impacts that negatively affect nearby residences and sensitive receptors. Examples of uses permitted in Regional Business Park under draft Development Code Update articles[4] include Limited Industrial, Research and Development, Indoor Warehousing and Storage, Outdoor Storage, Wholesaling and Distribution, Freight/Truck Terminals, Light Fleet-Based Services and Warehouses, and Minor Utilities *by right* and Airports and Heliports and Major Utilities by conditional use permit.

The Light Industrial land use designation accommodates a diverse range of light industrial uses, including limited manufacturing and processing, research and development, fabrication, utility equipment and service yards, wholesaling, warehousing, and distribution activities. 3:41. Light Fleet-Based Services include businesses that rely on fleets of vehicles for their operations. Development Code Update Revised Module 3, p. 51. Minor utilities include structures such as electrical distribution lines and underground water and sewer lines. Major Utilities include "Generating plants, electric substations, solid waste collection, including transfer stations and material recovery facilities, solid waste treatment and disposal, water and wastewater treatment plants, and similar facilities of public agencies or public utilities". *Id.*

Taken together these designations continue the practice of placing undesirable land uses in low income communities. Community residents and partners have repeatedly expressed to the City that these practices will further degrade the quality of life and overall health of Southeast and Southwest Fresno neighborhoods.

R-1
CONT

The Final Plan must address and mitigate the current concentration of undesirable land uses and adopt policies and implementation actions that will lead to community based processes to determine appropriate land use designations in the most impacted neighborhoods. The Final Plan must also conduct an analysis of impediments to revitalization and create an action plan to address such findings. The City must also identify funding sources and other incentives such as capital infrastructure financing and reduced impact fees to support true revitalization efforts. The Final Plan must also call for a rezone of the Draft Plan's current land use designation to eliminate any and all land uses that result in negative cumulative effects or negatively impact residents' health and well-being.

Fresno BHC hopes to enter into a collaborative partnership with the City, as described in the Draft Plan's Healthy Communities chapter, to engage residents in a community based process that we

[4] Revised Module 3 District Purpose Statements and Use Regulations ("Development Code Update Revised Module 3"), provided to the Development Code Update Technical Advisory Committee on August 12, 2013.

believe will respond to multiple requests to invest to promote health and vibrancy in these neighborhoods.

Provide Affordable and Equitable Multi-Modal Transportation Service to all Fresnans

A safe, efficient and affordable transit system is critical to connecting neighborhoods to critical destinations such as employment centers, recreation centers, civic centers, medical care, shopping centers and educational institution. Community residents have also expressed great interest in improved transportation service and pedestrian and biking infrastructure to access essential services such as those mentioned above. The Final Plan must ensure that the City operates an efficient transportation system that not only connects residents to critical services but one that also seamlessly connects bus service to Bus Rapid Transit corridors and potentially High Speed Rail. The Final Plan must also contain policies and implementation actions geared towards regional collaboration to provide for well-coordinated transportation programs throughout the region. The Final Plan must also incorporate measurable performance indicators to determine quality of service and effectiveness of polices. Such indicators may include: annual performance reports to the city council, updated maps of transit service and amenities, track standard service enhancement such as changes in routes, increase/decrease in service frequency, placement of bus stops, shelters, sidewalks and bike lanes, cost effectiveness, ridership projections and annual performance standards to assess policy effectiveness.

We recommend the following policy revisions and additions to assist the City in its efforts to provide a safe, efficient and equitable transportation system that meets the needs of all Fresnans:

R-1
CONT

- The City shall allocate **30%** of all Federal, State, and local transportation funds to transit for capital investment, operations and maintenance.
- The City shall impose impact fees on all new development to pay for the cost of transit services to the new development.
- Revise MT-8-d to Facilitate Use of Multiple Transportation Modes. Plan, design and construct improvements that promote single and serial use of multiple transportation modes.
- Ensure that traditional transit service will connect to Bus Rapid Transit in ways that enhance traditional service.
- Revise MT-9-a to Provide Equitable Transit. Provide transit service that all riders are able to use regardless of age or disability.
- Revise MT-8-j to Expand transit service in low income neighborhoods that lack adequate service. Connect these neighborhoods with destinations referred to in Objective MT-8.
- Provide bus stop amenities on all routes, particularly in low income neighborhoods that lack bus shelters and benches.

Prioritize Investments and Revitalization Efforts in Low Income Neighborhoods

The Draft Plan calls for priority investment in established neighborhoods generally South of Herndon. While we recognize that there are needs and infrastructure deficiencies throughout our City we must focus investment and revitalization efforts in those neighborhoods that have been historically neglected. The Final Plan must contain policies that improve and expand basic infrastructure and revitalize those neighborhoods through infill strategies. The Final Plan must also contain specific implementation programs that create financial incentives for private and public sector investments to achieve revitalization goals. As previously mentioned, the City can draw upon the success of the Measure C TOD funding program to incentivize investment and work with community partners to apply for and advocate for planning and infrastructure grants from state and federal funding sources. As is recognized by city officials, low income neighborhoods lack the basic features of a complete, healthy community –grocery stores that offer fresh fruits and vegetables, health and medical services, employment opportunities that provide for upward financial mobility, sidewalks and streetlights, quality housing,
To meaningfully address such disparities, we recommend that the Final Plan include the following policy:

- Pursue all sources of funding for and prioritize basic infrastructure improvements in established neighborhoods within (1) neighborhoods in Fresno at or below 60% Medium Household Income (MHI) for Fresno County and (2) neighborhoods which rank within the top 10% of pollution-burdened census tracts under the Communities Environmental Health Screening Tool ("CalEnviroScreen") created by the California Communities Health California Environmental Protection Agency ("CalEPA") and the California Office of Environmental Health Hazard ("OEHHA").

R-1
CONT

The inclusion of this policy will allow for targeted investment and revitalization to the neighborhoods that can best leverage targeted investment.

Prioritize Farmland Conservation and Prevent Premature Conversion

Key to fulfilling stated goals of revitalization in established neighborhoods will be strong and enforceable farmland conservation policies. While the Draft Plan makes numerous mention of the importance of protecting this the foundation of our economy, it fails to meaningfully protect and mitigate for possible loss of land due to greenfield development. The Final Plan must contain enforceable policies to protect agricultural lands and prevent premature conversion for new communities. Adopting strong conservation policies will assist the City in meeting its goal to prioritize and revitalize established neighborhoods.

Reporting and Monitoring on the General Plan's Effectiveness

The City Planning staff shall provide City administrators and the City Council with an annual status report on the General Plan which incorporates quantifiable indicators such as transit ridership, infrastructure investments, infill and new growth statistics, water and energy conservation, number of incidents of hospital and clinic visits for respiratory problems and heart attacks, housing statistics and employment statistics in industrial clusters so that the City Council and City Administration can judge the success, or lack thereof, of the implementation of each of the City's General Plan policies to reach the City's goals as specified in the Fresno City General Plan.

R-1
CONT

* * * * *

We thank you for your consideration of our comments. We look forward to working with you to adopt a Final General Plan that creates One Healthy Fresno. Please feel free to contact me via email to sceledon@fresnobhc.org or by phone at (559) 392-6012 with any questions or comments relating to this letter.

Sincerely,

Sandra Celedon-Castro
Fresno BHC Hub Manager

Ashley Werner
Staff Attorney

/s/
Sabina Gonzalez
Regional Director

/s/
Amparo Cid
Director

Mary Curry
Chair

/s/
Nyla Zender
President

Margarita Rocha
Executive Director

Cesar Campos
Coordinator

Andy Levine
Executive Director

/s/
Daniel O'Connell, PhD
San Joaquin Valley Program Manager

Artie Padilla
Executive Director

Ben Wong
Executive Director

Yammilette Rodriguez
Senior Director

Laura Katie Moreno
Executive Director

Socorro Santillan
Executive Director

Letter R: Fresno Building Healthy Communities, Sandra Celedon-Castro, August 17, 2014

Response to Comment R-1

The commenter provides various comments on the policies provided in the Fresno General Plan but is not addressing the content of the Draft Master EIR. There is also a comment stating that increased investment in the Downtown area and surrounding neighborhoods, implementation of the Bus Rapid Transit, and development of High Speed Rail and a station would likely increase housing costs and may displace residents in the surrounding Downtown area. It is speculative to conclude that investment in the Downtown areas within Fresno would result in displaced residents since the Downtown area contains a substantial amount of high-density residential uses.

The commenter raises a concern that Policy POSS-2 in the Park, Open Space and Schools Chapter of the Draft Fresno General Plan encourages recreational opportunities near freeway corridors. Policy POSS-2-d identifies potential recreational opportunities near freeway corridors when there are opportunities to develop remnant parcels. Locations near freeway corridors could be one option of future recreational opportunities. These opportunities could occur outdoors or indoors. Not all outdoor open space constitute uses that would be adversely impacted by being sited near freeways; for instance, groundwater recharge and landscaping for visual buffering would not cause impairment of human health if they are located near a freeway. If the opportunities are outdoor and within a freeway corridor, Mitigation Measure AQ-2 identified on pages 5.3-60 and 5.3-61 in the Draft Master EIR could be required depending on the freeway corridor.

County of Fresno

Department of Public Works and Planning
Alan Weaver
Director

October 9, 2014

Jennifer K. Clark, Director
City of Fresno Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno CA 93722

Dear Ms. Clark:

SUBJECT: City of Fresno General Plan Update and Master Environmental Impact Report

The County of Fresno appreciates the opportunity to review and comment on the City of Fresno's General Plan Update and Master Environmental Impact Report (EIR). Based on the County's review of the project, the following comments are offered for your consideration:

Chapter 1: Introduction

13. Emphasize the City as a role model for good growth management planning, efficient processing and permit streamlining, effective urban development policies, environmental quality, and a strong economy. Work collaboratively with other jurisdictions and institutions to further these values throughout the region.

Positively influence the same attributes in other jurisdictions of the San Joaquin Valley—and thus the potential for regional sustainability—and improve the standing and credibility of the City to pursue appropriate State, LAFCO, and other regional policies that would curb sprawl and prevent new unincorporated community development which compete with and threaten the success of sustainable policies and development practices in Fresno.

It is important that the City recognize and acknowledge that existing County unincorporated communities exist and provide a full range of community services and employment opportunities similar to small incorporated cities, and offer an alternative for residents who desire to not live in a metropolitan area. While the County applauds the City for recognizing the inefficiencies of developing beyond its urban core, it seems premature to emphasize the City of Fresno as a role model for good growth management planning and effective urban development policies until the City demonstrates that the policies to curb urban growth expansion, promote infill development and promote investment in downtown and central Fresno have been effectively implemented. S-1

The County is concerned with statements and inferences that development in the unincorporated communities of Fresno County is promoting sprawl which would compete and threaten the sustainability of the City's development policies. These communities have also adopted boundaries, as well as policies, seeking to guide residential, commercial, and industrial development. Moreover, the State Housing and Community Development Department mandates that the County provide housing units to accommodate population growth in the County for all income groups, just as cities are so mandated. The unincorporated

communities are places where much of this housing development and associated facilities would occur.

S-1 CONT

Transportation & Traffic:

The General Plan Update proposes a number of street reclassifications that if approved would present potential inconsistencies with County classifications. These inconsistencies will impact development approved by the County within the Sphere of Influence (SOI) with regard to street improvements and requirements.

Incremental build-out of roadways may necessitate right-of-way acquisition from unincorporated parcels. These right-of-way acquisitions by the City on unincorporated areas should be for the minimum amounts required for incremental street improvements.

S-2

Roadway widening projects undertaken by the City should not negatively impact farming or livestock operations on remaining County parcels. The design of incremental roadway improvements should provide for continued unobstructed access for these County parcels, especially for any ongoing truck and trailer operations.

Individual projects within the SOI that require environmental review should be reviewed by Fresno County to ensure the proposed project does not significantly impact County transportation facilities. Projects that significantly impact County transportation facilities should pay their proportionate share for mitigation to reduce significant impacts to a less than significant level.

S-3

County-wide Services and Coordinated Planning Efforts:

The City's General Plan will have a direct fiscal impact on the County. The growth to be accommodated in the Plan will result in an additional population of approximately 425,000 persons by the year 2056. This significant increase in population will result in an increased service population for health services, social services, the justice system, and other county-wide services provided by Fresno County. The increased population will also impact and necessitate expansion of the County transportation system, recreational facilities, library system, and other County facilities to accommodate the increased growth.

S-4

The Fresno County General Plan promotes the updating of applicable County-adopted community plans following city adoption of a general or community plan. In this case, Fresno County has a number of adopted community plans for the City of Fresno. The greatest challenge to implementing this policy, however, is the lack of funding for the plan update process. Without funding, County staff does not anticipate initiating any community plan update process anytime soon. In staff's opinion, the only viable alternative, given the City's vested interest, is for the City to fund the County's community plan update process for lands within the City of Fresno's Sphere of Influence. This would ensure that the County's community plan update process occurs in a timely manner, and that the County can attempt to rely on the City's Master Environmental Impact Report to the extent possible.

The County is concerned that many existing rural parcels may be bypassed in favor of Greenfield parcels, thus potentially resulting in irregular urban growth patterns and rural/urban interface impacts. The City is encouraged to develop a comprehensive annexation program

S-5

that addresses annexation of both developed and undeveloped parcels. As previously expressed with certain City annexations, the County will be expecting the City to address coordination of services relating to code enforcement, emergency mutual aid response, traffic enforcement, illegally-dumped debris within County rights-of-way, and take responsibility for City-constructed infrastructure within County rights-of-way for by-passed unincorporated areas resulting from City annexations.

S-5
CONT

We appreciate the opportunity to comment on the project. If you have any questions you may email me at bsholars@co.fresno.ca.us or call me at (559) 600-4207.

Sincerely,

Briza Sholars, Planner III

cc. Alan Weaver, Director
Bernard Jimenez, Deputy Director
Dan Gibbs, Deputy Director
Will Kettler, Development Services
Chris Motta, Current Planning

BS:BJ:CM:ks:cwm
G:\4360Devs&Pln\EnvPlan\OAR\City of Fresno\2035 General Plan Update\Comment Letter.doc

THIS PAGE INTENTIONALLY LEFT BLANK

Letter S: County of Fresno Department of Public Works and Planning, Briza Scholars, October 9, 2014

Response to Comment S-1
This comment refers to the City of Fresno General Plan Update. The reference to the "Introduction" in the comment relates to the General Plan Update document. Since there are no specific comments on the environmental conclusions of the Draft EIR; no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment S-2
The commenter expresses concern regarding a conflict between City and County roadway classifications for future right-of-way acquisitions pursuant to the General Plan buildout. City roadway improvements (including the acquisition of right-of-way) within unincorporated County areas require permission from the County; the roadway improvement plans are reviewed and approved by County Public Works and Planning staff. This interagency consultation has mitigated potential conflicts between County and City roadway classifications and should continue to do so in the future. The County's Street Maintenance Agreement and Encroachment Permit processes provide tools for the County to ensure that impacts are prevented and are minimized if they cannot be completely avoided.

Roadway improvements within annexed areas would be implemented pursuant to approved development. In annexed areas, incremental roadway improvements are expected to occur as development occurs. Through environmental review, the County would be afforded the opportunity to request conditions and measures that would mitigate potential adverse impacts on existing land uses, including farming and livestock operations.

Response to Comment S-3
For any individual projects within the sphere of influence, Fresno County would either be a responsible agency, commenting agency, or lead agency under CEQA. In all of these cases, the County would have an adequate opportunity to review and comment on environmental documentation. The Regional Transportation Impact Fee (RTMF)program is administered through the Fresno County Council of Governments (FCOG). The RTMF is intended to ensure that future development contributes to its fair share towards the cost of infrastructure to mitigate the cumulative, indirect regional transportation of new growth in a manner consistent with provisions of the State of California Mitigation Fee Act.

Response to Comment S-4
The City acknowledges that the population growth anticipated under the General Plan Update would result in impacts to facilities. Section 5.13.5 of the Draft Master EIR provides an analysis of the physical impacts related to public services, specifically identifying the potential for impacts to: fire prevention, police protection, schools, parks and recreational facilities, courts, libraries, and hospitals. Therefore, the Draft Master EIR fully analyzes these impacts, and no additional analysis is required.

The commenter indicates that additional funding may be necessary in order to update the community plans for certain unincorporated areas. If the County requires updates of their

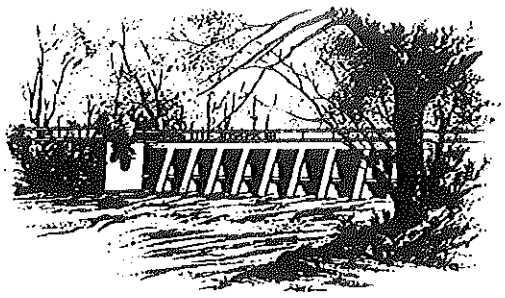
community plans as development occurs within the City of Fresno sphere-of-influence, the City acknowledges that the County may need to update the relevant plans. The provision of funding to update County area plans is an economic issue, and in accordance with CEQA Section 15131, a Lead Agency is not required to analyze economic impacts in a CEQA document. However, moving forward, the City is committed to collaborating with the County to identify potential funding sources and neighborhoods that would benefit from joint planning efforts, similar to the Fig Garden Community Transportation and Land Use Study which was a collaborative effort.

Response to Comment S-5

The commenter expresses a concern that many rural parcels may be bypassed in favor of greenfield parcels. The General Plan Update proposes to constrain "leapfrog" development by establishing criteria for opening new areas at the City fringe for development. However, it will not be possible to prevent bypassing of parcels because many are developed with rural residential uses, and owners of such parcels may not be willing to sell, and/or developers may be unwilling to purchase it based on economies of scale.

The commenter would like to encourage the City to develop a comprehensive annexation program. The City includes Objectives UF-12 and UF-13 that provide guidance for future development within the Planning Area. As areas are proposed for annexation, the City will review each project. Each project will need to undergo a CEQA review, and the County would be a commenting agency to review the projects. Moreover, the independent role of the Local Agency Formation Commission (LAFCO) will consider each project within the context of its annexation application.

Services such as and emergency mutual aid response, and law enforcement (including traffic patrols), have been, and continue to be, addressed through adoption of Mutual Aid agreements.



YOUR MOST VALUABLE RESOURCE - WATER

OFFICE OF
FRESNO IRRIGATION DISTRICT

TELEPHONE (559) 233-7161
FAX (559) 233-8227
2907 S. MAPLE AVENUE
FRESNO, CALIFORNIA 93725-2208

October 8, 2014

Jennifer K Clark, Director
Development and Resource Management Department
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721

RE: Draft Master Environmental Impact Report for the Draft General Plan for the City of Fresno and Related Items
FID Facilities: Various

Dear Ms. Clark:

The Fresno Irrigation District (FID) has reviewed the Draft Master Environmental Impact Report (DMEIR) for the Draft General Plan for the City of Fresno (Project). The Planning Area includes the City of Fresno, its sphere of influence (SOI), and land to the north adjacent to the SOI that serves as a logical boundary along Willow Avenue and east of the San Joaquin River, as well as land to the southwest of the SOI dedicated to the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF). The Project is an update to the City of Fresno General Plan since the last comprehensive update in 2002. The Fresno General Plan Update is intended to shape development within the Planning Area through 2035 and beyond, and the DMEIR is intended to identify the potential impact for the project. We appreciate the opportunity to review and comment on the subject documents for the proposed project. Your proposed project is a significant development and requires thorough and careful consideration of all of the potential impacts. Our comments are as follows:

Impacted Facilities

1. FID has many canals within the Project Area as shown on the attached FID exhibit map. The major facilities include: Briggs No. 7, Fancher No. 6, Mill No. 36, Hernon No. 39, and Dry Creek No. 75. FID's canals range from smaller diameter pipelines to large open canals. In many cases, the existing facilities will need to be relocated to accommodate new urban developments which will require new pipelines and new exclusive easements. FID anticipates it will impose the same conditions on future projects as it would with any other project located within the common boundary of the City of Fresno and FID. FID will require that it review and approve all maps and plans which impact FID canals and easements. T-1

2. FID's facilities that are within the Planning Area carry irrigation water for FID users, recharge water for the City of Fresno, and flood waters during the winter months. In addition to FID's facilities, private facilities also traverse the Planning Area.

BOARD OF DIRECTORS President RYAN JACOBSEN, Vice-President STEVEN BALLS
GEORGE PORTER, GREGORY BEBERIAN, JERRY PRIETO JR. General Manager GARY R. SERRATO

Water Supply Impact

3. The northern parts of the Planning Area is located within a portion of the County of Fresno that is outside of the FID service area. See the attached FID water service area maps for reference. FID does not supply surface water to those areas outside of the FID service area for the City's use. The City's Urban Water Management Plan was updated in 2010 and calls for the City to balance its water usage by 2025. It is unknown whether the Urban Water Management Plan will really be able to provide for the water consumption by development projects like the ones proposed within the Planning Area just on groundwater. If not, a balanced water supply will be more difficult to achieve and the potential impacts must be evaluated. T-2

4. The potential for increase in water consumption by the project will result in additional groundwater overdraft. As mentioned in the DMEIR, there is a significant cone of depression beneath the City of Fresno. The Urban Water Management Plan (UWMP) states that the City will have a balanced water supply by 2025, and the goal includes reducing the consumption of gallons per capita per day (gpcd) from 295 to 250. At full buildout, the consumption will be reduced from 250 gpcd to 215 gpcd. It is assumed that the users within the City, including those within FID, will be able and willing to use less water. Will that truly be the case? If not, FID is concerned that the increased water demand due to a change in land use will have a significant impact to the groundwater quantity and/or quality underneath the City of Fresno, FID and the Kings Groundwater Sub-basin. T-3

5. According to the City's Urban Water Management Plan, the City of Fresno is currently in the process of planning projects which will enable increased use of available surface water supplies and recycled water, and eliminate groundwater overdraft. It is projected that total water supplies and demands will be balanced by the year 2025. FID would like to see the City keep progressing with this goal, but FID is concerned that future development will inhibit the City's progress to balancing the water usage, if the necessary offsets for the increased water demands are not provided. T-4

6. For development outside of the areas allocated surface water supplies from FID, the Draft Master Environmental Impact Report should consider whether developers should be responsible to increase the groundwater recharge capabilities in the area and/or purchase of additional water supplies to offset the additional demand. The Hydrology and Water Quality Section (5.9) of the Draft Master Environmental Impact Report mentioned making improvements to recharge basins where surface water could be used to recharge the groundwater table. There are several improvements that could provide the necessary mitigation including constructing a new recharge basin in the nearby area, recycling more water, acquiring additional water supplies, and increasing the capacity of local recharge basins. T-5

7. As mentioned on Page 5.15-42 of the DMEIR, implementation of the General Plan and Development Code Update would not have sufficient water supplies available to serve the full buildout of the project and would result in a significant impact related to water supplies. As noted in Impact USS-4, water supply impact may be significant and unavoidable. T-6

8. As mentioned on Page 5.15-4 of the DMEIR, the City is currently allocated 23.6 percent (92,200 AF/year) of FID's water delivery on normal years, and plans to use up to 32.4 percent of the allocations (126,500 AF/year) at full buildout during normal condition. During dry years, FID's water supply may not be enough to meet the projected demand, the City may want to explore other sources of water during dry years. It should also be noted that the anticipated water allocations are based on the assumption that the existing agreements will remain unchanged. T-7

Agricultural Land Conversion Impact

9. The proposed General Plan would convert Farmland to other land use designation. The DMEIR assumes the water rights belonging to the agricultural land within FID boundary will remain intact and that the parcels be converted onto City water rates. T-8

10. Conversion of agricultural land for urban use should be done in a manner to minimize the impacts to agriculture and agricultural resources. T-9

Trail Impact

11. According to the City of Fresno General Plan, the City is proposing trail projects that will impact FID's canals. As noted in the general plan, significant issues remain before FID's canal system can be used for trail purposes. For informational purposes, FID's standard requirements for a trail along a canal are as follows:

    a. FID will not allow the trail easement to be in common use with FID owned property or easements.
    b. FID requires all trail improvements be placed outside of FID owned properties and easements.
    c. FID will not allow any portion of a tree canopy to encroach within its properties or easements.
    d. FID's canals will not accept any drainage from the trail or the canal bank.
    e. FID may require some improvements be made to the canal depending on the existing canal condition, the proposed trail and the adjacent development.
    f. FID requires its right-of-way be graded to provide a smooth uniform drive surface and cleared of all encroachments including but not limited to; trees, bushes, brush, pipes, stand pipes, wells, miscellaneous debris, etc.

T-10

Road Improvement Impact

12. History and Prior Rights – FID was formed in 1920 as a successor to the privately owned Fresno Canal and Irrigation Company. The assets of the company consisted of over 600 miles of canals and distribution works, which were constructed between the years 1860 and 1900, as well as extensive water rights on the Kings River. In most cases, FID canals pre-date all roads, highways, and railroads.

13. There will be many FID canals impacted by future road improvements and the High Speed Rail project. Significant effort will be required to allow for such growth and expansion in a manner that allows FID to maintain and operate its facilities in an efficient and effective manner. In the past, the City has not always been supportive of providing FID the access and means necessary to efficiently maintain and operate the conveyance systems. T-11

14. Small/Medium Canal Crossing Requirements – The majority of the proposed crossings will impact existing pipelines and small open channel canals. Requirements for the pipelines will include:
    a. Pipeline Requirements:
        i. FID will require all open channels and existing pipelines to be replaced with ASTM C-361 Rubber Gasket Reinforced Concrete Pipe (RGRCP). Although many of FID's facilities that lie within the proposed Planning Area are pipelines, the majority of these pipelines do not meet FID's urban specifications which would include road or highway crossings. The majority of the existing pipelines are monolithic cast-in-place concrete pipe (CIPCP), low head/thin wall PVC, and non-reinforced mortar jointed concrete pipeline. These pipelines were designed for a rural environment and will fail if they are not replaced as part of the proposed project.
        ii. FID typically requires a minimum of three feet of cover over pipelines. FID tries to eliminate siphons wherever possible due to sedimentation, plugging, and trash removal issues. Most utilities can be moved above and below FID's pipelines and because FID typically pre-dates everyone else, FID should be placed in its desired location.
        iii. FID is also concerned with its existing pipelines being damaged during development construction. FID anticipates the use of large, heavy equipment during construction that could easily damage FID's older pipelines, especially where there is shallow cover and/or non-reinforced concrete pipe.
    b. The two conditions that the proposed crossings will likely fall under are:
        i. Canal Crossings within a New or Realigned Road or Highway Right-of-Way (ROW) –The Road Maintaining Agency (City, County or State) is responsible for maintaining the canal facilities under the Road ROW and they will most likely require the canal crossing to be upgraded to the requirements mentioned above.
        ii. Canal Realigned outside of the Road ROW – there may be existing conditions or proposed plans to realign a FID canal outside of the Road ROW as part of future road improvements. FID will require that the City obtain an exclusive pipeline easement on FID's behalf. The width will vary between 15 to 40 feet depending on the pipeline diameter and site conditions.

T-12

15. Large Canal Crossing Requirements – There are several large canal crossings that will not be able to be contained within a pipeline such as the Fancher, Mill, Hernon, and Dry Creek canals. The design shall protect the canal's integrity for an urban setting. The proposed canal crossing must be designed to convey the water in a safe and efficient manner without altering the existing conditions in a negative manner for FID's operations and maintenance. Additional requirements will include:
    a. Freeboard of Bridge – FID requires a minimum freeboard of 2.0 feet through the canal crossing, where possible. The freeboard is needed to pass floating debris and trash through the structure. All of the large open canals are used to convey stormwater from the Fresno/Clovis metropolitan area along with the water coming from the rural creeks in eastern Fresno County. Trash will include both

large and small items including, but not limited to: shopping carts, couches, refrigerators, tree branches, plastic bags, lawn clippings, leaves, aquatic weeds, and all other trash that one could expect from both urban and rural areas.

b. Bridge/Culvert Type – FID prefers that all bridges to be freestanding, no piers, etc. FID understands that a multiple bay box culvert is more desirable because it is less expensive, however, it may end up being more expensive with additional costs going towards additional improvements mentioned below. Also, there is increased liability to both FID and the City, due to the possibility of trash accumulating at dividing walls causing the water levels to raise upstream and potential breach and flood nearby homes and businesses.

c. Trash/Debris – If a multiple bay culvert or a bridge with pilings design is selected, trash and debris will collect on the piers and culvert walls. Access must be provided to remove the trash in a safe and efficient manner. Additional property or easement may be required if it is determined that more trash will collect due to the canal crossing. Maintenance accessibility for trash removal needs to be evaluated based on channel size, amount of trash collected at location in question and accessibility.

d. Equipment Access – In order to access the maintenance road with our larger equipment, FID requires a larger drive approach. FID's minimum access requirement off major roadways is 50 feet from edge of right-of-way narrowing to 20 feet wide drive banks (See attached "Drive Approach in Urban Areas" Detail No. 62). The 50 foot width is defined as starting from the end portion of the bridge/railing outward (away from the bridge). In certain circumstances, a minimum 35 foot setback, to allow safe and adequate access has been accepted. Every road and canal intersection is different and therefore each access will be different. The major factors affecting the proposed width will be the angle of the road intersecting the Canal, grade of canal bank vs. City road, median vs. no median, etc.

T-12 CONT

16. Water Routings and Construction Window – The FID construction window will vary from year-to-year based on the length of the irrigation season, flood routings, recharge deliveries, maintenance projects and projects funded by others. FID's typical irrigation season begins on March 1, with FID opening the headgates to fill the canals/pipelines approximately 8 days prior (approximately February 21). An average irrigation season lasts 6 months, therefore the season will typically end on August 31. In very wet years, such as this current year, the irrigation season may go through mid-November.

17. Discharges into FID Canals – FID will not allow any discharges into the canals for numerous reasons, including but not limited to, it is a violation Federal/ State/Local regulations, FID's Rules and Regulations and negative impact it will have during the Operations and Maintenance Seasons. All existing discharges from the proposed project into canals must be re-routed to FMFCD storm drain facilities.

Miscellaneous Comments

18. There appears to be typographical errors on Page 5.9-4. The third paragraph states that there was 453,1000 AF of intentional recharge and the sixth paragraph states that the safe yield is approximately 1000,000 AF per year.

T-13

19. It should be noted that FMFCD's Storm Drainage Master Plan as noted on Page 5.9-34 is dependent on FID's canal system for disposal. The second paragraph on Page 5.9-39 states that the master planned storm drainage facilities are designed to collect, convey and dispose of the runoff. It should also be noted that disposal of the runoff is dependent on FID's canal system. T-14

20. Mitigation Measure HYD-5.2 on Page 5.9-44 includes increasing the size of the retention basin through the purchase of more land or deepening the basin or a combination for planned retention basins. FID agrees with the statement. It also suggests that the size of the emergency relief pump capacity required to pump excess runoff volume out of the basin and into adjacent canal be increased. It should be noted that there is a finite maximum conveyance capacity in the canals and that just merely increasing the pump sizes may not resolve the issue. T-15

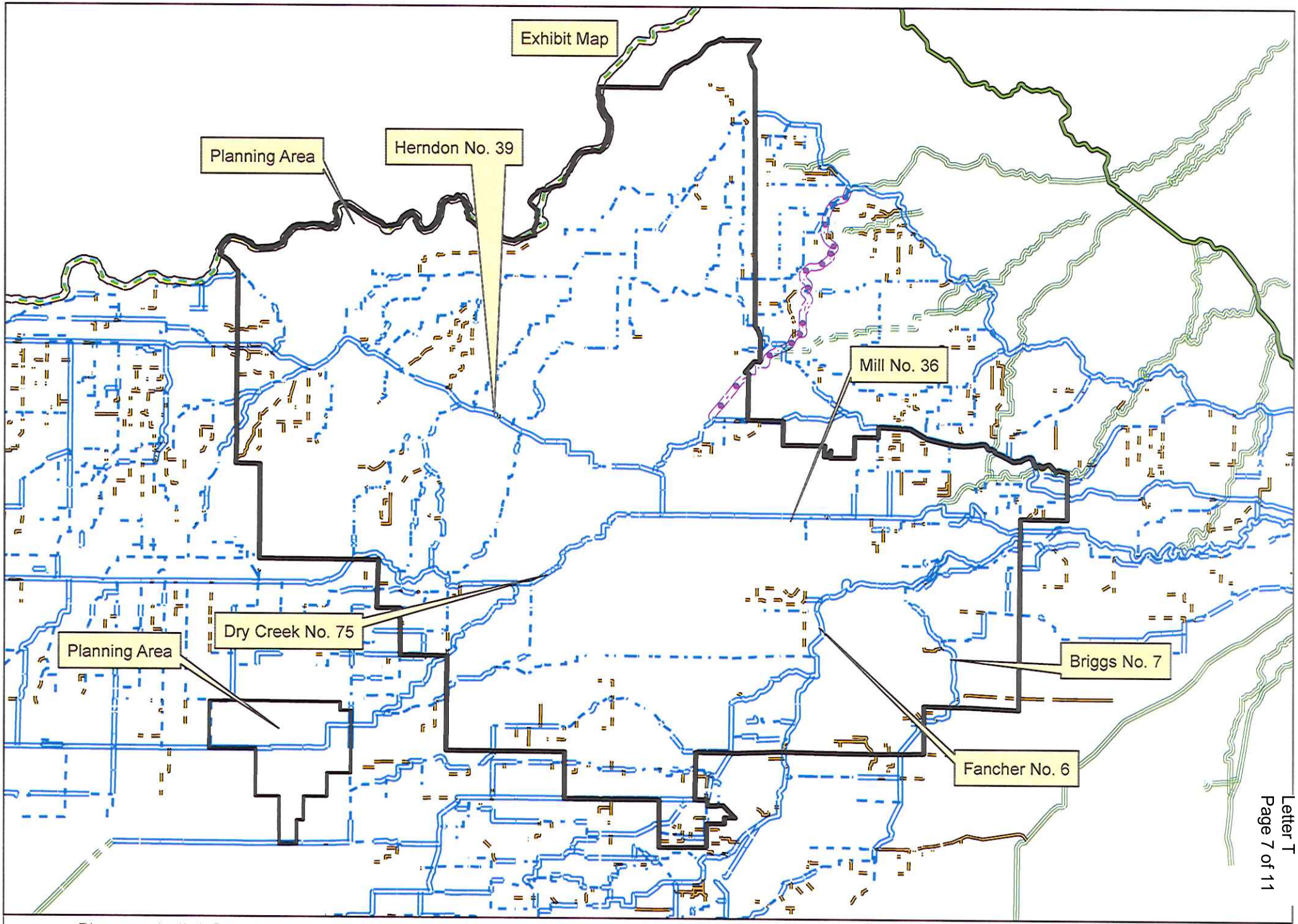
21. The City's General Plan indicated that more canals may be left unlined or un-piped to allow for additional recharge. This measure is not consistent with FID's policy and the potential impacts of the increased exposure to a greater population need to be properly evaluated. Public safety and the City's exposure to liability must also be considered and evaluated. T-16

Thank you for making available to us the Draft Master Environmental Impact Report for the City of Fresno General Plan and Development Code Update for our review and allowing us the opportunity to provide comments. We appreciate the opportunity to review and comment on the subject documents for this project. While it is difficult to envision all of the potential impacts without all of the improvement details, we attempted to provide you as much information as possible. We reserve the right to provide additional comments when more detailed information becomes available. If you have any questions please feel free to contact me at 233-7161 extension 7103 or LKimura@fresnoirrigation.com.

Sincerely,

Laurence Kimura, P.E.
Chief Engineer – Special Projects

Attachments



This map was produced by the Fresno Irrigation District and is provided for reference and informational purposes only and is not intended to show map scale accuracy or all inclusive map features, nor for legal purposes. FID makes no statements regarding the accuracy of this map as the features shown are in their approximate location. Please contact the FID Engineering Dept. at (559) 233-7161 for further information on FID facilities.

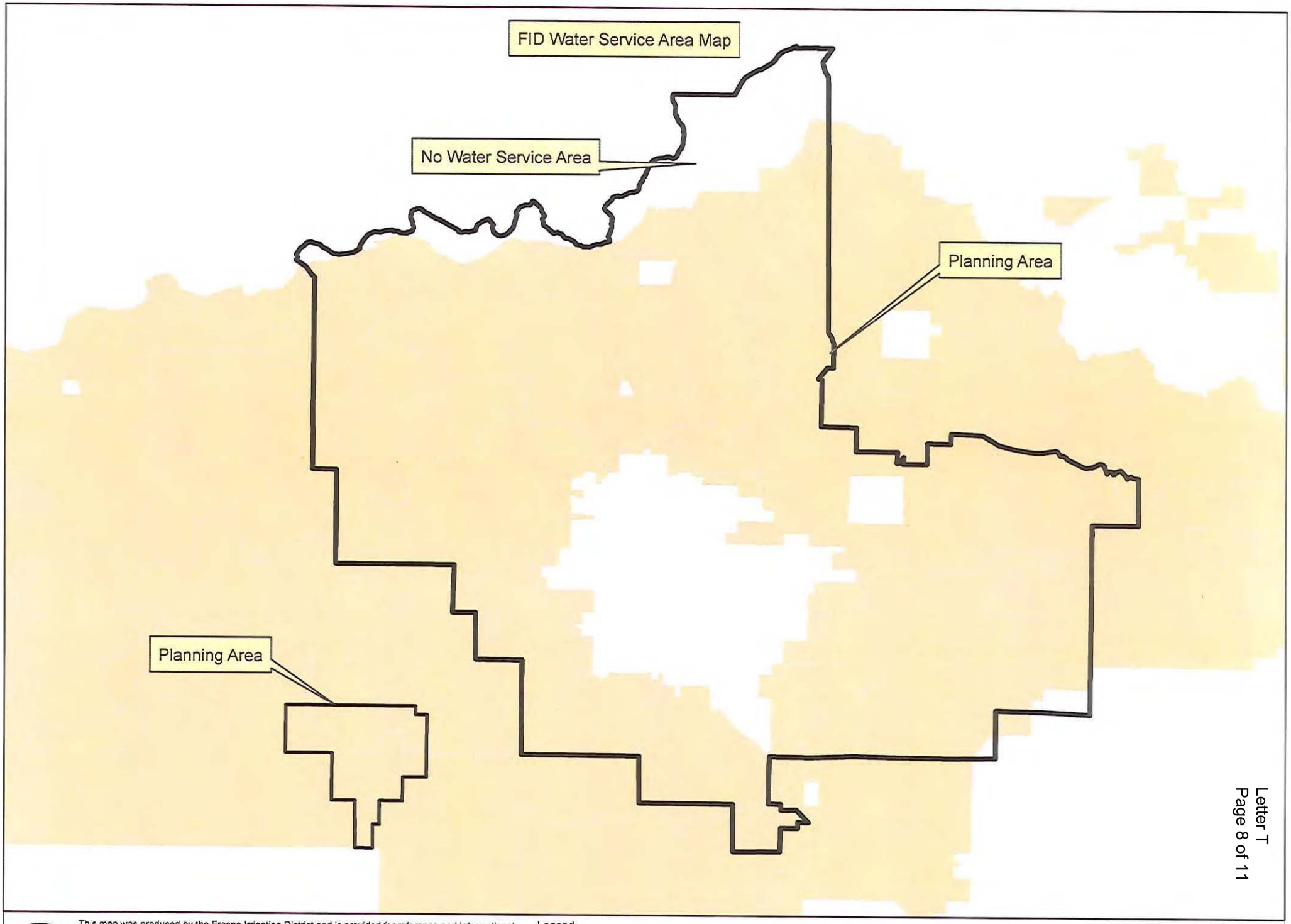
Legend

- FID Canal
- Private Canal
- Abandoned Canal
- FID Pipeline
- Private Pipeline
- Abandoned Pipeline
- Stream Group
- Other-Creek\River
- Other-Pipeline
- FID Boundary
- Railroad
- Streets & Hwys
- Parcel
- FMFCD Acquired Basins
- FMFCD Proposed Basins

0 6,500 13,000 Feet

1 inch = 13,498.17 feet

6/30/2014
G:\Fidgis\master_AG10.mxd



This map was produced by the Fresno Irrigation District and is provided for reference and informational purposes only and is not intended to show map scale accuracy or all inclusive map features, nor for legal purposes. FID makes no statements regarding the accuracy of this map as the features shown are in their approximate location. Please contact the FID Engineering Dept. at (559) 233-7161 for further information on FID facilities.

Legend

- FID Canal
- Private Canal
- Abandoned Canal
- FID Pipeline
- Private Pipeline
- Abandoned Pipeline
- Stream Group
- Other-Creek\River
- Other-Pipeline
- FID Boundary
- Railroad
- Streets & Hwys
- Parcel
- FMFCD Acquired Basins
- FMFCD Proposed Basins

0 6,500 13,000 Feet

1 inch = 13,498.17 feet

6/30/2014
G:\Fidgis\master_AG10.mxd

NOTES:

(1) DIMENSIONS AND NOTES ARE FOR LAYOUT PURPOSES ONLY. A SCALEO DRAWING SHALL BE PREPARED AND SUBMITTED WITH ALL PLAN SETS PRIOR TO CONSTRUCTION.

(2) IF CULVERT/BRIDGE STRUCTURE CAN COLLECT TRASH ON ITS PIERS, DEVELOPER MUST PROVIDE A SAFE ACCESS TO TRASH PIER RIDER. GALVANIZED STEEL OR CONCRETE CATWALK WITH CHAIN-LINK BARRIER MAY NEED TO BE INCORPORATED INTO CULVERT DESIGN (ON THE UPSTREAM SIDE OF THE BRIDGE/CULVERT STRUCTURE).

(3) DRAINAGE WILL NOT BE ACCEPTED IN THE CANAL AND SHALL BE ROUTED AWAY FROM FID PROPERTY/DRIVE BANKS. SLOPE DRIVE BANKS MINIMUM OF 2% AWAY FROM THE CANAL WITH PROVISIONS MADE FOR RAINFALL. RUNOFF TO BE CONVEYED TO NEARBY PUBLIC STREETS OR DRAINAGE SYSTEM BY DRAINAGE SWALES OR OTHER FID ACCEPTABLE ALTERNATIVES.

(4) WITHIN FID EASEMENT/RIGHT-OF-WAY AREA, ALL EXISTING TREES, BUSHES, DEBRIS, OLD CANAL STRUCTURES, PUMPS, CANAL GATES, AND OTHER NON OR IN-ACTIVE FID AND PRIVATE STRUCTURES MUST BE REMOVED.

(5) RAISED BANKS-1.0 TO 1.5 FEET OF FREEBOARD IS REQUIRED.

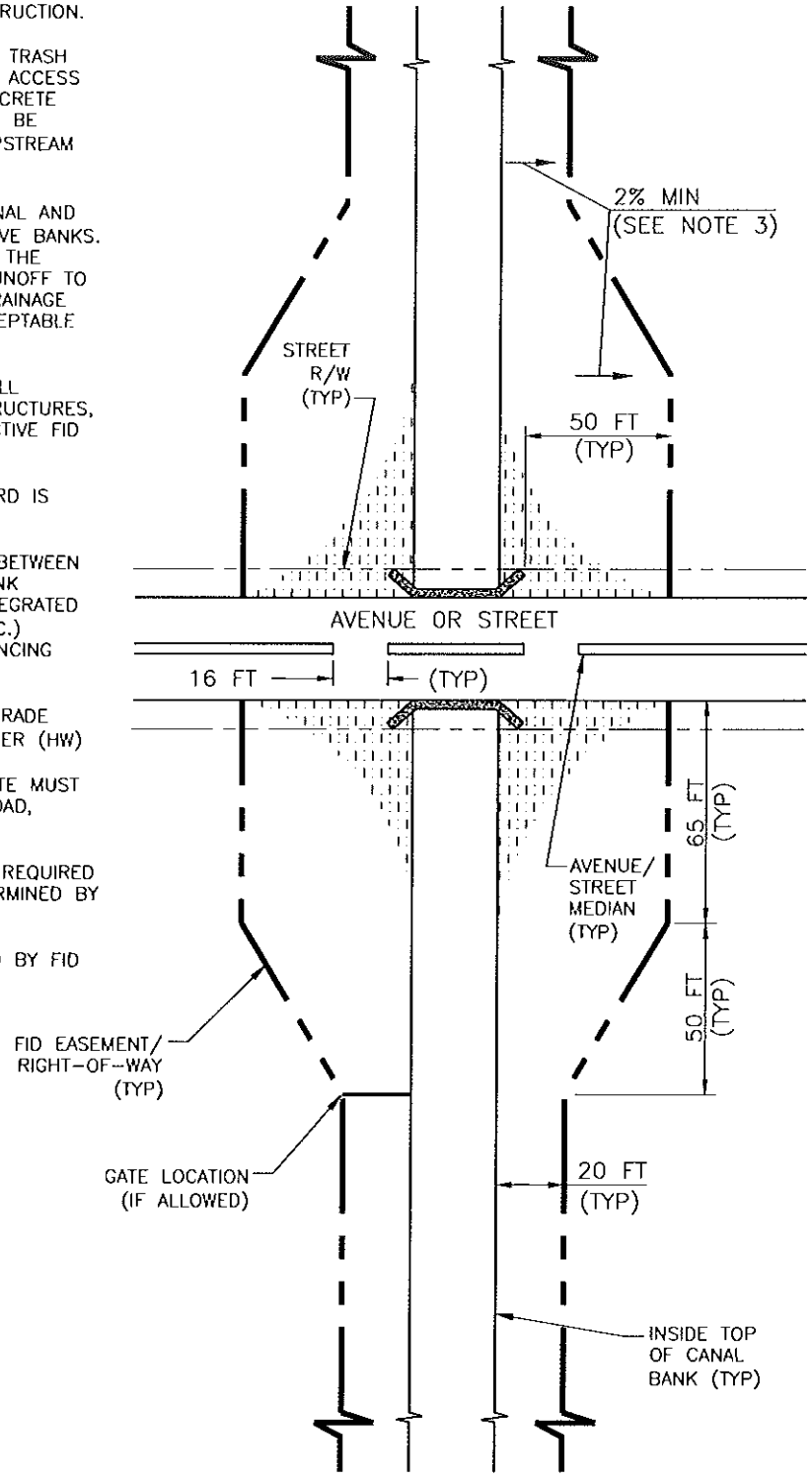
(6) BLOCK/MASONRY WALL SHALL BE REQUIRED BETWEEN THE OPEN CANALS AND DEVELOPMENT. CHAIN-LINK FENCING IS AN ACCEPTABLE ALTERNATIVE WITH INTEGRATED VISUAL BARRIERS (SLATS, SCREENS, SHEETING, ETC.) APPROVED ON A CASE-BY-CASE BASIS. WOOD FENCING WILL NO LONGER BE ACCEPTED.

(7) LINE CANAL BANKS OR RAISE SURROUNDING GRADE ELEVATIONS TWELVE (12) INCHES ABOVE HIGH-WATER (HW)

(8) IF AN ACCESS GATE IS PERMITTED BY FID, GATE MUST BE PLACED A MINIMUM OF 115 FT AWAY FROM ROAD, WHERE DRIVEBANK NARROWS TO 20 FT.

(9) THREE (3) INCH THICK GRAVEL BASE MAY BE REQUIRED AT THE ENTRANCE TO EACH DRIVE BANK AS DETERMINED BY FID ENGINEER.

(10) DRIVEWAY APPROACH WIDTH TO BE APPROVED BY FID ENGINEER.



DRIVE APPROACH IN URBAN AREAS

NOT TO SCALE

City of FRESNO

Development and Resource Management Department

2600 Fresno Street, Third Floor, Room 3065
Fresno, California 93721-3604
(559) 621-8003, FAX (559) 498-1012

Jennifer K. Clark, AICP, HDFP
Director

RECEIVED
JUL 25 2014
Fresno Irrigation District

July 23, 2014

NOTICE OF AVAILABILITY OF THE DRAFT MASTER ENVIRONMENTAL IMPACT REPORT FOR THE DRAFT GENERAL PLAN FOR THE CITY OF FRESNO AND RELATED ITEMS

NOTICE IS HEREBY GIVEN that the Draft Master Environmental Impact Report (DMEIR) for the General Plan Update and related items is available for review and comment, and that the City of Fresno (City) has completed an assessment of the possible environmental effects of the following-described project and has determined that the preparation of an Master Environmental Impact Report (MEIR) is appropriate. This determination has been made according to the California Environmental Quality Act (CEQA), the State CEQA Guidelines, and the City of Fresno's regulations and procedures for implementing CEQA (SCH # 2012111015).

Project Location:

The City is located in the County of Fresno, which is in the central San Joaquin Valley. The City is located approximately 200 miles north of Los Angeles and 170 miles south of Sacramento, on the State Route (SR) 99 corridor that links it to other Central Valley cities. The County of Madera is to the north and the City of Clovis is located northwest and adjacent to the City. East, south, and west of the City is unincorporated land.

The Planning Area is the geographic area for which the General Plan establishes policies about future growth. The boundary of the Planning Area was determined in response to State law (California Government Code Section 65300) requiring each city to include in its General Plan all territory within the boundaries of the incorporated area as well as "any land outside its boundaries which in the planning agency's judgment bears relation to its planning". The Planning Area established by the City includes all areas within the City's current city limits, including the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF), the areas within the current Sphere of Influence (SOI), and an area north of the City's most northeasterly portion of the city.

The SOI is a boundary that encompasses lands expected to be ultimately annexed into the City, although until annexed, the lands fall under the jurisdiction of the County of Fresno. Within the Planning Area, the current SOI covers approximately 100,249 acres or approximately 157 square miles, but does not include the 3,292-acre RWRF and an additional 2,486 acres for the North Area. The Planning Area encompasses approximately 106,027 acres, or approximately 166 square miles of both incorporated (approximately 72,244 acres) and unincorporated (approximately 33,783 acres) land bearing relation to the City's future growth. The Planning Area is generally located within the San Joaquin River to the north, American Avenue to the south, Garfield Avenue to the west, and McCall Avenue to the east, with the RWRF generally located with Jensen Avenue to the north, American Avenue to the south, South Chateau Fresno Avenue, and Cornelia Avenue to the east. The Planning Area includes various unincorporated islands surrounded by the City's limits.

Project Description:

The proposed project is comprised of two components: the General Plan Update and the Development Code Update. The updates will accommodate projected growth and development through the buildout of the General Plan and Development Code which will be approximately the year 2056. The anticipated population at buildout is approximately 970,000 people in the Planning Area.

The General Plan Update includes a comprehensive update of the existing General Plan and includes the following elements: (1) Economic Development and Fiscal Sustainability, (2) Urban Form, Land Use and Design, (3) Mobility and Transportation, (4) Parks, Open Space and Schools, (5) Public Utilities and Services, (6) Resource Conservation and Resilience, (7) Historic and Cultural Resources, (8) Noise and Safety, (9) Healthy Communities, and (10) Implementation. The Housing Element has already been adopted by the City and the General Plan contains a Housing Element Consistency chapter. As a component of the General Plan Update, the City includes amendments to various existing plans including: Bullard Community Plan (this will be renamed to the Pinedale Neighborhood Plan), Sierra Sky Park Land Use Policy Plan, Fresno-Chandler Downtown Airport Master and Environs Specific Plan (formatting revisions for consistency with the ALUC's Plan), Tower District Specific Plan, Butler-Willow Specific Plan, North Avenue Industrial Plan, Sun Garden Acres Specific Plan, Hoover Community Plan (this will be renamed the El Dorado Park Neighborhood

City of Fresno Extends Public Review Period of Final Draft of General Plan 2035

08/22/2014

NEWS

City of Fresno Video Feeds

Department of City Communications

News Releases

2014

2013

2012

2011

2010

2009

2008

2007

2006

2005

2004

What's Happening?

World News of Fresno

FRESNO, CA - Mayor Ashley Swearengin today announced that the City of Fresno has extended the public comment period for the 2035 General Plan for another 45 days. The reason for the extension is due to a number of requests that City officials and staff have received for additional time to review the document. In addition, staff has identified a typographical error in the previous notice of publication.

The draft General Plan 2035 will be available for the extended 45-day public review period commencing Monday, August 25, 2014 and ending on Thursday, October 9, 2014.

"With an abundance of caution and to allow for a transparent and thorough evaluation of the General Plan, I feel it is appropriate to extend the deadline for public comment," said Mayor Swearengin. **"We will still proceed with previously scheduled District town hall meetings and will also work with any Councilmembers who have not yet scheduled a district meeting to utilize this extra time to do so."**

Interested parties are invited to submit written comments on the draft General Plan for consideration by the Planning Commission and City Council. Public agencies and/or service providers should also provide the name of a contact person with their response. Copies of the document are available at the City of Fresno's Development and Resource Management Department, Room 3043 at City Hall and the Fresno County Library Central Branch at 2420 Mariposa Street. The document may also be accessed online at www.fresno.gov/newplan.

The General Plan, which was last updated in 2002, serves as the blueprint for the future land use and growth of the city in the form of maps, goals, objectives, policies, and implementation measures necessary to guide the city's growth for the next 20 or so years. Virtually all City departments, along with other agency partners and stakeholders will develop their strategies, calculate their capacities and will develop their plans for successive decades contingent on what the General Plan prescribes.

State laws require that general plans be updated periodically to reflect population growth and physical changes that occur through development. The General Plan proposes measures and strategies to accommodate projected population through 2035, together with the development of related commercial, industrial, and public facility uses necessary to serve this population.

###

Select Language
Powered by Google Translate

 ©2014 The City of Fresno. All Rights Reserved.

THIS PAGE INTENTIONALLY LEFT BLANK

Letter T: Fresno Irrigation District, Laurence Kimura, October 8, 2014

Response to Comment T-1

The City understands and acknowledges that Fresno Irrigation District (FID) would be a "Responsible Agency" for projects that encompass FID facilities or when project infrastructure requirements require modification of off-site FID facilities. The City considers FID to be a "partnering" agency and has established a practice of routing all development project applications to FID so that there is adequate opportunity for the irrigation district to review and comment on specific projects that potentially impact FID canals and easements.

Response to Comment T-2

The commenter expresses concern that the City would not be able to balance water usage prior to 2025. The City recently updated (and on November 20, 2014, reaffirmed) its Metropolitan Water Management Plan, which demonstrates balancing of water usage and provides for stabilizing aquifer levels. In addition to the City's Kings River water supply obtained through FID's land-based entitlement, the City plans to utilizes multiple sources of water (San Joaquin River water obtained through its Bureau of Reclamation contract; groundwater, including percolated stormwater; water made available via detention facilities on the Fresno Stream Group) in order to adequately serve future growth within its Planning Area. Impacts to groundwater (and groundwater supplies) are discussed in the Draft Master EIR Section 5.9.5 under Impact HYD-2, and in Section 5.15.5 under Impact USS-2. Mitigation Measure USS-5 in the Draft Master EIR does not allow additional development to be approved where the City would exceed supply capacity until or unless the additional capacity is provided. The implementation of this mitigation measure, as well as others identified in the Draft Master EIR related to this issue, would ensure an adequate water supply for future developments.

Response to Comment T-3

The Draft Master EIR identifies that the City intends to reduce the amount of groundwater extracted in the future, and implement water conservation measures (required through implementation of MM HYD-1) to decrease future demand.

Response to Comment T-4

As previously noted, the City would implement water conservation measures through compliance with Mitigation Measure HYD-1, which would reduce the future demand for domestic water. It is also noted that conservation measures and water metering have already achieved a reduction in per capita water consumption beyond that projected in the 2010 Urban Water Management Plan. Recent data from the Department of Public Utilities Water Division show that the City is already using less than 240 gallons per person per day. Additionally, if the City's water supply capacity is unable to accommodate additional growth while the City reduces groundwater extraction, Mitigation Measure USS-5 would not allow additional development to be approved where the City would exceed supply capacity until additional capacity is provided. The implementation of these mitigation measures and conservation measures implemented and advocated by the Department of Public Utilities will continue to moderate future water supply demand through conservation, and ensure that adequate water supply capacity is provided in order to accommodate future demand prior to approval of new projects.

Response to Comment T-5
See Response to Comments T-2 and T-4, above. The City would be required to implement Mitigation Measures HYD-1 and USS-5, which would alleviate future water supply demand through conservation, and ensure that adequate water supply capacity is provided in order to accommodate future demand prior to approval of new projects. Future water supplies to serve additional development could include the construction of new recharge basins through the implementation of Mitigation Measure HYD-5.2 in Section 5.9 of the Draft Master EIR. However, the intent of this measure is to reduce potential impacts to the capacity of the existing or planned storm drainage Master Plan retention basins.

Response to Comment T-6
The commenter accurately states that the Draft Master EIR under Impact USS-4 identifies a potentially significant impact to water supplies; however, within the planning horizon for this General Plan Update (to Year 2035), the Metropolitan Water Management Plan and Urban Water Management Plan project adequate supplies. At the point where water supply needs would exceed the supply capacity of Fresno's portfolio, additional supplies would need to be developed and/or additional conservation measures would need to be implemented. As a further protection in the currently proposed General Plan Update, Mitigation Measures USS-5 and USS-21 would reduce the potential impact to water supplies to less than significant. Therefore, the potential impact on water supply for this General Plan update would not be significant and unavoidable.

Response to Comment T-7
As previously noted, the City would utilize other water sources to provide for future domestic water needs. The City would be required to implement Mitigation Measures HYD-1 and USS-5, which would alleviate future water supply demand through conservation, and ensure that adequate water supply capacity is provided in order to accommodate future demand prior to approval of new projects. It would be speculative to assume that the existing water allocation agreements would change.

Response to Comment T-8
The City acknowledges the future development will convert farmland to non-farmland uses. As development is proposed within the City and in areas proposed to be annexed, the City's intent is to have the development connect to the existing municipal domestic water system that would include City water rates. The City has established a process whereby an agricultural operation within City boundaries may apply to the City Department of Public Utilities for use of FID surface water (an entitlement assigned to the City upon annexation) for the farming operation. This release process involves compliance with City ordinances relating to agricultural activities, specifically the requirement that the agricultural operation adhere to accepted water conservation practices and provide for in-lieu recharge for any groundwater extracted via on-site wells.

Response to Comment T-9
The City acknowledges the comment that the conversion of agricultural land for urban use should be done in a manner to minimize the impacts to agriculture and agricultural resources. A standard requirement for annexation of urban development projects includes "right to farm" covenants whereby property owners and successors in interest are bound by a recorded instrument to accept

specified effects of nearby agricultural operations. Refer to Response to Comment B-2 for further discussion of Policy RC-9-c and the establishment of a farmland preservation program.

Response to Comment T-10
This comment raises a concern that future trail projects along the Fresno Irrigation District's (FID's) canal system could cause significant issues to FID. When specific trail projects are proposed, such projects would be required to comply with FID requirements where the trail is within FID's jurisdiction. For these specific projects, FID will have adequate opportunity to review and comment on the design aspects and the potential impacts to FID facilities. Furthermore, the City understands that use of land within FID's jurisdiction requires an easement approval by FID.

Response to Comment T-11
The commenter states that many FID canals will be impacted by future road improvements and the High Speed Rail project. The City acknowledges that future development in accordance with the Fresno General Plan Update could impact FID canals. The City intends to work with FID to address these potential impacts as development is proposed. However, the High Speed Rail Project is under the purview of the State of California, more specifically, the High Speed Rail Authority and potential impacts as a result of either rail construction or operation of the system are subject to conditions and/or mitigation measures outlined in the Environmental Impact Report prepared for the train project. For additional information, please refer to the HSR Authority website at www.hrs.ca.gov.

Response to Comment T-12
The City acknowledges that FID would have a right to review projects involving a crossing of an FID facility. Trails that cross these facilities would be required to conform to FID requirements where the trail is within the jurisdiction of FID.

Response to Comment T-13
The commenter noted typographical errors on Page 5.9-4 of the Draft Master EIR. The commenter stated that the first sentence in the second paragraph on page 5.9-4 of the Draft Master EIR includes a figure of 453,1000; however, the Draft Master EIR reflects 453,100. No revision for this figure is required.

The fourth sentence in the last paragraph on page 5.9-4 of the Draft Master EIR is revised as follows:

> "This reduction in groundwater pumping will recharge the aquifer by approximately 15,000 acre-feet per year because the safe yield is approximately ~~1000,000~~ 100,000 acre-feet per year."

Response to Comment T-14
The City acknowledges that the FMFCD's Storm Drainage Master Plan utilizes FID's canal system for stormwater disposal/conveyance. It has already been determined that the FID canal system subsumed and replace natural drainage courses which historically traversed the Fresno metropolitan area; therefore, it is appropriate that canal and spillway facilities accept the increment of storm drainage which cannot be retained in Fresno Metropolitan Flood Control District (FMFCD) ponding basins for percolation during extreme storm events.

Response to Comment T-15

The City acknowledges FID's concurrence with Mitigation Measure HYD-5.2. The City will recommend that, as these future specific facilities are planned by FMFCD, details regarding emergency conveyance improvements would be provided to FID so that the two involved agencies may consult on their design.

Response to Comment T-16

This comment states that the provision of removing concrete from existing canals to allow for natural recharge is not consistent with FID's policy and states that there are potential public safety impacts. Policy RC-6-i, which recommends against concrete-lined canals, is intended to increase groundwater supply by allowing more exfiltration from canals. The City acknowledges that the canals are under the jurisdiction of FID, and that any implementation of this policy would need to be approved by FID.

FRESNO METRO MINISTRY

4270 N. BLACKSTONE AVE, SUITE 212, FRESNO, CA 93726 PH. 559.485.1416 FAX 559.485.9109
INFO@FRESNOMETMIN.ORG WWW.FRESNOMETMIN.ORG

October 9th, 2014

Dear Ms. Clark,

Thank you for your time and energy to collect substantial public comments for the City of Fresno Draft MEIR and General Plan. We look forward to seeing how comments and requests for changes will be incorporated into the document before it is presented to City Council. As you know, Fresno Metro Ministry has been an active partner in the General Plan Update since 2010. As such, we have been happy to contribute our thoughts and support for the ideas that work towards Achieving Healthy People and Healthy Places, most especially in our city's most disadvantaged neighborhoods, at every decision-point along the way. We support the 2035 General Plan Update.

Furthermore, we are excited to build partnerships throughout the city to implement projects that will be made possible through the adoption of this plan. It's time to get to work!

Below you will find our most pressing concerns in the final draft as released.

Comments on the City of Fresno Draft MEIR General Plan and Development Code Update dated July 22, 2014 (MEIR) and including the Fresno General Plan Update Public Review Draft dated July 2, 2014 (GPU)

1. The GPU shaped by the vision and commitment of Mayor Ashley Swearengin to a sustainably healthy and prosperous Fresno and crafted into a coherent plan document by the administrative leaders and city departmental staff she currently leads through a strong mayor form of government - appropriately brings the substantive relationships and significant impacts of land use, transportation, public facilities, and public services planning, policies, implementation, and resource management, into the reality of the context of Fresno. Fresno factually has the characteristics noted on pages 1-2 and 1-3 of the GPU of:
    - High concentrated poverty, high unemployment, and extreme disparities of quality-of-life opportunities;
    - Neglected and disinvested established neighborhoods and Downtown Planning Area;
    - Poor air quality, and environmental and community health issues;
    - Residential growth patterns that negatively impact natural resources and deplete strategic farmland; and
    - Fiscal instability related to the city's existing spread out form and land use inefficiencies.

U-1

2. **The negative realities** accumulating in the existing built environment of Fresno, as characterized in the GPU, **have reached systemic risk levels** and continue to get worse and to expand geographically, while dominant market forces drive construction of inefficient but currently financeable and marketable land use and auto-reliant transportation system development even further out on the edge of the city to escape the harsh realities trailing closely behind. **The**

growing footprint of neglected and disinvested neighborhoods in Fresno affects all property owners' home and business values and the attractiveness of Fresno on the whole as a place to live and do business. This vicious, interdependent, and self-reinforcing cycle will continue – apparently - until all our natural and financial resources are depleted or exclusive short-term market-driven political influence exhausts itself, whichever comes first we suppose, unless something positively bold and dramatic happens to change our city's collective awareness and future development trajectory.

3. As hundreds of engaged neighborhood and community leaders and residents have weighed in on this planning dilemma in Fresno the past few years - the negative cycle described above must be broken sooner than later for Fresno to have a fighting chance of being economically, environmentally and socially viable over the long-term. **A new balance must be achieved** soon between horizontal suburban expansion and revitalization and new development within our existing city that better serves the immediate needs and long-term interests of all existing and future residents, businesses, and taxpayers.

4. The GPU clearly aims for and provides a vision for a better balance. How we get there financially in the face of daunting fiscal projections for our national, state, and local debt and deficits for the next 25 to 40 years, and with what strategic mix of appropriate priorities, policies, regulations, incentives, implementation strategies, financing mechanisms and mitigations are key questions. **These fiscal questions remain unanswered in the Draft as released**.

5. We assume the best intent and follow-through by the City of Fresno as outlined in GPU with respect to **prioritizing increased investments** in infrastructure, transit, parks, public facilities, code enforcement, other necessary public services, and high quality maintenance in established neighborhoods and business districts within the city limits. Public investment encourages private investment through infill, revitalization, new businesses and new jobs in these areas of the city where residents live now and that also have the highest system-level returns on investment to support the General Fund and in terms of resource stewardship by building on and improving what we have now.

U-1
CONT

6. With this framing in mind –and in addition to those points highlighted above - there are two sets of **systemic risks facing the city** now and in the long run that merit deeper consideration and priority for action and mitigation in the GPU and the MEIR:
    a. **Long-term water resources are a systemic risk** given the emerging sense by informed water experts and scientists that California and the entire southwestern U.S. may be entering a mega-drought and aridity cycle with precedents of occurrence in the past 800 to 1,100 years - that places the sustainability and resilience of our primary agricultural economic base and our cities and rural communities in the San Joaquin Valley in peril. Sustainable surface water and ground water supplies are potentially in great jeopardy.
    b. **The long-term fiscal sustainability of the city is a systemic risk** given the still predominant, resource inefficient, and growing suburban pattern of development of the city, and the lack of sophisticated and reliable economic/fiscal models and impact assessment tools with

which to uniformly measure the complex cost and revenue streams to the city from different development options. The public and elected officials do not know all the costs and long-term fiscal and economic consequences of development proposals before projects are approved and that the city and the public are obligated in perpetuity to maintain, serve, and protect.

U-1 CONT

7. **Water Resource Sustainability**:
    a. Mitigation Measure USS-5 (Page 2-40 of the MEIR) states that by 2025 new and expanded surface water treatment capabilities should be constructed in the southeast, northwest and southwest areas of Fresno. The recent repeal of water rate increases to finance construction of significant portions of these facilities and the long time frame accorded the construction of these critical water supply facilities in the MEIR, **may prove too late** to be financed at acceptable costs to the public, businesses, and the city's financial wherewithal and credit worthiness, and also too late to prevent deleterious consequences to quality-of-life and economic activity supported by adequate potable water supplies and infrastructure. The same concern holds true for Mitigation Measures USS-8 (Page 2-43) and USS-9 (Page 2-44).
    b. **If the mitigation** called for in Mitigation Measures USS-5, USS-8, and USS-9 **cannot be achieved in a very short time frame** - It seems quite reasonable given the existing and emerging potential scale of systemic risks to access to long-term water resources for existing residents and businesses within the city limits of Fresno that **a moratorium on new annexations to the city should be considered** until either satisfactory mitigation is in place or state approved studies have verified priority availability of water resources to existing residents, businesses, and rate payers. An appropriate water resource development tax or fee surcharge on all new annexations might also be considered to help offset the costs of water resource mitigation.

U-2

8. **Fiscal Resource Sustainability**:
    a. Although a complete fiscal impact assessment is not required to be conducted in the MEIR (which it would make sense to do since so much proposed in the GPU is contingent upon long-term city fiscal wherewithal), the comprehensive assessment of long-term fiscal and economic impacts of new development annexed to the city (or major plan changes) as proposed in the GPU is imperative. **The development pattern of the city since World War II has produced enormous and uncalculated mitigation costs** to appropriately deal with the systemic levels of accumulated urban decay other negative realities articulated in the GPU. GPU Policy ED-5-b Fair and Proportional Payments (Page 2-27) and Policy ED-5-e (Page 2-28) are good starts – but need to be re-considered in the context of what should be the **extraordinary responsibility of newly annexed development to contribute to the mitigation costs of the urban decay** and accumulated deferred maintenance of the city system the new development is joining. So far the city has grown and expanded geographically nearly 9 times since World War II – and urban decay has relentlessly followed and expanded in its wake. There appears to be a relationship that suggests financial responsibility by new development added to the city limits.

U-3

b. An additional GPU policy (and MEIR assessment or other reliable modeling or comprehensive impact assessment) is needed to **address the lack of accurate economic modeling and measurement of all the direct and indirect costs**, externalities created, perpetual costs and the offsetting benefits to the public (and city organization) of continued annexation of land for geographically expansive new development vs. the related relative cost-benefit of development contained within the existing city limits. Otherwise and as noted - The public and elected officials cannot know all the costs and long-term fiscal and economic consequences of development proposals before projects are approved and that the city and the public are obligated in perpetuity to maintain, serve, and protect.

U-3 CONT

Given all of the above, as Fresno Metro Ministry, we call on our elected officials to ensure that with the implementation of this General Plan they keep the following steps in mind:

1. **STOP new annexations which create new unsustainable costs and obligations**
2. **ACCEPT responsibility for repairing and maintaining existing neighborhoods**
3. **VALUE every Fresnan**
4. **ELEVATE cross-sector strategies that work**

This needs to be represented in implementing policies as well as in every city-level decision moving forward.

1. Fresno needs permission to begin implementation to make the community's vision come to life. Metro is excited for our community to start working together toward the new vision with projects such as developing transit corridors, diversifying housing options, and infill projects on vacant or run-down properties. **It's time to pass the plan!**
2. Fix it first! **City resources should *only* be spent within existing city limits** to heal and help our existing (and often forgotten) neighborhoods prosper. Hundreds of residents supported Alternative A in 2012 because they wanted city leaders to re-prioritize to invest more in existing neighborhoods rather than in building new neighborhoods. This continues to be necessary. We want to see policies implemented that ensure that our tax dollars stay within our city limits.
3. Don't use public investments to enable sprawl. **New subdivisions** or any other projects outside of city limits **should pay for all costs of development**, services and maintenance, (such as extending sewer/water lines, major streets, ongoing police and fire services, farmland mitigation, etc.) without exception.
4. We support the **50/50 housing balance** commitment between new housing developments inside our city and new housing developments outside the city limits. While we know our city core needs the majority of attention and investment, we understand that there is not community consensus yet to completely stop sprawl. 50/50 was the compromise that we believe represents significant progress. We want to see **a policy and procedure implemented immediately for tracking** new units as they are built on either side of the 2012 city limit line.

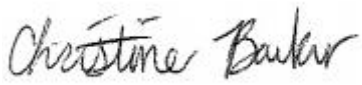
U-4

We look forward to working with you as Director of DARM, as well as our elected representatives to ensure that Fresno has a fiscally responsible, significantly more sustainable city footprint moving forward.

Thank you for your time and dedication to a robust public process.

Sincerely,

Program Director
Resilient Communities Program
Fresno Metro Ministry



Project Manager
Resilient Communities Program
Fresno Metro Ministry

THIS PAGE INTENTIONALLY LEFT BLANK

Letter U: Fresno Metro Ministries, Sarah Sharpe, October 9, 2014

Response to Comment U-1

This comment is on the contents on the Draft General Plan and not the Draft Master EIR. Since there is no specific comment on the environmental conclusions of the Draft Master EIR, no response is required. (CEQA Guidelines, Section 15088.)

Response to Comment U-2

This comment raises a concern of the availability of water to accommodate future development. The Draft EIR in Sections 5.9 and 5.15 of the Draft Master EIR identifies mitigation measures to ensure that adequate water supply and water facilities are available prior to approving additional development. These measures include not approving additional development until adequate supply and facilities are available. Furthermore, the City Council reaffirmed the Metropolitan Water Resource Management Plan on November 20, 2014 and additional surface water treatment capacity is included in that adopted plan. Rate restructuring to pay for those facilities and other needs was also re-initiated by the City Council on that date. It should be noted that, under California impact fee law and U.S. Supreme Court decisions relating to rational nexus and rough proportionality requirements for impact fees, charges cannot be assessed against new development (and related annexations) to defray the costs of existing water infrastructure needs/deficits which are not caused by that new development.

Response to Comment U-3

The commenter raises concerns regarding the economic effects associated with the General Plan Update. In accordance with CEQA Section 15131, a Lead Agency is not required to analyze economic impacts in a CEQA document.

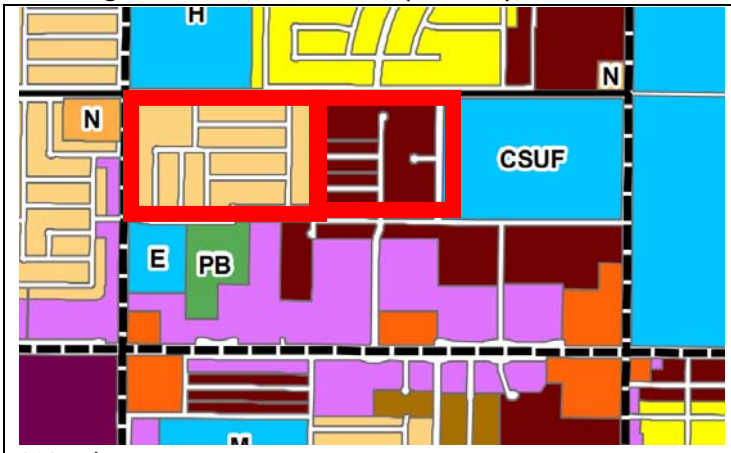
Response to Comment U-4

This comment provides opinions on revisions to the General Plan Update. Since there is no specific comment on the environmental conclusions of the Draft Master EIR, no response is required. (CEQA Guidelines, Section 15088.)

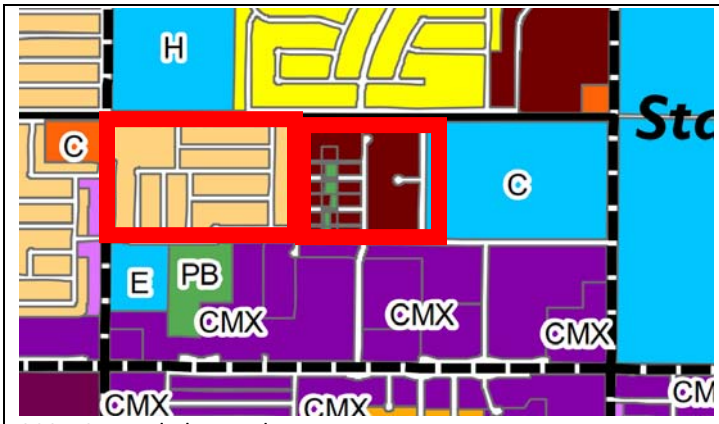
THIS PAGE INTENTIONALLY LEFT BLANK

Granville Homes, Inc.
Partial Comments, Pending Release of the Development Code Update
General Plan Update – Environmental Report Comments
October 9, 2014

1. An important concern, that seems to be overlooked by staff, even though we have repeatedly made the issue known: The Land Use density ranges were all modified and densities increased with this change. The EIR did not study the effects of the increase in development densities required by the new higher densities. For example, even though the designations for the two neighborhoods shown below did not change (i.e. Medium and High), if they were to be built out at full densities, there will be approximately 121 additional housing units allowed under the new proposed density ranges, than what is currently allowed. This increase in densities doesn't reflect the change in land uses that was also incorrectly applied throughout the City, and previously identified by us in our draft General Plan Comments. These two changes coupled will serve the exponentially increase the development, density, population and taxing on City services in all existing Fresno neighborhoods, but most importantly, was not reviewed by the EIR. V-1



2025 Plan
Medium (4.99-10.37 DU/AC)
High (18.16 – 43.56 DU/AC)
55+/- acres (First/Barstow/Fourth/San Jose) Medium=274-570 total u/a
35+/- acres (Fourth/Barstow/Millbrook/Bulldog Lane) High=635- 1,524 u/a



2035 General Plan Update:
Medium 5-12 DU/ac
High 30-45 du/ac
55+/- acres (First/Barstow/Fourth/San Jose) Medium=275-660 total u/a
35+/- acres (Fourth/Barstow/Millbrook/Bulldog Lane) High=1,050- 1,575 u/a

2. Page 3-17: The EIR mentions the proposed future "Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan, which may be adopted by the City". The narrative includes mention of several "districts" and potential uses. The entire section should be deleted as the plan, nor draft plan has officially been made public for comment or review, and thus should be reviewed separately and not included here. V-2

3. Page 3-25 to 3-26: Table 3-5 should identify the most current 2010 Census populations, and delete any references to estimated 2010 population data. V-3

4. Page 3-26: Section 3.5 Infill Areas should ensure that infill areas definition matches what has been proposed by the Mayor and Planning staff, to encompass all City Limit areas. V-4

5. Page 3-29 to 3-33: Table 3-6 identifies Total Proposed Dwelling Units in the Growth Areas. Two Grantland Communities seem to identify an excessive amount of multi-family dwelling units in an area that has not proven can sustain the large increase in rentals. V-5

6. Page 5.6-5: Exhibit 5.4-1 – Incorrectly identifies the area bounded by Gettysburg, Grantland, Garfield and Shields as Deciduous Orchard – it has been barren land for several years, at varied times growing alfalfa. V-6

7. Page 5.12-7, 8, 9: The Housing Element chapter references several programs and committees that no longer exist. Even though the paragraph is copied from the last approved Housing Element, this EIR should correctly identify the existing program, and not reference those that have ceased to exist. V-7

8. Page 5.13-33: First paragraph, says the proposed General Plan Update would not meet the City's goal of 5 acres of parkland per 1,000 residents for all City park space and 3 acres per 1,000 residents for Pocket, Neighborhood, and Community Park Space. If the update doesn't meet the goal, then the City should re-evaluate the goal, and either make accommodations to meet the goal, or make the goal more attainable. V-8

9. Page 5.14-83: The last two paragraphs include information on increased density and its effects on the City's Transportation system. The density scenarios do not take into account the increase in density ranges for the same named planned land uses, therefore the transportation system cannot adequately provide a system that serves the true increased density allowances in the City. Additionally, the paragraphs reference "complete streets" concept which hasn't been defined or identified in detail, nor has it been reviewed in this MEIR. The reference should be deleted. V-9

10. Page 5.14-85, First paragraph under Impact TRANS-6, Project Specific Impact Analysis – The last sentence is an incomplete sentence, and therefore cannot be evaluated, even though it seems to be making an important point on future required improvements or expansions. V-10

11. Page 5.14-88: The last sentence states the General Plan Update and resulting impact will be less than significant on transportation. Based on the information referenced above, where density ranges are increased, thereby inflating densities throughout the City, the statement cannot adequately assess the situation, much less say that the impacts are less than significant. V-11

12. Page 5.15-7, the last paragraphs is outdated, as it references the City's Recycled Water Master Plan that is expected to be adopted in August 2012. The updates to the narrative should identify whether or not the plan was adopted, or if the plan is expected to be adopted in the future still. V-12

13. Page 5.15-12, Solid Waste Disposal, first paragraph, references a goal that was to be attained by 2012. The update to the narrative should identify whether or not the goal was achieved by printing of the EIR. V-13

14. Pages 5.15-19 to 5.15-29: Wastewater Treatment, Waste Discharge and Sewer System Capacity Impacts. The narrative states that there is a "potential for significant impact" and also that "potential cumulative impacts are considerable and would be a significant cumulative impact". These impacts should receive attention due to the limited resources available to mitigate the impacts. More attention and funds should be targeted towards the mitigation of this issue. V-14

15. Page 5.15-42: The water supply source analysis confuses the narrative with the reference to build out to 2035 (even though staff has said build out to 2035 was taken out of the General Plan Update). Most importantly though, the narrative states that the City will NOT have enough water for the General Plan Update full build out. First, if this is the case, then there will be residents without water available to them - further analysis and mitigation is needed, or full build out scenarios should be adjusted to ensure availability of water for all development. Second, the availability of water doesn't take into account the increased densities from the changes to the density ranges, which will only serve to further exacerbate the impacts to resources City-wide. Last, Page 5.15-43 states that even with mitigating policies, the impact, at full build out, to "water supplies will remain significant". Staff should consider that water availability is a determining factor on development, and therefore adjust any forecasts or policies to ensure full build out development has water available to all. V-15

16. Page 5.15-49: Landfill space availability will be significantly impacted by full build out of the general plan. Staff should consider that land space availability is a determining factor on development, and therefore adjust any forecasts or policies to ensure full build out of development has space at local landfills available. V-16

17. Page 5.15-50 MM USS-22 and accompanying levels of impact. If the selection and building of a new landfill is required for full build out, how can this impact be "less than significant"? Staff should re-evaluate this determination as building a new landfill will be a huge impact on the environment. V-17

18. Page 5.16-9 to 14, Impact EC-1- "The project would not result in the inefficient, wasteful and unnecessary consumption of energy." The manner in which the "impact" is worded, in effect makes it so that it is not an impact. Additionally, we believe the impact to energy consumption cannot be treated as leaving "No Impact" on the environment, when, at full build out, the Fresno population will nearly double. How can this have "no impact" on the environment? V-18

19. Page 8-1: Section 8.1, Mineral Resources: The "Impact Discussion" is confusing in that it states that if mineral resources continue to be extracted as currently allowed, then all resources will be depleted. The narrative goes on to state that current extraction will continue, and yet identifies ways to stop the depletion of resources. Overall, the logic to this train of thought is missing. V-19

20. Page 67 of the Initial Study identified the displacement of housing as a potentially significant impact, yet the issue wasn't identified in the MEIR. V-20

21. Page 72 of the Initial Study identified the potential for future development to reduce capacities of roadways and intersections that could impede emergency access. We don't believe this emergency transportation impact was adequately identified or addressed in the MEIR, as mitigation measures only glossed over development goals and policies, none strictly addressing emergency response. V-21

22. Letter dated 12/6/2012 from Michael Navarro at Caltrans states that their office wasn't integrally involved in the General Plan Update, even though they had recommended and offered their expertise, particularly in the transportation sections. Was Caltrans involved as they requested? If so, possibly a follow up letter is required to clarify their position. V-22

23. Letter dated 12/5/2012 from Norman Allinder, Planning Director of the County of Madera states that Madera County hasn't been adequately involve in the draft planning of the General Plan Update, and the effects of the full build out don't adequately cover the impacts to the surrounding communities, Madera County particularly – even though the general plan narrative seems to tough regional collaboration as a main driving principle of responsible growth. Was Madera County's issues addressed in the MEIR analysis? If so, possibly a follow up letter is required to clarify their position. V-23

24. Appendix C-1 – Vegetation Communities Mapping – Exhibit 5.4-B identifies Copper River (area east of Friant, north of Copper) and Exhibit 5.4. C (Westlake Map area) as having deciduous orchard. This seems incorrect and should be fixed. V-24

There are many and various typos/minor modifications needed, a sample of these is listed here:

1. Table 3-4: Correct mention of Southeast Growth Area (SEGA); change to SEDA V-25
2. Page 3-33: Tables Notes: Correct the density ranges for Low and Medium low (should say Low: 1-3.5 du/acre). V-26
3. Page 5-9.24: in the middle of the page a two line sentence is repeated. V-27
4. Page 5.15-28: The "Tulare Lake Basin Plan" is referenced to as the "(Bain Plan)", which likely shoul be "(Basin Plan)". V-28
5. Page 5.15-47: Last sentence says "Error! Reference source not found" though it seems to reference Table 5.15-3 V-29
6. Page 9-1, 9-2: Arnoldo's last name is mis-spelled. V-30

Letter V: Granville Homes, Inc., October 9, 2014

Response to Comment V-1

This commenter is concerned that the proposed land use densities were not evaluated appropriately. The General Plan Update includes different density ranges compared to the 2025 General Plan. The densities that were used were a reasonable worst-case for each of the residential land use categories. The reasonable worst-case is not necessarily the maximum density allowed for a residential land use category based on past development patterns, because the highest density within the range for a residential land use category is not consistently developed. Therefore, the City calculated future residential units based on a reasonable worst-case density, but as individual development project applications are reviewed the specific service capacity of each location is re-evaluated.

Response to Comment V-2

The commenter suggests that the land use classifications identified for the Planning Area Exclusive to the Downtown Planning Area (Downtown) be removed from the General Plan Update. As stated on Page 3-17 of the Draft Master EIR, the land use classifications proposed in the Downtown area may be further refined in community and specific plans such as the proposed Downtown Neighborhoods Community Plan. Depiction of the entire Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan area on the General Plan Update land use map are noted as being illustrative only and will not be implemented until the formal adoption of additional plans in that area plan after the General Plan is adopted.

Response to Comment V-3

The commenter requests that the most current 2010 Census population data be used in Table 3-5 in the Draft Master EIR. As noted in the footnote on Table 3-5, the San Joaquin Valley Demographic Forecasts 2010 to 2050 prepared by the Fresno Council of Governments (FCOG) was used to estimate the 2010 population for the County of Fresno as the basis for regional transportation planning and housing allocations among the jurisdictions. Based on a review of the U.S. Census (http://quickfacts.census.gov/qfd/states/06/06019.html), the County's population in 2010 was 930,450. Therefore, the use of 930,000 people in the Draft Master EIR as an estimate was validated and appropriate. In addition, the footnote providing the 2010 population estimate for the City of Fresno Planning Area was required because the Planning Area encompasses more land than is contained within current City limits. Based on a review of the U.S. Census (http://quickfacts.census.gov/qfd/states/06/06019.html), the population within the City limits was 494,665, and the figure used in the Draft Master EIR estimated 495,000 people within the City limits, another validation of forecasting in the environmental document. The Draft Master EIR estimated that the Planning Area population would have approximately 50,000 persons outside of the City limits and within the Planning Area, therefore, use of the 545,000± population figure (495,000 plus 50,000) was appropriate.

Response to Comment V-4

The commenter requests that the infill description provided in Section 3.5 of the Draft Master EIR be consistent with the Infill Areas depicted on Exhibit 3-5 of the Draft Master EIR. The description of the Infill Area provides a narrative of each infill category represented on Exhibit 3-5. This description

is consistent with Exhibit 3-5 and as depicted, all areas within the City limits have been identified as an Infill Area.

Response to Comment V-5
This comment states that the two Grantland Communities within the Planning Area seem to identify an excessive amount of multiple-family dwelling units in an area that has not proven that they can sustain large increase in rentals. The proposed General Plan aims at providing a greater range of housing types to meet changing market demands, and to increase the inventory of land available for multi-family residential development in order to meet needs identified in the City's Housing Element Update. One of the longstanding problems for housing in Fresno has been ‑incongruity between the types of homes built, and the housing needs of the population. For nearly seventy years, the most common type of dwelling unit constructed in Fresno has been a detached single-family house constructed on a lot 6,000± square feet in size (or larger). This has not fully accommodated people who require multiple-family, condominiums, townhouses, accessory ("mother-in-law"), and mixed-use units. These segments of the Fresno population are projected to increase in the future and so will the demand for these types of housing.

The General Plan does not distinguish between dwelling units that are owner-occupied versus those which are rented. While the General Plan proposes higher densities in some areas (such as the two Grantland communities referenced in Comment V-5), higher housing densities do not necessarily equate to rental housing. It is becoming increasingly common for higher-density projects to be owner-occupied; for example, condominiums that meet the needs of some segments of the population. Census Bureau data show that the proportions of single adults and seniors in Fresno's population has been increasing over the past 50 years. These proportions are projected to increase further in coming decades. While some areas depicted on the General Plan Update land use map may appear to designate densities greater than what some predict that the market would accommodate in the immediate future, the General Plan is a long-range document intended to meet future needs. It is projected that evolving market trends and demographic changes will demand more dwelling units provided as a different product than conventional detached single-family homes.

Moreover, the City has designated over 34,000 acres for conventional detached single-family homes, 10,500 of which are in the two Grantland communities. This ensures that households that want those types of homes will also be accommodated.

While the City is not proposing significant modifications to the Planned Land Use map within the two Grantland communities, requested modifications by community members have been noted and have been evaluated in accordance with the California Environmental Quality Act (see Attachment 1 of this Response to Comments).

Response to Comment V-6
This comment regarding the vegetation community identified on Exhibit 5.4-1 of the Draft Master Plan for the area bounded by Gettysburg, Grantland, Farfield, and Shields is noted. A November 2, 2014 news story in the *Fresno Bee* states that the owner of the property described in Comment V-6 is going to plant the property with almonds, which is a deciduous orchard crop Vegetation mapping for the Planning Area was compiled by the City of Fresno in 2010; this compilation of information

included data from the U.S. Department of Agriculture and the most recent information from that source was dated 2007. Regardless of agricultural vegetation communities' changes over time, development proposed within the Planning Area will be required to implement the mitigation measures identified in Section 5.4 of the Draft Master EIR, as applicable.

Response to Comment V-7
The commenter expresses a concern that some of the programs identified in the Draft Master EIR relative to housing programs and committees no longer exist. While some of the listed committees or programs no longer in existence, such as the 10 x 10 Affordable Housing Subcommittee, some of these committees and/or programs were established for single purposes. Upon completion of their tasks, the committee and/or program was disbanded, or in other cases replaced by another with a slightly different focus. For example, the Redevelopment Agency of the City of Fresno is referenced. While redevelopment agencies in California were disbanded, the agency morphed into the Successor Agency to the Redevelopment Agency of the City of Fresno while some of its responsibilities were transferred to the City of Fresno. Consequently, while an agency may no longer be active, their roles and programs continue under the purview of the City or other service providers. Additionally, as part its annual Housing Element with the California Department of Housing and Community Development, the City outlines which programs it is implementing and/or eliminating, consistent with the operative Housing Element.

Response to Comment V-8
The commenter expresses a concern of the General Plan Update not meeting the City's park and recreational goals. As discussed in Impact PS-4 in Section 5.13 of the Draft Master EIR, the initial evaluation of the potential impacts associated with the project was that the General Plan Update would not meet the City's park and recreational goals. However, a subsequent evaluation within Impact PS-4 was conducted to identify the various General Plan Update objectives and policies that would increase the amount of park and recreational uses. These objectives and policies are provided on pages 5.13-33 through 5.13-38 of the Draft Master EIR. With the implementation of the General Plan Update objectives and policies, adequate park and recreational facilities would be provided throughout the Planning Area.

Response to Comment V-9
This commenter expresses a concern that the proposed transportation system will not be able to accommodate the increased densities proposed in the General Plan Update. Please see Response to Comment V-1 regarding the densities used in the Draft Master EIR.

The commenter also states that the Draft Master EIR did not define the term "complete streets" concept. The complete street concept is described in Chapter 4, Mobility and Transportation and is defined in the Glossary, of the General Plan Update. Complete Streets concept is a multi-modal transportation system. Users could include motorists, pedestrians, bicyclists, children, older adults, persons with disabilities, and users of public transportation. Each street segment is not required to include all of these modes of transportation, but all streets within the system must be considered. While there is no standard design template for a Complete Street, it generally includes one or more of the following features: bicycle lanes, wide shoulders, well-designed and well placed crosswalks, crossing islands in appropriate midblock locations, bus pullouts or special bus lanes, audible and

accessible pedestrian signals, sidewalk bulb-outs, center medians, street trees, planter strips and ground cover. Complete Streets create a sense of place and improve public safety due to their emphasis on comprehensively encouraging pedestrian activity.

Response to Comment V-10
This comment noted a typographical error. The second sentence in the first paragraph under Impact TRANS-6 on page 5.14-85 of the Draft Master EIR is revised as follows:

> "Implementation of the City of Fresno General Plan Update would increase demand for public transit, bicycle, and pedestrian facilities, which would require those facilities to be improved and expanded as development occurs ~~e improvement and expansion~~."

The above revision does not alter the impact finding for Impact TRANS-6.

Response to Comment V-11
Please see Response to Comment V-1 regarding residential densities proposed in the General Plan Update.

Response to Comment V-12
The commenter stated that a reference to the adopted date of the City's Recycled Water Master Plan is outdated. The approval of the City's Recycled Water Master Plan, and certification of the Environmental Impact Report prepared for that project, occurred on April 11, 2013. Therefore, the first sentence of the last paragraph on page 5.15-7 of the Draft General Plan is revised as follows:

> "The City of Fresno commissioned a team of engineering consultants to prepare the City's Recycled Water Master Plan, which is was formally adopted by the City in April 2013."

In addition, the Recycle Water Ordinance giving the City the authority to require connection to the system was adopted by the Fresno City Council on June 26, 2014.

Response to Comment V-13
The commenter asked if the goal of the 75 percent Waste Diversion Rate was achieved by the City by 2012. While Fresno's recycling rate remains among the highest in the United States (65 percent for Year 2013), the City has had difficulty reaching the 75 percent. Regardless, the City continues to strive for a 75 percent waste diversion rate.

Response to Comment V-14
The commenter expressed a concern that the potential impacts associated with wastewater treatment, waste discharge, and sewer system capacity could be significant. The discussion of wastewater treatment facilities and sewer facilities in Impact USS-2 in Section 5.15 of the Draft Master EIR includes the potential for future construction of the facilities to cause significant impacts. Mitigation measures are provided; however, the potential environmental impacts associated with construction activities of these facilities could remain significant. The potential issues associated with operational activities including capacity would be reduced to less than significant.

The discussion of wastewater discharge in Impact USS-1 in Section 5.15 of the Draft Master EIR states that potential impacts to capacity could occur; however, with the implementation of the recommended mitigation measures, potential impacts would be less than significant.

Response to Comment V-15
The commenter raised a concern about the City having adequate water supply at full buildout. Although the discussion of Impact USS-4 identifies that the General Plan Update could result in potential significant impacts on water supplies. However, mitigation measures are recommended (MM USS-5 and MM USS-21) to reduce potential impacts to water supplies to less than significant. Also see Response to Comments T-2, and T-4 through T-7, above.

Response to Comment V-16
The commenter requested that the City should adjust any growth forecast based on having adequate landfill space. The General Plan Update includes a policy for landfill facility siting, should that prove necessary. The first paragraph on page 5.15-50 of the Draft Master EIR states that implementation of the General Plan Update could result in a significant impact on landfill capacity however, Mitigation Measure USS-22 would reduce the potential impact on landfill capacity to less than significant. Implementation of that mitigation measure would ensure that new development would not be approved if solid waste generated by that development would require landfill capacity exceeding the capacity available, until additional capacity is provided.

Response to Comment V-17
The commenter asked how building a new landfill, as may be necessary to serve full buildout, would have a less than significant impact. Current federal and state regulations for siting, constructing, permitting, operating, maintaining, and closure of new landfills are designed to mitigate potential adverse impacts of solid waste repositories. The analysis in the Draft Master EIR can rely upon compliance with federal and state regulations pertaining to landfill siting, construction, and use. Other state regulations are aimed at diverting (recycling and avoiding) solid waste, to the extent that construction of new landfills may not be necessary. The issue addressed in the Impact USS-6 analysis is whether the landfills serving future development under the General Plan Update would have sufficient capacity to accommodate the future development associated with the General Plan Update. Mitigation Measure USS-22 includes provisions to ensure that additional development is not approved that would exceed available landfill capacity, and this measure would reduce the potential landfill capacity impact to less than significant.

Response to Comment V-18
The commenter asked how the project can have no impact on energy consumption as discussed in Impact EC-1 in Section 5.16 of the Draft Master EIR. The City acknowledges that the approximate doubling of population with the implementation of the General Plan Update would increase energy consumption. The energy consumption increases are identified in Table 5.16-4 (electrical demand), Table 5.16-5 (natural gas), and Table 5.16-6 (fuel). Impact EC-1 discusses the inefficient, wasteful and unnecessary consumption of energy. Based on the implementation of the General Plan Update policies identified in the discussion of Impact EC-1, the implementation of the General Plan Update would not result in the inefficient, wasteful or unnecessary consumption of energy.

Response to Comment V-19
The commenter expressed a concern that the discussion of mineral resources in Section 8 of the Draft Master EIR is confusing. As stated in Section 8.1.1 of the Draft Master EIR, the General Plan Update would allow the extraction of aggregate mineral resources (sand and gravel) to continue along the San Joaquin River corridor in the Fresno Production-Consumption Zone identified by the California State Mining and Geology Board. The General Plan Update includes policies to conserve land identified as having significant deposits of aggregate mineral resources to allow for future extraction of these resources. While existing aggregate operations in the San Joaquin riverbed closest to the City of Fresno have largely been mined-out, Fresno County has identified high-quality aggregate mineral resource areas on and near the Kings River. Madera County also has mineral resources near the Fresno River that are also readily available to the Fresno consumption zone. Since the General Plan Update would continue to allow future extraction, and since the Kings River aggregate production area is available to support development in the City of Fresno, the General Plan Update would result in less than significant impacts on existing mineral resources.

Response to Comment V-20
The commenter identified that the Initial Study for the Master EIR stated that the displacement of housing would result in a potentially significant impact. The commenter also states that the issue was not addressed in the Draft Master EIR. However, after further evaluation, the impact of displacement of housing was found to be less than significant. The displacement of housing was addressed in Impact PH-2 in Section 5.12 of the Draft Master EIR. With the implementation of the General Plan Update (full buildout development in the year 2056), the evaluation states that the proposed project (full buildout of the General Plan Update) would not necessitate construction of replacement housing in addition to the housing that is planned under the proposed General Plan Update.

Response to Comment V-21
The commenter expressed a concern that emergency access was not adequately addressed in the Draft Master EIR. Impact TRANS-5 in Section 5.14 of the Draft Master EIR addresses emergency access. The General Plan Update includes policies that would support the provision of adequate emergency access. As stated on page 5.14-85 of the Draft Master EIR, implementation of the General Plan Update would result in a less than significant impact related to emergency access.

Response to Comment V-22
This comment asked if Caltrans was involved in the General Plan Update. The City of Fresno met with Caltrans staff during a scoping meeting held at the City in 2012. Fresno City staff, as well as the traffic consultants preparing the General Plan and the Draft Master EIR, have had various discussions with Caltrans staff during the preparation of the General Plan Update and its traffic evaluation. Please see Response to Comments E-1 through E-20 regarding comments that were provided by Caltrans, District 6 on the Draft Master EIR.

Response to Comment V-23
This comment asked if Madera County's issues that were raised in their letter dated December 5, 2012 addressed in the Draft Master EIR. The City of Fresno has had ongoing discussion with the

County of Madera regarding issues associated with the General Plan Update. Please see Response to Comment Z-1, below, regarding their comment that was provided on the Draft Master EIR.

Response to Comment V-24
This comment expresses a concern regarding the vegetation mapping provided on Exhibit 5.4-1 in the Draft Master EIR. Please see Response to Comment V-6 regarding the vegetation mapping.

Response to Comment V-25
The commenter identified a typographical error. Footnote 3 on Table 3-4 on page 3-25 of the Draft Master EIR is revised as follows:

> "[3] The 'Other' category for the General Plan Update does not include ~~SEGA~~ SEDA because the individual land uses are included in the land use designations. This category includes roads canals, railroads, etc. and the buffer area designated in Southeast Development Area."

Response to Comment V-26
The commenter identified a typographical error. The Note at the bottom of Table 3-6 on page 3-33 of the Draft Master EIR is revised as follows:

> "Notes: Single-family residential uses include low density (1.0 to ~~3.0~~ 3.5 du/acre), medium low density (3.5 to 6.0 du/acre), and medium density (5.0 to 12.0 du/acre) residential uses. Multiple family residential uses include medium high (12.0 to 16.0 du/acre), urban neighborhood (16.0 to 30 du/acre), and high density residential uses (30 to 45 du/acre)."

Response to Comment V-27
The commenter identified a typographical error. The following sentence is repeated on page 5.9-24 of the Draft Master EIR. Therefore, the sentence is deleted.

> "~~Additionally, the General Plan Update includes the following policies designed to reduce the potential for groundwater overdraft impacts:~~"

Response to Comment V-28
The commenter identified a typographical error. The first sentence in the fourth paragraph on page 5.15-28 of the Draft Master EIR is revised as follows:

> "The Water Quality Control Plan for the Tulare Lake Basin (~~Bain~~ Basin Plan) designates beneficial uses, established water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates by reference plans and policies of the State Water Resources Control Board."

Response to Comment V-29
The commenter identified a typographical error. The last sentence on page 5.15-47 is revised to read as follows:

> "**~~Error! Reference source not found.~~** Table 5.15-3 below shows the estimated generated wastes for each land use."

Response to Comment V-30

The commenter identified a typographical error. The following is revised in Section 9.1.1 on page 9-1 of the Draft Master EIR and in Section 9.2.1 of the Draft Master EIR.

"Arnoldo ~~Rodriquez~~ Rodriguez"

City of FRESNO

Development and Resource Management Department

2600 Fresno Street, Third Floor, Room 3065
Fresno, California 93721-3604
(559) 621-8003, FAX (559) 498-1012

Jennifer K. Clark AICP
Director

August 26, 2014

Arnoldo Rodriquez, AICP
Planning Manager
Development and Resource Management Department
2600 Fresno Street
Fresno, CA 93721

Dear Mr. Rodriguez:

At the August 25th, 2014 public meeting, the City's Historic Preservation Commission reviewed the Cultural Resources Chapter of the Draft Master Environmental Impact Report (DMEIR) for the General Plan and Development Code Update. The Commission, pursuant to its duties under FMC 12-1606(b)(6), passed a resolution (5-0) supporting staff recommendations for revisions and corrections as outlined in the staff report:

5.5.2: "reviewing literature of the resources" should be amended to say, "review of primary and secondary sources of information, such as Sanborn Fire Insurance maps, building permits and the like." W-1

5.5-6: Paragraph 1 and 2: The Easterby Farm/Ranch was **not** located in what is now downtown Fresno. An article in the *Fresno Weekly Expositor* July 10, 1872 noted that Easterby's Farm was within 4½ miles of Fresno (Clough and Secrest, p. 118). It was considerably east of what is now Fresno. W-2

5.5-7 Paragraph 4: Early development straddled the rail corridor, thus was located both "east" and "west" of the tracks. Fresno's Chinatown was well developed by the date of incorporation in 1885. The Central Pacific Railroad Depot was by 1885 the Southern Pacific Railroad Depot as the official name change for the company officially occurred in 1884.

Paragraph 4: The reference to early ethnic groups is a tad simplistic. Chinese, Scandinavian farmers and "Americans" were the earliest settlers from 1872 on. Armenians began to arrive in Fresno in 1881, Volga Germans in 1887, Japanese in the late 1890s. A sentence we used in the GP might work as it is inclusive of time and ethnicity: "Emigrants from Scandinavia, China, Japan, Armenia, Russia (Volga Germans), Mexico, and most recently Southeast Asia have contributed to the character and cultural heritage of the area." W-3

p. 5.5-8 Second paragraph… Section on prior historic surveys is out of place in the W-4

middle of a chronological narrative about Fresno's history and development. This should be relocated to a section on methods or environmental review. W-4 CONT

Third paragraph: Paragraph about streetcars is largely redundant with the first paragraph on this page. Should probably be deleted or additional information melded into first. W-5

p. 5.5-9 paragraph 2, would be appropriate to briefly mention that Japanese were relocated and detained in two assembly centers; one located at the Fairgrounds the other at the former Sugar Pine Lumber Company. W-6

Paragraph 4: "Victorian" is not an architectural style, it does refer accurately to an era. Suggest what we used in the General Plan: "As with many California towns of the nineteenth century, Fresno has a wealth of residential architectural styles. Due to fires and redevelopment in Downtown, the earliest building stock is gone, with a few notable exceptions. Examples of the late Queen Anne style survive, while the "Victorian" city has largely disappeared. Other residential styles that are well represented in Fresno include Craftsman bungalows, Neoclassical cottages, American Foursquare, and Period Revival buildings, such as Tudors and Spanish Eclectic." W-7

p. 5.5-10 As of August 19, 2014 there are 29 National Register resources within the Fresno City limits. They are **not** all located in the downtown core (e.g. Tower Theatre, Forestiere Underground Gardens, Kindler Home, etc.) W-8

p. 5.5-12 Table of Known Cultural Resources. How are "Historic-era Buildings and Structures" defined? Does this refer to designated resources, potentially eligible resources or just resources that are over 50 years of age? If the later, the number would be significantly higher. W-9

p. 5.5-14 Paragraph 3. As of August 19, 2014 there are 271 designated properties on Fresno's Local Register of Historic Resources and 15 Heritage Properties. We recommend using a date, "as of" as these numbers change quickly. Also "structures" refers to a very specific category of resources (like canals), best to use the generic term, "properties." Also "Local Register" in the last line of this paragraph should be capitalized. W-10

Paragraph 4. The Historic Preservation Ordinance was also amended in 2009 and 2012. The City's Historic Preservation database has close to 5,000 entries (4965 as of today). Also regarding the database it is more appropriate to say "buildings" not "structures," as structures under the HP Ordinance, California Register and the National Register refer to resources such as bridges and canals. W-11

p. 5.5-19 Third paragraph, The Historic Preservation Ordinance was also amended in 2009 and 2012. W-12

p. 5.5-20 Only a portion of the policies and goals from the 2025 General Plan for Historic Resources is included. They all need to be included. W-13

p. 5.5-22 last paragraph, As of August 19, 2014 there are 271 designated properties on Fresno's Local Register of Historic Resources and 15 Heritage Properties. W-14

p. 5.5-23-24 Not all the draft policies and objectives from the General Plan Update (Chapter 8, Historic and Cultural Resources) are listed. They all need to be included. W-15

p. 5-25. Mitigation Measure Cul-1 for sub-surface historic resources is a typical "late discovery" mitigation measure. This measure should parallel that for pre-historic resources (CUL-2). W-16

5.25. 5.27 We cannot legally compel private property owners to part with any artifacts that have been discovered on their property. W-17

Additionally, the Commission asked that the importance of the watershed date of 1769 be more fully discussed in the historic overview. To wit, the establishment of the first Franciscan mission in California is considered the beginning of the "historic era" for archaeological resources and yet the date is not discussed again in the historic context. (It is assumed that this is because there were no missions in the Project Area and thus this earlier history is not germane to this study). The Commission also seconded the staff concern noted above about private property owners and artifacts. W-18

Sincerely,

Karana Hattersley-Drayton, M.A.
Historic Preservation Project Manager
Secretary, Historic Preservation Commission
City of Fresno
(559) 621-8520

THIS PAGE INTENTIONALLY LEFT BLANK

Letter W: Historic Preservation Commission, Karana Hattersley-Drayton, August 26, 2014

Response to Comment W-1
The commenter suggested a clarification of literature review. The last sentence in the first paragraph on page 5-2 of the Draft Master EIR is revised as follows:

> "Given this, a major goal of the historian is to determine accurate themes of analysis, a task that can only be undertaken by a thorough review of previous researchers' thoughts and ideas, as well as reviewing the primary and secondary sources of information, such as Sanborn Fire Insurance maps, building permits and the like. ~~literature of the resources."~~

Response to Comment W-2
The commenter requested an editorial revision. The fourth sentence in the third paragraph on page 5.5-6 of the Draft Master EIR is revised as follows:

> "Named for the Spanish word for "ash tree," Fresno has its roots in the form of a large farm established in 1867 by A.Y. Easterby in an area approximately 4.5 miles east of what is now central downtown."

Response to Comment W-3
The commenter requested a clarification on the location of early development near the railroad, and what ethnic groups were present in Fresno's early years. The second and fourth sentences in the fourth paragraph on page 5.5-7 of the Draft Master EIR are revised as follows:

> "Development straddled the rail corridor and was located on both the east and west sides of the tracks. ~~was restricted to a six-block area beginning at and northeast from the Central Pacific Depot; development was concentrated at Mariposa and H Street.~~ Development of the infrastructure needed to support increases in agricultural and commercial industry soon followed and once diversity of industry was established, immigrant populations also began to increase. ~~Chinese, Armenian and Volga Germans began to arrive and settle."~~

Response to Comment W-4
The commenter suggested an editorial revision to the discussion of past historical surveys. The second and third sentence in the second paragraph are deleted as shown below.

> "~~Numerous project-level historical studies have taken place in the City during the last ten years (Bungalow Courts 2004; Chinatown Survey 2006; Germantown Historical Context 2006; Arts and Culture District 2006-7; Pinedale 2007; Mid-Century Modern Historic Context 2008; North Park 2008; South Stadium 2008; Wilson Island 2009), and each have focused on the background history of specific areas in the City. Future historical research is likely to occur at neighborhood analytical levels because of the City's status as a NPS-SHPO Certified Local Government.~~

Response to Comment W-5
The commenter suggested that the last paragraph on page 5.5-7 and extending onto page 5.5-8 should be deleted due to its redundancy with the first paragraph on page 5.5-7. Therefore, the last paragraph on page 5.5-7 and extending onto page 5.5-8 is deleted as shown below.

> "~~As Fresno grew from its founding as a regional agricultural center, municipal infrastructure and amenities also increased. One of the first projects to build Fresno's infrastructure was the electric intra-urban railway. By 1905, Fresno Traction Company had laid 15.5 miles of track on Fresno streets before being purchased in 1910 by Southern Pacific Railroad. In addition, the Fresno Traction Company built an amusement park on eight acres of San Joaquin River bottomland eleven miles from downtown Fresno named Fresno Beach. They extended the tracks to the beach in 1913. The Fresno Beach route was terminated at Herndon Avenue in 1930 due to increasing automobile use. Fresno Traction Company continued to cut back all of its routes and in 1939 streetcar service in Fresno ended.~~"

To retain the discussion regarding the Fresno Traction Company, the third paragraph on page 5.5-8 of the Draft Master EIR is revised as follows:

> "The first three decades of the 20th Century were a period of steady growth and increasing prosperity for Fresno during which the city established itself as the primary city of the San Joaquin Valley. The City's first electric streetcar was in use in 1902. By 1905, Fresno Traction Company had laid 15.5 miles of track on Fresno streets before being purchased in 1910 by Southern Pacific Railroad. By 1909, the first double- track streetcar line was installed along J Street. By the early 1920s, streetcar lines would radiate out from the central business district to the north, east, south, and west where farmland was being subdivided for suburban development. The expanding transit infrastructure, along with exponentially increasing private automobile ownership, made living further from the city center possible. Land within the central city increasingly became used for commercial and civic purposes.

Response to Comment W-6

The commenter suggested to include information regarding the Japanese-Americans. The second paragraph on page 5.5-9 of the Draft Master EIR is revised as follows:

> "Approximately 60,000 service members were stationed in and around Fresno during the War. Military activity was concentrated at two locations. One, the Hammer Field bomber base, was constructed in 1941 just beyond what was then the eastern boundary of the City. Today it is the site of Fresno Yosemite International Airport. The second, Camp Pinedale, was located six miles east of Downtown Fresno in the (then) unincorporated community of Pinedale on the site of the defunct Sugar Pine Lumber Company. The Army had acquired the site in March of 1942 for use as an Army Signal Training School. During World War II, Japanese-Americans were detained in two assembly centers; one located at the Fairgrounds and the other at the former Sugar Pine Lumber Company."

Response to Comment W-7

The commenter suggest a clarification on the architectural styles within the City. The fifth paragraph on page 5.5-9 of the Draft Master EIR is revised as follows:

> "As with many California towns of the nineteenth century, Fresno has a wealth of residential architectural styles. Due to fires and redevelopment in Downtown, the earliest building stock is gone, with a few notable exceptions. Examples of the late Queen Anne style survive,

while the 'Victorian' city has largely disappeared. Other residential styles that are well represented in Fresno include Craftman bungalows, Neoclassical cottages, American Foursquare, and Period Revival buildings, such as Tudors and Spanish Eclectic. ~~Fresno is home to a diversity of architectural styles that include Victorian, Revival (Colonial, Italian, Renaissance, Mission, Mediterranean, Spanish, and Tudor), Neoclassical, Craftsman Bungalow, Streamline Moderne, Beaux-Arts, Art Deco, International, Mid-Century Modern, and Ranch among others. While styles focus upon a collection of specific decorative features; types are based on form. Considered a distinctly American type, the Prairie Box— also known as the American Foursquare— was popular in Fresno in the early 20th Century.~~"

Response to Comment W-8
The commenter stated that as of August 19, 2014, there were 29 National Register resources. Therefore, the last sentence in the first paragraph on page 5.5-10 of the Draft Master EIR is revised as follows:

"As of August 19, 2014, there are 29~~There are also 26~~ National Register-listed structures within the Planning Area ~~in the downtown core~~."

Response to Comment W-9
The commenter asked how historic-era buildings and structures defined. The historic-era buildings and structures referred to in Table 5.5-1 of the Draft master EIR are those resources that are historic-era resources that have been recorded and are included in the Southern San Joaquin Valley Information Center.

Response to Comment W-10
The commenter identified updated information for the third paragraph on page 5.5-14 of the Draft Master EIR. Therefore, the third paragraph on page 5.5-14 of the Draft Master EIR is revised as follows:

"The City of Fresno retains many of its historically significant properties ~~buildings and structures~~ through listings on various registers; local and national. Within the Planning Area there are 29 historical resources listed on the National Register of Historic Places, and as of August 19, 2014, there are 271 designated properties ~~240 existing structures that are designated by the City~~ on the Local Register of Historic Resources~~. Additionally, there are~~ and 15 ~~13~~ Heritage Properties, which are not Historic Resources for the purposes of the City's Historic Preservation Ordinance but could potentially be treated as historical resources for the purposes of CEQA at the City's discretion. (http://www.historicfresno.org/). According to the Map Atlas – Existing Conditions Report prepared for the City of Fresno, there are three designated Local Historic Districts: the Porter Tract, the Wilson Island, and the Chandler Airfield/Fresno Municipal Airport. Since 1995, numerous historic building surveys have been undertaken by the City's Historic Preservation Division and technically qualified consultants, resulting in a potential of an additional 11 historic districts identified but not formally designated by the City on the ~~local~~ Local Register ~~register~~ as Local Historic Districts."

Response to Comment W-11
The commenter identified updates regarding the Historic Preservation Ordinance and the City's database. The third paragraph on page 5.5-14 of the Draft Master EIR is revised as follows:

> "Unlike the analysis of prehistoric resources, a process for establishing the significance of individual buildings and historic districts was mandated by the City in 1979 in the form of a Historic Preservation Ordinance, which was updated in 1999, 2009, and 2012. The Ordinance has resulted in the identification of close to 5,000 entries ~~over 2,000 older structures~~ within the City limits, and as the City ages more historic-era properties are added to the database each year. Many formal studies have been undertaken, especially in the last 10 years, primarily because the City recognizes the advantages of preservation.

Response to Comment W-12
The commenter identified updated information regarding amendments to the Historic Preservation Ordinance. The second sentence in the second paragraph is revised as follows:

> "First established in 1979, the Ordinance was ~~last~~ updated in 1999, 2009, and 2012."

Response to Comment W-13
The commenter noted that there are more policies in the 2025 General Plan than those listed on pages 5.5-20 and 5.5-21. It is acknowledged that there are more policies in the 2025 General Plan. The first sentence under "Local Policies" on page 5.5-20 is revised as follows:

> "Following includes a portion of the policies from the 2025 General Plan for Historic Resources. For a complete listing of all of the policies under Objectives G-10 and G-11, please see the 2025 Fresno General Plan that is available for review at the City of Fresno Development and Resources Management Department. ~~are the objectives and policies related to cultural resources from the existing City of Fresno 2025 General Plan."~~

Response to Comment W-14
The commenter identified updated information regarding the number of structures on the Local Register. The first paragraph under Impact CUL-1 on pages 5.5-22 and 5.5-23 of the Draft Master EIR is revised as follows:

> "Known historical resources are located primarily in Downtown Fresno because this is the area where development of the city began in the mid-1800s. These known resources meet the definition of an historical resource under CEQA Section 15064.5(a). As discussed previously, there are 29 historical resources listed on the National Register of Historical Places, 31 historical resources listed on the California Register of Historical Resources, four State Historic Landmarks, and as of August 19, 2014, there are 271 designated properties ~~240 existing structures~~ that are on the City of Fresno's Local Register of Historic Resources. ~~T~~there are also 13 Heritage Properties, which are not Historic Resources for the purposes of the City's Historic Preservation Ordinance but could potentially be treated as historical resources for the purposes of CEQA at the City's discretion. In addition to the individual resources, there are three designated Local Historic Districts within the Planning Area. As

additional surveys for potential historical resources are prepared, such as the surveys that were prepared for the Fulton Corridor Specific Plan in Downtown Fresno, additional resources may be added to the various lists. Many areas of Downtown, as well as other locations within the Planning Area, have not been surveyed. As a result, only a portion of the resources in the Planning Area are known.

Response to Comment W-15
The commenter identified that not all of the historic resources policies and objectives from the General Plan Update are provided in the discussion under Impact CUL-1. The objectives and policies that were provided on pages 5.5-23 through 5.5-24 are those that could reduce potential environmental effects on historic resources.

Response to Comment W-16
The commenter suggested that Mitigation Measure CUL-1 is a typical "late discovery" measure. This measure reduces potential impacts to previously unknown resources. The measure identifies that evaluation of the resources would occur if resources are encountered before or during grading. Therefore, this measure is not considered a "late discovery" mitigation measure.

Response to Comment W-17
The commenter stated that the City cannot legally compel private property owners to part with any artifacts that have been discovered on their property. This comment is noted. The Mitigation measures cited in Comment W-17 include provisions for a person who is capable of providing long-term preservation. However, federal and state officials have the right to seize Native American human remains, funeral objects, sacred and cultural ritual objects, etc. (except those in possession of the rightful descendants of the original owners), under the 1990 federal Native American Graves Protection and Repatriation Act which prohibits non-Native American ownership of such items. Objects discovered in the HSR archaeological excavations were not Native American, so it is important to note historic-era artifacts do not fall under the Native Americans Graves and Repatriation Act.

Response to Comment W-18
The commenter asked about the 1769 date referred in Section 5.5 of the Draft Master EIR. The 1769 date is discussed in Section 5.5 of the Draft Master EIR in terms of historic archaeological resources. Historic-era properties are discussed on pages 5.5-9 through 5.5-14.

THIS PAGE INTENTIONALLY LEFT BLANK

The following comments is submitted with respect General Plan.
I recommend that all references in the General Plan to Voluntary Emission Reduction Agreements (VERAs) be deleted as they do not constitute feasible CEQA mitigation measures. X-1

Jeff Reid
Attorney
McCormick Barstow et al LLP
7647 North Fresno Street
Fresno, CA 93720
T (559) 433-2310 |
www.mccormickbarstow.com
Jeff.Reid@mccormickbarstow.com

THIS PAGE INTENTIONALLY LEFT BLANK

Letter X: Jeff Reid, No Date

Response to Comment X-1

The commenter recommended that Voluntary Emission Reduction Agreements (VERAs)be deleted because they do not represent feasible CEQA mitigation measures. Page 5.3-48 and Page 5.3-49 of the Draft Master EIR includes a discussion of VERAs. The San Joaquin Valley Air Pollution Control District offer VERAs as a method to reduce criteria pollutants. VERAs have been implemented for various projects within the San Joaquin Valley. The past implementation of VERAs demonstrates the feasibility of VERAs as an option to reduce criteria pollutants.

THIS PAGE INTENTIONALLY LEFT BLANK

LEADERSHIP COUNSEL
FOR
JUSTICE & ACCOUNTABILITY
A Tides Center Project

October 9, 2014

Jennifer K. Clark, Director
Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93721
newplan@fresno.gov

Submitted Via Hand Delivery and E-Mail

RE: Fresno General Plan Update and Draft Master Environmental Impact Report for the Fresno General Plan Update and Development Code Update (SCH 2012111015)

Dear Ms. Clark:

We thank you for the opportunity to submit comments on the City of Fresno's (City's) Draft Master Environmental Impact Report (DMEIR) for the General Plan and Development Code Updates ("Project"). Leadership Counsel for Justice and Accountability is a project of the Tides Center, a non-profit organization, with a mission to work alongside residents of the most impacted communities in the Central and Coachella Valleys to advocate for sound policy and eradicate injustice to secure equal access to opportunity regardless of wealth, race, income or place.

Y-1

These comments aim to assist the City in its preparation of a Final General Plan and Master Environmental Impact Report that meet the needs of the City's current and future low-income disadvantaged residents and communities, in particular, those in the central, southeast, and southwest areas of the City. The comments also seek to help the City comply with applicable state and federal legal requirements, including those set forth in the California Environmental Quality Act (CEQA) (Pub. Res. Code § 21000, *et seq.*; C.C.R. § 1500, *et seq.*), state planning laws (Gov. Code § 65000, *et seq.*), and state and federal civil rights and fair housing laws (e.g., 42 U.S.C. § 2000d *et seq.*; 40 C.F.R. § 1040.13(B)(4), 1040.13(d); Gov. Code §§ 11135, 12955).

The DMEIR fails to meet the requirements of CEQA to disclose, analyze, and propose all feasible mitigation measures for potentially significant environmental impacts related to the

Project. In various instances, the DMEIR impermissibly proposes to rely on vague, voluntary and otherwise unenforceable policies contained in the Draft General Plan as mitigation measures. Pub. Res. Code § 21081.6(b); C.C.R. § 15126.4(a)(2); *See Napa Citizens for Honest Gov't v. Napa County Bd. of Sup.* (2001) 91 Cal.App.4th 342, 358 . The DMEIR also fails in multiple instances to consider and propose all feasible mitigation measures for potentially significant impacts which it determines cannot be mitigated to insignificant levels as required by CEQA. Pub. Res. Code § 21002; C.C.R. § 15091(a)(1); see *id.* § 15126.2(b).

The failings of the DMEIR and certain general plan policies identified in our letter to the City dated August 18, 2014 (incorporated by reference herein and included with this letter as Attachment 4) threaten to impose an unlawful disparate negative impact on the basis of race, ethnicity, country of origin, or other protected characteristics. 42 U.S.C. § 2000d *et seq.*; 40 C.F.R. § 1040.13(B)(4), 1040.13(d); Gov. Code §§ 11135, 12955. Y-1 CONT

The City must remedy the flaws contained in the DMEIR and the General Plan Update and recirculate the revised documents for review by public agencies and the public in order to comply with applicable environmental, planning, and civil rights and fair housing laws.

I. The City Must Recirculate the DMEIR for Public Comment with the Release of the Development Code for Public Review

As a preliminary matter, we note that the City's failure to release a Public Review Draft of the Development Code Update precludes meaningful public comment on the sufficiency of the DMEIR's consideration and mitigation of potentially significant impacts associated with that component of the Project. Accordingly, the City must recirculate the DMEIR for comment by the public and public agencies upon the release of the Public Review Draft of the Development Code Update. C.C.R. § 15088.5(a) ("A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review...but before certification.") Y-2

II. Failure to Adequately Mitigate Air Quality and Greenhouse Gas Impacts Associated with Low-Density Residential Development

The 2035 General Plan Land Use Map fails to include higher density residential designations in significant portions of the growth areas designated by the Plan, including but not limited to neighborhoods within the area East of Grantland, South of Shields Avenue, North of Belmont Avenue, and West of Marks Avenue and neighborhoods in the Southeast Development Area (SEDA) South of McKinley Street and North of Tulare Street. Y-3

The failure to include higher density residential designations in these neighborhoods will result in air quality and greenhouse gas impacts. As the General Plan Update notes, low-density residential development induces reliance on personal automobiles for transportation and harms the ability of the City to maintain a comprehensive and efficient transit system. As the MEIR notes, motor vehicle travel throughout the Planning Area are the largest source of air emissions generally. 5.3-1. Motor vehicles are a significant contributor to reactive organic gases (ROG) and nitrous oxide (NOx). DMEIR at 5.3-3. Failure to plan for higher density housing in significant portions of the General Plan Land Use Diagram will result in significant air quality and greenhouse gas impacts.

CEQA prohibits an agency from approving a project with significant environmental impacts if feasible mitigation measures or alternatives exist that would lessen or avoid such impacts. Pub. Res. Code § 21002. Though the DMEIR concludes that the Project will result in significant and unavoidable air quality and greenhouse gas impacts (1:14), it fails to consider or propose the incorporation of additional higher density housing in growth areas, including the significant portions of the growth areas in the Land Use Map that lack <u>any</u> high, urban, or even in some cases, medium high or medium density housing.

Y-3
CONT

The DMEIR must consider feasible mitigation of air quality and greenhouse gas emission impacts associated with low-density residential development through the redesignation of parcels in growth areas to higher density residential land use.

III. <u>The Project Fails to Assess the Environmental, Social and Economic Impacts of Inadequate Affordable Housing and Displacement</u>

A. Lack of Consideration of Impact of Failure to Implement Housing Element Program 2.1.6A on Project-Specific Population and Housing Impacts

The DMEIR analysis relating to Project impacts on population and housing includes a description of the regulatory setting as it relates to such impacts. The DMEIR's description of this regulatory setting includes City of Fresno 2009-2013 Housing Element Program 2.1.6A. Housing Element Program 2.1.6A required the City to rezone approximately 500 acres of vacant land to the R-2 or R-3 zoning district and an additional 200 acres of vacant land to the R-3 or R-4 zone district by 2010. As we brought to the City's attention in our letter dated September 8, 2014 (included with these comments as Attachment 6), the City has failed to implement Program 2.1.6A, though more than four years has passed since the deadline for the City to do so.

Y-4

Though the DMEIR identifies Housing Element Program 2.1.6A in its description of the regulatory setting as it relates to Project-specific population and housing impacts, the DMEIR does not disclose the City's failure to implement Housing Element Program 2.1.6A and neither does it assess how this failure impacts the DMEIR's related analyses, including but not limited to impacts on population and housing, air quality and greenhouse gas emissions. A revised DMEIR must correct this deficiency.

Y-4 CONT

B. Failure to Consider Project-Related Displacement Due to Rising Housing Costs

Housing is a critical factor in the assessment of the Project's impacts. The availability and location affordable housing throughout the planning period will impacts levels of vehicle miles traveled, air quality, greenhouse gas emission levels, traffic, and other environmental factors.

The General Plan Update includes goals, objectives, and policies designed to increase investment in the Downtown Area and surrounding neighborhoods, draw "young professionals" to Fresno, implement Bus Rapid Transit Corridors, and support the development of a High Speed Rail System with a station downtown. See e.g., UF-1-b; UF-3; UF-9; p. 2-17 ("Improving quality of life to attract and retain professionals to live in Fresno"). These goals, objectives, and policies will likely contribute to a significant rise in property values and rents with the greatest increases in the Downtown and surrounding areas targeted for investment by the Plan - areas currently home to high concentrations of low-income residents. Rent increases associated with the Project will impose displacement pressures on low-income residents.

Y-5

The DMEIR's discussion of potential Project displacement impacts is limited to displacement that occurs due to the removal of existing units. 5.12-13, 14, & 15. The DMEIR does not include analysis of or propose mitigation for potential displacement of low-income populations due to rising property values and rent prices as a result of the Project.

Displacement, caused by both physical and economic forces, will result in significant environmental impacts which require analysis and mitigation. C.C.R. § 15064(e). Residents forced to move from areas served by high quality transit will be forced to rely on personal vehicles which in turn will have significant impacts on vehicle miles travelled, traffic, greenhouse gas (GHG) emissions, and air quality. No adequate analysis of the environmental impacts of displacement is included in the DMEIR. Similarly, displacement will result in significant social and economic costs, including, but not limited to increased transportation costs to lower income residents, decreased access to employment opportunities, and social and

economic dislocation. The DMEIR must be revised to consider the adverse social, economic and environmental impacts of displacement. *See* C.C.R. § 15064(e)("[I]f a project would cause overcrowding of a public facility and the overcrowing causes an adverse effect on people, the overcrowding would be regarded as a significant effect."); *see also* Cal. Pub. Res. Code § 21083(b)(3) (the Guidelines "shall require a finding that project may have a 'significant effect on the environment' if…[t]he environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.").; C.C.R. §§ 15131, 15064(e). The impacts of socio-economic displacement also negatively affect human health, an issue which the DMEIR does not consider.

The DMEIR's assertion that "the General Plan Update includes a substantial number of new housing" (5.12-14) does not substitute for analysis of potential Project-related socio-economic displacement impacts nor does it constitute mitigation. The mere designation of land for housing does not in itself *prevent* displacement of low-income residents from existing housing, nor does such designation assure affordable alternative housing - either within the City or more specifically, within residents' pre-displacement neighborhood -- for those displaced.

Y-5 CONT

The DMEIR does not adequately analyze and mitigate significant environmental and human impacts related to forseeable (not merely aspirational) levels of housing affordability. Affordable housing and anti-displacement strategies must be considered and included in the DMEIR as essential measures to reduce impacts associated with increased housing costs. Feasible mitigation measures include but are not limited to:

- Requiring all new residential development to include at least 20% of residential units affordable to low, very-low, and extremely-low income populations.
- Adopt a rent stabilization ordinance preventing rent increases of more than 15% over a 3 year period.
- Adopt and enforce right of first refusal policies that provide current tenants an opportunity to buy a property before it is sold to a third party.
- Implementation of nexus studies and mitigation fees to promote and secure adequate affordable housing development

C. <u>Failure to Assess and Mitigate for Environmental Impacts Caused by Lack of Jobs/Housing Fit and Access to Goods and Services</u>

Y-6

As discussed in Leadership Counsel's August 18th letter, incorporated herein as Attachment 4, the Draft Plan fails to promote affordable housing throughout the City and in most growth areas.

That in turn will create and exacerbate a jobs housing imbalance for lower wage workers as development in growth areas generates low wage jobs. Additionally, physical and economic pressures discussed in Section III(B) above threaten to displace lower income residents from areas of considerable job growth. The lack of any provisions to secure a jobs/housing fit will have significant impacts on the environment, including, but not limited to impacts on vehicle miles travelled, traffic, GHG emissions, and air quality. Similarly, the lack of jobs/housing fit will have both social and economic impacts on lower-income communities that must be analyzed and appropriately mitigated.

The DMEIR fails to adequately assess the impacts - both environmental and socio-economic - of the lack of a jobs housing fit and fails to propose adequate mitigation measures to address these impacts. Y-6 CONT

Mitigation measures may include but are not limited to:

- Higher densities in growth areas
- Requiring all new residential development to include at least 20% of residential units affordable to low, very-low, and extremely-low income populations.
- Implementation of nexus studies and mitigation fees to promote and secure adequate affordable housing development

The DMEIR is wholly inadequate in its assessment of - and proposed mitigation of - the environmental, social and economic impacts of the Plan's failure to protect and promote affordable housing options. Accordingly, the DMEIR must be revised and recirculated.

IV. The DMEIR Fails to Adequately Identify and Propose Feasible Mitigation for Project Impacts to Farmland

A. Failure to Identify and Propose Feasible and Enforceable Mitigation for Impacts to Farmland within the Planning Area

The DMEIR identifies approximately 15,901 acres of farmland designated by the Farmland Mapping and Monitoring Program of the California Department of Conservation, including 9,550 acres of Prime Farmland, 2,911 acres of Unique Farmland, and 2,355 acres of Farmland of Statewide Importance, and approximately 11,714 acres of farmland with existing operations within the Planning Area. The DMEIR anticipates that the Project would convert all of this farmland to non-agricultural uses and correctly identifies such conversion as a significant impact. 5.2-11, 12. Y-7

Where an agency concludes that a project will result in a significant and unavoidable impact, the agency is required to identify all feasible mitigation measures to substantially lessen the significant environmental effect. C.C.R. § 1538. Mitigation measures proposed in an EIR must be fully enforceable through permit conditions, agreements, or other legally binding instruments. Pub. Res. Code. § 21081.6(b); C.C.R. § 15126.4(a)(2).

The DMEIR impermissibly relies on just one vague and unenforceable policy, Policy RC-9-b, "Land Outside SOI", to "reduce" project impacts on farmland and concludes that no feasible measures exist to mitigate this loss of farmland. 5.2-1, 12.

Policy RC-9-b states:

> "Express opposition to residential and commercial development proposals in unincorporated areas (excluding County Islands) within or adjacent to the Planning Area when these proposals would do any of the following:
>
> - Make it difficult or infeasible to implement the General Plan;
> - Contribute to the premature conversion of agricultural, open space, or grazing lands; or
> - Constitute a detriment to the management of resources and/or facilities important to the Fresno Metropolitan Area (such as air quality, water quantity and quality, traffic circulation and riparian habitat)."

Y-7
CONT

While Policy RC-9-b calls on the City to "express opposition" to certain development proposals "within or adjacent to the Planning Area", the policy's title and the objective with which the policy is associated - Objective RC-9 - refer only to land "outside" of the planning area. This inconsistency creates potential uncertainty with respect to - and thus ultimately leaves the City discretion to determine -- whether the intended scope of Policy RC-9-b in fact covers land *within* or rather only encompasses land outside of the planning area.

Policy RC-9-b's directive to "[e]xpress opposition" provides no commitment on the part of the City to take any specific action to prevent a development proposal which falls within the purview of the policy.

Implementation of Policy RC-9 with respect to the first identified category of proposals (proposals that make implementation of the General Plan difficult or infeasible) could not adequately mitigate project-specific impacts, as it merely entails opposition to proposals that impair implementation of the Plan as a whole. Policy RC-9 is also vague and unenforceable with

respect to the second category of proposals that it references, as the policy does not define what constitutes "premature conversion" of agricultural, open space, or grazing lands. The third category of proposals identified by Policy RC-9 is so broad that it could feasibly apply to almost *any* project that contributes to air pollution, water usage, water contamination, traffic circulation and riparian habitat, especially given the existing poor air quality, declining water table, and water contamination that impact the Planning Area. The MDEIR thus proposes *no* clear and enforceable mitigation measures for the dramatic loss of farmland that this Project would entail.

The MDEIR also fails to consider various feasible mitigation measures to reduce the project's impacts on agricultural resources. A few examples of such mitigation measures include the following:

- Use of agricultural conservation easements through direct purchase or donation of in-lieu development fees to an entity whose purpose includes farmland acquisition and preservation to preserve and mitigate lost farmland within the City's Sphere of Influence.[1]
- The City shall deny approval of proposals for residential or commercial development that would constitute "leap frog development", defined as development that is not contiguous to the existing urbanized area.
- The City shall not pursue funding for or invest in roadway improvements to support new residential or commercial development that would constitute "leap frog development", defined as development that is not contiguous to the existing urbanized area, or would result in or that would result in or contribute to a failure to achieve 57% of development infill.
- The City shall not invest in water, sewer or other public services and infrastructure in growth areas that would support development which would result in or contribute to a failure to locate 57% or more of residential development in infill areas, defined as being within the City on December 21, 2012".
- Designate and zone land for urban and high density residential in all quarter sections (160 acre sections generally formed by the half-grid of major streets) with residential use designations in the growth areas. (Smaller-lot residential units by their nature use less land than larger lots; thus incorporation of higher density residential designation would contribute to the efficient use of land for residential uses and farmland preservation).

Y-7
CONT

[1] Courts have found that agricultural conservation easements to constitute appropriate mitigation for the direct loss of farmland when a project would convert agricultural land to a nonagricultural use. *Masonite Corp. v. County of Mendocino* (2013) 218 Cal.App.4th 230.

The following modified version of Objective UF-12 included in the Draft General Plan Update is also a feasible mitigation measure for Project impacts on farmland[2]:

- Objective UF-12: "57% or more of future residential development shall be located in infill areas - defined as being within the City on December 21, 2012 - including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land."

Y-7 CONT

The DMEIR must be revised to consider these and other feasible mitigation measures for the loss of farmland resources and recirculated for public review pursuant to CEQA.

B. Failure to Identify and Propose Feasible and Enforceable Mitigation for Cumulative Impacts to Farmland

The DMEIR concludes that the Project, considered together with anticipated conversion of farmland to non-agricultural uses in areas outside of the Planning Area, will result in a significant cumulative impact on agricultural resources. 5.2-12. In response, the DMEIR lists one objective and three policies included in the Draft General Plan which it claims will reduce the Project's potential cumulative impact on agricultural resources. However, the objective and policies are neither clear nor enforceable and thus are not adequate mitigation measures under CEQA.

Policy RC-9-a, Regional Cooperation, reads:

Y-8

> "Work to establish a cooperative research and planning program with the Counties of Fresno and Madera, City of Clovis, and other public agencies to conserve agricultural land resources."

The directive "Work to establish" provides no guidance as to specific actions that the City must take and is therefore vague and unenforceable as a mitigation measure.

Objective RC-9 consists of a general directive to "preserve agricultural land outside the [planning area]." While an appropriate aspirational objective, the City lacks authority to exert

---

[2] In Spring 2012, Fresno City Council adopted General Plan Alternative A-Modified as the framework upon which the draft general plan would be based. In the Fresno 2035 General Plan Initiation Review Draft (Exhibit A), released in August 2012, City staff projected that a General Plan Update based on Alternative A would support location of approximately 57% of new units within existing City limits. p. 7.

direct control over the use of land outside of its planning area and thus has no power to ensure its enforcement.

Similarly, Policy RC-8-3 calls upon the City to "Advocate for the enrollment of all prime farmland outside of the City's SOI in agricultural land conservation programs." The directive to the City to "advocate" entails no specific, enforceable commitment to any action that would result in the preservation of farmland. The enrollment of land outside of the City's SOI in agricultural land conservation programs is ultimately an action outside of the City's control and not subject to enforcement as a mitigation measure.

Y-8 CONT

The DMEIR also identifies Policy RC-9-b as a measure that would reduce the Project's cumulative impacts to farmland. For the reasons identified in Section III(A) above, Policy RC-9-b is not an appropriate mitigation measure upon which the City may rely under CEQA.

The City must circulate a revised DMEIR for review by public agencies and the general public which considers and proposes all feasible mitigation measures for the Project's contribution to cumulative impacts on farmland. Examples of such measures include but are not limited to those identified in Section III(A) of this letter.

C. Failure to Disclose Impacts on Farmland From Project-Induced Changes to the Existing Environment

Without providing any supportive analysis, the DMEIR concludes that:

> "Except for direct conversion, the implementation of project development would not result in other changes in the existing environment that would impact agricultural land outside of the Planning Area…Therefore, the project would result in no impact on farmland...involving other changes in the existing environment" 5.2-15.

Y-9

On this basis, the DMEIR further concludes that the project would result in no cumulative impacts involving other changes in the existing environment that could result in the conversion of farmland. *Id.*

The DMEIR fails to consider or propose mitigation for the impact of Project depletion of groundwater resources on the viability of farmland both within and beyond the Planning Area. The DMEIR itself finds that:

> "The project could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting

nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)." (Impact HYD-2, p. 2-28).

As explained in the letter prepared by SWAPE included with these comments as Attachment 3, the groundwater in Fresno is already in a condition known as critical overdraft where "continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." (2010 Fresno Urban Water Management Plan, 2012, p. 4-8). Thus, project-related groundwater depletion may well result in or contribute to conversion of farmland within and beyond the Planning Area to non-farmland uses. Y-9 CONT

The City must circulate a revised DMEIR for review by public agencies and the general public which analyzes and proposes adequate mitigation for impacts of Project-related groundwater depletion on farmland conversion. Examples of feasible mitigation measures are included in the letter prepared by SWAPE included with this comment letter.

V. The Draft MEIR Fails to Adequately Consider and Mitigate Potential Impacts Due to Restrictions on Access to San Joaquin River Parkway

As explained in the letter submitted by Shute, Mihaly, & Weinberger to the City of Fresno dated September 25, 2014, the Draft MEIR fails to adequately consider and mitigate project-specific impacts due to restrictions imposed by the Project on vehicular access to the San Joaquin River Parkway at two access points. That letter is included with those comments as Attachment 7 and incorporated into these comments by reference. Y-10

VI. The Project Threatens to Create an Illegal, Disparate Impact on Protected Classes

As explained in our August 18, 2014 letter to the City on the General Plan Update (incorporated by reference herein and included with these comments as Attachment 4) and in the October 9, 2014 letter to Leadership Counsel from Shute, Mihaly, and Weinberger (incorporated by reference herein and included with these comments as Attachment 2), the City is legally bound to comply with fair housing and civil rights laws that prohibit the creation of a disparate negative impact on the basis of race, ethnicity, national origin, or other protected characteristics in the preparation of the General Plan Update, Development Code Update, and DMEIR. 42 U.S.C. § 2000d *et seq.*; 40 C.F.R. § 1040.13(B)(4), 1040.13(d); Gov. Code §§ 11135, 12955. Y-11

Objectives and policies contained in and land use patterns proposed by the Draft General Plan Update threaten to violate civil rights and fair housing protections. These objectives and policies and land use patterns include but are not limited to:

- policies encouraging the concentrated siting of industrial facilities in and around low-income communities of color already highly burdened by multiple sources of pollution (see e.g., 2035 General Plan Land Use Diagram; LU-7; LU-7-c) ;
- low-density residential land uses designations in significant portions of the growth area without accompanying higher density residential designations or effective measures to affirmatively further fair housing opportunities (see e.g. 2035 General Plan Land Use Map);
- policies that will contribute to increase housing and rent prices and resident displacement in low-income communities of color without providing tenant protections or relocation assistance (e.g., UF-1-b; UF-3; UF-9; p. 2-17);
- objectives and policies that permit and perpetuate disinvestment in existing low-income neighborhoods of color, such as policies allowing unchecked development in growth areas (e.g., UF-12;; 12-26, 27; Leadership Counsel August 18, 2014 Comment Letter (Attachment 4), pp. 6-13).

Y-11
CONT

The DMEIR's failure to analyze and mitigate potentially significant impacts also threatens to result in unlawful disparate impacts on protected classes, including people of color in neighborhoods identified by the California Environmental Protection Agency (CalEPA) as among the most highly burdened by pollution in the State of California, and thereby violate fair housing and civil rights protections. See Exhibit B (CalEPA & Office of Environmental Health Hazard Assessment, California Communities Environmental Health Screening Tool 2.0 (CalEnviroScreen 2.0)) & Exhibit C ("Health Hazard: West Fresno Riskiest Place to Live in California, Mark Grossi, Fresno Bee, March 16, 2013")[3].

The City must address the deficiencies of the General Plan Update and the DMEIR raised in these and attached comments to ensure that it complies with all applicable state and federal civil rights and fair housing laws.

[3] This letter also includes by reference CalEnviroScreenv2.0.xlsx which includes the ranked scores for census tracts under CalEnviroScreenv.2.0xlsx with the higher ranked / higher scoring census tracts corresponding to comparatively and absolutely greater pollution burden under the tool. CalEnviroScreenv2.0.xlsx is available at http://oehha.ca.gov/ej/ces2.html or from Leadership Counsel upon request.

* * * * *

Thank you for your consideration of our comments. We remain ready and willing to work collaboratively with the City to address the issues identified in this letter in the spirit of achieving the best results for South Fresno communities and the City as a whole. Please contact me at (559) 369-2790 to set up a time to meet to discuss these comments in person.

Sincerely,

Werner

Ashley Werner
Attorney
Leadership Counsel for Justice and Accountability

THIS PAGE INTENTIONALLY LEFT BLANK

Letter Y: Leadership Counsel for Justice & Accountability, Ashley Werner, October 9, 2014

Response to Comment Y-1
The commenter states that the Draft Master EIR fails to meet the requirements of CEQA to disclose, analyze, and propose all feasible mitigation measures for potentially significant impacts of the General Plan Update. The commenter continues to state that due to these flaws, the Master EIR must be recirculated. Since the detailed comments are provided in Comments Y-2 through Y-11, responses to each of the detailed comments are provided below. As discussed in Response to Comments Y-2 through Y-11, the analysis and conclusions within the Draft Master EIR are adequate.

Response to Comment Y-2
The commenter raised a concern that the City failed to release the Public Review Draft of the Development Code Update. Please refer to Response to Comment N-1, above.

Response to Comment Y-3
The commenter expressed a concern that the Land Use Map does not include higher density designations in significant portions of the growth areas. These comments are provided on the General Plan Update and not on the contents of the Draft Master EIR. Therefore, no further response is required (CEQA Guidelines, Section 15088). However, reference is made to Draft Master EIR Response to Comment V-5, for a conflicting opinion as to the amount of acreage planned in new growth areas for higher density residential development, and the above Response to Comment V-5. In comparing Exhibit 3-6, Growth Areas, with Exhibit 3-8, Subsequent Project Areas, much of the growth areas is covered by Subsequent Projects. A listing of the specific development proposed within the Subsequent Project Areas is provided in Table 3-6 in Section 3 of the Draft Master EIR. Table 3-6 identifies single-family and multiple-family residential units that are proposed within each Subsequent Project Area. As depicted in Table 3-6, each Subsequent Project Area, except for the BRT Corridors and the South Industrial Center, contains a substantial amount of multiple-family residential units.

The potential air quality and greenhouse gas impacts associated with the land uses proposed within the General Plan Update are addressed in Sections 5.3 and 5.7, respectively, in the Draft Master EIR.

The commenter also expressed a concern that additional mitigation measures beyond those identified in the Draft Master EIR should be recommended. Although the criterion pollutant emissions thresholds adopted by the San Joaquin Valley Air Pollution Control District (SJVAPCD) are intended for use on individual projects, no other quantitative plan level thresholds have been adopted and the SJVAPCD is the regional trustee agency for air quality protection, charged with implementing the provisions of the federal and state Clean Air Acts and Amendments thereto.

The General Plan Update provides for the development of numerous individual development projects that will be subject to impact analysis under these. Large individual projects may exceed the thresholds, even when complying with SJVAPCD rules such as the Indirect Source Review Rule and permit requirements for enhanced control technology application to point sources. Development of land in the City's Planning Area as prescribed by the General Plan Update will result in the exceedance of criteria pollutant thresholds.

Although existing City ordinances and air quality regulations (including those of the U.S. Environmental Protection Agency, the California Air Resources Board, the SJVAPCD), as well as General Plan policies would reduce criteria pollutant emissions, buildout of the Planning Area will still generate substantial emissions of air pollutants and pollutant precursors. As stated on page 4.3-50 of the Draft Master EIR, no feasible additional mitigation measures beyond the proposed General Plan policies are available to the City (given its limited jurisdictional powers for controlling air pollution) to further reduce potential adverse air quality impacts associated with population growth and concomitant development associated with population growth.

Response to Comment Y-4
This comment refers to Housing Element Program 2.1.6A and the provision of higher density residential units. These comments are provided on the General Plan Update and not on the contents of the Draft Master EIR. Therefore, no further response is required (CEQA Guidelines, Section 15088).

Response to Comment Y-5
The commenter asserts that the General Plan Update's goals, objectives, and policies that are designed to increase investment will likely contribute to a significant raise in property values and rents, and thus would displace low-income residents. These comments are provided on the General Plan Update and not on the contents of the Draft Master EIR. Therefore, no further response is required (CEQA Guidelines, Section 15088). However, it is noted that, the General Plan Update includes goals, objectives, and policies that increase investment to improve various areas of within the Planning Area, and it is speculative to state that improvements to these areas would ultimately lead to the displacement of low-income persons. It is also speculative to assert that the goals, objectives, and policies would have a "gentrification" effect that would surmount wage increases over time, leading to displacement.

The commenter also states that the mere designation of land for housing does not in itself prevent displacement of low-income residents from existing housing. The commenter is correct; however, the Housing Element provides programs to provide housing for different income levels. As described in Response to Comment Y-3 above, a substantial amount of multiple-family units are proposed within the Planning Area. These multiple-family units could accommodate low-income housing however, the implementation of the Housing Element programs could provide housing for different income levels.

Response to Comment Y-6
The commenter asserts that the failure to promote affordable housing throughout the City and in most growth areas, will in turn, create and exacerbate a jobs housing imbalance. As described in Response to Comment Y-3, above, most of the growth areas include a substantial amount of multiple-family residential units. Substantial job growth is also proposed within the growth areas. The presence of both single-family and multiple-family residential units within the growth areas, as shown in Table 3-6 in Section 3 of the Draft Master EIR, provide greater opportunities for residents with various income levels to live and work within most of the growth areas. It is further noted that this assertion is speculative; see above Responses to Comments Y-4 and Y-5.

Response to Comment Y-7
The commenter expressed a concern that not all feasible mitigation measures were identified to reduce impacts to farmlands within the Planning Area. Please see Response to Comment B-2 regarding farmlands.

The commenter also requests a revision to Objective UF-12 to reduce impacts to farmlands. Please see Response to Comment G-1 for a revision to the Commentary for Objective UF-12 that provides clarification of the objective.

Response to Comment Y-8
The commenter expressed a concern that mitigation measures were not provided to reduce cumulative impacts to farmlands. Please see Response to Comment B-2 regarding farmlands.

Response to Comment Y-9
The commenter states that the Draft Master EIR did not consider the impact of depleting groundwater resources and impacting the viability of farmland within and outside of the Planning Area. As shown in Table 5.15-2 on page 5.15-42 of the Draft Master EIR, groundwater supplies are projected to be limited to approximately 85,000 acre-feet per year so that the groundwater table can receive more recharge water compared to extracted water. Therefore, groundwater levels are projected to rise in the future. Farmland locations that contain their own wells are required by City ordinance (Fresno Municipal Code Section 12-306-N-11) to provide for recharge (or in-lieu recharge), and would not be adversely affected by a reduction of groundwater pumping by the City of Fresno. Also see above Response to Comment T-2 and T-4 through T-7.

Response to Comment Y-10
The commenter asserts that the Draft Master EIR failed to adequately consider and mitigate project-specific impacts due to the restriction imposed by the General Plan Update in vehicular access to the San Joaquin River Parkway. Please see Response to Comment AA-1 regarding access to the San Joaquin River Parkway via Riverview Drive.

Response to Comment Y-11
The commenter asserts that the General Plan Update threatens to create an illegal, disparate impact on protected classes by threatening to violate civil rights and fair housing practices. The specific objectives and policies referred to include LU-7, LU-7-c, UF-1-b, UF-3, UF-9, and UF-12 and there is a reference to the Land Use Diagram. These comments are provided on the General Plan Update and not on the contents of the Draft Master EIR (environmental justice analysis not being required under CEQA). Therefore, no further response is required (CEQA Guidelines, Section 15088). However, the following should be noted:

In response to the first issue raised, siting of industrial facilities in and around low-income communities:

The locations of industrial uses in the southern portion of the Planning Area, on the north side of State Route 180 in the western portion of the Planning Area, along the BNSF Railroad corridor north of McKinley, and near the Fresno International Airport are similar to the locations that were

previously planned in the 2025 General Plan, the 1984 Fresno General Plan, and preceding City and Metropolitan Area Plans. These planned industrial areas currently include industrial uses at many locations.

Fresno's original development pattern replicated that of other San Joaquin Valley cities: heavy industrial uses tend to be sited in the southern part of the urban area so that prevailing winds would tend to carry fumes away from the community. This development pattern was established under County jurisdiction, before the City of Fresno's corporate boundaries expanded to encompass south Fresno's industrial areas. Fresno's industrial base achieved pre-eminence because the southern part of the City also provided a beneficial conjunction of transportation modes (highways and rail lines) to allow for the most efficient transport of raw materials and finished goods, and because this part of the metropolitan area had the most readily available water supply (groundwater accessible at shallow depths) as well as proximity to the workforce.

California has what may be considered the most comprehensive and strictly enforced environmental regulatory program in the nation to protect human health, air, water, and the ground from industrial contamination. The fact that CalEPA's databases reflect the presence of hazardous materials is proof that the hazardous material regulatory system is working properly: industries and pest control applicators are complying with mandatory safeguards and reporting procedures so that current requirements for storage, transport, handling, use, and disposal of these materials can be met. The state's contaminated site database also provides affirmative notice to ensure that past improper practices are addressed through remediation. It should be noted that re-use of contaminated sites provides for the most expeditious path to remediation, because there is an immediate financial incentive driving the cleanup. Therefore, nothing would be gained by prohibiting new or expanded industrial or commercial development on "brownfield" sites in Fresno.

Over the past two decades, the City has increased its assessment and prevention efforts to provide for improved community health. The environmental assessment process for new projects includes an enhanced protocol for examining and mitigating potential air pollutants and greenhouse gases. New assessment tools are being employed for health risk assessments when indicated. The City has adopted an ordinance to provide for agricultural uses and community gardens throughout the urban area. Alternative transportation modalities are being greatly increased, and this General Plan Update proposes a "Health Communities" element to provide a policy framework for continued improvement in this area.

These efforts have been greatly facilitated with enhanced interagency collaboration. Since the last Fresno General Plan was adopted in 2002, Fresno County Community Health/Environmental Health Division has become a Certified Unified Program Agency to provide for integrated oversight of public health protection and hazardous material regulation (see http://www.co.fresno.ca.us/DivisionPage.aspx?id=2974 for information). The City's Development and Resource Management (DARM) Department has formed a closer working relationship with that agency, as well as with the local Department of Toxic Substances Control office, the San Joaquin Valley Air Pollution Control District, and the Fresno County Agricultural Commissioner.

These cooperative efforts benefit the entire City, because contaminated properties and hazardous materials are present throughout Fresno—the CalEPA database notes that hazardous materials and contamination may be found in all quadrants of the City, and in Census Tracts with all levels of household income.

The second issue raised is the location of low-density residential land use designations in significant portions of the growth areas without accompanying higher density residential densities. As discussed in Response to Comment Y-3, above, most of the growth areas include a substantial amount of multiple-family residential units.

The third issue asserts that the General Plan Update policies will contribute to increase housing and rent prices as resident displacement is speculative. Please see Response to Comment Y-5, above.

The fourth issue asserts that the General Plan Update objectives and policies would perpetuate disinvestment in existing low-income neighborhoods of color. This assertion is unfounded and speculative.

Based on a review of the issues raised by the commenter, the Draft Master EIR adequately addresses the environmental issues associated with the General Plan Update.

THIS PAGE INTENTIONALLY LEFT BLANK

Community and Economic Development
Planning Division

Norman L. Allinder, AICP
Director

- 2037 W. Cleveland Avenue
- Mail Stop G
- Madera, CA 93637
- (559) 675-7821
- FAX (559) 675-6573
- TDD (559) 675-8970
- mc_planning@madera-county.com

October 9, 2014

Letter Z
Page 1 of 2

City of Fresno
Ms. Jennifer Clark
Development & Resource Management Director
2600 Fresno Street, Room 3065
Fresno CA 93722

Re: Draft Master EIR

Dear Ms. Clark:

Madera County has reviewed the City of Fresno's Draft Master Environmental Impact Report and is writing to provide comments on the Draft. As with the General Plan Draft, which we reviewed, the Draft Master EIR mentions how the City of Fresno is currently implementing a balanced approach to land use focusing on infill, transit oriented development and sustainable development practices. The current trend within the City of Fresno is quite the contrary. Development has rapidly grown outward, bringing it all the way to the northern border of Fresno and Madera County. This expansion has caused an increase in traffic, noise, nighttime glare and degraded air quality which directly affects Madera County. When such topics are covered within the Draft Master EIR, the document fails to properly address the pressing issues that currently are and will continue to affect Madera County.

Specifically, the discussion of Transportation and Traffic impacts is dismissive of the concerns voiced by Madera County in public hearings and written documentation provided to the Fresno City Council. The Draft Master EIR states that as part of the General Plan Update, the City will be providing a greater balance of housing and employment, most likely an oversupply, which will lead to less than significant impacts to neighboring counties. But with commercial development being intensified on the border with Madera County, anticipated results from traffic would be more likely to increase not decrease. This lack of forward thinking can lead to increased traffic congestion that will overflow onto Madera County roadways. A possible solution to easing traffic caused by commercial development would be to integrate more housing to balance the land uses in that area. The addition of housing could potentially lessen the bulk amount of vehicle trips that would cause congestion in the region. These conclusions made from the findings of Transportation and Traffic, found that potential impacts to neighboring counties, including Madera, are speculative, resulting in no mitigation being required. The idea that traffic impacts to

Z-1

neighboring counties would be speculative is dismissive in nature, and can be found as not complying with the California Environmental Quality Act (CEQA).

In closing, Madera County has continued to voice a number of concerns over the Fresno General Plan Draft Update and now the Draft Master EIR. The lack of implementation policies to mitigate potential impacts to neighboring counties, including Madera County, is concerning and should be properly addressed. Appropriate action should be taken to ensure the least significant effects possible to surrounding jurisdictions in order to achieve a complete and thorough plan. We are hopeful that our feedback will result in a positive outcome for all involved parties.

Z-1
CONT

Sincerely,

Brent Gibbons
Planner II

Letter Z: Madera County Community and Economic Development, Brent Gibbons, October 9, 2014

Response to Comment Z-1

This commenter states that the concerns voiced by Madera County related to Traffic and Transportation were not addressed. The commenter states there will not be a balance of housing and employment, and the City is intensifying commercial development on the City's border with the County of Madera.

With regard to the comment on traffic and transportation:

As discussed in Impact TRANS-1, currently a multi-county travel demand forecast (TDF) model comprised of Madera, Fresno and/or other surrounding counties does not exist. The County of Fresno Council of Governments TDF model released in 2010, and calibrated and validated for the project study subarea is a forecasting tool specific to the County of Fresno.

The County of Madera previously identified that future development within the City of Fresno Planning Area could impact roadways and intersections within Madera County. As discussed in Impact TRANS-1 on pages 5.14-57 and 5.14-58 for project impacts and on pages 5.14-78 and 5.14-79 for cumulative impacts, there is a discussion of potential traffic impacts within Madera County as well as other surrounding counties based on a discussion of the jobs to housing evaluation that was presented in Section 5.12 in the Draft Master EIR. The evaluation concluded that approximately 16,162 people who were employed and resided within the Planning Area in 2010, travelled outside of the Planning Area to their place of employment. With the implementation of the General Plan Update and the proposed land uses, there is a projection that fewer people would be required to leave the Planning Area at General Plan Update Buildout (year 2056) compared to the year 2010. At buildout, approximately 10,517 people who are employed and reside within the Planning Area would be required to travel outside the Planning Area for employment. Due to the land use configurations proposed in the General Plan Update, there would be approximately 5,645 fewer people that would be required to leave the Planning Area for employment.

By providing a greater balance, the proposed project would generally result in a less than significant impact on roadways within neighboring counties. However, since the traffic volumes are assumed to increase along SR 99 and SR 41, it is reasonable to assume that there would be increases in regional traffic volumes. The specific increases in traffic volumes beyond the County of Fresno boundary (i.e., in areas adjacent to SR 99 and SR 41) resulting from buildout of the Planning Area is speculative because future growth within areas outside of the County of Fresno is dependent on land use development approvals of other jurisdictions and timing of future development. Therefore, the project's impact on other surrounding counties is considered speculative.

With regard to the comment on north Fresno's development patterns:

For over 150 years, the City of Fresno has developed concentrically outward from the original railroad siding in the current Downtown area. Fresno's expansion to the north occurred only after major sewer trunks were developed in the 1980s to provide wastewater conveyance capacity, and

agricultural reserve areas in northeast Fresno were opened for development when a surface water treatment plant was approved to meet needs for potable and firefighting water supply. Commercial development logically followed North Fresno's residential development as demographic data demonstrated sufficient population growth and disposable household income to support commercial enterprises in the area. Based on a review of the 2025 General Plan land use diagram and the General Plan Update land use diagram, there are no commercial designated lands that are located on the border with Madera County. There are areas proposed along Herndon Avenue and Friant Road, but these locations are similar to the locations that were planned under the 2025 General Plan.

Michael P. Paoli, MCRP
27404 Sales Creek Road
Clovis, CA 93619
Phone: 559.324.0789
Email: mpaoli00@gmail.com

October 8, 2014

Jennifer K. Clark, AICP
Director
Development and Resource Management Department
City of Fresno
2600 Fresno Street, Room 3065
Fresno, Ca 93721

Subject: Comments on Fresno General Plan and Development Code Update Draft Master Environmental Impact Report

Dear Ms. Clark:

Thank you for the opportunity to comment on the Fresno General Plan and Development Code Update Draft Master Environmental Impact Report (DEIR). I am submitting the comments presented in this letter on behalf of my family. The comments reflect the many experiences we have enjoyed while visiting the San Joaquin River Parkway and canoeing the San Joaquin River. They also reflect my over 40 years of experience as a CEQA practitioner.

My comments focus on two policies in the Parks, Open Space, and Schools (POSS) Element of the draft General Plan Update: Policy POSS-7-g and Policy POSS-7-i. These policies restrict the use of River View Drive to provide public access to the River West unit of the San Joaquin River Parkway.

A. Background

POSS-7-g and -I were included in the General Plan Update at the direction of the Fresno City Council. The Council provided this direction at a meeting on February 14, 2013. The direction reflected a staff report that stated, in part, "… the following policy recommendations have been developed and are intended to strike a balance between the community concerns while providing, to the greatest extent possible, access to the trail extension by the general public." The staff report, in turn, reflected the desire of the "community" to limit severely access to River West from River View Drive.

AA-1

The "community" referenced in the staff report consists primarily of residents from the "The Bluff" subdivision, which is generally located north and south of River View Drive between Audubon Drive and the southern bluff of the San Joaquin River channel. The concerns of the residents involved traffic, parking, noise, visual, crime, and fire-related impacts that they perceived would occur with development of public access to River West via Riverview Drive.

The staff report did not provide any substantive information that would support or refute the concerns of the property owners, and the City did not subject the policy to review under the California Environmental Quality Act (CEQA) before submitting it to the City Council for preliminary approval.

Instead, it appears that the City intended that the CEQA evaluation would occur in the EIR the City would prepare for the General Plan Update.

B. General Plan Update Draft EIR

I have reviewed the General Plan Update DEIR and have completed several word searches to identify where in the DEIR the City evaluated the environmental impacts of POSS-7-g and –i. This research resulted in a determination that the DEIR does not contain an evaluation of environmental impacts that may result from the policies. In fact, I cannot find mention of the policies anywhere in the DEIR.

The failure to address the policies in the DEIR leaves the City with two options if it intends to proceed with the DEIR in a manner that complies with CEQA:

1) The City can delete POSS-7-g and -i from the General Plan Update, in which case the need to evaluate the policies in the DEIR would be moot.

2) The City can revise the DEIR to include a comprehensive evaluation of the policies, in which case, under the CEQA Guidelines, the City would have to recirculate the DEIR for public review. Recirculation of the DEIR would be necessary because the City would have to make extensive changes in the document in order to address adequately the policies.

Because of the absence of any discussion of the policies in the DEIR and considering the controversy surrounding the policies, it would be inappropriate for the City to attempt to evaluate the policies simply by responding to comments regarding them in the final EIR. CEQA does not allow a lead agency to address such a glaring omission without giving the public an opportunity to review and comment on the revisions.

Moreover, it would not be defensible for the City to leave the policies in the General Plan Update on the basis that they would be subject to CEQA review in a subsequent environmental document. Under CEQA, if the policies are part of the General Plan Update project, the City must evaluate them in the General Plan Update EIR.

AA-1
CONT

C. Environmental Issues

To comply with CEQA, the DEIR must provide a comprehensive, objective evaluation of the environmental impacts that may result from the implementation of POSS-7-g and -i. The evaluation, at minimum, should address the following points:

1) A fundamental question the EIR must address is why the public should not have vehicular access to River West from River View Drive. To address this question, the City must prepare a comprehensive traffic study that would identify the extent to which vehicular access would affect traffic conditions on River View Drive and on other streets that the public could use to reach the River View Drive access point. The traffic study also must identify any design or operational measures that the City could incorporate into the street system that would avoid or reduce to an insignificant level any significant impacts vehicular access would have on the street system.

2) If the City of Fresno prohibits vehicular access at River View Drive, the only way Fresno residents could drive to River West would be to drive north on State Route 41 to the Children's Avenue interchange in Madera County and then backtrack south on a frontage road to an access point at the Perrin Avenue alignment. The traffic study must include an evaluation of the impacts that would result from requiring motorist to take this circuitous route to reach River West. At minimum, the study must address traffic impacts on State Route 41, the State Route 41/Children's Boulevard interchange, State Route 41 interchanges in the northern part of

Fresno, and the frontage road leading to the Perrin Avenue access point. The evaluation must consider the significant volume of traffic that the large residential projects that Madera County has approved will generate on State Route 41 and the interchanges.

3) The EIR must evaluate the suitability of the proposed pedestrian and bicycle access at the River View access point for senior citizens, handicapped citizens, and families with young children. The evaluation should take into consideration the steep slope that leads from existing River View Drive to the river bottom. Would this access comply with federal, state, and local requirements for handicap access? Is it reasonable to expect young families to push strollers up the steep slope? Is it safe for young children to ride bicycles down the steep slope? Could senior citizens walk or ride bicycles up the steep slope? How could handicapped citizens access River West without having to drive the circuitous route through Madera County? How can Fresno claim it is a handicapped accessible, senior citizen friendly community if it does not allow vehicular access to River West at River View Drive?

4) What impacts would result if Fresno residents that live too far from River West to walk or bicycle to the facility decide to park on the local residential streets near the River View Drive access point and then walk or ride into the facility? Does the City allow parking on the streets? Would the local residents object to people parking in front of their homes? Considering the likelihood they would object, would they ask the City to prohibit parking on the streets? If the City did prohibit parking, where could Fresno residents park if they must drive to River West?

5) The EIR must provide a comparative analysis of the air quality, greenhouse gas, energy use, and noise impacts that would result from allowing vehicular access to River West from River View Road versus requiring Fresno residents to drive the circuitous route through Madera County if they can only reach River West using their automobiles.

AA-1
CONT

6) Under the State General Plan Guidelines, a general plan is supposed to be internally consistent. In view of this requirement, please explain why it is acceptable for the City to include Policies POSS-7-g and-i in the General Plan Update when they clearly conflict with numerous policies throughout the document. These include, but are not limited to, policies that promote an efficient multi-modal transportation system, the reduction of transportation-related air emissions, the reduction of greenhouse gas impacts, and the provision of a user-friendly park and open space system that is accessible to all residents.

7) Fresno has a number of streets similar to River View Road that traverse upscale neighborhoods. Examples include Van Ness Boulevard, Van Ness Extension, and Shepherd Avenue near Woodward Park. The EIR should identify any environmental conditions along River View Drive that are different from those found along the other streets that would justify not allowing the public to drive to River West using River View Avenue.

8) The California General Plan Guidelines includes recommendations for addressing environmental justice in general plans. Environmental justice is defined in state planning law “as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (§65040.12(e)). Included in the recommendations is the following discussion of access to public facilities and services: Access “…can be measured as the distance or travel time from each residential area to the [public] facility or service. Access may also be measured by the ability to use a variety of transportation modes, including public transit, walking, and bicycling, to travel between each residential area and the facility or service.”(page 25) POSS 7-g and -i violate the concept of environmental justice. As discussed in previous points, the City of Fresno, by

including the policies in the General Plan Update, is denying reasonable, multi-modal access to River West to the elderly, handicapped, families with small children, and the many citizens that live too far from the facility to walk or ride a bicycle. Instead, the City is telling these citizens that if you need to drive to River West, you can take the back road through Madera County. The City has taken this position at the behest of a group of wealthy residents that seem to believe they have the right to deny public vehicular access to a public facility from a public road. By taking this position, the City is committing an act of environmental injustice, or discrimination, against all but the relatively few residents of Fresno that have the economic means necessary to live in the Bluff Subdivision.

AA-1
CONT

D. Conclusion

Thank you for the opportunity to comment. Please let me know if you have any questions on my comments.

Respectfully submitted,

Michael P. Paoli, MCRP

Letter AA: Michael P. Paoli, October 8, 2014

Response to Comment AA-1

The commenter states that there are a number of perceived deficiencies in the analysis provided in the Draft Master EIR based on assumption that Policy POSS-7-g and POSS-7-i in Chapter 5 of the General Plan Update would restrict the use of River View Drive to provide public access to the San Joaquin River Parkway ("Parkway").

General Plan Update Policy POSS-7-g and POSS-7-i were not intended to restrict vehicular access on existing roadways.

The westernmost extension of West Riverview Drive terminates at the intersection with West Bluff Avenue. At this terminus, a private driveway (easement) provides access to two residences located further north near the river. Additionally, a public access easement at this roadway terminus currently provides non-vehicular public access into the Parkway from the West Riverview Drive/West Bluff Avenue intersection.

The purpose of the relevant portions of Policy POSS-7-g and POSS-7-i was to restrict public access along this existing easement to cyclists and pedestrians, with the exceptions provided. The General Plan Update cannot assign private property rights (including easements for vehicular travel) to the public; the current owner of the easement would have to assign those rights to the public and may do so in the future for some consideration (or as a donation or bequest).

The policies would not restrict public access into the neighborhoods east of the park, and would not result in any public access restrictions to existing public roadways. Vehicular public access on existing roadways would not be expressly prevented or restricted based on these policies and is not prohibited from being extended on the easement in the future; but, as noted above, public vehicular travel on the easement cannot be authorized by fiat via the General Plan Update.

The commenter's assertion that the General Plan Update's Draft Master EIR should include an exhaustive environmental assessment of extending vehicular access from West Riverview Drive is unwarranted. The General Plan is a broadscale policy document and its Draft Master EIR could not accommodate a fully detailed analysis of every subsequent individual development and public works project, which would occur subsequent to adoption of the General Plan Update.

Providing access to, or across, San Joaquin River Conservancy property is part of that agency's master planning and Parkway facility development process. The City of Fresno will continue to assist with those efforts as feasible and appropriate. However, the appropriate time to conduct a detailed analysis of vehicular travel on an easement west of the current terminus of Riverview Drive for purposes of public access to a Parkway component is when some responsible party proposes to obtain or grant public access on that easement and open it for vehicular travel. At that time, a site-specific assessment would need to be prepared to assess all the factors listed in Response to Comment AA-1 for that project (and other factors brought forth in a scoping process for this project). The assessment and its interagency/public consultation process would assist the developer of this public access route with mitigation and appropriate design with regard to safety (including a range of

issues, such as soil stability, floodplain management, and policing), management of storm drainage, potential air pollutant emissions, and so forth.

Therefore, the Draft Master EIR adequately addressed the impacts of the project. The following commentary is added to the General Plan Update Policy POSS-7-g to clarify the intent of the policy:

> ***Commentary:*** *Limitations on vehicular access through the River View Drive Area/Neighborhoods are not intended to restrict vehicular access to the neighborhoods themselves. Public right-of-way held by the City for public street purposes will remain accessible to the public consistent with the requirements of the California Vehicle Code.*

M R O
ENGINEERS

660 Auburn Folsom Rd.
Suite 201B
Auburn, California
95603
PHONE (916) 783-3838
FAX (916) 783-5003

September 10, 2014

Ms. Carmen Borg
Shute, Mihaly & Weinberger LLP
396 Hayes Street
San Francisco, California 94102

Subject: Review of "Transportation and Traffic" Analysis –
Draft Master Environmental Impact Report
General Plan and Development Code Update
City of Fresno, Fresno County, California

Dear Ms. Borg:

As requested, MRO Engineers, Inc., has completed a review of the "Transportation and Traffic" section of the Draft Master Environmental Impact Report (DMEIR) prepared with respect to the proposed General Plan and Development Code Update for the City of Fresno, California. That document was prepared by First Carbon Solutions and published on July 22, 2014. The DMEIR incorporates a traffic and transportation impact analysis prepared by Fehr & Peers (F&P).

This letter report documents the results of our detailed review of the DMEIR "Transportation and Traffic" analysis.

1. ***Deficient Travel Demand Forecasting Model*** – According to page 5.14-27 of the DMEIR:

> *"A modified version of the Fresno COG countywide travel demand forecasting (TDF) model was used to forecast future traffic volume for the City of Fresno General Plan Update. The modifications were specific to the City of Fresno to ensure that the model accurately estimated traffic volumes used in the analysis process . . . Appendix H-5 includes documentation of the transportation modeling and analysis steps including a summary of the model validation."*

Although DMEIR Appendix H-5 contains maps illustrating the boundaries of the model's traffic analysis zones (TAZ) and detailed information concerning the land use inputs for Existing, Existing Plus Project, and Cumulative Conditions, there is no other "documentation of the transportation modeling and analysis steps." As noted, however, there is a summary of the model validation, which is presented in a table entitled, "Fresno COG Traffic Model GIS Validation Results: PM Peak Hour Two-Way Total Traffic Volumes." For ease of reference, that table is presented here as Attachment A. BB-1

According to the *Travel Model Validation and Reasonableness Checking Manual – Second Edition* (Federal Highway Administration and Cambridge Systematics, Inc., September 24, 2010, p. 1-4), validation is defined as follows:

> *"Validation is the application of the calibrated models and comparison of the results against observed data."*

Specifically, the "base year" model is run and the traffic volume estimates generated by the model are compared to existing traffic volume data on a link-by-link basis. The question is, how well does the model replicate existing traffic volumes? The theory is that if the model can

accurately predict existing volumes (based on existing land use data and transportation system information), then it will accurately predict future traffic volumes (based on future land use and transportation system projections).

The results of the model validation process are summarized at the bottom of the table presented in Attachment A. Three parameters were used to determine whether the modified Fresno COG countywide model provides valid traffic estimates:

- The percent of road segments "within target deviation,"
- The Percent Root Mean Square Error, and
- The Correlation Coefficient.

For each of those three metrics, a target was established, and the model-generated traffic volume estimates were compared to those targets, with the following results:

- The percent of road segments "within target deviation" was 60 percent, whereas the goal was to exceed 75 percent,
- The "Percent Root Mean Square Error" was 46 percent, while the goal was to be less than 40 percent, and
- The "Correlation Coefficient" was 0.88, which just missed the goal of exceeding 0.88.

Each of these three parameters is discussed below.

BB-1
CONT

Target Deviation

The "target deviations" employed in the model validation process are listed in the table presented in Attachment A; they range from 0.20 to 0.60. These values were derived from a curve presented in the Caltrans *Travel Forecasting* Guidelines (November 1992).

As noted above, the goal of the model validation process was for 75 percent of the links to fall within the allowable deviation. In other words, it was considered acceptable for 25 percent of the links to fall outside that allowable value. In fact, only 60 percent of the links met this target, meaning that a full 40 percent failed to do so. In this case, 199 of the 495 tested links had traffic forecasts that were either excessively high or low, compared to the actual traffic counts.

Of those 199 deficient traffic forecasts, 120 (60 percent) were lower than the corresponding traffic count. Moreover, of the 495 total roadway links, the traffic forecasts at 281 (57 percent) were lower than the actual count. The links at which traffic was underestimated are highlighted in yellow in Attachment A.

Percent Root Mean Square Error

Percent root mean square error, according to the FHWA *Travel Model Validation and Reasonableness Checking Manual* is a:

> *". . . measure of accuracy of the traffic assignment measuring the average error between the observed and modeled traffic volumes on links with traffic counts."*

The modified Fresno COG model validation had a goal for this parameter of less than 40 percent. The actual model validation result was 46 percent, which failed to meet the established goal. Thus, the model validation process determined that the modified Fresno COG model is not sufficiently accurate, which reinforces the results described above with respect to the target deviation.

Correlation Coefficient

Correlation coefficient is a measure of the degree of straight-line or linear association between two variables. A value of 1.00 would indicate a perfect relationship between the two variables. That is, as one variable increases, the other variable increases in a linear fashion. In this case, although the validation results indicate that the model again fell short of the established standard, the shortfall is minimal.

Conclusion

The model validation results for the modified Fresno COG countywide travel demand forecasting model clearly indicate that the model fails to provide accurate forecasts of future traffic – it can't even "predict" existing volumes. As described above, it tends to underestimate traffic. In fact, a number of the roadway links listed in the validation results table had literally no traffic assigned to them.

BB-1 CONT

The use of this deficient tool to estimate study area traffic volumes has substantial ramifications for the environmental analysis. In addition to the likelihood that the underestimated traffic will result in failure to identify significant traffic impacts, it is probable that the air quality, noise, and greenhouse gas analyses are compromised by the defective traffic forecasts.

Clearly, more effort needs to be devoted to the model refinement process, with the goal of creating a travel demand forecasting model that actually provides credible forecasts of travel demand; the modified Fresno COG model used in the DMEIR traffic analysis is woefully inadequate in this regard. Once the model has been improved to the point that it is capable of replicating existing traffic volumes and generating meaningful future traffic projections, the DMEIR traffic analysis needs to be revised and the document needs to be recirculated for further public review.

2. ***Level of Service Calculation Methodology*** – The DMEIR traffic analysis focused on determination of level of service (LOS) for major roadway segments throughout the city. The specific process is described on DMEIR p. 5.14-4:

> *"The LOS was determined by comparing traffic volumes for selected roadway segments with peak hour LOS capacity thresholds. These thresholds are shown in Table 5.14-2 and were calculated based on the methodology contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000). The HCM methodology is the prevailing measurement standard used throughout the United States."*

BB-2

Several points are in order with respect to the above statement from the DMEIR.

First, we note that the LOS analysis was based on the year 2000 version of the *Highway Capacity Manual*. This violates the requirement established in the *City of Fresno Traffic*

Impact Study Report Guidelines (City of Fresno, Department of Public Works, Updated February 2, 2009, p. 3), which requires that the:

> *"Most current edition of the Highway Capacity Manual by Transportation Research Board, and MUTCD shall be used."*

The current (year 2010) version of the *Highway Capacity Manual* (HCM 2010) was released on April 11, 2011. It follows previous editions completed in 1965, 1985, 1997, and 2000.

Although it is unclear exactly when the DMEIR traffic analysis was initiated, p. 5.14-4 of the document says that the traffic counts used in the analysis represent year 2012 conditions. Thus, the DMEIR traffic study was initiated at least a year after the current (2010) version of the *Highway Capacity Manual* became widely available. Despite this, the traffic analysis was performed using procedures documented in the superseded (year 2000) version of the *Highway Capacity Manual*, which violates standard City of Fresno procedures.

The second point concerns the DMEIR statement regarding the status of the HCM methodology as the prevailing standard for level of service analysis. This statement (which is true) implies that the HCM method was used in the DMEIR analysis (which is not true).

The DMEIR analysis is a simple volume/capacity (V/C) ratio evaluation. In this case, the volumes represent either the existing (year 2012) traffic volumes or the pertinent traffic forecasts generated by the deficient modified Fresno COG model. Only the estimated capacity thresholds were ostensibly based on HCM methodologies. DMEIR Table 5.14-2 (pages 5.14-7 and 5.14-8) presents a highly detailed set of LOS thresholds for various roadway types. Unfortunately, no information is provided that would illuminate the question of exactly how these thresholds were derived. (For ease of reference, DMEIR Table 5.14-2 is presented here as Attachment B.)

BB-2
CONT

For example, DMEIR Table 5.14-2 provides thresholds for each level of service (LOS A through LOS F) for various numbers of lanes for a variety of roadway types, including freeways. Chapter 11 of the *Highway Capacity Manual* (2010) describes the HCM 2010 analysis procedures for "Basic Freeway Segments." According to that chapter, freeway level of service is defined by density (i.e., the number of passenger cars per mile per lane); neither traffic volume nor volume/capacity ratio is a measure of freeway level of service.

Moreover, under the HCM 2010 methodology, calculation of level of service on a freeway segment requires substantial data input, including the following:

- Free-flow speed (miles/hour),
- Number of mainline freeway lanes,
- Lane width (feet),
- Right-hand lateral clearance (feet),
- Total ramp density (i.e., ramps/mile),
- Terrain (level, rolling, or mountainous or specific grade information),
- Heavy-vehicle (i.e., truck) percentage,

- Peak-hour factor (which describes the uniformity of traffic flow within the peak hour), and
- Driver population (e.g., commuters who are familiar with the route or tourists who are not).

Although we have used freeways as an example to illustrate our point, similar considerations apply to all of the roadway types represented in DMEIR Table 5.14-2.

No information is provided in the DMEIR with regard to the specific input parameters that were used in developing the theoretical thresholds applied in the LOS analysis, whether for freeways or any of the other roadway types presented. Consequently, it is impossible to judge whether the analysis is credible and, moreover, whether the LOS results are valid.

Moreover, we assume (based on the nature of the information presented in DMEIR Table 5.14-2) that the same input assumptions were applied across the entire study area. This ignores the obvious fact that different roadways, or even different sections of a given road, vary somewhat. Lane widths, shoulder widths, truck percentages, and a wide variety of parameters could easily change as one travels down a particular roadway. The generic approach employed in the DMEIR analysis fails to account for these key differences, which raises serious questions as to the validity of the analysis results.

We also note that DMEIR Table 5.14-2 has "holes" where no capacity threshold value has been provided. For example, for "super arterial" roads, values are only shown for LOS D and E; no thresholds are presented for LOS A, B, or C. A footnote to the table might be an attempt to explain this. It says, "LOS is not achievable because of type of facility." Referring again to super arterials, this suggests that it is impossible for a driver to experience LOS A, B, or C. How can this be? If that driver happens to be traveling on one of Fresno's super arterials at a time when traffic is particularly light, will he not experience LOS A, which the DMEIR (p. 5.14-4) defines as:

BB-2
CONT

> *". . . free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver."*

According to DMEIR Table 5.14-2, the best this driver can expect is LOS D, which is defined as:

> *". . . high-density, but stable flow. Users experience severe restrictions in speed and freedom to maneuver, with poor levels of comfort and convenience."*

This simply defies common sense and, more importantly, raises questions as to the technical and philosophical approach to the analysis of roadway level of service. As presented, the LOS analysis for certain roadway types lacks credibility.

The failure to use the latest version of the *Highway Capacity Manual* represents a violation of City of Fresno procedures. To ensure the accuracy of the DMEIR traffic analysis, as well as consistency with City procedures and policies, the level of service calculations must be performed using the current, year 2010 version of the *Highway Capacity Manual*. Also, the specific inputs used to develop LOS thresholds must be revealed and adjusted, as necessary, to reflect the specific link-by-link characteristics of the study area roadways. After the LOS calculations are corrected, the DMEIR will need to be recirculated for further public review.

3. ***Obsolete Traffic Volume Data*** – According to the DMEIR (page 5.14-4):

> *"Traffic counts used for this analysis represent year 2012 conditions."*

Referring to the *City of Fresno Traffic Impact Study Report Guidelines* (p. 7):

> *"Available existing counts can be used if they are less than twelve (12) months old and the counts have not be* [sic] *significantly changed due to more recent development in the vicinity.*

The traffic counts used in the DMEIR are now two years old, which violates the City's standard, as well as accepted practice within the traffic engineering profession. Page 19 of the 2006 Institute of Transportation Engineers (ITE) document, *Transportation Impact Analyses for Site Development*, specifically states that ". . . traffic volume data should generally be no older than 1 year." BB-3

Because the traffic volumes represent the most critical input parameter in the level of service calculation process, any inaccuracies in those values directly affect the validity of the level of service results. In short, to the extent that the existing peak-hour traffic volumes are inaccurate, the corresponding level of service results reported in the DMEIR are invalid, and a misleading representation of the environmental setting and plan-related impacts will be provided. Although the document does not specifically say so, it is also likely that the future year traffic volumes were developed based, in part, on the existing traffic volumes. Thus, any shortcomings in the existing conditions data will adversely affect the validity of the future year information, as well.

Updated traffic data must be obtained and all analysis scenarios must be revised using the current traffic volume information. The modified transportation and traffic impact analysis should then be incorporated into a revised DMEIR, which must be recirculated for further public review.

4. ***Failure to Consider the Operational Effects of Truck Traffic*** – The proposed General Plan calls for substantial additional industrial land use, particularly in the south and west Fresno areas. Consequently, the road system in those areas will be called upon to accommodate substantial truck traffic.

As described above, it is impossible to determine what assumption has been incorporated into the analysis with regard to the heavy-vehicle percentage on the study area road system. Moreover, we would point out that the use of a blanket heavy-vehicle percentage for all study area roadways would be inappropriate, as it would fail to account for the relatively high truck percentages that can reasonably be anticipated in south and west Fresno and any other areas where substantial industrial development is proposed. BB-4

To ensure that the traffic impact analysis fully accounts for truck traffic, the analysis of each roadway link should incorporate a realistic "heavy vehicle percentage" and an appropriate "passenger-car equivalent" (PCE) factor. These factors can be used to derive adjusted traffic volumes that accurately account for the truck component of the pertinent traffic volume.

The traffic impact analysis incorporated into a recent draft environmental impact report prepared for the City of Irwindale in southern California used the following PCE values

(Reference: Urban Crossroads, *Athens-Irwindale Materials Recovery Facility and Transfer Station Traffic Impact Analysis*, February 27, 2014.):

- Light trucks: PCE = 1.5,
- Medium-duty trucks: PCE = 2.7, and
- Heavy-duty trucks: PCE = 3.7.

Thus, according to the assumptions employed in that analysis, one truck is equivalent to between 1.5 and 3.7 passenger cars, depending upon the specific type of truck. These factors reflect not only the size of the vehicles, but also their operating characteristics, particularly with regard to slower acceleration, longer braking distances, and the need for greater separation between vehicles. BB-4 CONT

The failure to incorporate appropriate factors reflecting the presence of a substantial number of trucks in the prevailing traffic stream results in unrealistic, overly-optimistic level of service results. The roadway segment level of service analyses must be revised to reflect the existing and anticipated composition of traffic in the study area.

5. ***Failure to Consider the Safety Effects of Truck Traffic*** – As described above, the proposed General Plan proposes substantial additional industrial land use in south and west Fresno, where residential neighborhoods are also common. Consequently, implementation of the proposed plan will add a considerable volume of heavy trucks to the road system in those areas. Despite this, the "Transportation and Traffic" section of the DMEIR includes no discussion or analysis of auto-truck conflicts and the potential safety issues associated with mixing automobile traffic with a considerable amount of heavy-vehicle traffic. This is a substantial deficiency in the DMEIR, given the extent of nearby residential land uses. BB-5

6. ***Deficient Safety Analysis*** – DMEIR p. 5.14-15 provides a one-paragraph section labeled "Traffic Safety." That section briefly describes a small number of locations in Fresno having the highest number of vehicular collisions since 2009. This information, which is presented graphically on Exhibit 5.14-5 in Appendix H-12, is based on data presented in the Statewide Integrated Traffic Records System (SWITRS).

   Unfortunately, this information is virtually meaningless, as the number of collisions alone fails to account for the total volume of traffic at any given location. For example, consider two hypothetical locations, both of which were found to have 100 collisions per year. Location A carries 10,000 vehicles per day, while Location B has 100,000 vehicles per day. Based on the analysis presented in the DMEIR, these two locations are equally problematical, despite the fact that one carries ten times more traffic than the other. BB-6

   This is, of course, not accurate and is, further, misleading. This example illustrates that it is not simply the number of collisions that matters; it's the rate at which the collisions occur that accurately tells the story. A valid traffic safety analysis will include the development and comparison of accident rates, in terms of collisions per million-vehicle-miles for key roadway segments. The DMEIR, though, provides no such assessment and, therefore, it is impossible to determine whether the accident data indicates an existing safety problem. In addition, the DMEIR contains no evaluation with respect to the potential impacts of implementation of the proposed General plan on traffic safety within the City of Fresno. The DMEIR must be revised

to include a detailed analysis of plan-related safety impacts and to identify needed mitigation measures. BB-6 CONT

7. ***Failure to Consider Pedestrian and Bicycle System Impacts*** – As noted above, the level of service on the study area road system was derived (DMEIR, p. 5.14-4):

> *". . . based on the methodology contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000)."*

The DMEIR goes on to say:

> *"It should be noted that this traditional methodology used to analyze the roadway system does not consider the potential impact on walking, bicycling, and transit."*

The analyst appears to be unfamiliar with the current, year 2010 edition of the *Highway Capacity Manual*, which might explain why the roadway LOS values were inappropriately derived using the superseded year 2000 version of that document. In fact, the very first paragraph of the "Foreword" in the current HCM document (p. V1-i) states that:

> *"It is the first* Highway Capacity Manual *to provide an integrated multimodal approach to the analysis and evaluation of urban streets from the points of view of automobile drivers, transit passengers, bicyclists, and pedestrians. This is the first manual to take into account the effects of cars on bicyclists and pedestrians."* BB-7

Recognizing the integrated nature of the transportation system, the HCM does not include separate chapters for non-automobile travel modes. Instead, the document states (HCM 2010, p. 1-4.):

> *"Where applicable, pedestrian and bicycle material has been integrated throughout the Volume 3* [Interrupted Flow] *chapters, along with the public transit material specific to multimodal analyses."*

Detailed analysis procedures for the pedestrian, bicycle, and transit modes are presented in HCM 2010 Chapters 16 (Urban Street Facilities) and 17 (Urban Street Segments).

Given the focus of the proposed Fresno General Plan Update on accommodating all travel modes, it is difficult to understand how the non-automobile modes could be so thoroughly dismissed in the DMEIR. The DMEIR acknowledges this modified City perspective with the following statement (DMEIR, p. 5.14-42):

> *"The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS . . . is not desirable since it fails to acknowledge other users of the circulation system and other community values."*

Moreover, the specific policies and objectives in the proposed General Plan related to pedestrian, bicycle, and transit facilities are detailed on pages 5.14-85 through 5.14-88 in the DMEIR.

Impact TRANS-6 concerns the potential impacts of the proposed General Plan on these "alternative" travel modes. It is addressed beginning on p. 5.14-85 of the DMEIR. As stated there:

> *"The project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities."*

Although the next several pages of the DMEIR list the policies and objectives that relate to the non-automobile travel modes, no quantitative analysis or qualitative statement is provided to address the potential impacts of the proposed General Plan with regard to the "performance or safety of such facilities." Consequently, there is simply no basis for the DMEIR' s finding of a less-than-significant impact.

BB-7 CONT

The DMEIR ignores factors that could lead to significant operational and safety-related impacts throughout the City as the plan is implemented. At the very minimum, transit users will suffer from the extensive travel delays imposed by a roadway system where LOS E and F are prevalent. Moreover, pedestrians and bicyclists are likely to be exposed to unsafe conditions, as frustrated motorists become impatient and make poor decisions leading to red light running, failure to yield to pedestrians in crosswalks, or using road shoulders and bike lanes as added travel or turn lanes.

Given the importance of non-automotive travel within the proposed plan, it is essential that the DMEIR include a meaningful analysis of the plan's impacts on those alternative modes. Such an analysis is absent from the current document. Upon completion of the analysis, the DMEIR must be revised and recirculated for further public review.

8. ***Vehicle Miles Traveled Calculation*** – DMEIR Table 5.14-3 presents estimates of vehicle miles traveled (VMT) for the three analysis scenarios addressed in the traffic study: Existing Conditions, Existing Plus General Plan Buildout, and Cumulative Plus General Plan Buildout.

Addition of General Plan Buildout to existing conditions is projected to increase the daily VMT by almost 8,950,000 vehicle-miles, an increase of 95 percent. Under cumulative conditions, total VMT is projected to increase by over 111 percent (i.e., 10,487,655 vehicle-miles) compared to existing conditions.

Unfortunately, these values were derived through a "black box" process using the modified Fresno COG Countywide Travel Demand Forecasting Model, and no detail is provided to assist the reader in understanding the factors that were key in developing these estimates or, more importantly, to judge whether the estimates are credible. Because the VMT values are key inputs to the air quality and greenhouse gas analyses, it is important to ensure the validity of these values. (Of course, as described earlier, the ability of the Fresno COG model to provide meaningful estimates of future travel (including future VMT estimates) is highly questionable.)

BB-8

We note that California in September 2013 enacted Senate Bill 743 (SB 743), which will eventually eliminate level of service as a determinant of significant effects in documents prepared under the California Environmental Quality Act (CEQA), such as the DMEIR. In other words, vehicular delay will no longer be considered an environmental impact under CEQA. Instead, VMT will be the primary measure of transportation impacts. Although

debatable, this is ostensibly intended to better reflect the multi-modal nature of the transportation system, particularly with regard to pedestrians, bicyclists, and transit users.

Although no local or statewide thresholds have been established with regard to what constitutes a significant impact concerning increases in vehicle miles traveled, it is disappointing that the DMEIR would dismiss a 111 percent increase in VMT as insignificant.

BB-8 CONT

9. ***At-Grade Railroad Crossing Safety*** – As described on DMEIR pages 5.14-17 and 5.14-18, Fresno is served by two railroad corridors. The Burlington Northern Santa Fe (BNSF) corridor runs through "the middle of downtown" and the Union Pacific (UP) corridor runs parallel to State Route 99 (SR 99). Moreover, ". . . about 50 freight trains pass through the two rail corridors daily as they travel through Downtown."

   Each of these rail lines has numerous at-grade crossings of local streets and, further, each of those locations represents a potentially hazardous condition. As traffic increases in Fresno in accordance with the General Plan Update land use plan, the likelihood of conflicts between automobiles and trains will also increase. Despite this, the DMEIR fails to address safety-related issues associated with at-grade rail crossings. This is a substantial deficiency that must be corrected.

BB-9

10. ***Emergency Access*** – Impact TRANS-5 (DMEIR, p. 5.14-83) addresses whether the proposed plan would result in inadequate emergency access, and concludes that the General Plan Update would have a less-than-significant impact. This conclusion was based largely on a review of the proposed General Plan policies and objectives that might "provide adequate emergency access." We note that the potential role of certain of these policies in providing adequate emergency access is questionable. For example, it is unclear how Policy LU-1-g has any effect on emergency access: "Maintain the City's current SOI boundaries without additional expansion . . ." Since the SOI boundary is nothing more than a line on a map, we fail to see any effect whatsoever with respect to emergency access.

    The DMEIR discussion of the emergency access issue includes the following statement:

    > *"Implementation of the City of Fresno General Plan Update would increase the amount of vehicle traffic, which would require the improvement and expansion of the City of Fresno's roadway system . . . to accommodate forecasts* [sic] *travel demand as well as maintaining acceptable traffic operations (LOS) in the City (see Impact TRANS-1). An enhanced roadway network that accommodates forecasted travel demand would also provide adequate emergency access."*

    There are several problems with this statement. First, while it is certainly true that implementation of the proposed plan will increase the amount of vehicle traffic (as noted earlier, the plan will more than double daily vehicle miles traveled), there is no certainty regarding the "improvement and expansion of the City of Fresno's roadway system." Road construction is dependent upon the availability of funding (among other factors) and it is not certain whether adequate funding will be available in coming years to keep up with needs.

    Second, it is also true that, "[a]n enhanced roadway network that accommodates forecasted travel demand would also provide adequate emergency access." Unfortunately, as demonstrated in the DMEIR, the City's road system will not, in many cases, accommodate the forecasted traffic demand. For example, the level of service standard for the entire Downtown

BB-10

Planning Area (designated as Traffic Impact Zone I or TIZ-I) is LOS F. Similarly, roadway segments within TIZ-II ("areas of the City currently built-up and wanting to encourage infill development") and TIZ-III ("areas near or outside the City limits but within the SOI") that the DMEIR has identified as operating at LOS F are "grandfathered in" and will be allowed to continue to operate at LOS F.

By definition, roads that are projected to operate at LOS F will not accommodate forecasted traffic demand. Referring to the level of service definitions provided on DMEIR p. 5.14-4:

> *"LOS F is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion."*

Clearly, such roads will not provide adequate emergency access. The simple fact is that roads that are at LOS F will be clogged with traffic, which will impede the ability of emergency vehicles to respond to calls. A recent (September 2 and 3, 2014) feature on the NBC *Nightly News* addressed the issue of delays in emergency response due to traffic congestion. According to that report, research has indicated a ten percent increase in deaths for every minute of delay in emergency response time. Further, a 2012 study in Utah found an eight percent increase in fatalities within the 24-hour period following a delayed emergency response.

BB-10
CONT

Traffic delays caused by planned congestion associated with the proposed General Plan Update will, very simply, result in additional fatalities among the citizens of Fresno, particularly in the areas of the City where LOS F will be allowed by General Plan policies. This is a significant impact, which was ignored in the DMEIR.

CONCLUSION

Our review of the "Transportation and Traffic" section of the Draft Master Environmental Impact Report for the proposed City of Fresno General Plan Update revealed several issues that affect the validity of the conclusions presented in that document. These issues should be addressed prior to City of Fresno approval of the proposed plan and the associated environmental documentation.

Among other considerations, we find it ironic that the City of Fresno has developed a General Plan Update that:

- Explicitly encourages and addresses the needs of non-automobile travel through an extensive set of policies and objectives, while
- Performing absolutely no analysis to determine whether the proposed plan will have adverse operational or safety impacts on pedestrians, bicyclists, and transit users, and
- Determines that implementation of the proposed General Plan Update will have no significant traffic impacts, even though roads throughout the City will operate at LOS E and F, while also
- Determining that VMT in the City will more than double as a result of plan implementation, but still

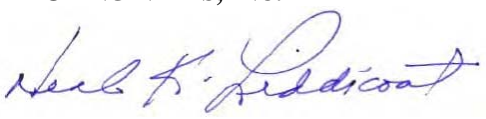
- Maintaining that the proposed plan will have no significant transportation impacts requiring mitigation.

As described above, the DMEIR "Transportation and Traffic" analysis has substantial deficiencies and, further, has failed to identify a number of significant impacts,

We hope this information is useful. If you have questions concerning any of the items presented here or would like to discuss them further, please feel free to contact us at (916) 783-3838.

Sincerely,

MRO ENGINEERS, INC.



Neal K. Liddicoat, P.E.
Traffic Engineering Manager

ATTACHMENT A

Fresno COG Traffic Model GIS Validation Results:
PM Peak Two-Way Total Traffic Volumes

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
1	A	N/O	STANISLAUS	5186	5190	05186-05190	160	183	0.87	0.60	Yes	-23	529
2	ABBY	S/O	180	4404	2040	04404-02040	983	290	3.39	0.60	No	693	480,249
3	ABBY	N/O	DIVISADERO	2093	2092	02093-02092	1,055	371	2.84	0.60	No	684	467,856
4	ABBY	S/O	OLIVE	2087	2086	02087-02086	908	854	1.06	0.60	Yes	54	2,916
5	AIRWAYS	W/O	CLOVIS	2540	8220	02540-08220	1,338	1,135	1.18	0.35	Yes	203	41,209
6	ALLUVIAL	E/O	CEDAR	3093	3105	03093-03105	483	912	0.53	0.60	Yes	-429	184,041
7	ALLUVIAL	E/O	CHESTNUT	3100	3110	03100-03110	130	1,013	0.13	0.37	No	-883	779,689
8	ALLUVIAL	E/O	INGRAM	6540	6542	06540-06542	739	840	0.88	0.60	Yes	-101	10,201
9	ALLUVIAL	E/O	MAPLE	3096	3108	03096-03108	350	1,020	0.34	0.37	No	-670	448,900
10	ALLUVIAL	E/O	MARKS	3165	5047	03165-05047	97	162	0.60	0.60	Yes	-65	4,225
11	ALLUVIAL	W/O	MILBURN	5784	5791	05784-05791	790	436	1.81	0.60	No	354	125,316
12	ALLUVIAL	E/O	VAN NESS	3166	5048	03166-05048	8	104	0.08	0.60	No	-96	9,216
13	ALLUVIAL	E/O	WEST	3168	5049	03168-05049	1	53	0.02	0.60	No	-52	2,704
14	ANNADALE	E/O	CEDAR	8434	9236	08434-09236	0	66	0.00	0.60	No	-66	4,356
15	ANNADALE	W/O	ELM	2134	2779	02134-02779	307	206	1.49	0.60	Yes	101	10,201
16	ANNADALE	W/O	MARTIN LUTHER KING JR	2914	2934	02914-02934	17	19	0.89	0.60	Yes	-2	4
17	ANNADALE	W/O	WALNUT	2934	3036	02934-03036	0	9	0.00	0.60	No	-9	81
18	ARMSTRONG	N/O	BELMONT	3559	12146	03559-12146	294	239	1.23	0.60	Yes	55	3,025
19	ARMSTRONG	N/O	BUTLER	5627	6684	05627-06684	16	118	0.14	0.60	No	-102	10,404
20	ARMSTRONG	S/O	CHURCH	6685	12142	06685-12142	11	121	0.09	0.60	No	-110	12,100
21	ARMSTRONG	S/O	DAKOTA	5021	8378	05021-08378	118	360	0.33	0.60	No	-242	58,564
22	ARMSTRONG	S/O	KINGS CANYON	3560	6684	03560-06684	15	252	0.06	0.60	No	-237	56,169
23	ASHLAN	W/O	41	3128	4336	03128-04336	2,411	2,210	1.09	0.27	Yes	201	40,401
24	ASHLAN	E/O	BLACKSTONE	2077	3128	02077-03128	1,911	2,312	0.83	0.27	Yes	-401	160,801
25	ASHLAN	W/O	BRYAN	3330	5072	03330-05072	138	155	0.89	0.60	Yes	-17	289
26	ASHLAN	E/O	CEDAR	2450	2451	02450-02451	2,522	2,091	1.21	0.28	Yes	431	185,761
27	ASHLAN	E/O	CHESTNUT	5034	6812	05034-06812	1,425	1,863	0.76	0.29	Yes	-438	191,844
28	ASHLAN	E/O	DEL MAR	2077	2444	02077-02444	1,171	1,598	0.73	0.31	Yes	-427	182,329
29	ASHLAN	E/O	FRESNO	2445	2446	02445-02446	1,850	1,805	1.02	0.29	Yes	45	2,025
30	ASHLAN	W/O	FRUIT	2440	5428	02440-05428	1,611	1,375	1.17	0.32	Yes	236	55,696
31	ASHLAN	W/O	HAYES	3330	5072	03330-05072	138	208	0.66	0.60	Yes	-70	4,900
32	ASHLAN	E/O	MILLBROOK	2449	5007	02449-05007	1,960	1,931	1.02	0.28	Yes	29	841
33	ASHLAN	W/O	SANTA FE	2440	5428	02440-05428	1,611	1,359	1.19	0.32	Yes	252	63,504
34	ASHLAN	E/O	WEBER	3119	5084	03119-05084	3,093	3,111	0.99	0.25	Yes	-18	324
35	ASHLAN	W/O	WEST	2438	5431	02438-05431	1,801	1,495	1.20	0.31	Yes	306	93,636
36	ASHLAN	W/O	WINERY	5034	6288	05034-06288	1,425	2,657	0.54	0.26	No	-1,232	1,517,824
37	AUDUBON	E/O	BLACKSTONE	3173	3174	03173-03174	729	1,465	0.50	0.31	No	-736	541,696
38	AUDUBON	N/O	COLE	3175	3176	03175-03176	772	1,028	0.75	0.37	Yes	-256	65,536
39	AUDUBON	W/O	DEL MAR	2060	12117	02060-12117	434	1,237	0.35	0.33	No	-803	644,809
40	AUDUBON	W/O	FRIANT	3173	5584	03173-05584	575	1,519	0.38	0.31	No	-944	891,136
41	AUDUBON	N/O	LEXINGTON	3272	3274	03272-03274	499	1,244	0.40	0.33	No	-745	555,025
42	AUDUBON	N/O	NEES	3272	6560	03272-06560	437	1,126	0.39	0.35	No	-689	474,721
43	B	N/O	STANISLAUS	3493	4438	03493-04438	214	213	1.00	0.60	Yes	1	1
44	B	N/O	TUOLUMNE	2180	3493	02180-03493	94	180	0.52	0.60	Yes	-86	7,396
45	BARSTOW	E/O	BLACKSTONE	2072	2347	02072-02347	1,660	1,542	1.08	0.31	Yes	118	13,924
46	BARSTOW	E/O	BRAWLEY	2337	3562	02337-03562	33	354	0.09	0.60	No	-321	103,041
47	BARSTOW	E/O	CEDAR	2354	12314	02354-12314	1,569	1,073	1.46	0.36	No	496	246,016
48	BARSTOW	W/O	CEDAR	2354	5442	02354-05442	1,451	987	1.47	0.60	Yes	464	215,296
49	BARSTOW	E/O	FRUIT	2342	2343	02342-02343	358	1,009	0.35	0.37	No	-651	423,801
50	BARSTOW	E/O	GRANTLAND	3295	6744	03295-06744	32	79	0.41	0.60	Yes	-47	2,209
51	BARSTOW	E/O	PALM	2311	2344	02311-02344	684	903	0.76	0.60	Yes	-219	47,961
52	BARSTOW	E/O	THORNE	2344	3195	02344-03195	358	1,084	0.33	0.36	No	-726	527,076
53	BARSTOW	W/O	VALENTINE	3562	3563	03562-03563	30	133	0.23	0.60	No	-103	10,609
54	BARSTOW	E/O	WEST	2341	3194	02341-03194	156	770	0.20	0.60	No	-614	376,996
55	BEHYMER	E/O	CHANCE	5513	5517	05513-05517	16	427	0.04	0.60	No	-411	168,921
56	BEHYMER	E/O	MAPLE	5513	6648	05513-06648	474	332	1.43	0.60	Yes	142	20,164
57	BEHYMER	W/O	MAPLE	5513	5517	05513-05517	16	378	0.04	0.60	No	-362	131,044
58	BELMONT	W/O	99	4368	4369	04368-04369	428	420	1.02	0.60	Yes	8	64
59	BELMONT	E/O	ABBY	2090	2728	02090-02728	809	573	1.41	0.60	Yes	236	55,696
60	BELMONT	W/O	BLACKSTONE	4402	4403	04402-04403	530	168	3.15	0.60	No	362	131,044
61	BELMONT	E/O	CEDAR	2737	2738	02737-02738	1,167	1,070	1.09	0.36	Yes	97	9,409
62	BELMONT	W/O	CHESTNUT	2741	2742	02741-02742	698	884	0.79	0.60	Yes	-186	34,596
63	BELMONT	W/O	CLOVIS	2746	2747	02746-02747	289	534	0.54	0.60	Yes	-245	60,025
64	BELMONT	E/O	FIRST	2733	2734	02733-02734	762	1,388	0.55	0.32	No	-626	391,876
65	BELMONT	W/O	FRESNO	2729	2730	02729-02730	771	659	1.17	0.60	Yes	112	12,544
66	BELMONT	W/O	FULTON	4382	5178	04382-05178	1,031	878	1.17	0.60	Yes	153	23,409
67	BELMONT	W/O	H	2723	6650	02723-06650	651	634	1.03	0.60	Yes	17	289
68	BELMONT	W/O	MAPLE	2739	2740	02739-02740	923	1,160	0.80	0.34	Yes	-237	56,169
69	BELMONT	W/O	MARKS	3363	3473	03363-03473	179	409	0.44	0.60	Yes	-230	52,900
70	BELMONT	W/O	PEACH	2745	5505	02745-05505	442	904	0.49	0.60	Yes	-462	213,444
71	BLACKSTONE	N/O	ALLUVIAL	6539	9180	06539-09180	2,657	2,821	0.94	0.26	Yes	-164	26,896
72	BLACKSTONE	N/O	BREMER	5438	4400	05438-04400	802	685	1.17	0.60	Yes	117	13,689
73	BLACKSTONE	N/O	BULLARD	2071	2130	02071-02130	2,566	1,259	2.04	0.33	No	1,307	1,708,249
74	BLACKSTONE	N/O	CLINTON	2082	3253	02082-03253	1,789	1,177	1.52	0.34	No	612	374,544
75	BLACKSTONE	S/O	DAKOTA	2078	2079	02078-02079	1,632	835	1.95	0.60	No	797	635,209
76	BLACKSTONE	N/O	DIVISADERO	4413	4412	04413-04412	479	421	1.14	0.60	Yes	58	3,364
77	BLACKSTONE	N/O	GETTYSBURG	2075	2076	02075-02076	1,953	1,098	1.78	0.36	No	855	731,025
78	BLACKSTONE	S/O	HERNDON	2068	3223	02068-03223	2,225	968	2.30	0.60	No	1,257	1,580,049
79	BLACKSTONE	S/O	OLIVE	2086	4361	02086-04361	491	637	0.77	0.60	Yes	-146	21,316
80	BLACKSTONE	N/O	SHAW	2073	2074	02073-02074	1,942	1,241	1.56	0.33	No	701	491,401

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
81	BLACKSTONE	N/O	SHIELDS	2079	2080	02079-02080	1,877	835	2.25	0.60	No	1,042	1,085,764
82	BLACKSTONE	N/O	SIERRA	2069	3223	02069-03223	2,285	605	3.78	0.60	No	1,680	2,822,400
83	BRAWLEY	N/O	BARSTOW	2337	5487	02337-05487	1,249	1,798	0.69	0.30	No	-549	301,401
84	BRAWLEY	S/O	CALIFORNIA	5136	8062	05136-08062	104	106	0.98	0.60	Yes	-2	4
85	BRAWLEY	N/O	CLINTON	2562	3429	02562-03429	213	860	0.25	0.60	No	-647	418,609
86	BRAWLEY	N/O	DAKOTA	3339	3340	03339-03340	579	537	1.08	0.60	Yes	42	1,764
87	BRAWLEY	N/O	GETTYSBURG	3118	3585	03118-03585	1,290	1,218	1.06	0.33	Yes	72	5,184
88	BRAWLEY	S/O	HERNDON	3281	5107	03281-05107	1,280	793	1.61	0.60	No	487	237,169
89	BRAWLEY	N/O	NIELSEN	5120	5440	05120-05440	152	384	0.40	0.60	No	-232	53,824
90	BRAWLEY	N/O	SHAW	2374	3571	02374-03571	1,436	3,053	0.47	0.25	No	-1,617	2,614,689
91	BRAWLEY	N/O	WEBER	3118	3585	03118-03585	1,290	608	2.12	0.60	No	682	465,124
92	BROADWAY	N/O	41	6145	6187	06145-06187	436	522	0.84	0.60	Yes	-86	7,396
93	BROADWAY	N/O	DIVISADERO	4385	5400	04385-05400	186	87	2.14	0.60	No	99	9,801
94	BROADWAY	N/O	FRESNO	9226	9227	09226-09227	297	202	1.47	0.60	Yes	95	9,025
95	BROADWAY	S/O	VENTURA	4457	5222	04457-05222	25	238	0.11	0.60	No	-213	45,369
96	BRYAN	S/O	ASHLAN	3326	5632	03326-05632	162	62	2.61	0.60	No	100	10,000
97	BULLARD	E/O	41	3675	4327	03675-04327	2,646	2,601	1.02	0.26	Yes	45	2,025
98	BULLARD	W/O	BLACKSTONE	2071	3126	02071-03126	2,177	1,983	1.10	0.28	Yes	194	37,636
99	BULLARD	E/O	CARNEGIE	5806	5808	05806-05808	292	808	0.36	0.60	No	-516	266,256
100	BULLARD	E/O	CEDAR	2316	5001	02316-05001	1,850	2,114	0.88	0.27	Yes	-264	69,696
101	BULLARD	W/O	CEDAR	2313	2314	02313-02314	2,006	2,055	0.98	0.28	Yes	-49	2,401
102	BULLARD	W/O	CHESTNUT	2316	5001	02316-05001	1,850	2,029	0.91	0.28	Yes	-179	32,041
103	BULLARD	W/O	FIRST	2309	3245	02309-03245	2,044	2,467	0.83	0.26	Yes	-423	178,929
104	BULLARD	W/O	FRESNO	3675	4327	03675-04327	2,646	2,563	1.03	0.26	Yes	83	6,889
105	BULLARD	E/O	GRANTLAND	2294	6740	02294-06740	14	104	0.13	0.60	No	-90	8,100
106	BULLARD	W/O	JEANNE	3291	5052	03291-05052	34	91	0.37	0.60	No	-57	3,249
107	BULLARD	W/O	MAPLE	2316	5001	02316-05001	1,850	1,900	0.97	0.28	Yes	-50	2,500
108	BULLARD	E/O	MAROA	2306	3126	02306-03126	2,350	2,328	1.01	0.27	Yes	22	484
109	BULLARD	W/O	MILLBROOK	2312	3244	02312-03244	2,084	2,514	0.83	0.26	Yes	-430	184,900
110	BULLARD	W/O	PALM	2303	3201	02303-03201	2,230	1,869	1.19	0.29	Yes	361	130,321
111	BULLARD	E/O	VALENTINE	6062	12301	06062-12301	40	358	0.11	0.60	No	-318	101,124
112	BULLARD	E/O	WEST	2301	3193	02301-03193	1,940	1,668	1.16	0.30	Yes	272	73,984
113	BUTLER	E/O	ARMSTRONG	2850	5627	02850-05627	24	16	1.50	0.60	Yes	8	64
114	BUTLER	E/O	CHESTNUT	2842	2843	02842-02843	661	684	0.97	0.60	Yes	-23	529
115	BUTLER	W/O	CLOVIS	2846	2847	02846-02847	157	410	0.38	0.60	No	-253	64,009
116	CALAVERAS	E/O	N	3008	6084	03008-06084	213	148	1.44	0.60	Yes	65	4,225
117	CALIFORNIA	E/O	BRAWLEY	3068	3113	03068-03113	15	95	0.16	0.60	No	-80	6,400
118	CALIFORNIA	W/O	CEDAR	2879	3505	02879-03505	148	88	1.68	0.60	No	60	3,600
119	CALIFORNIA	E/O	CHERRY	5405	6188	05405-06188	11	59	0.19	0.60	No	-48	2,304
120	CALIFORNIA	E/O	MARKS	2863	2966	02863-02966	94	154	0.61	0.60	Yes	-60	3,600
121	CALIFORNIA	E/O	ORANGE	2878	3505	02878-03505	203	127	1.60	0.60	Yes	76	5,776
122	CALIFORNIA	W/O	TUPMAN	2872	6089	02872-06089	409	455	0.90	0.60	Yes	-46	2,116
123	CALIFORNIA	W/O	WALNUT	3586	6750	03586-06750	185	304	0.61	0.60	Yes	-119	14,161
124	CALIFORNIA	E/O	WEST	2865	2866	02865-02866	58	496	0.12	0.60	No	-438	191,844
125	CECELIA	N/O	BULLARD	2929	5411	02929-05411	1,388	468	2.97	0.60	No	920	846,400
126	CEDAR	N/O	BULLDOG	2354	3129	02354-03129	1,693	2,100	0.81	0.27	Yes	-407	165,649
127	CEDAR	S/O	CALIFORNIA	2879	3146	02879-03146	528	605	0.87	0.60	Yes	-77	5,929
128	CEDAR	N/O	CENTRAL	2962	12353	02962-12353	98	126	0.78	0.60	Yes	-28	784
129	CEDAR	S/O	CENTRAL	5169	8106	05169-08106	105	129	0.81	0.60	Yes	-24	576
130	CEDAR	N/O	CHURCH	2897	3146	02897-03146	461	714	0.65	0.60	Yes	-253	64,009
131	CEDAR	N/O	CLINTON	2557	2586	02557-02586	1,315	941	1.40	0.60	Yes	374	139,876
132	CEDAR	N/O	COPPER	3053	12318	03053-12318	283	80	3.54	0.60	No	203	41,209
133	CEDAR	S/O	DAKOTA	2491	2508	02491-02508	938	1,450	0.65	0.31	No	-512	262,144
134	CEDAR	S/O	HERNDON	2252	2283	02252-02283	1,962	1,686	1.16	0.30	Yes	276	76,176
135	CEDAR	N/O	JENSEN	3150	4614	03150-04614	401	417	0.96	0.60	Yes	-16	256
136	CEDAR	S/O	MCKINLEY	2634	2651	02634-02651	1,684	1,611	1.05	0.30	Yes	73	5,329
137	CEDAR	N/O	NEES	2230	3112	02230-03112	879	1,839	0.48	0.29	No	-960	921,600
138	CEDAR	N/O	NORTH	2952	5296	02952-05296	225	387	0.58	0.60	Yes	-162	26,244
139	CEDAR	S/O	PARKWAY	2962	3693	02962-03693	114	148	0.77	0.60	Yes	-34	1,156
140	CEDAR	S/O	SHAW	2140	2399	02140-02399	1,836	1,401	1.31	0.31	No	435	189,225
141	CEDAR	S/O	SHEPHERD	2222	3067	02222-03067	422	1,716	0.25	0.30	No	-1,294	1,674,436
142	CEDAR	N/O	TEAGUE	3067	3161	03067-03161	630	1,685	0.37	0.30	No	-1,055	1,113,025
143	CEDAR	N/O	TULARE	2767	2787	02767-02787	761	1,322	0.58	0.32	No	-561	314,721
144	CEDAR	N/O	VENTURA	2189	2813	02189-02813	893	1,390	0.64	0.32	No	-497	247,009
145	CENTRAL	W/O	MAPLE	5176	6202	05176-06202	89	136	0.65	0.60	Yes	-47	2,209
146	CHAMPLAIN	E/O	FRIANT	3305	5464	03305-05464	5	386	0.01	0.60	No	-381	145,161
147	CHERRY	N/O	ANNADALE	2938	5177	02938-05177	508	256	1.98	0.60	No	252	63,504
148	CHESTNUT	S/O	BELMONT	2742	3545	02742-03545	2,223	2,173	1.02	0.27	Yes	50	2,500
149	CHESTNUT	S/O	BUTLER	2842	2856	02842-02856	1,197	743	1.61	0.60	No	454	206,116
150	CHESTNUT	S/O	CALIFORNIA	2856	5278	02856-05278	1,474	1,429	1.03	0.31	Yes	45	2,025
151	CHESTNUT	S/O	CHURCH	2900	3541	02900-03541	1,096	921	1.19	0.60	Yes	175	30,625
152	CHESTNUT	N/O	HERNDON	2253	6107	02253-06107	1,414	505	2.80	0.60	No	909	826,281
153	CHESTNUT	S/O	JENSEN	2927	5291	02927-05291	1,197	1,126	1.06	0.35	Yes	71	5,041
154	CHESTNUT	N/O	NEES	2231	4996	02231-04996	1,055	887	1.19	0.60	Yes	168	28,224
155	CHESTNUT	N/O	OLIVE	2653	2687	02653-02687	2,028	1,332	1.52	0.32	No	696	484,416
156	CHESTNUT	N/O	SHIELDS	2539	5011	02539-05011	1,749	1,204	1.45	0.33	No	545	297,025
157	CHESTNUT	N/O	TEAGUE	3071	5467	03071-05467	845	978	0.86	0.60	Yes	-133	17,689
158	CHURCH	E/O	ARMSTRONG	3317	3557	03317-03557	11	32	0.34	0.60	No	-21	441
159	CHURCH	E/O	BLYTHE	4263	4407	04263-04407	11	34	0.32	0.60	No	-23	529
160	CHURCH	E/O	CHESTNUT	3239	5277	03239-05277	132	323	0.41	0.60	Yes	-191	36,481

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
161	CHURCH	E/O	ELM	2108	5729	02108-05729	225	342	0.66	0.60	Yes	-117	13,689
162	CHURCH	E/O	FOWLER	3317	3557	03317-03557	11	94	0.12	0.60	No	-83	6,889
163	CHURCH	W/O	FRUIT	2885	2992	02885-02992	23	120	0.19	0.60	No	-97	9,409
164	CHURCH	E/O	PEACH	6527	8264	06527-08264	0	157	0.00	0.60	No	-157	24,649
165	CHURCH	W/O	PEACH	2901	3533	02901-03533	137	236	0.58	0.60	Yes	-99	9,801
166	CLINTON	E/O	ANGUS	2580	2581	02580-02581	1,315	1,048	1.25	0.37	Yes	267	71,289
167	CLINTON	E/O	BLACKSTONE	2082	2577	02082-02577	1,552	1,245	1.25	0.33	Yes	307	94,249
168	CLINTON	E/O	CEDAR	2586	5710	02586-05710	851	840	1.01	0.60	Yes	11	121
169	CLINTON	E/O	FIRST	2581	2582	02581-02582	1,258	1,095	1.15	0.36	Yes	163	26,569
170	CLINTON	E/O	FOWLER	12148	12154	12148-12154	57	180	0.32	0.60	No	-123	15,129
171	CLINTON	E/O	FRUIT	2571	2572	02571-02572	1,425	1,467	0.97	0.31	Yes	-42	1,764
172	CLINTON	E/O	MARKS	2564	2565	02564-02565	1,790	1,793	1.00	0.30	Yes	-3	9
173	CLINTON	N/O	MCKINLEY	5783	6119	05783-06119	577	571	1.01	0.60	Yes	6	36
174	CLINTON	E/O	SUNNYSIDE	6633	8228	06633-08228	629	293	2.15	0.60	No	336	112,896
175	CLINTON	E/O	TEMPERANCE	12148	12154	12148-12154	57	69	0.83	0.60	Yes	-12	144
176	CLINTON	W/O	WEST	2568	2569	02568-02569	1,588	1,735	0.92	0.30	Yes	-147	21,609
177	CLOVIS	S/O	CALIFORNIA	3316	5591	03316-05591	1,315	915	1.44	0.60	Yes	400	160,000
178	CLOVIS	N/O	CLINTON	2541	5394	02541-05394	2,308	1,991	1.16	0.28	Yes	317	100,489
179	CLOVIS	S/O	KINGS CANYON	2199	2822	02199-02822	1,357	2,169	0.63	0.27	No	-812	659,344
180	CLOVIS	N/O	MCKINLEY	6631	8232	06631-08232	4,071	2,360	1.73	0.27	No	1,711	2,927,521
181	CLOVIS	N/O	TULARE	3547	7051	03547-07051	2,813	2,331	1.21	0.27	Yes	482	232,324
182	COLE	E/O	AUDUBON	3176	3208	03176-03208	483	423	1.14	0.60	Yes	60	3,600
183	COPPER	E/O	CEDAR	5773	3053	05773-03053	673	603	1.12	0.60	Yes	70	4,900
184	CORNELIA	N/O	DAKOTA	2472	3410	02472-03410	123	803	0.15	0.60	No	-680	462,400
185	DAKOTA	E/O	BLACKSTONE	2078	2485	02078-02485	335	1,032	0.32	0.37	No	-697	485,809
186	DAKOTA	E/O	CEDAR	2492	5708	02492-05708	763	843	0.91	0.60	Yes	-80	6,400
187	DAKOTA	E/O	CHESTNUT	2495	5015	02495-05015	321	976	0.33	0.60	No	-655	429,025
188	DAKOTA	E/O	FOWLER	5016	12157	05016-12157	24	120	0.20	0.60	No	-96	9,216
189	DAKOTA	E/O	MAPLE	2493	2494	02493-02494	510	953	0.54	0.60	Yes	-443	196,249
190	DAKOTA	W/O	MAPLE	2493	5713	02493-05713	707	1,263	0.56	0.33	No	-556	309,136
191	DAKOTA	W/O	PEACH	2495	5015	02495-05015	321	806	0.40	0.60	No	-485	235,225
193	DAKOTA	E/O	WEST	2478	2479	02478-02479	576	574	1.00	0.60	Yes	2	4
194	DIVISADERO	W/O	41	4637	6180	04637-06180	1,771	1,757	1.01	0.30	Yes	14	196
195	DIVISADERO	E/O	FRESNO	2781	5263	02781-05263	1,839	1,475	1.25	0.31	Yes	364	132,496
196	DIVISADERO	E/O	VAN NESS	2778	5237	02778-05237	227	520	0.44	0.60	Yes	-293	85,849
197	E	N/O	STANISLAUS	5413	5501	05413-05501	49	604	0.08	0.60	No	-555	308,025
198	EAST	S/O	CALIFORNIA	2876	2884	02876-02884	281	255	1.10	0.60	Yes	26	676
199	EL DORADO	E/O	E	3489	5413	03489-05413	246	359	0.69	0.60	Yes	-113	12,769
200	EMERSON	W/O	WEST	3214	12297	03214-12297	359	367	0.98	0.60	Yes	-8	64
201	F	N/O	FRESNO	5418	5500	05418-05500	35	101	0.35	0.60	No	-66	4,356
202	FIG	S/O	NORTH	2946	8094	02946-08094	39	189	0.21	0.60	No	-150	22,500
203	FIGARDEN	E/O	BRAWLEY	4628	5060	04628-05060	790	380	2.08	0.60	No	410	168,100
206	FIRST	N/O	ALLUVIAL	3087	3088	03087-03088	846	938	0.90	0.60	Yes	-92	8,464
207	FIRST	N/O	BARSTOW	2351	5006	02351-05006	746	1,742	0.43	0.30	No	-996	992,016
208	FIRST	N/O	BULLARD	2309	2310	02309-02310	1,205	1,654	0.73	0.30	Yes	-449	201,601
209	FIRST	N/O	CLINTON	2555	2581	02555-02581	1,710	1,063	1.61	0.36	No	647	418,609
210	FIRST	N/O	DAKOTA	2467	2488	02467-02488	1,361	899	1.51	0.60	Yes	462	213,444
211	FIRST	N/O	GETTYSBURG	2411	3234	02411-03234	1,454	1,688	0.86	0.30	Yes	-234	54,756
212	FIRST	N/O	HERNDON	2250	6102	02250-06102	1,220	1,029	1.19	0.37	Yes	191	36,481
213	FIRST	N/O	MCKINLEY	2602	2630	02602-02630	1,633	1,261	1.30	0.33	Yes	372	138,384
214	FIRST	N/O	NEES	3073	3178	03073-03178	601	1,145	0.52	0.35	No	-544	295,936
215	FIRST	N/O	SAN JOSE	2351	2364	02351-02364	990	1,626	0.61	0.30	No	-636	404,496
216	FIRST	S/O	SHAW	2138	2397	02138-02397	959	1,806	0.53	0.29	No	-847	717,409
217	FIRST	N/O	SIERRA	2281	5471	02281-05471	1,072	1,879	0.57	0.29	No	-807	651,249
218	FIRST	N/O	TULARE	2764	2783	02764-02783	1,037	896	1.16	0.60	Yes	141	19,881
219	FOWLER	N/O	CHURCH	5304	5592	05304-05592	196	369	0.53	0.60	Yes	-173	29,929
220	FOWLER	N/O	CLINTON	2593	8462	02593-08462	906	376	2.41	0.60	No	530	280,900
221	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	487	1.90	0.60	No	439	192,721
222	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	526	1.76	0.60	No	400	160,000
223	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	400	2.32	0.60	No	526	276,676
224	FOWLER	N/O	DAKOTA	5016	8376	05016-08376	953	1,187	0.80	0.34	Yes	-234	54,756
225	FOWLER	N/O	JENSEN	2906	3317	02906-03317	193	501	0.39	0.60	No	-308	94,864
226	FOWLER	N/O	KINGS CANYON	7056	7082	07056-07082	564	1,149	0.49	0.35	No	-585	342,225
227	FRESNO	E/O	99	4440	5870	04440-05870	1,592	1,637	0.97	0.30	Yes	-45	2,025
228	FRESNO	N/O	CLINTON	2554	2578	02554-02578	984	1,021	0.96	0.37	Yes	-37	1,369
229	FRESNO	N/O	DIVISADERO	2763	6092	02763-06092	881	899	0.98	0.60	Yes	-18	324
230	FRESNO	E/O	E	5418	5870	05418-05870	1,516	1,148	1.32	0.35	Yes	368	135,424
232	FRESNO	N/O	GETTYSBURG	2409	3232	02409-03232	1,484	696	2.13	0.60	No	788	620,944
233	FRESNO	N/O	HERNDON	2249	6100	02249-06100	2,287	2,478	0.92	0.26	Yes	-191	36,481
234	FRESNO	S/O	HERNDON	2249	2280	02249-02280	1,181	1,536	0.77	0.31	Yes	-355	126,025
235	FRESNO	S/O	MCKINLEY	2629	2646	02629-02646	724	893	0.81	0.60	Yes	-169	28,561
236	FRESNO	N/O	NEES	5461	6099	05461-06099	309	1,422	0.22	0.31	No	-1,113	1,238,769
237	FRESNO	S/O	SHAW	2339	3232	02339-03232	1,484	1,582	0.94	0.31	Yes	-98	9,604
238	FRESNO	N/O	SHIELDS	2502	2527	02502-02527	1,022	956	1.07	0.60	Yes	66	4,356
239	FRESNO	E/O	VAN NESS	3015	3016	03015-03016	847	915	0.93	0.60	Yes	-68	4,624
240	FRIANT	N/O	AUDUBON	2221	5036	02221-05036	4,487	4,202	1.07	0.23	Yes	285	81,225
241	FRIANT	N/O	CHAMPLAIN	3304	8116	03304-08116	1,966	1,423	1.38	0.31	No	543	294,849
242	FRIANT	N/O	SHEPHERD	2220	2221	02220-02221	2,852	2,347	1.22	0.27	Yes	505	255,025
244	FRUIT	S/O	ASHLAN	5429	5430	05429-05430	565	690	0.82	0.60	Yes	-125	15,625
245	FRUIT	S/O	CALIFORNIA	2867	2880	02867-02880	195	127	1.54	0.60	Yes	68	4,624

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes

ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
246	FRUIT	N/O	CLINTON	2571	3261	02571-03261	369	853	0.43	0.60	Yes	-484	234,256
247	FRUIT	S/O	HERNDON	2245	5058	02245-05058	827	728	1.14	0.60	Yes	99	9,801
248	FRUIT	S/O	SHAW	2380	3270	02380-03270	890	309	2.88	0.60	No	581	337,561
249	FULTON	N/O	DIVISADERO	4386	4384	04386-04384	301	322	0.93	0.60	Yes	-21	441
250	FULTON	N/O	SAN JOAQUIN	5857	5861	05857-05861	86	120	0.72	0.60	Yes	-34	1,156
251	G	N/O	EL DORADO	2775	2776	02775-02776	177	108	1.64	0.60	No	69	4,761
252	G	S/O	STANISLAUS	4392	5191	04392-05191	205	371	0.55	0.60	Yes	-166	27,556
253	G	S/O	STANISLAUS	4392	5191	04392-05191	205	741	0.28	0.60	No	-536	287,296
254	G	N/O	TUOLUMNE	4392	5191	04392-05191	205	371	0.55	0.60	Yes	-166	27,556
255	G	S/O	VENTURA	2105	5879	02105-05879	309	338	0.91	0.60	Yes	-29	841
256	GARFIELD	S/O	BARSTOW	6725	6756	06725-06756	11	52	0.21	0.60	No	-41	1,681
257	GATES	N/O	BLYTHE	3297	4632	03297-04632	1,167	946	1.23	0.60	Yes	221	48,841
258	GATES	N/O	SAN JOSE	3564	4632	03564-04632	1,147	1,056	1.09	0.36	Yes	91	8,281
259	GATES	S/O	SAN JOSE	3297	4632	03297-04632	1,167	760	1.54	0.60	Yes	407	165,649
260	GETTYSBURG	E/O	BLACKSTONE	2076	2408	02076-02408	872	1,105	0.79	0.35	Yes	-233	54,289
261	GETTYSBURG	E/O	CEDAR	2413	2414	02413-02414	1,230	1,401	0.88	0.31	Yes	-171	29,241
262	GETTYSBURG	E/O	WEST	2401	3205	02401-03205	84	128	0.66	0.60	Yes	-44	1,936
263	GOLDEN STATE	N/O	ASHLAN	4635	12254	04635-12254	1,485	1,732	0.86	0.30	Yes	-247	61,009
264	GOLDEN STATE	N/O	BUCKINGHAM	4635	12254	04635-12254	1,485	1,541	0.96	0.31	Yes	-56	3,136
265	GOLDEN STATE	S/O	CHURCH	2892	5406	02892-05406	302	346	0.87	0.60	Yes	-44	1,936
266	GOLDEN STATE	S/O	JENSEN	2892	5406	02892-05406	302	385	0.78	0.60	Yes	-83	6,889
267	GOLDEN STATE	N/O	SHAW	3723	4847	03723-04847	147	822	0.18	0.60	No	-675	455,625
268	GRANTLAND	N/O	BARSTOW	3293	5388	03293-05388	315	350	0.90	0.60	Yes	-35	1,225
269	GRANTLAND	N/O	BULLARD	2294	6165	02294-06165	348	502	0.69	0.60	Yes	-154	23,716
271	H	N/O	DIVISADERO	2761	6182	02761-06182	1,024	1,015	1.01	0.37	Yes	9	81
272	H	S/O	DIVISADERO	2777	3007	02777-03007	565	130	4.35	0.60	No	435	189,225
273	H	N/O	MERCED	4419	5207	04419-05207	581	166	3.50	0.60	No	415	172,225
274	HAYES	N/O	ASHLAN	3402	5633	03402-05633	84	119	0.71	0.60	Yes	-35	1,225
275	HAZELWOOD	N/O	BUTLER	2816	2834	02816-02834	598	257	2.33	0.60	No	341	116,281
276	HERNDON	E/O	BLACKSTONE	2068	4321	02068-04321	5,061	4,169	1.21	0.23	Yes	892	795,664
277	HERNDON	W/O	BRAWLEY	3281	5106	03281-05106	2,783	2,631	1.06	0.26	Yes	152	23,104
280	HERNDON	E/O	CEDAR	2252	4999	02252-04999	3,997	4,235	0.94	0.23	Yes	-238	56,644
281	HERNDON	E/O	CHESTNUT	2253	5002	02253-05002	4,404	3,301	1.33	0.24	No	1,103	1,216,609
282	HERNDON	E/O	FIRST	2251	5004	02251-05004	4,171	5,023	0.83	0.21	Yes	-852	725,904
283	HERNDON	E/O	FRUIT	2246	5037	02246-05037	5,432	5,673	0.96	0.20	Yes	-241	58,081
284	HERNDON	W/O	MARKS	3055	5041	03055-05041	3,334	3,191	1.04	0.25	Yes	143	20,449
285	HERNDON	E/O	MAROA	2068	2248	02068-02248	4,660	3,973	1.17	0.23	Yes	687	471,969
286	HERNDON	E/O	MILLBROOK	2251	5003	02251-05003	4,769	4,208	1.13	0.23	Yes	561	314,721
287	HERNDON	W/O	PALM	2246	5037	02246-05037	5,432	5,673	0.96	0.20	Yes	-241	58,081
289	HUGHES	N/O	KEARNEY	2815	2827	02815-02827	20	14	1.43	0.60	Yes	6	36
290	HUGHES	N/O	NIELSEN	3474	5326	03474-05326	329	116	2.84	0.60	No	213	45,369
291	HUGHES	S/O	SHIELDS	2517	2549	02517-02549	706	599	1.18	0.60	Yes	107	11,449
292	HUNTINGTON	E/O	R	3034	3155	03034-03155	78	214	0.36	0.60	No	-136	18,496
293	INGRAM	N/O	HERNDON	2247	3302	02247-03302	1,188	1,102	1.08	0.35	Yes	86	7,396
294	INYO	E/O	L	3160	5219	03160-05219	428	117	3.66	0.60	No	311	96,721
295	INYO	E/O	VAN NESS	3159	5219	03159-05219	62	176	0.35	0.60	No	-114	12,996
296	ISLAND WATERPARK	N/O	SHAW	6820	5596	06820-05596	2,747	530	5.18	0.60	No	2,217	4,915,089
297	JENNIFER	E/O	GATES	6063	6064	06063-06064	1,091	680	1.60	0.60	No	411	168,921
298	JENSEN	E/O	CEDAR	2925	6296	02925-06296	1,704	1,528	1.12	0.31	Yes	176	30,976
299	JENSEN	E/O	CLOVIS	2929	5411	02929-05411	1,388	993	1.40	0.60	Yes	395	156,025
300	JENSEN	W/O	CORNELIA	2908	5135	02908-05135	208	251	0.83	0.60	Yes	-43	1,849
301	JENSEN	E/O	ELM	2109	5730	02109-05730	899	1,568	0.57	0.31	No	-669	447,561
302	JENSEN	W/O	FRUIT	2913	5146	02913-05146	256	292	0.88	0.60	Yes	-36	1,296
303	JENSEN	E/O	GOLDEN STATE	2923	8440	02923-08440	2,024	2,041	0.99	0.28	Yes	-17	289
304	JENSEN	E/O	MAPLE	2926	3531	02926-03531	1,927	1,459	1.32	0.31	No	468	219,024
305	JENSEN	E/O	PEACH	2928	6200	02928-06200	1,376	1,634	0.84	0.30	Yes	-258	66,564
306	JENSEN	W/O	WILLOW	2927	5276	02927-05276	1,326	1,207	1.10	0.33	Yes	119	14,161
307	KEARNEY	W/O	FRESNO	2833	8410	02833-08410	605	328	1.84	0.60	No	277	76,729
308	KEARNEY	E/O	HUGHES	2827	2828	02827-02828	54	136	0.40	0.60	No	-82	6,724
309	KEARNEY	E/O	MARKS	2826	5329	02826-05329	95	100	0.95	0.60	Yes	-5	25
310	KEARNEY	E/O	WEST	2829	8418	02829-08418	205	148	1.39	0.60	Yes	57	3,249
312	KINGS CANYON	E/O	CEDAR	2189	2190	02189-02190	806	1,379	0.58	0.32	No	-573	328,329
313	KINGS CANYON	W/O	CLOVIS	2198	2199	02198-02199	1,535	1,684	0.91	0.30	Yes	-149	22,201
314	KINGS CANYON	E/O	MAPLE	2193	2194	02193-02194	736	1,273	0.58	0.33	No	-537	288,369
315	LANE	E/O	CHESTNUT	2820	5317	02820-05317	574	405	1.42	0.60	Yes	169	28,561
316	LANE	W/O	PEACH	2821	3555	02821-03555	1,640	304	5.39	0.60	No	1,336	1,784,896
317	LOS ANGELES	E/O	L	3042	3263	03042-03263	195	286	0.68	0.60	Yes	-91	8,281
318	M	N/O	CALAVERAS	4416	5240	04416-05240	86	96	0.90	0.60	Yes	-10	100
321	M	N/O	MERCED	2183	5225	02183-05225	36	139	0.26	0.60	No	-103	10,609
322	M	S/O	VENTURA	2102	3039	02102-03039	929	690	1.35	0.60	Yes	239	57,121
323	MAPLE	S/O	CALIFORNIA	3506	12170	03506-12170	785	801	0.98	0.60	Yes	-16	256
324	MAPLE	N/O	CLINTON	2537	2559	02537-02559	624	536	1.16	0.60	Yes	88	7,744
325	MAPLE	N/O	GETTYSBURG	2416	3143	02416-03143	603	297	2.03	0.60	No	306	93,636
326	MAPLE	S/O	MCKINLEY	2685	2695	02685-02695	887	1,056	0.84	0.36	Yes	-169	28,561
328	MAPLE	N/O	TEAGUE	3070	4598	03070-04598	340	648	0.52	0.60	Yes	-308	94,864
329	MAPLE	N/O	TULARE	2789	3488	02789-03488	1,736	1,228	1.41	0.33	No	508	258,064
330	MARKS	S/O	CALIFORNIA	2863	2903	02863-02903	253	131	1.93	0.60	No	122	14,884
331	MARKS	N/O	CLINTON	4276	12241	04276-12241	688	876	0.79	0.60	Yes	-188	35,344
332	MARKS	S/O	HERNDON	3055	6060	03055-06060	347	1,088	0.32	0.36	No	-741	549,081
333	MARKS	N/O	KEARNEY	2826	5129	02826-05129	305	265	1.15	0.60	Yes	40	1,600

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
334	MARKS	N/O	NIELSEN	5132	5133	05132-05133	234	529	0.44	0.60	Yes	-295	87,025
335	MARKS	S/O	SHAW	2375	2394	02375-02394	1,370	1,699	0.81	0.30	Yes	-329	108,241
336	MAROA	S/O	BULLARD	2306	2332	02306-02332	245	919	0.27	0.60	No	-674	454,276
337	MAROA	N/O	CLINTON	2576	2552	02576-02552	463	461	1.00	0.60	Yes	2	4
338	MAROA	S/O	HERNDON	2248	2275	02248-02275	336	694	0.48	0.60	Yes	-358	128,164
339	MAROA	S/O	SHAW	2384	2396	02384-02396	495	590	0.84	0.60	Yes	-95	9,025
340	MAROA	N/O	SIERRA	2274	2275	02274-02275	301	693	0.43	0.60	Yes	-392	153,664
341	MARTIN LUTHER KING JR	S/O	CALIFORNIA	2704	2872	02704-02872	67	360	0.19	0.60	No	-293	85,849
342	MCKINLEY	E/O	BLACKSTONE	2084	3249	02084-03249	1,788	1,798	0.99	0.30	Yes	-10	100
343	MCKINLEY	E/O	CEDAR	2634	5711	02634-05711	2,121	1,707	1.24	0.30	Yes	414	171,396
344	MCKINLEY	E/O	CHESTNUT	2636	8226	02636-08226	1,581	1,204	1.31	0.33	Yes	377	142,129
345	MCKINLEY	W/O	CLOVIS	2637	2638	02637-02638	1,317	838	1.57	0.60	Yes	479	229,441
346	MCKINLEY	E/O	FIRST	2630	2631	02630-02631	1,759	1,430	1.23	0.31	Yes	329	108,241
347	MCKINLEY	E/O	MARKS	2612	2613	02612-02613	982	215	4.57	0.60	No	767	588,289
348	MCKINLEY	E/O	PALM	2606	2621	02606-02621	1,167	979	1.19	0.60	Yes	188	35,344
349	MCKINLEY	E/O	VAN NESS	2624	2625	02624-02625	1,965	1,281	1.53	0.33	No	684	467,856
350	MCKINLEY	E/O	WEST	2617	2618	02617-02618	1,184	1,128	1.05	0.35	Yes	56	3,136
351	MILBURN	S/O	HERNDON	6058	12269	06058-12269	672	1,211	0.55	0.33	No	-539	290,521
352	MILBURN	N/O	SPRUCE	5526	5831	05526-05831	827	1,236	0.67	0.33	No	-409	167,281
353	MILBURN	S/O	SPRUCE	5526	8043	05526-08043	606	723	0.84	0.60	Yes	-117	13,689
354	MILLBROOK	S/O	ASHLAN	2449	2468	02449-02468	510	597	0.85	0.60	Yes	-87	7,569
355	MILLBROOK	N/O	CLINTON	2583	6192	02583-06192	6	168	0.04	0.60	No	-162	26,244
356	MILLBROOK	N/O	NEES	3074	3076	03074-03076	647	792	0.82	0.60	Yes	-145	21,025
357	MILLBROOK	S/O	SHAW	2975	8112	02975-08112	477	373	1.28	0.60	Yes	104	10,816
358	MINARETS	E/O	BLACKSTONE	2066	4597	02066-04597	561	1,459	0.38	0.31	No	-898	806,404
359	NEES	E/O	AUDUBON	6528	6560	06528-06560	2,224	1,983	1.12	0.28	Yes	241	58,081
360	NEES	E/O	CEDAR	2230	3078	02230-03078	1,813	1,699	1.07	0.30	Yes	114	12,996
361	NEES	E/O	FIRST	2229	3084	02229-03084	1,494	2,388	0.63	0.27	No	-894	799,236
362	NEES	E/O	FRESNO	3114	3115	03114-03115	1,603	2,160	0.74	0.27	Yes	-557	310,249
363	NEES	W/O	FRESNO	2228	5835	02228-05835	1,496	2,322	0.64	0.27	No	-826	682,276
364	NEES	E/O	MAPLE	3080	3097	03080-03097	1,321	1,729	0.76	0.30	Yes	-408	166,464
365	NEES	E/O	WILLOW	2232	4929	02232-04929	1,113	1,198	0.93	0.34	Yes	-85	7,225
366	NIELSEN	E/O	WEST	2772	2773	02772-02773	239	120	1.99	0.60	No	119	14,161
367	NORTH	W/O	CEDAR	3690	5321	03690-05321	716	551	1.30	0.60	Yes	165	27,225
368	NORTH	W/O	CHERRY	2948	5733	02948-05733	221	283	0.78	0.60	Yes	-62	3,844
369	NORTH	E/O	EAST	2951	3152	02951-03152	222	514	0.43	0.60	Yes	-292	85,264
370	NORTH	E/O	ELM	2948	5733	02948-05733	221	521	0.42	0.60	Yes	-300	90,000
371	NORTH	W/O	ELM	2110	2947	02110-02947	206	754	0.27	0.60	No	-548	300,304
372	NORTH	W/O	GOLDEN STATE	2953	2954	02953-02954	568	444	1.28	0.60	Yes	124	15,376
373	NORTH	E/O	MARTIN LUTHER KING JR	2946	2947	02946-02947	206	312	0.66	0.60	Yes	-106	11,236
374	NORTH	E/O	PEACH	2956	8086	02956-08086	215	169	1.27	0.60	Yes	46	2,116
375	NORTH	W/O	WALNUT	2945	3019	02945-03019	65	172	0.38	0.60	No	-107	11,449
376	NORTH	W/O	WEST	3318	8078	03318-08078	60	101	0.59	0.60	Yes	-41	1,681
377	O	S/O	TULARE	4610	5234	04610-05234	275	243	1.13	0.60	Yes	32	1,024
378	O	S/O	VENTURA	4612	6184	04612-06184	230	457	0.50	0.60	Yes	-227	51,529
379	OLIVE	W/O	99	4364	4366	04364-04366	95	724	0.13	0.60	No	-629	395,641
380	OLIVE	E/O	CEDAR	2683	2684	02683-02684	313	841	0.37	0.60	No	-528	278,784
381	OLIVE	W/O	CLOVIS	2692	5491	02692-05491	303	401	0.76	0.60	Yes	-98	9,604
382	OLIVE	E/O	FIRST	2679	2680	02679-02680	489	948	0.52	0.60	Yes	-459	210,681
383	OLIVE	E/O	GOLDEN STATE	2642	2667	02642-02667	483	435	1.11	0.60	Yes	48	2,304
385	OLIVE	W/O	WEBER	2642	2667	02642-02667	483	498	0.97	0.60	Yes	-15	225
386	ORANGE	N/O	CALIFORNIA	2854	2878	02854-02878	111	328	0.34	0.60	No	-217	47,089
387	ORANGE	S/O	CALIFORNIA	2878	3147	02878-03147	310	279	1.11	0.60	Yes	31	961
388	ORANGE	S/O	NORTH	3528	8102	03528-08102	100	45	2.22	0.60	No	55	3,025
389	P	S/O	TULARE	2133	5236	02133-05236	55	379	0.15	0.60	No	-324	104,976
390	P	S/O	VENTURA	6184	4461	06184-04461	88	147	0.60	0.60	Yes	-59	3,481
391	PALM	S/O	BELMONT	2724	5185	02724-05185	607	423	1.43	0.60	Yes	184	33,856
393	PALM	N/O	BULLARD	2303	2304	02303-02304	1,627	1,691	0.96	0.30	Yes	-64	4,096
394	PALM	N/O	CLINTON	2551	2573	02551-02573	1,333	970	1.37	0.60	Yes	363	131,769
395	PALM	N/O	DAKOTA	2463	2482	02463-02482	1,477	1,045	1.41	0.37	No	432	186,624
396	PALM	N/O	HERNDON	2246	6536	02246-06536	2,933	3,138	0.93	0.25	Yes	-205	42,025
397	PALM	S/O	HERNDON	2246	5065	02246-05065	1,471	1,631	0.90	0.30	Yes	-160	25,600
398	PALM	N/O	MCKINLEY	2606	2621	02606-02621	1,167	984	1.19	0.60	Yes	183	33,489
399	PALM	S/O	SHAW	2984	5159	02984-05159	18	1,153	0.02	0.34	No	-1,135	1,288,225
400	PEACH	S/O	ASHLAN	2454	5014	02454-05014	992	1,187	0.84	0.34	Yes	-195	38,025
401	PEACH	N/O	BELMONT	2745	5609	02745-05609	1,808	2,324	0.78	0.27	Yes	-516	266,256
402	PEACH	S/O	CALIFORNIA	3321	3537	03321-03537	734	964	0.76	0.60	Yes	-230	52,900
403	PEACH	N/O	CHURCH	2901	3535	02901-03535	642	631	1.02	0.60	Yes	11	121
404	PEACH	S/O	OLIVE	2690	5700	02690-05700	1,324	1,437	0.92	0.31	Yes	-113	12,769
405	PEACH	N/O	TULARE	2793	3546	02793-03546	1,331	1,355	0.98	0.32	Yes	-24	576
406	PERRIN	W/O	MAPLE	4595	5515	04595-05515	650	771	0.84	0.60	Yes	-121	14,641
407	PERRIN	N/O	SHEPHERD	3309	3310	03309-03310	1,356	1,626	0.83	0.30	Yes	-270	72,900
408	POLK	S/O	HERNDON	3164	6625	03164-06625	463	849	0.55	0.60	Yes	-386	148,996
409	POLK	S/O	SHAW	2370	6295	02370-06295	1,199	275	4.36	0.60	No	924	853,776
410	R	N/O	HUNTINGTON	3034	5258	03034-05258	194	524	0.37	0.60	No	-330	108,900
411	R	N/O	INYO	3034	3155	03034-03155	78	483	0.16	0.60	No	-405	164,025
412	R	N/O	TULARE	3022	3031	03022-03031	114	582	0.20	0.60	No	-468	219,024
413	SAN JOSE	E/O	GATES	3397	4633	03397-04633	21	200	0.11	0.60	No	-179	32,041
414	SAN PABLO	N/O	DIVISADERO	4388	4389	04388-04389	128	84	1.52	0.60	Yes	44	1,936
415	SANTA FE	S/O	PALO ALTO	6058	12269	06058-12269	672	1,089	0.62	0.36	No	-417	173,889

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
416	SHAW	E/O	ANGUS	2137	2138	02137-02138	2,957	1,356	2.18	0.32	No	1,601	2,563,201
417	SHAW	W/O	ANGUS	2136	2137	02136-02137	3,227	3,164	1.02	0.25	Yes	63	3,969
418	SHAW	E/O	BLACKSTONE	2074	2135	02074-02135	3,816	3,486	1.09	0.24	Yes	330	108,900
419	SHAW	W/O	BRAWLEY	3117	3574	03117-03574	2,154	2,199	0.98	0.27	Yes	-45	2,025
420	SHAW	E/O	CEDAR	2140	2141	02140-02141	2,723	3,411	0.80	0.24	Yes	-688	473,344
421	SHAW	W/O	GOLDEN STATE	2371	2372	02371-02372	1,768	2,543	0.70	0.26	No	-775	600,625
422	SHAW	W/O	HAYES	3301	3398	03301-03398	609	1,004	0.61	0.37	No	-395	156,025
423	SHAW	W/O	LOLA	3399	12245	03399-12245	662	1,008	0.66	0.37	Yes	-346	119,716
424	SHAW	E/O	MARKS	2375	5426	02375-05426	2,584	2,939	0.88	0.26	Yes	-355	126,025
425	SHAW	W/O	VAN NESS	2377	4559	02377-04559	3,070	3,160	0.97	0.25	Yes	-90	8,100
426	SHAW	E/O	WEST	2378	2379	02378-02379	3,142	2,961	1.06	0.26	Yes	181	32,761
427	SHEPHERD	E/O	CEDAR	2222	3062	02222-03062	649	1,268	0.51	0.33	No	-619	383,161
428	SHEPHERD	E/O	FRIANT	2221	3059	02221-03059	1,681	2,316	0.73	0.27	No	-635	403,225
429	SHEPHERD	W/O	MAPLE	3062	3063	03062-03063	649	1,182	0.55	0.34	No	-533	284,089
430	SHIELDS	E/O	BLACKSTONE	2080	2526	02080-02526	3,039	2,481	1.22	0.26	Yes	558	311,364
431	SHIELDS	E/O	BLYTHE	2547	3346	02547-03346	286	418	0.68	0.60	Yes	-132	17,424
432	SHIELDS	E/O	CEDAR	2534	5709	02534-05709	1,998	1,553	1.29	0.31	Yes	445	198,025
433	SHIELDS	E/O	FOWLER	3142	5024	03142-05024	473	838	0.56	0.60	Yes	-365	133,225
434	SHIELDS	W/O	SUNNYSIDE	2542	9221	02542-09221	1,188	937	1.27	0.60	Yes	251	63,001
435	SHIELDS	E/O	TEMPERANCE	2544	5018	02544-05018	207	131	1.58	0.60	Yes	76	5,776
436	SHIELDS	E/O	VALENTINE	6171	6173	06171-06173	623	686	0.91	0.60	Yes	-63	3,969
437	SHIELDS	E/O	WEBER	2516	5104	02516-05104	359	393	0.91	0.60	Yes	-34	1,156
438	SHIELDS	E/O	WEST	2519	2520	02519-02520	1,365	826	1.65	0.60	No	539	290,521
439	SIERRA	E/O	BLACKSTONE	2277	12210	02277-12210	592	1,223	0.48	0.33	No	-631	398,161
440	SIERRA	E/O	CEDAR	5474	5481	05474-05481	2	139	0.01	0.60	No	-137	18,769
441	SIERRA	W/O	POLK	5631	6245	05631-06245	0	259	0.00	0.60	No	-259	67,081
442	SIERRA	E/O	WEST	2269	2270	02269-02270	88	605	0.15	0.60	No	-517	267,289
443	SIXTH	N/O	TULARE	2766	2785	02766-02785	67	189	0.35	0.60	No	-122	14,884
444	SPRUCE	W/O	BLYTHE	5039	6057	05039-06057	545	156	3.49	0.60	No	389	151,321
447	TEAGUE	E/O	MAPLE	3070	5469	03070-05469	276	877	0.31	0.60	No	-601	361,201
448	TEILMAN	N/O	NIELSEN	2754	2773	02754-02773	197	135	1.46	0.60	Yes	62	3,844
449	TEMPERANCE	S/O	BUTLER	5303	12198	05303-12198	653	545	1.20	0.60	Yes	108	11,664
450	TEMPERANCE	N/O	CLINTON	2544	8360	02544-08360	663	663	1.00	0.60	Yes	0	0
451	TEMPERANCE	N/O	SHIELDS	2544	8386	02544-08386	1,125	214	5.26	0.60	No	911	829,921
452	THORNE	N/O	KEARNEY	2177	2831	02177-02831	128	176	0.73	0.60	Yes	-48	2,304
453	TRINITY	N/O	STANISLAUS	8412	8428	08412-08428	183	83	2.20	0.60	No	100	10,000
456	TULARE	E/O	41	4408	4640	04408-04640	1,509	2,410	0.63	0.26	No	-901	811,801
457	TULARE	E/O	CEDAR	2787	2788	02787-02788	1,521	1,023	1.49	0.37	No	498	248,004
458	TULARE	E/O	CHESTNUT	2791	5315	02791-05315	747	578	1.29	0.60	Yes	169	28,561
459	TULARE	E/O	E	5419	5421	05419-05421	214	244	0.88	0.60	Yes	-30	900
460	TULARE	E/O	N	3510	4610	03510-04610	1,340	769	1.74	0.60	No	571	326,041
461	TULARE	W/O	R	5253	5254	05253-05254	1,827	1,111	1.64	0.35	No	716	512,656
462	TULARE	E/O	U	4409	4638	04409-04638	2,150	1,737	1.24	0.30	Yes	413	170,569
464	U	S/O	MARIPOSA	4409	5250	04409-05250	505	284	1.78	0.60	No	221	48,841
465	U	N/O	TULARE	4409	5250	04409-05250	505	430	1.17	0.60	Yes	75	5,625
466	VALENTINE	S/O	ASHLAN	3254	12176	03254-12176	249	231	1.08	0.60	Yes	18	324
467	VALENTINE	S/O	BARSTOW	3563	3566	03563-03566	30	245	0.12	0.60	No	-215	46,225
468	VALENTINE	S/O	CALIFORNIA	2862	5137	02862-05137	181	48	3.77	0.60	No	133	17,689
469	VALENTINE	S/O	CLINTON	2563	3442	02563-03442	39	151	0.26	0.60	No	-112	12,544
470	VALENTINE	S/O	MCKINLEY	2660	3467	02660-03467	7	106	0.07	0.60	No	-99	9,801
471	VAN NESS	N/O	41	4467	6186	04467-06186	935	476	1.96	0.60	No	459	210,681
472	VAN NESS	S/O	CALIFORNIA	2875	2882	02875-02882	182	192	0.95	0.60	Yes	-10	100
474	VAN NESS	N/O	DIVISADERO	2778	2762	02778-02762	483	201	2.40	0.60	No	282	79,524
475	VAN NESS	S/O	FRESNO	3026	3494	03026-03494	473	673	0.70	0.60	Yes	-200	40,000
476	VAN NESS	N/O	HERNDON	2243	5043	02243-05043	591	303	1.95	0.60	No	288	82,944
477	VAN NESS	S/O	MCKINLEY	2645	2624	02645-02624	180	542	0.33	0.60	No	-362	131,044
478	VAN NESS	N/O	SAN JOAQUIN	3010	8406	03010-08406	459	503	0.91	0.60	Yes	-44	1,936
479	VAN NESS	N/O	SHAW	2988	4852	02988-04852	335	406	0.83	0.60	Yes	-71	5,041
480	VAN NESS	N/O	SIERRA	2268	3182	02268-03182	756	414	1.83	0.60	No	342	116,964
481	VAN NESS	N/O	STANISLAUS	3010	4393	03010-04393	427	543	0.79	0.60	Yes	-116	13,456
482	VAN NESS	N/O	STANISLAUS	3010	4393	03010-04393	427	526	0.81	0.60	Yes	-99	9,801
483	VAN NESS	S/O	VENTURA	2104	3037	02104-03037	888	674	1.32	0.60	Yes	214	45,796
484	VENTURA	W/O	41	2184	5256	02184-05256	1,523	1,215	1.25	0.33	Yes	308	94,864
485	VENTURA	E/O	E	2106	5424	02106-05424	1,303	965	1.35	0.60	Yes	338	114,244
487	VENTURA	E/O	H	5223	8554	05223-08554	1,660	1,087	1.53	0.36	No	573	328,329
489	VENTURA	E/O	MAYOR	3500	5497	03500-05497	409	367	1.11	0.60	Yes	42	1,764
490	VENTURA	E/O	P	2100	5255	02100-05255	1,520	1,076	1.41	0.36	No	444	197,136
491	VENTURA	E/O	VAN NESS	2103	2104	02103-02104	1,046	930	1.12	0.60	Yes	116	13,456
492	WALNUT	S/O	CALIFORNIA	3586	6751	03586-06751	160	275	0.58	0.60	Yes	-115	13,225
493	WALNUT	S/O	CHURCH	2886	5166	02886-05166	81	111	0.73	0.60	Yes	-30	900
495	WALNUT	S/O	GROVE	2915	5166	02915-05166	49	110	0.45	0.60	Yes	-61	3,721
497	WALNUT	N/O	JENSEN	2915	5166	02915-05166	49	174	0.28	0.60	No	-125	15,625
498	WALNUT	N/O	NORTH	2945	3027	02945-03027	27	16	1.69	0.60	No	11	121
500	WEBER	N/O	OLIVE	2667	2698	02667-02698	886	806	1.10	0.60	Yes	80	6,400
501	WEBER	E/O	VALENTINE	3268	5111	03268-05111	1,010	918	1.10	0.60	Yes	92	8,464
502	WEST	N/O	ASHLAN	2438	3214	02438-03214	1,933	1,418	1.36	0.31	No	515	265,225
504	WEST	S/O	CALIFORNIA	2865	3029	02865-03029	134	82	1.63	0.60	No	52	2,704
505	WEST	N/O	CLINTON	2569	3260	02569-03260	1,671	957	1.75	0.60	No	714	509,796
506	WEST	S/O	DAKOTA	2478	2499	02478-02499	1,495	1,388	1.08	0.32	Yes	107	11,449
507	WEST	N/O	GETTYSBURG	2401	3123	02401-03123	1,771	1,714	1.03	0.30	Yes	57	3,249

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes

ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
508	WEST	S/O	HERNDON	2244	3145	02244-03145	620	1,079	0.57	0.36	No	-459	210,681
509	WEST	S/O	KEARNEY	2095	2829	02095-02829	81	148	0.55	0.60	Yes	-67	4,489
510	WEST	N/O	MCKINLEY	2596	2617	02596-02617	1,387	981	1.41	0.60	Yes	406	164,836
511	WEST	N/O	SANTA FE	2401	12298	02401-12298	1,766	1,418	1.25	0.31	Yes	348	121,104
512	WEST	N/O	SHAW	4534	2010	04534-02010	3,451	1,481	2.33	0.31	No	1,970	3,880,900
513	WEST	N/O	SIERRA	2269	3145	02269-03145	680	944	0.72	0.60	Yes	-264	69,696
514	WEST	S/O	SIERRA	2269	3187	02269-03187	742	1,068	0.69	0.36	Yes	-326	106,276
515	WHITES BRIDGE	E/O	WEST	2176	5754	02176-05754	131	240	0.55	0.60	Yes	-109	11,881
516	WILLOW	S/O	CALIFORNIA	3534	3536	03534-03536	238	286	0.83	0.60	Yes	-48	2,304
517	WILLOW	S/O	HERNDON	2254	5511	02254-05511	2,298	2,240	1.03	0.27	Yes	58	3,364
518	WILLOW	N/O	SPRUCE	3100	3111	03100-03111	1,572	1,963	0.80	0.28	Yes	-391	152,881
519	WILLOW	N/O	TEAGUE	3072	5468	03072-05468	848	1,687	0.50	0.30	No	-839	703,921
520	WISHON	N/O	CLINTON	4352	4354	04352-04354	174	624	0.28	0.60	No	-450	202,500
521	WISHON	N/O	FLORADORA	4355	4356	04355-04356	207	1,074	0.19	0.36	No	-867	751,689
522	ELM AVE	S/O	CALIFORNIA	2120	6090	02120-06090	325	466	0.70	0.60	Yes	-141	19,881
						Subtotal	**463,732**	**476,825**			**Model/Count Ratio =**	**0.97**	Targets
											Percent Within Target Deviation =	**60%**	>75%
											Percent Root Mean Square Error =	**46%**	<40%
											Correlation Coefficient =	**0.88**	>0.88

ATTACHMENT B

DMEIR Table 5.14-2
Roadway Functional Class and Peak Hour Level-of-Service Thresholds

It should be noted that this traditional methodology used to analyze the roadway system does not consider the potential impact on walking, bicycling, and transit. Pedestrians, bicyclists, and transit riders are all users of the roadway system but may not be fully recognized in the traffic operations analysis and the calculation of LOS. The LOS thresholds in Table 5.14-2 are based on driver's comfort and convenience. Identifying the need for roadway improvements based on the resulting roadway LOS can have unintended impacts to other modes such as increasing the walking time for pedestrians. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users.

Table 5.14-2: Roadway Functional Class and Peak Hour Level-of-Service Thresholds

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Threshold				
			A	B	C	D	E
Freeway	N/A[1]	4	2,720	4,460	6,630	7,720	8,630
		3+Aux[2]	2,360	3,860	5,640	6,730	7,530
		3	2,000	3,270	4,660	5,740	6,430
		2+Aux	1,650	2,700	3,850	4,760	5,340
		2	1,300	2,130	3,050	3,790	4,260
State Expressway	Divided	6	2,410	3,960	5,730	7,450	8,450
		4	1,610	2,650	3,810	4,960	5,630
		2	810	1,340	1,890	2,470	2,810
City Expressway	Raised Median	6			1,860	6,170	6,520
		5			1,520	5,110	5,430
		4			1,180	4,050	4,340
		2			520	1,910	2,160
Super Arterial	Raised Median	6				4,910	6,240
		5				4,040	5,195
		4				3,170	4,150
Arterial	Raised Median	8			2,120	7,070	7,490
		6			1,560	5,270	5,610
		5			1,280	4,370	4,670
		4			1,000	3,470	3,730
		3			720	2,555	2,795
		2			440	1,640	1,860
	TWLTL[3]	4			940	3,290	3,550
		2			420	1,550	1,760

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Threshold				
			A	B	C	D	E
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
Collector	TWLTL	4			940	3,290	3,550
		2			420	1,550	1,760
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
One-Way	Undivided	3		1,960	2,240	2,430	2,610
		2		1,250	1,490	1,620	1,740
		1		550	740	800	870
Rural State Highway	Undivided	2	310	570	1,020	1,730	2,470
Rural Arterial	Divided	4			1,950	3,580	3,780
	Undivided	2			570	1,230	1,310
Rural Collector/Local	Undivided	2			700	930	1,000

Notes:
[1] N/A - Not applicable for operational class
[2] Aux - Auxiliary Lane
[3] TWLTL – Two-way Left-turn Lane
- LOS is not achievable because of type of facility.
Source: Fehr & Peers 2012.

Exhibit 5.14-2 shows existing AM peak hour traffic volumes (two-way total) and LOS (See Appendix H-3 for detail) and Exhibit 5.14-3 shows existing PM peak hour traffic volumes (two-way total) and LOS (See Appendix H-4 for detail). Exhibit 5.14-4 illustrates the planned roadway number of lanes.

Most roadways operate at LOS D or better during the AM and PM peak hours, except for the following, which operate at LOS E and F:

City of Fresno

- Willow Avenue – Copper to Behymer Avenue (LOS E during the PM peak hour)
- Willow Avenue – Behymer Avenue to Shepherd Avenue (LOS F during the PM peak hour)
- Golden State Boulevard – Shaw Avenue to Swift Avenue (LOS F during the PM peak hour)
- Golden State Boulevard – Motel Drive to Ashlan Avenue (LOS E during the PM peak hour)
- Nees Avenue – Jordan Avenue to Paula Avenue (LOS E during the PM peak hour)
- Cornelia Avenue – Ashlan Avenue to Griffith Way (LOS E during the PM peak hour)
- Marks Avenue – Dakota Avenue to Weber Avenue (LOS E during the PM peak hour)
- Clinton Avenue – Valentine Avenue to Marks Avenue (LOS F during the PM peak hour)

THIS PAGE INTENTIONALLY LEFT BLANK

Letter BB: MRO Engineers, Neal K. Liddicoat, September 10, 2014

Response to Comment BB-1

The transportation impact analysis for the General Plan Update Draft Master MEIR used a modified version of the most recently adopted Fresno COG regional travel demand forecasting (TDF) model (released in 2010) that was available at commencement of the transportation analysis. This version of the Fresno COG model was used to develop the 2011 Regional Transportation Plan (Adopted July 29, 2010) for Fresno County. As such, the model conforms to all federal and state requirements for transportation, air quality, and greenhouse gas (GHG) modeling and has been accepted by FHWA, EPA, Caltrans, and ARB for these purposes. The model development is documented in the *Fresno County Traffic Model Calibration/Validation Report and Model Documentation* (Fresno COG, September 20, 2001)

The base year version of the model was modified and calibrated within the study area to more accurately reflect existing conditions. Static validation and sensitivity tests, consistent with Caltrans' *Travel Forecasting Guidelines* (Caltrans, 1992) and FHWA's *Model Validation and Reasonableness Checking Manual* (FHWA, 1997), were completed to validate the TDF model for the study area. Static validation compares base year traffic model estimates to existing traffic counts while sensitivity tests evaluate how a traffic model responds when model inputs are changed.

Static validation includes statistical comparisons to evaluate the effectiveness of calibration adjustments. As shown below, the study area calibration conducted for the project improved model performance compared to the unmodified (i.e., off-the-shelf) version of the Fresno COG model.

Measure	Off-the-Shelf Model	Modified Model	Target
Model to Count Ratio	1.06	0.97	
Percent Within Target Deviation	54%	60%	>75%
Percent Root Mean Square Error	53%	46%	<40%
Correlation Coefficient	0.84	0.88	>0.88

Having a model match existing conditions is not desirable, since calibration adjustments made to force a model to produce a desired output may limit a models' effectiveness in evaluating changes due to land use and transportation networking changes.

Since the model is being used to evaluate changes due to implementation of the General Plan Update, sensitivity tests were conducted to confirm that the model (i.e., after calibration adjustment) responded in the correct direction and magnitude when in changes to the model's land use and roadway network inputs were made. Sensitivity tests included adding roadway new roadway network connections, changing roadway capacity, changing residential land use inputs, and changing employment inputs. The following illustrates the results of adding a roadway link.

Sensitivity Test	Expected Change	Actual Change
Add a Link	• Traffic will redistribute and use the new link • Volume on parallel links will decrease • Total flow across screenline (in direction of travel served by roadway) will increase due to increased capacity	• Added Van Ness Boulevard/Christmas Tree Lane (Weldon Avenue to south of Shaw Avenue). Trips redistributed for adjacent parallel roadways to added roadway. Volume on added roadway was comparable to (but slightly more than) volume reduction on adjacent parallel roadways that continue north of Shaw Avenue (Palm Avenue and Maroa Avenue). Total volume on parallel north/south roadways (West Avenue to Blackstone Avenue) increased from 65,100 to 65,200 vehicles per day.

The sensitivity testing demonstrated that the model performed acceptably when making network and land use changes.

Consistent with standard model application and forecasting practice, traffic model volume forecasts were adjusted to account for model error. The difference method, which adjusts raw model volume forecasts by adding the forecasted incremental growth from the TDF model to the existing traffic counts, was applied.

Response to Comment BB-2
For the General Plan Update, work on the transportation impact analysis commencement in early January 2012. At that time, the City of Fresno had not adopted the use of the 2010 HCM and transportation impact analysis was still being conducted using the 2000 HCM. Although the 2010 HCM was released in April 2011, releases of key modules of the companion software HCS 2010 (McTrans) that implements HCM methods (i.e., needed for the General Plan Update) were not released until early 2012.

Although the General Plan Update relied on methodology from the 2000 HCM, much of the planning level capacity analysis did not change between the two manuals such that the conclusions or outcomes of the analysis would change. Further, both versions of the HCM provide guidance on different levels or analysis that are acceptable depending on the nature and type of analysis. Chapter 2 of the 2010 HCM outlines the following:

> Any given HCM application can be analyzes at different levels of detail, depending on the purpose of the analysis and the amount of information available…

The HCM continues to describe three primary levels of analysis, operational analysis, design analysis, and planning analysis. Operational analysis is generally focused on current or near-term conditions involving detailed inputs to HCM procedures. Planning analysis is generally focused on future long-range conditions. The General Plan Update is focused on identifying roadway functional class and number of through travel lanes (i.e. two, four, or six lanes). As such, a planning methodology is appropriate. In contrast, operational analysis as governed by the City's TIS guidelines is appropriate for individual development projects.

Chapter 6 of the 2010 HCM provide additional guidance for the application of HCM-based tools for planning applications:

> It is well recognized that the models of the Highway Capacity Manual (HCM) are part of a continuum available to the analyst for highway capacity and quality-of-service analysis. For example, transportation planners and engineers have different needs in scope and level of detail. Planners focus on network performance in broad, general terms to understand supply-demand interactions between network capacity and flows. Of primary interest are the interactions of land uses and the transportation system…

Furthermore, the 2010 HCM provides guidance on the use of generalized service volume tables, which were used for the General Plan Update:

> A service volume table provides an analyst with an estimate of the maximum number of vehicles that a system element can carry at a given LOS. The use of a service volume table is most appropriate in certain planning applications in which evaluation of every segment or node within a study area is not feasible. Examples of these applications are city, county, or statewide planning studies where the size of the study area makes a capacity or LOS analysis of every system element infeasible…

As indicated above, although the 2010 HCM was released in April 2011, releases of key modules of the companion software HCS 2010 (from McTrans) that implements HCM methods (i.e., needed for the General Plan Update) were not released until early 2012, this includes the urban streets module.

However, the basic freeway segment module, which was available, was evaluate and produced similar results to the 2000 HCM. The 2010 HCM did not substantially change this method and the basic capacity inputs are the same as the 2000 HCM, including the following:

- Capacity of a two-lane highway – 1,700 passenger cars per hour
- Capacity of a basic freeway segment – 2,400 passenger cars per hour per lane
- Base saturation flow rate – 1,900 passenger cars per hour per lane

Response to Comment BB-3
For the General Plan Update, work on the transportation impact analysis commencement in early January 2012. Consequently, the traffic count data used in the analysis is representative of 2012 conditions and conditions and the time the NOP for the Draft Master EIR was released.

Response to Comment BB-4
As outlined in Response to Comment BB-2, the analysis for the General Plan Update follows the 2000 HCM recommendations and guidance for planning level analysis. This analysis relied on two primary modules (basic freeway segment and urban streets) to develop the service volume tables used for the analysis. Both modules account for the presence of heavy vehicles in the traffic stream in the following methodology. The basic freeway segment analysis includes a direct input of heavy vehicles (i.e., trucks, busses, and recreational vehicles). For basic freeway segments, a heavy vehicle

percentage of 4 percent was applied for the peak hour analysis. The planning level method for urban streets does not include a specific input for heavy vehicles. However, the effect of heavy vehicle on these facilities (i.e., arterial and collector roadways) was accounted for by adjusting the base saturation flow rate, which is a measure of the maximum rate of flow for a traffic lane, as measured at the stop line during the green indication at a traffic signal. The base saturation flow rate, which represents the saturation flow rate for a 12-foot traffic lane and no heavy vehicles, was adjusted from 1,900 vehicles per hour per lane for arterial and collector roadway types. Lastly, the analysis for the General Plan Update was conducted for the morning (AM) and evening (PM) peak hour conditions, which typically have lower heavy vehicle use (compared to other times of the day), since trucks typically avoid peak commute times. Furthermore, Chapter 4: Mobility and Transportation includes Policy MT-2-i that requires transportation impact studies for development projects. Based on the criteria outlined in Policy MT-2-I, a detailed operations-level analysis, consistent with the City's transportation impact study guidelines, would be conducted using project-specific information to assess project-level impacts to the transportation system.

Response to Comment BB-5
As discussed in Impact TRANS-4 in the Draft Master EIR, a review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or discrepancies related to hazards associated with design features and incompatible uses. Changes in existing conditions related to safety are address by the General Plan Update's policies and City requirements for projects to conform to applicable federal, state, and local design standards when modifying or expanding the transportation network.

Key General Plan Update objectives and policies that address safety include the following:

- Objective MT-1. Create and maintain a transportation system that is safe, efficient, provides access in an equitable manner, and optimizes travel by all modes.
- Policy MT-1-h. Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specification reflect the Complete Street concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.
- Policy MT-1-i. Local Street Standards. Establish and implement local roadway standards addressing characteristics such as alignment, width, continuity and traffic calming, to provide efficient neighborhood circulation: to allow convenient access by resident, visitors, and public service and safety providers; and to promote neighborhood integrity and desired quality of life by limiting intrusive pass-through traffic.
- Policy MT-1-j. Transportation Improvements Consistent with Community Character. Prioritize transportation improvements that are consistent with the character of surrounding neighborhoods and supportive of safe, functional and Complete Neighborhoods: minimize negative impacts upon sensitive land uses such as residences, hospitals, schools, natural habitats, open space areas, and historic resources. In implementing this policy, the City will design improvements to
  - Facilitate provision of multi-modal transportation opportunities

  - Provide added safety, including appropriate traffic calming measures
  - Promote achievement of air quality standards
  - Provide capacity in a cost effective manner
  - Create improved and equitable access with increased efficiency and connectivity

- Policy MT-11-b. Railroad Improvements. Continue to participate in and advocate for collaborative efforts to improve railroad transportation facilities and reduce conflicts with the street system, including relocation and/or consolidation of the BNSF and UP mainline track facilities.

- Policy MT-11-c. Truck Route Designations. Continue to plan and designate truck routes within the Metropolitan Area to facilitate access to and from goods production and processing areas while minimizing conflicts with other transportation priorities.

- Policy MT-11-d. Appropriate Truck Route Roadway Design. Incorporate provisions for trucks in design of routes designated for turn movement. Ensure that truck routes meet federal standards for intersections, pavement, and turning movements.

- Policy MT-11-e. Railroad Crossing Improvements. Continue to improve and maintain the condition and safety of existing railroad crossings by upgrading surface conditions and installing signs and signals where warranted.

Response to Comment BB-6
The commenter asserts that the safety analysis presented in the traffic analysis was deficient. Please see Response to Comment BB-5.

Response to Comment BB-7
Please refer to Impact TRANS-4 and Impact TRANS-6 in the Draft Master EIR. As discussed in Response to Comment BB-5, a review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or discrepancies related to hazards associated with design features and incompatible uses. Similarly, in Impact TRANS-6 in the Draft Master EIR, a review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities of the performance or safety of those facilities. The discussion of Impact TRANS-6 does contain a qualitative statement about the performance of transit, bicycle, and pedestrian facilities. Notably, demand will increase that would require improvement and expansion of associated facilities and services. The discussion further elaborates on how demand for these services and facilities will change under the General Plan Update due to its focus on more compact and concentrated growth. Chapter 4: Mobility and Transportation of the General Plan includes Policy MT-2-h that requires the update of the City's traffic impact study guidelines to address all modes of transportation and Complete Streets concepts consistent with the General Plan to accommodate planned growth. This process will involve a comprehensive review of all relevant methods (including the HCM methods) for evaluating the transportation system, including automobile, bicycle, pedestrian, and transit operations.

Response to Comment BB-8
Page 5.14-28 of the Draft Master EIR describes the model inputs. As discussed in Response to Comment BB-1, the transportation impact analysis for the General Plan Update Draft Master EIR used a modified version of the most recently adopted Fresno COG regional travel demand forecasting (TDF) model (released in 2010) that was available at commencement of the transportation analysis. This version of the Fresno COG model was used to develop the 2011 Regional Transportation Plan (Adopted July 29, 2010) for Fresno County. As such, the model conforms to all federal and state requirements for transportation, air quality, and greenhouse gas (GHG) modeling and has been accepted by FHWA, EPA, Caltrans, and ARB for these purposes. The model development is documented in the *Fresno County Traffic Model Calibration/Validation Report and Model Documentation* (Fresno COG, September 20, 2001).

It should be noted that SRB 743 has not been implemented and that the preliminary guidelines from OPR regarding SB 743 that have been released recognize lead agency discretion to set thresholds. The projected VMT growth is based on key inputs from the plan including land uses, socioeconomic conditions, and the transportation network. As such, VMT growth is an outcome of the plan and is consistent with the expected levels of population and employment growth and the desired changes to the transportation network.

Response to Comment BB-9
A review of the Federal Railroad Administration (FRA) database indicates that all of the existing railroad crossings are adequate relative to current design standards. As discussed in Impact TRANS-4 in the Draft Master EIR, a review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or discrepancies related to hazards associated with design features and incompatible uses. Changes in existing conditions related to safety are address by the General Plan Update's policies and City requirements for projects to conform to applicable federal, state, and local design standards when modifying or expanding the transportation network.

Key General Plan Update objectives and policies that address railroad safety include the following:

- Objective MT-1. Create and maintain a transportation system that is safe, efficient, provides access in an equitable manner, and optimizes travel by all modes.
- Policy MT-1-h. Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specification reflect the Complete Street concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.
- Policy MT-11-b. Railroad Improvements. Continue to participate in and advocate for collaborative efforts to improve railroad transportation facilities and reduce conflicts with the street system, including relocation and/or consolidation of the BNSF and UP mainline track facilities.
- Policy MT-11-c. Truck Route Designations. Continue to plan and designate truck routes within the Metropolitan Area to facilitate access to and from goods production and processing areas while minimizing conflicts with other transportation priorities.

- Policy MT-11-d. Appropriate Truck Route Roadway Design. Incorporate provisions for trucks in design of routes designated for turn movement. Ensure that truck routes meet federal standards for intersections, pavement, and turning movements.
- Policy MT-11-e. Railroad Crossing Improvements. Continue to improve and maintain the condition and safety of existing railroad crossings by upgrading surface conditions and installing signs and signals where warranted.

Also note, the in addition to the key policy of the General Plan Update outlined above, the implementation of high speed rail may result in the potential elimination of at-grade crossings along the UP rail corridor through the City.

Response to Comment BB-10
Please refer to Impact TRANS-5 in the Draft Master EIR. A policy evaluation is the appropriate method for evaluating potential impacts of the General Plan Update on emergency service, since the policy will ensure that public facilities are available as development occurs. The City of Fresno has multiple methods, beyond just expansion of the roadway network, for providing adequate emergency access and response times. Examples include the location of staffing of emergency response units throughout the City (i.e., fire stations, police stations, emergency care, etc.) and encouraging infill development and development within the existing city limits, consistent with Policy LU-1-a, which will place new population closer to existing services.

THIS PAGE INTENTIONALLY LEFT BLANK

Pacific Gas and Electric Company
Environmental Management
650 "O" Street, Mail Bag 23
Fresno, CA 93760-0001

October 8, 2014

Jennifer K Clark, Director
Reg: DMEIR
City of Fresno, Development and Resource Mgt. Dept.
2600 Fresno Street, Room 3065
Fresno, CA 93721

Re: Draft General Plan and Draft Master EIR

Dear Jennifer:

Thank you for the opportunity to review the Draft General Pland and Master EIR for the City of Fresno. PG&E has the following comments to offer.

PG&E owns and operates gas and electric facilities located within and in the sphere of influence of the City of Fresno. To promote the safe and reliable maintenance and operation of utility facilities, the California Public Utilities Commission (CPUC) has mandated specific clearance requirements between utility facilities and surrounding objects or construction activities. To ensure compliance with these standards, project proponents should coordinate with PG&E early in the development of their project plans. Any proposed development plans should provide for unrestricted utility access, and prevent easement encroachments that might impair the safe and reliable maintenance and operation of PG&E's facilities.

CC-1

Developers will be responsible for the costs associated with the relocation of existing PG&E facilities to accommodate their proposed development. Because facilities relocations require long lead times and are not always feasible, developers should be encouraged to consult with PG&E as early in their planning stages as possible.

Relocations of PG&E's electric transmission and substation facilities (50,000 volts and above) may also require formal approval from the California Public Utilities Commission. If required, this approval process may take as long as three years to complete. Proponents with development plans that may affect such electric transmission facilities should be referred to PG&E for additional information and assistance in the development of their project schedules.

Please note that continued development consistent with your General Plan will have a cumulative impact on PG&E's gas and electric systems and may require on-site and off-site additions to the facilities that supply these services. Because utility facilities are operated as an integrated system, the presence of an existing gas or electric transmission or distribution facility does not necessarily mean the facility has capacity to connect new loads.

PG&E recommends that environmental documents for proposed development projects include adequate evaluation of cumulative impacts to utility systems, the utility facilities needed to serve those developments, and any potential environmental issues associated with extending utility service to the proposed project. This will assure the project's compliance with CEQA and reduce potential delays to the project schedule.

We have the following comments regarding possible future facilities PG&E is planning for at this time:

- A new distribution substation is currently being constructed in the vicinity of Shepherd and Sunnyside Avenues, and is scheduled to be in operation by June 1, 2015, and is expected to meet the capacity needs of northern Fresno. PG&E has long-term plans that could include a new substation in west Fresno and in southeast Fresno. As future growth continues west of Highway 99, it is possible that a new substation will be needed at approximately the vicinity of Ashlan Avenue and Hayes Avenue. It is also possible that a new substation will be needed at approximately the vicinity of East Church Avenue and South Armstrong Avenue.

- PG&E maintains short term and long term plans for anticipated growth in any given area based upon the annual load projection for that area. This is an internal plan which cannot be shared for security reasons. PG&E does anticipate the need to build new substations in the future. Approximate locations for new substations can be shared and should be included in the city's General Plan.

CC-1
CONT

- PG&E is engaged in several long term initiatives to replace obsolete gas facilities. These initiatives are focused but not limited to a long term process to replace older plastic pipe in sections of the City of Fresno that were developed in the 1970's. We also have ongoing projects to replace older steel pipe. Replacement of these facilities is key to our efforts to improve public safety and improve our service reliability in the City of Fresno.

PG&E remains committed to working with the City of Fresno to provide timely, reliable and cost effective gas and electric service within the City. Please contact me at (559) 263-5237 if you have any questions regarding our comments. We would also appreciate being copied on future correspondence regarding this subject as this plan is developed.

The California Constitution vests in the California Public Utilities Commission (CPUC) exclusive power and sole authority with respect to the regulation of privately owned or investor owned public utilities such as PG&E. This exclusive power extends to all aspects

of the location, design, construction, maintenance and operation of public utility facilities. Nevertheless, the CPUC has provisions for regulated utilities to work closely with local governments and give due consideration to their concerns. PG&E must balance our commitment to provide due consideration to local concerns with our obligation to provide the public with a safe, reliable, cost-effective energy supply in compliance with the rules and tariffs of the CPUC.

CC-1
CONT

Sincerely,

Andrew Smith
Sr. Land Planner

THIS PAGE INTENTIONALLY LEFT BLANK

Letter CC: Pacific Gas and Electric Company, Andrew Smith, October 8, 2014

Response to Comment CC-1

The City acknowledges that the commenter encourages project proponents to coordinate with Pacific Gas and Electric Company (PG&E) as early as possible in order to ensure compliance with PG&E and California Public Utilities Commission (CPUC) requirements.

The commenter notes that future development may result in the need for on-site and off-site improvements to PG&E facilities to accommodate the development. As future development is proposed, PG&E would need to determine if PG&E facilities are required during the project development review process. The City's early consultation process for planning requires that a copy of each application for new and materially expanded development projects be provided to PG&E for comment and proposed conditions of approval.

This City's early consultation process for evaluating project-specific power (and natural gas) needs can assure that individual projects will be accommodated. It also furnishes PG&E with data that the utility can use to track cumulative system impacts via its in-house capacity analysis tools. Since PG&E's infrastructure and operational capacity are proprietary data, the City could not do cumulative impact assessment on PG&E facilities, but can only continue to assist PG&E with information on potential new demand and consultation on broadscale projects such as General Plan updates and specific plan proposals.

Currently, power substations are classified uses in the City's Zoning Ordinance and may also be proposed in any zone district as public facilities which may be approved through the Conditional Use Permit process. Similar language is anticipated to be carried forward as the City updates its Development Code.

THIS PAGE INTENTIONALLY LEFT BLANK

Law Offices of
Richard L. Harriman
1078 Via Verona Drive
Chico, CA 95973-1031
Telephone: (530) 343-1386
Facsimile: (530) 343-1155
Email: harrimanlaw1@sbcglobal.net

August 18, 2014

VIA FACSIMILE TRANSMISSION
[Fax No. (559) 488-1005]

Jennifer Clark
Department of Planning and Community Development
c/o City Clerk
City of Fresno
2600 Fresno Street
Fresno, California 93721

Re: City of Fresno General Plan Update
Draft Environmental Impact Report (DEIR)
Comments re General Plan Update DEIR
Request for Special Written Notice of the Availability of the Final EIR

Gentlepersons:

Because of my long-term interest in land use planning and protection of environmental resources in the City of Fresno and the San Joaquin Valley, I have reviewed the proposed General Plan Update (GPU) and the Draft Environmental Impact Report (DEIR) dated July 22, 2014 for the proposed GPU, and other public documents for this Project.

The analysis of the Energy Alternatives and Mitigation Measures set forth in Section 15.6 of the DEIR, pp. 15.6-1 through 15.6-14 is inadequate, because of the lack of an adequate alternatives analysis of the renewable energy alternatives and because the following Policies are which are too vague and non-specific to be adequate.

DD-1

Policy RC-8-g. Revolving Energy Fund. Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Policy RC-8-h. Solar Assistance. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations

meeting specified standards, which may include maximum size (in kV) of units that can be so approved.
Policy RC-8-i. Renewable Target. Adopt and implement a program to increase the use of renewable energy to meet a given percentage of the City's peak electrical load within a given time frame

Policy RC-8-j. Alternative Fuel Network. Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

The foregoing policies are too vague as to the time frame within which they will be developed and achieved. There is no quantification of the energy conservation or reduction that will result from the foregoing Policies. Finally, since there are no mitigation measures or mitigation monitoring program identified in Section 15.6, the foregoing Policies inadequately address the cumulative impacts from the reliance on fossil fuel energy sources.

DD-1 CONT

Therefore, the GPU DEIR should be revised and amended to include the following mitigation measure to conserve and reduce the use of fossil fuel energy during the build-out of the General Plan:

:All new industrial development, business parks, retail-commercial development, multi-family and single-family development and public buildings, including without limitation, public and private schools and administrative buildings, and other government buildings shall be required to include photo-voltaic and/or solar-thermal energy on all buildings and occupied structures sufficient to provide enough electric energy to serve these buildings during the months of March through October of each year."

For the foregoing reasons, this commentator submits that the proposed GPU and DEIR for the Fresno General Plan Update should be revised, amended, and re-circulated before final adoption and certification and submission to the Fresno County Local Agency Formation Commission for final approval. Please provide special written notice of the availability to the public of the Responses to Comments and the Final EIR at the address on the letterhead above.

Thank you for the opportunity to provide comments on these documents.

Respectfully submitted,

Richard L. Harriman

RICHARD L. HARRIMAN

cc: City Councilmembers
Clients

Letter DD: Richard Harriman, August 18, 2014

Response to Comment DD-1

The commenter asserts that the analysis contained in Section 5.16 of the Draft Master EIR is deficient as it lacks an adequate analysis of renewable energy alternatives and because certain General Plan policies are too vague. Section 5.16.5 (Impact EC-1) provides an estimate of the potential electrical demand at General Plan buildout, and indicates that there would be an incremental increase to the demand for electricity. Specific General Plan Update objectives and policies are identified, which are intended to reduce the potential use of energy.

The EIR concludes that the implementation of these objectives and policies would not result in a significant impact, and therefore no mitigation measures are required. As no mitigation measures in the Draft Master EIR are identified related to this issue, the commenter's assertion that the mitigation measures set forth in this section are inadequate does not accurately reflect the analysis provided in Section 5.16 of the Draft Master EIR.

The commenter lists several General Plan Update policies that the commenter regards as "too vague as to the time frame within which they will be developed to achieve." The policies identified by the commenter are regarded as project features, and are therefore a component of the overall project that the qualitative analysis provided in the Draft Master EIR relies on. As these policies are proposed project features (as opposed to mitigation measures), there is no requirement under CEQA to identify the time frame in which they will be developed or achieved.

The commenter requests the revision, amendment and recirculation of the Draft Master EIR to include a mitigation measure that would require photo-voltaic and/or solar thermal energy facilities on all buildings within the General Plan Area. As no significant impacts were identified in the analysis in Section 5.16 related to this issue, the inclusion of a new mitigation measure is not required.

Furthermore, analyses prepared for residential and commercial projects by the "Sustainable Fresno" energy audit team demonstrated that solar energy may not be the most energy or financially effective means of reducing net power demand. However, should solar energy become effective and a feasible means of reducing net energy demand in the future, the 2013 California Building, Mechanical, Energy, and Green Code has mandated that all residential roofs be constructed to be "solar ready" so that solar panels could be installed quickly, without need for structural modifications.

Finally, the commenter indicates that General Plan Update and Draft Master EIR should be submitted to the Fresno County Local Agency Formation Commission (LAFCO) for final approval. The General Plan Update does not propose to revise the City's existing Sphere of Influence, therefore approval by LAFCO is not required.

THIS PAGE INTENTIONALLY LEFT BLANK

From: Robert Merrill [geolbob@yahoo.com]
Sent: Thursday, October 09, 2014 4:38 PM
To: General Plan
Subject: General Plan Update comments

From: Robert D. Merrill, PhD, email: geolbob@yahoo.com
Subject: Comments on Draft General Plan Update
To: newplan@fresno.gov

Date: October 9, 2014
To: Jennifer K. Clark, ACIP, Director, Development and Resource Management Department
From: Robert D. Merrill PhD, 8540 N. Colfax, Fresno, CA 93720
Re: Comments on City of Fresno Draft General Plan

I am commenting on the City of Fresno Draft General Plan Update as a resident and taxpayer in the city of Fresno for the last 44 years and as a professional in the scientific community with knowledge in geology, water, and land use.

Comments on City of Fresno General Plan Update

Submitted by Robert D. Merrill, PhD., October 9, 2014

1. The Economic Development and Fiscal Sustainability section of the General Plan Chapter 2 section ED-3-f needs an additional note involving a historical review of how Fresno's urban sprawl has impacted its tax base, as developers changed the city's land use zoning development code due to City Council approval of these changes, which violated past General Plans. What is needed is for City Planners to explain to the public the financial impact when zoning change requests by developers are made to the City Council. Unless City Planners are able to clearly present the fiscal impacts of developer requests to its citizens there is little chance of this General Plan improving the city's tax base and moving in a more positive direction.

   a. Presentations to the city Council and the public must make clear this connection, especially when the Development Code and Zoning regulations are presented to the City Council. The City spent funds tobring Joe Minicozzi to town to help us understand this issue, now it is up to City staff to use his analysis.

   b. The City also needs to argue before the Fresno County Board of Supervisors for protection from urban/suburban sprawl on County land in areas outside the City's Sphere of Influence. EE-1

2. The General Plan needs to strongly explain the connection between land use, urban/suburban sprawl, transportation, and resultant air quality. The City needs to also engage with the County of Fresno on this issue.

   a. Holding to the General Plan's Complete Neighborhoods Policy and infill development will enhance these connections. Describe that connection more directly in the General Plan.

   b. Add a section to chapter 10, Healthy Communities that gives a range of estimates for changes in air quality and associated increased or decreased asthma rates, and other specific health impacts.

3. Consider adding a section to the General Plan's chapter 7 regarding the connection between climate change and water resources, as well as their impact on per capita water use under different population growth projections. Remember that water supply is a finite resource and that climate change is most likely going to reduce the Sierra Nevada snowpack reservoir, plus climate change models include more erratic storm patterns (floods and droughts). So the City's surface water contracts may not be as guaranteed as current City staff assumes.

4. Perhaps Chapter 8 Historical and cultural Resources ought to include a section or a reference to an appendix that describes previous General Plans and evaluates their success or lack thereof. It's important to give context to how the City got to its present state, and this could also help citizen readers understand the need for the new directions.

5. Mathematical errors in General Plan Chapter 2 page 7 Table 2-4 Economic Sector Comparisons.

Comments on the MEIR

1. I did not find any discussion of soil hardpans in the Geologic Hazards section of the MEIR. While not a hazard generally, soil types with hardpans do present problems throughout Fresno for landscaping with regard to slow infiltration and in some areas these soils play a role in flooding through their slow infiltration or blockage of infiltration. EE-2
Sincerely,

Robert D. Merrill

THIS PAGE INTENTIONALLY LEFT BLANK

Letter EE: Robert Merrill, October 9, 2014

Response to Comment EE-1

This comment states that a detailed historical review of sprawl and the City's tax base should be provided in the General Plan. These comments are provided on the General Plan Update and not on the contents of the Draft Master EIR. Therefore, no further response is required (CEQA Guidelines, Section 15088). It should also be noted that the General Plan is not a fiscal plan, and the need to coordinate land use with fiscal sustainability is reiterated several times in the General Plan.

This comment further states that an Air Impact Assessment (AIA) application (required under SJVAPCD Rule No. 9510, the Indirect Source Review or "ISR" Rule) is to be submitted no later than receiving final discretionary approval and pay any applicable off-site mitigation fees before issuance of the first building permit. The exact provisions of the ISR Rule are somewhat different than outlined above, but the following response can be made: The Indirect Source Review Rule only applies at the point where a FINAL discretionary approval is given for a development project; therefore, a General Plan is not, itself, subject to the ISR Rule. The discretionary actions associated with implementing the City of Fresno General Plan Update are listed in Section 2.4 of the Draft Master EIR; these actions are approvals needed prior to commencement of construction activities. The obligation to comply with the ISR Rule rests with project sponsors (applicants and property owners). However, the City facilitates compliance with the ISR Rule by including it in project Conditions of Approval (which must be satisfied prior to issuance of construction permits). The City additionally provides early notification of ISR requirements to potential project applicants during its required face-to-face pre-application meetings.

In response to comments raised regarding future water supply, see responses to preceding comments, including Responses to Comments F-2, J-1, P-2, T-2, T-4 through T-7, U-2, and V-15.

Response to Comment EE-2

Comment noted. Impacts related to groundwater infiltration and stormwater runoff are discussed in Section 5.9 (Hydrology and Water Quality) of the Draft Master EIR. In this section, the potential for increased stormwater flows was thoroughly analyzed.

THIS PAGE INTENTIONALLY LEFT BLANK

SAN JOAQUIN RIVER CONSERVANCY
STATE OF CALIFORNIA

5469 E. Olive Avenue
Fresno, California 93727
Telephone (559) 253-7324
Fax (559) 456-3194
www.sjrc.ca.gov

GOVERNING BOARD

Steve Brandau, Chairman
Councilmember, City of Fresno

Andreas Borgeas, Vice-Chair
Supervisor, County of Fresno

Max Rodriguez, *Supervisor*
County of Madera

Donald E. Holley, *Councilmember*
City of Madera

Barbara Goodwin, *Director*
Fresno Metropolitan Flood Control District

Carl Janzen, *Director*
Madera Irrigation District

Jeffrey Single, *Regional Manager*
Department of Fish and Wildlife

Kent Gresham, *Sector Superintendent*
Department of Parks & Recreation

John Donnelly, *Executive Director*
Wildlife Conservation Board

Patrick Kemp, *Assistant Secretary*
Natural Resources Agency

Michael McKown, *Designee*
State Lands Commission

Eraina Ortega, *Chief Deputy Director*
Department of Finance

Bryn Forhan
Paul Gibson
Carolyn Nolan
Citizen Representatives

Melinda S. Marks
Executive Officer

Edmund G. Brown, Jr.
Governor

August 18, 2014

City of Fresno
ATTN: Jennifer K. Clark, AICP,
Director, Development and Resource Management Dept.
2600 Fresno Street, Third Floor, Rm. 3043
Fresno, CA 93721

Dear Ms. Clark:

City of Fresno General Plan Comments

The San Joaquin River Conservancy is a regionally governed state agency formed to implement and manage the San Joaquin River Parkway, a planned 22-mile regional natural and recreation area in the floodplain extending from Friant Dam to Highway 99. The Conservancy's mission includes acquiring approximately 5,900 acres from willing sellers; developing, operating and maintaining those lands for public access and recreation; and protecting, enhancing, and restoring riparian and floodplain habitat. FF-1

The Conservancy generally supports the City's proposed San Joaquin River Parkway policies presented in the Draft General Plan. City staff worked cooperatively with the Conservancy to review and revise the policies, incorporating many of the Conservancy's draft policies from its concurrent San Joaquin River Parkway Master Plan update.

The Conservancy offers the following comments and proposed revisions for specific policies:

1. *Recommended revision:*

POSS-6-a San Joaquin River Parkway Master Plan
Support the San Joaquin River Conservancy in its efforts to update the San Joaquin River Parkway Master Plan by working with the other jurisdictions and the River Conservancy to create a comprehensive and feasible plan for preservation, conservation, and *Parkway* development. FF-2

2. *Recommended revision:*

POSS-7 (No Title)
Support the San Joaquin River Conservancy in its *collaborative, multiagency* efforts to develop ~~a river parkway~~ *the San Joaquin River Parkway*.

3. *Comment:*

POSS-7-c Monitoring River Corridor Conditions
Undertake periodic monitoring to determine the status of conditions and mitigation measures required for projects within, and in the vicinity of, the river corridor.

- Pursue a Memorandum of Understanding (MOU) or other agreement so that the San Joaquin River Conservancy can perform, or participate in, this monitoring program in order to furnish additional expertise, provide for cost efficiency, and to ensure consistency throughout the river corridor.

FF-3

Comment: The project developer/owner must bear the costs and responsibility for mitigation monitoring. The proposed MOU may not be practical in the near term, depending on the role the City envisions the Conservancy would fulfill. The Conservancy's management jurisdiction does not extend beyond public lands acquired, conserved, and/or developed for San Joaquin River Parkway purposes.

4. *Comment:*

POSS-7-g San Joaquin River Parkway—River West Fresno Project Area
Support the extension of the Lewis Eaton Trail into the River West Fresno Project Area consistent with the San Joaquin River Parkway Master Plan and the following criteria:

- Public access into the River View Drive Area/Neighborhoods should be limited to cyclists and pedestrians with the exception of public safety, circulation, and/or other governmental/support service provider vehicles.
- Proposed public parking facilities should be designed in order to accommodate as many vehicles as possible.
- Additional public parking should be located under and/or adjacent to the old San Joaquin Bridge and State Route 41 corridor.
- The feasibility of additional public parking and equestrian trailer parking near Spano Park should be considered and fully evaluated.
- The location of public parking should not conflict with other recommendations in this policy.
- The trail alignment should, at the greatest extent possible, be located along and/or near the river for maximum public enjoyment, view and access to the river by all users, and to allow for the best possible fire and public safety buffer for adjacent property owners while also taking into consideration environmental impacts, design and maintenance costs, historical and required water flows and flooding, and/or other events that result in increases to water levels.
- Full development or public access should be avoided until adequate and sustainable funding needed to support annual operations and maintenance has been identified.
- The San Joaquin River Bluff and Protection Ordinance should be implemented prior to the completion of the project.

FF-4

Comment: The Conservancy is the lead agency for an Environmental Impact Report to evaluate the potential environmental impacts of the River West Fresno, Eaton Trail Extension Project. The potential impacts of the proposed project and alternative public pedestrian, bicycle, and vehicle access, parking, and trail alignments are being analyzed. Potential environmental impacts and measures to protect public safety, protect against elevating or obstructing floods, and conserve and enhance habitat are among the issues to be studied and included in the report.

Conservancy staff participated in the Fresno City Council hearing that resulted in directing City staff to include the proposed General Plan policy regarding the use of River View Drive for public vehicular access to the proposed River West project. The policy states the intent of the City to restrict the State's rights as a landowner to have full access via a public road to a public property purchased with public funds for the purposes of public recreational and educational access to the river and environs.

FF-4 CONT

5. *Comment:*

It appears that the Public Services, Parks analysis in the General Plan Master Environmental Impact Report fails to evaluate the existing and planned contribution of the Parkway to parks and open space within the City limits, and the associated impacts. Implementation of the Parkway, as supported by General Plan policies, could substantially contribute to meeting the recreation needs of the residents and improve per capita park space. There are presently over 1,000 acres of conserved open space in the Parkway within the City sphere of influence, all with existing or planned public river access and low-impact recreation.

FF-5

The overall support of the San Joaquin River Parkway in the City General Plan policies and coordination with your staff are truly appreciated. Please contact me at Melinda.Marks@sjrc.ca.gov or (559) 253-7324 ext. 3 if you have questions or require additional information.

Respectfully,

Melinda S. Marks
Executive Officer

THIS PAGE INTENTIONALLY LEFT BLANK

Letter FF: San Joaquin River Conservancy, Melinda Marks, August 18, 2014

Response to Comment FF-1
The commenter states that the San Joaquin River Conservancy generally supports the City's proposed policies related to the San Joaquin River Parkway. No specific comment on the environmental conclusions of the Draft Master EIR was provided; therefore, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment FF-2
The commenter identified recommended revisions to Policy POSS-6-and Objective POSS-7. These recommended revisions do not alter the environmental evaluations and findings identified in the Draft Master EIR. Since no comment on the environmental conclusions of the Draft Master EIR was provided; no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment FF-3
The commenter identified recommended revisions to Policy POSS-7-c. These recommended revisions do not alter the environmental evaluations and findings identified in the Draft Master EIR. Since no comment on the environmental conclusions of the Draft Master EIR was provided; no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment FF-4
The commenter identified that the San Joaquin River Parkway Conservancy is the Lead Agency for an Environmental Impact Report that is being prepared for the River West Fresno, Easton Trail Extension Project. This comment is noted. Please see Response to Comment AA-1 regarding the provision of commentary for Policy POSS-7-g in the General Plan Update.

Response to Comment FF-5
The commenter stated that the San Joaquin River Parkway contributes to parks and open space within the City limits. This comment is noted. Table 5.13-5 on page 5.13-9 identifies the existing open space within the City and includes multi-use that encompasses the areas within the San Joaquin River Parkway.

THIS PAGE INTENTIONALLY LEFT BLANK

San Joaquin River
Parkway and
Conservation Trust, Inc.

August 18, 2014
Sent via email

Jennifer K. Clark, AICP, Director
Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93722

BOARD OF DIRECTORS

George Folsom
President

Anna Wattenbarger
Vice President

Bart Bohn
Treasurer

Jennifer Williamson
Secretary

Coke Hallowell
Chairman of the Board

Candy Barnes
Janice Bissonnette
Sheri Bohigian
Jane Campbell
William Golden
Tom Harmon
Tom Holyoke
Ron Manfredi
Elise Moir
Edward B. Morgan
Carol Ann Moses
Julia O'Kane
Lyn Peters
Brigeen Radoicich
Sue Seiden
Frances Squire
Kevin Statham
Andrea Upton

Dowling Aaron Inc.
Christopher A. Brown
General Counsel

Dave Koehler
Executive Director

Subject: Comments – City of Fresno Draft General Plan

Dear Ms. Clark:

Thank you for the opportunity to provide comments on the City of Fresno's General Plan. The San Joaquin River Parkway and Conservation Trust has prepared these comments because of our organization's mission of implementing the San Joaquin River Parkway for the people of Fresno and the surrounding region.

We recognize the vital role the City of Fresno's has in establishing the Parkway and the critical relationship the Draft General Plan document has with its Draft Master Environmental Impact Report. Therefore, the Trust will be submitting additional comments on the Draft General Plan when it responds to the Plan's Draft Master Environmental Impact Report prior to the deadline for EIR comments.

With this writing, we ask for the City of Fresno's attention to correct a significant policy error in the Draft General Plan that restricts access to the San Joaquin River Parkway. The Trust is opposed to POSS-7-g in Chapter 5. As written, the policy will prevent the public from driving on a public road to enter and access public land of the San Joaquin River Parkway. Specifically, our concerns include the following summary:

GG-1

1. Policies that prevent vehicular access at Riverview Drive disproportionately impact low income residents and communities of color in violation of Title VI of the Civil Rights Act, Government Code section 65008(a), and Government code 11135. The City of Fresno's General Plan and the San Joaquin River Parkway have received significant federal and state funds and thus must comply with these provisions.

2. Limiting vehicular access and parking at Riverview Drive would increase environmental impacts to air quality, greenhouse gas emissions, and traffic by requiring Parkway users to travel 10 additional miles and cross the river into Madera County. Riverview Drive has ample width and capacity to provide access to Parkway users without causing traffic issues in the surrounding neighborhood.
3. The Draft Master EIR fails to adequately consider the inconstancies of POSS-7-g with other plans for the San Joaquin Parkway, including the Parkway Master Plan, which calls for "recreational and educational opportunities to all segments of the population."
4. Any limitation on public access to public streets for some users and not others violates state law. In addition, the City cannot prevent the public to access property at the end of Riverview Drive owned by the San Joaquin River Conservancy. This is public property acquired for public open space use.
5. Policies limiting vehicular access at Riverview Drive conflict with other provisions of the general plan calling for public access to the Parkway. Thus, POSS-7-g would result in an internally inconsistent general plan in violation of the State Planning and Zoning Law.
6. The San Joaquin River is held in public trust for the public. Limiting vehicular access at Riverview Drive interferes with the public's ability to enjoy public trust property.
7. Because easement rights restrict public access at Palm and Nees to that allowed at Riverview Drive, the effect of limiting access at Riverview Drive will be to also restrict public access at Palm and Ness. This will only exacerbate the impacts described in 1, 2, 3, 5, and 6.

GG-1
CONT

We ask that POSS-7-g be amended to eliminate the access restriction it places on Riverview Drive. Thank you for your attention to our concern and we stand ready to meet with the City to discuss this issue. Again, the Trust will be submitting additional comments on the Draft General Plan when we respond to the Plan's Draft Master Environmental Impact Report prior to the deadline for EIR comments.

Sincerely,

Dave Koehler
Executive Director

Letter GG: San Joaquin River Parkway and Conservation Trust, Inc., Dave Koehler, August 18, 2014

Response to Comment GG-1

The commenter raises an issue regarding Policy POSS-7-g. The issue is the restriction of access to the San Joaquin River Parkway. There is a misunderstanding of the intent of this policy and as a result a commentary has been provided for this policy. Please see Response to Comment AA-1 regarding the clarifying intent of this policy.

THIS PAGE INTENTIONALLY LEFT BLANK

October 9, 2014

Jennifer K Clark
Reg: DMEIR
Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93721

Project: Draft Master Environmental Impact Report (DMEIR) for the City of Fresno Draft General Plan Update and Development Code Update

District CEQA Reference No: 20140526

Dear Ms. Clark:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Draft Master Environmental Impact Report (DMEIR) for the City of Fresno Draft General Plan Update and Development Code Update. The updates will accommodate projected growth and development through the buildout of the General Plan and Development Code to the year 2056. The Planning Area includes all areas within the City's current limits, the areas within the current Sphere of Influence (SOI), and an area north of the City's most northeasterly portion of the city. The District offers the following comments: HH-1

1. On Page 5.3-2, the DMEIR states that "the combined annual emissions of projects during construction and operation would be compared to the annual threshold." The District would like to clarify that the emissions for construction and operation should be analyzed separately and compared against the District's significance threshold.

2. On Page 5.3-39, the DMEIR states that "Rule 9510 – Indirect Source Review requires project to reduce exhaust related construction emissions by 20 percent for NOx and by 50 percent for PM10." The District would like to clarify that Rule 9510 requires a project to reduce construction emissions by 45 percent for PM10 and not 50 percent as indicated. HH-2

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

Printed on recycled paper.

3. On Page 5.3-41, the DMEIR correctly cites District Rule 9510 construction emission reduction requirements of 20 percent NOx and 45 percent PM10 compared to the statewide average. The District would like to clarify that District Rule 9510 also has requirements for reducing emissions from operation, which is a 33.3 percent NOx reduction and a 50 percent PM10 reduction. Therefore, the District recommends that a discussion on the emission reduction requirements for operation be included in the DMEIR. HH-3

4. On Page 5.3-22 and Page 5.3-23, the DMEIR lists District rules and regulations that may apply to projects during the buildout of the General Plan. The District would like to add District Rule 2010 (Permits Required) which requires a permit for any stationary source emitting, controlling, or modifying the emission of any amount of air contaminant to the atmosphere. HH-4

5. The following comments are regarding the Toxic Air Contaminants discussion:

    a. On Page 5.3-52, the DMEIR states that exposure to low concentrations of toxic air contaminants over a long period of time can result in adverse chronic health effects to sensitive receptors. This statement is correct; however, acute health effects resulting from short term exposure (i.e., 1 hour or 8 hour) to higher concentrations are also a concern. HH-5

    b. On Page 5.3-52, the DMEIR cites the District's significance threshold of 10 in a million for carcinogenic risk. The City should note in presenting this threshold that the District may modify this threshold in the future because of changes proposed by the Office of Environmental Health Hazard Assessment (OEHHA) in the method for calculating risk. Therefore, the District recommends revising the DMEIR to include a phrase such as "or another significance threshold adopted by the San Joaquin Valley Air Pollution Control District" in addition to the 10 in a million. HH-6

    c. The DMEIR discusses two types of projects: 1) projects that can cause risk to nearby sensitive receptors because of their emissions of toxic air contaminants and 2) residential developments and other projects consisting of sensitive receptors that will locate near sources of toxic air contaminants emissions. It is not clear if both types of projects may require the preparation of a health risk assessment (HRA). Therefore, the District recommends that the discussion be made clearer. The Air Resources Board (ARB) has identified offset distances for freeways, chrome plating, and other facilities emitting toxics. Residential and other projects that would locate sensitive receptors further from those sources than ARB's offset distance are not required to assess health risk. The District recommends the City to consider adopting this approach. HH-7

d. It should be noted that the District does not consider mobile sources during its permitting process. However, such sources are considered during a HRA for compliance with the California Environmental Quality Act (CEQA). HH-8

e. On Page 5.3-56, the DMEIR states that "the Bay Area Air Quality Management District (BAAQMD) has adopted a cumulative threshold based on the aggregate total risk of all past, present, and foreseeable future sources within a 1,000 foot radius from the fence line of a source, or from the location of a receptor, plus the contribution from the project." The District would like to clarify that the use of a cumulative risk approach adopted by another air district cannot be relied upon since other air districts have their own local sources, land use patterns, etc. that are different from those in the District. HH-9

f. The DMEIR does not appear to exempt projects from conducting a risk review.

g. The City could be more explicit in identifying that project proponents should comply with methodologies recommended by the District for risk review. HH-10

The District appreciates the opportunity to comment on the DMEIR for the City of Fresno Draft General Plan Update and Development Code Update. If you have any questions or require further information, please call Sharla Yang at (559) 230- 5934.

Sincerely,

Arnaud Marjollet
Director of Permit Services

Sharla Yang

For Chay Thao
Program Manager

AM: sy

Cc: File

THIS PAGE INTENTIONALLY LEFT BLANK

Letter HH: San Joaquin Valley Air Pollution Control District, Arnaud Marjollet, October 9, 2014

Response to Comment HH-1
The SJVAPCD indicated that the Draft Master EIR on page 5.3-2 states that "the combined annual emissions of projects during construction and operation would be compared to the annual threshold", but the SJVAPCD recommends analyzing construction and operational emissions separately and comparing them against the SJVAPCD's thresholds.

The full statement in the Draft Master EIR agency makes a point that a "conservative interpretation" of the threshold would add the emissions from construction and operation for comparison to the threshold. On an individual project basis, separation is appropriate since the emissions occur sequentially and construction emissions are temporary. For a General Plan with a 2056 horizon year, construction would occur each year and adds to the cumulative impacts from operation. Therefore, the statement in the Draft Master EIR is correct.

Response to Comment HH-2
The SJVAPCD found that the Draft Master EIR on page 5.2-39 incorrectly identified the PM10 emission reduction requirement for Rule 9510 Indirect Source Review as 50 percent instead of the actual requirement of 45 percent. The typographical error does not change any significance finding or mitigation measure in the document. The change to page 5.3-39, paragraph 5 is revised as follows:

> "Rule 9510 – Indirect Source Review requires projects to reduce exhaust related construction emissions by 20 percent for NOx and by ~~50~~ 45 percent for PM10; however, significance for these emissions is based on whether projects exceed the SJVAPCD annual quantitative thresholds."

Response to Comment HH-3
The SJVAPCD stated that the Draft Master EIR includes discussion of the reductions that will occur from Rule 9510 for construction emissions but does not include a similar discussion in the section describing operational emissions. Comment noted. The Draft Master EIR describes Rule 9510 in the regulatory setting on page 5.3-23. Later at page 5.3-48, an additional statement in the operational section that Rule 9510 reduces operational NOx emissions by 33 percent and PM10 emissions by 50 percent. Therefore, further discussion is not required in the Draft MEIR to provide the magnitude of the benefit of this element of the ISR regulation, since it is provided elsewhere in the document.

Response to Comment HH-4
The SJVAPCD indicates that the regulatory section should include a discussion of Rule 2010 - Permits Required. Comment noted. Projects that include stationary sources will be required to comply with Rule 2010. The requirement to obtain permits does not result in any emission reductions, but describes an administrative requirement to obtain a permit whereby the SJVAPCD evaluates potential emissions and imposes control measures. Requirements for best available control technology (BACT) and emission offsets are included in Rule 2201- New and Modified Stationary Source Review. Special requirements for individual source categories are provided under source specific regulations.

Response to Comment HH-5
The SJVAPCD indicates that Draft Master EIR at page 5.3.52 should discuss the acute effects of short-term acute exposure to toxic emissions in addition to long-term chronic exposure. The SJVAPCD threshold for acute exposure is a Hazard Index of 1.0. Although development projects are unlikely to exceed the acute exposure threshold, the comment is correct. Both acute and chronic thresholds apply to projects developed under the General Plan Update. The following is added as a new paragraph after the second paragraph on page 5.3-52:

> "Exposures to toxic air contaminants can also result in acute (short-term) impacts. In a manner similar to assessment of chronic hazard impacts, acute hazard impacts are calculated using a hazard index. However, in the case of acute exposures, the air concentration of toxic air contaminants is calculated over a 1-hour average."

Response to Comment HH-6
The SJVAPCD indicates that the current 10 in a million threshold may be revised to address changes in the method calculating risk proposed by the Office of Environmental Health Hazard Assessment (OEHHA). Comment noted. If the SJVAPCD proposes a new threshold of significance at some future date, the City will advise project applicants and consultants regarding the change in OEHHA methodology to inform their preparation of special studies which may be required for development projects . However, as Lead Agency the City- reserves the right to consider alternative threshold approaches, at its own discretion, when such alternative thresholds can be validated by agencies having jurisdiction and professional expertise in the subject areas of hazardous materials, public health, and risk assessments.

Response to Comment HH-7
The SJVAPCD recommends that the Draft Master EIR include criteria from the Air Resources Board (ARB) Air Quality Land Use Handbook for situation when a health risk assessment would be required for projects which would result in locating sensitive receptors near sources of toxic emissions. This impact is discussed on page 5.3-55 of the Draft Master EIR. It includes criteria for locating residential development, schools, and parks near high volume roadways consistent with the ARB Handbook. It also provides criteria for projects located near facilities such as distribution centers or loading docks with large numbers of diesel trucks should undergo screening analysis or a full health risk assessment if screening finds a significant impact. The full ARB Handbook siting criteria are located in Table 5.3-5 on page 5.3-19 of the Draft Master EIR. The following is added as an Advisory Recommendation for Distribution Centers in Table 5.3-5 on page 5.3-19 of the Draft Master EIR.

> "Review the ARB Air Quality Land Use Handbook siting criteria to determine when additional analysis is required."

Response to Comment HH-8
The SJVAPCD states that mobile source emissions are not considered during permitting of stationary sources of toxic emissions. However, for CEQA purposes, the mobile sources are considered. Comment noted. No specific projects including stationary and mobile sources have been identified; however, the City will route new projects to the SJVAPCD for review and comment to ensure that all emissions have been addressed in the analysis.

Response to Comment HH-9

The SJVAPCD states that use of a threshold approach cannot be relied upon since other air districts have their own local sources, land use patterns, etc. that are different from those in the District. The Draft Master EIR includes an approach based on Bay Area Air Quality Management District (BAAQMD) for cumulative toxic emissions. Comment noted. The City will continue to work with the SJVAPCD and when the SJVAPCD adopts a cumulative threshold, then the City would consider the SJVAPCD-adopted threshold. Response to Comment HH-10

The SJVAPCD states that the City should be more explicit in identifying that project proponents should comply with methodologies recommended by the District for risk review. The Draft Master EIR includes an explicit statement requiring the use of SJVAPCD models. Page 5.3-4 of the Draft Master EIR states that this potential impact is considered in CEQA documents for individual projects; and General Plan Policy RC-4-c states, "Require use of computer models recommended by the SJVAPCD to evaluate the air quality impacts of projects that require environmental review by the City." Although the policy does not specifically mention methodologies, it is understood that use of SJVAPCD models would also require use of SJVAPCD methodologies to operate those models. When notified by the SJVAPCD that a project warrants a Health Risk Assessment (HRA), the City has provided applicants with the California Air Pollution Control Official Association (CAPCOA) *Health Risk Assessments for Proposed Land Use Guidelines*, which outlines the methodology required by the SJVAPCD for conducting HRAs.

THIS PAGE INTENTIONALLY LEFT BLANK

SHUTE, MIHALY & WEINBERGER LLP

396 HAYES STREET, SAN FRANCISCO, CA 94102
T: (415) 552-7272 F: (415) 552-5816
www.smwlaw.com

TAMARA S. GALANTER
Attorney
galanter@smwlaw.com

September 25, 2014

Via FedEx

Jennifer K. Clark
Director
Development and Resource Mgmt. Dept.
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93722

Re: Fresno General Plan Update and Draft Master Environmental Impact Report for the Fresno General Plan Update (SCH 2012111015)

Dear Ms. Clark:

On behalf of the San Joaquin River Parkway and Conservation Trust ("Trust"), we thank you for the opportunity to comment on the City of Fresno's General Plan Update and the Draft Master Environmental Impact Report ("Draft MEIR") for the General Plan Update. The Trust is a non-profit organization with a mission to establish a continuous greenway along the San Joaquin River in the Fresno-Madera region and to ensure the San Joaquin River Parkway ("Parkway") is accessible to all members of the community.

The Trust applauds the City for many of the General Plan Update's goals and policies that seek to provide park opportunities to all Fresno residents. However, the Trust objects to the language in Policy POSS-7-g that limits "public access into the River View Drive Area/Neighborhoods . . . to cyclists and pedestrians with the exception of public safety, circulation, and/or other governmental/support service provider vehicles." Gen. Plan at 5-39. The Trust also objects to the omission of automobile access and parking from the description of access at Riverview and Bluff Avenues in item 13 of Policy POSS-7-i. Gen. Plan at 5-40. These policies significantly limit the opportunity for Fresno residents who do not live near the Parkway to access it and undermine the General Plan's goals of providing access to all members of the community.

II-1

Moreover, these policies conflict with both federal and state law. State law does not permit the City to limit vehicular use of Riverview Drive to local residents. Furthermore, because the City has received federal funds to prepare its General Plan Update, Title VI of the Civil Rights Act of 1964 requires the City to ensure that its policies do not result in disparate impacts to members of the community on the basis of race, ethnicity, or national origin. By significantly limiting access to the Parkway, a major regional park, to many people of color who do not live within walking or biking distance from the Parkway, the City has failed to meet its duty under Title VI.

In addition, the inclusion of these access restrictions creates internal inconsistencies in the General Plan Update in violation of the State Planning and Zoning Law, California Government Code section 65000 *et seq*. Limiting access to the Parkway also conflicts with the Public Trust Doctrine and its purpose of ensuring public access to public trust property such as the San Joaquin River.

Also, as a result of the access restrictions, the Draft MEIR fails to meet the requirements of the California Environmental Quality Act, Public Resources Code section 21000 *et seq*. First, the Draft MEIR incorrectly concludes that the General Plan Update is consistent with the San Joaquin Parkway Master Plan ("Master Plan"). Policies POSS-7-g and POSS-7-i, however, clearly conflict with several policies in the Master Plan aimed at ensuring the Parkway is accessible to all residents of Fresno. Second, the Draft MEIR fails to consider that allowing access to the Parkway from Riverview Drive, as well as parking at that entrance, could feasibly mitigate significant environmental impacts related to air, greenhouse gas emissions, and traffic. II-1 CONT

All of the violations identified above are further exacerbated because any limitations on public access at Riverview Drive results in identical access limitations at Palm and Nees Avenues. The General Plan Update currently calls for "multi-modal access with parking" at Palm and Nees Avenues. Public access at Palm and Nees, however, cannot occur unless Riverview Drive also allows such public access.

Finally, the San Joaquin River Conservancy just last week decided to consider vehicular access and parking at both Riverview Drive and Palm & Nees Avenues as part of the Fresno River West, Eaton Trail Extension Project. Therefore, the General Plan Update's access limitations at Riverview Drive (and hence at Palm and Ness) would not only violate the law, they would undermine the planning for an existing project.

To comply with federal and state laws and ensure that the General Plan is internally consistent, the Trust urges the City to: (1) remove the first bullet in Policy POSS-7-g; (2) change the access information in item 13 of Policy POSS-7i to "multi-modal access with parking" to mirror the access information for Palm and Nees Avenues (item 11); and (3) change Figure POSS-2 and any other figures or tables in the General Plan Update to show multi-modal access and parking at Riverview Drive. In addition, the Draft MEIR should consider access to the Parkway at Riverview Drive, including parking, to reduce the significant environmental impacts resulting from the General Plan Update. II-1 CONT

I. General Plan Policy POSS-7-g Conflicts with State Law Regarding Public Streets.

Apparently, the City added the access limitations in the first bullet of POSS-7-g to address the concerns of a small group of influential residents living in the Riverview Drive area. As reported by news outlets, residents of Fresno's Riverview Drive neighborhood want to restrict public access to their neighborhood to prevent traffic congestion. *See* Carmen George, *Parking an Issue for Eaton Trail Extension Proposal in Fresno*, Fresno Bee (June 17, 2014) (attached hereto as Exhibit A).

Policy POSS-7-g prohibits through traffic on Riverview Drive and limits vehicular access to neighborhood residents and emergency vehicles. Gen. Plan at 5-39. These restrictions violate state law and must be removed from the General Plan Update. Under California law, all residents have a right to use all public streets. The "streets of a city belong to the people of the state, and every citizen of the state has a right to the use" of these streets. *Zack's, Inc. v. City of Sausalito* (2008) 165 Cal.App.4th 1163, 1183. Policy POSS-7-g calls for restricting the use of a public street, Riverview Drive, in direct conflict with this established principle. II-2

Moreover, the State has regulatory authority over traffic control, and Fresno has no authority to limit access to a public street as it proposes to do under Policy POSS-7-g. *See Rumford v. City of Berkeley* (1982) 31 Cal.3d 545, 551-52, 550 (state law does not "permit a city to close a street to through traffic while allowing its use for neighborhood purposes.") State law preempts the field of traffic control, including the regulation of public streets such as Riverview Drive. *Rumford,* 31 Cal.3d at 550; see also *Zack's*, 165 Cal.App.4th at 1183 (the "right of control over street traffic is an exercise of a part of the sovereign power of the state . . . ."). Unless the California legislature has "expressly provided" otherwise, Fresno "has no authority over vehicular traffic control." *Rumford*, 31 Cal.3d at 550; *see* Veh. Code § 21. State law does not expressly allow the

City to limit use to a public street as it proposes to do in Policy POSS-7-g, and thus, the City has no authority to do so.[1]

Courts have invalidated city actions with the same effect as Policy POSS-7-g. In *City of Lafayette*, Lafayette attempted to close a road to through traffic while permitting vehicular access to neighborhood residents. *City of Lafayette v. County of Contra Costa* (1979) 91 Cal.App.3d 749, 753-54. Contra Costa County challenged the ordinance, stating that the road "was the only convenient route for many persons of the traveling public in reaching recreational and other areas of the County including a state park." *Id.* at 752. The court found that the city had no authority to limit access to the public road and overturned the ordinance. *Id.* at 752-53.

Following *City of Lafayette*, the California legislature codified the principles of the case, highlighting the importance of maintaining unrestricted streets in cities such as Fresno. Vehicle Code § 21101.6 provides that "local authorities may not place gates or *other selective devices* on any street which deny or restrict the access of certain members of the public to the street, while permitting others unrestricted access to the street." (emphasis added). This statute further demonstrates that Fresno cannot restrict specific members of the public from using Riverview Drive through gates *or other devices*, such as street signs.

II-2 CONT

Policy POSS-7-g will not only impermissibly prevent public use of a public street, it will deny the public access to property owned by the San Joaquin River Conservancy – property that was purchased by the State for public use. The City must remove the first bullet of Policy POSS-7-g from the General Plan Update to avoid violating state law and preventing vehicular access to the Conservancy's property.

II. Federal Law Requires the City to Ensure Its General Plan Does Not Result in Disparate Impacts Based on Race, National Origin, or Ethnicity.

The City has accepted federal funds to prepare and implement its General Plan Update. Accordingly, the City must comply with Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d *et seq.*, which requires that the City ensure that its General Plan

II-3

[1] The Vehicle Code does permit a city, in limited circumstances, to vacate a street when it is no longer needed for vehicular traffic. Veh. Code § 21101. But Policy POSS-7-g does not implicate section 21101(a): That section concerns streets no longer needed for vehicular traffic. It does not permit a city to close a public street to through traffic while allowing local residents use of the street. *Rumford,* 31 Cal.3d at 551-52.

Update does not result in disparate impacts to its residents on the basis of race, color, national origin, or ethnicity.

Title VI prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance. On March 29, 2012, the City Council authorized the use of ARRA funding from the U.S. Department of Energy ("DOE") to prepare the General Plan Update. *See* City Council Agenda at General Administration Item B, March 29, 2012 (attached as Exhibit B). Therefore, the City must comply with Title VI and the DOE's regulation implementing Title VI, 10 C.F.R. Part 1040, when preparing and implementing the General Plan Update.

Specifically, DOE regulations prohibit any recipient of funds from, on the basis of race, color, or national origin, "restrict[ing] an individual in any way in the enjoyment of any advantage or privilege enjoyed by others receiving any disposition, service, . . . or benefit under the program. 40 C.F.R. § 1040.13(b)(4). Moreover, discrimination on the basis of race, color or national original need not be intentional. Rather, "[i]n determining the site or location of facilities, a recipient . . . may not make selections with the purpose *or effect of* excluding individuals from, denying them the benefits of, or subjecting them to discrimination because of race, color, [or] national origin . . . or with the purpose *or effect of* defeating or substantially impairing the accomplishment of the objectives of Title VI or this subpart." *Id.* at § 1040.13(d) (emphasis added).

II-3
CONT

In Fresno, neighborhoods with larger majorities of people of color have significantly less access to parkland than neighborhoods with residents that are primarily white. The General Plan itself recognizes that the provision of and access to parklands is uneven in the City, with many neighborhoods falling below the 3.0-acre of parkland per 1,000 resident standard set by the previous General Plan. Gen. Plan at 5-9. The neighborhoods with the least parkland are the neighborhoods south of Shaw Avenue (1.02 acres per 1,000 residents), the Combined Development Areas NW (0.92 acres per 1,000 residents), Combined Development Areas East (1.38 acres per 1,000 residents), and the South Industrial Area (1.79 acres per 1,000 residents). *Id.* at 5-11, Table 5-3. These are also the neighborhoods with the lowest percentage of white residents. *See id.* at 1-35, Figure 1-6. In contrast, the area of the City with the highest percentage of white residents – the established neighborhoods north of Shaw Avenue – have 4.62 acres of parkland per 1,000 residents. *See* Gen. Plan at 1-35, Figure 1-6; 5-11, Table 5-3.

West Fresno, which is composed of the DA-1 North and DA-4 West neighborhood indicated on Figure 1-3, has the lowest amount of parkland per 1,000

residents of all of Fresno (0.92 acres). *See* Gen. Plan at 1-23, Figure 1-3; 5-11, Table 5-3. West Fresno residents are primarily of minority racial and ethnic groups. Naomi Cytron, The Enduring Challenge of Concentrated Poverty in America: Case Study of Fresno, California (April 2009) at 9 (attached hereto as Exhibit C). Moreover, the immigrant population is higher in West Fresno than in the rest of Fresno; as of 2000, nearly 30 percent of residents were foreign-born. *Id.*

Regional parks, such as the Parkway, provide opportunities to decrease the deficits in parkland to underserved neighborhoods, and may in fact be the most straightforward and effective way of doing so. The General Plan acknowledges that creating neighborhood parks in established neighborhoods is difficult because the City may not be able to fund park development with development fees. Gen. Plan at 5-12. Many of these established neighborhoods, such as the neighborhoods south of Shaw Avenue and the South Industrial Area have significant parkland deficits. *Id.* Because these neighborhoods with substantial populations of residents of color are already underserved by the existing parkland and face uphill battles in creating new parkland, the City must ensure that these residents have access to regional parks, such as the Parkway. If the City does not, it is effectively denying its residents of color from enjoying the benefits of parkland and impairing the objectives of Title VI, in violation of federal law. 40 C.F.R § 1040.13(d). II-3 CONT

Unfortunately, Policies POSS-7-g and POSS-7-i exacerbate the existing disparities in access to parklands. The policy significantly limits access to the Parkway at Riverview Drive to those residents that can access the Parkway by foot or bicycle – namely, residents who live directly adjacent to the Parkway (i.e., the neighborhoods north of Shaw Avenue). *See* Gen. Plan at 1-23, Figure 1-3. These residents—who are primarily white—live within the "walk shed" (i.e. the area within which people can comfortably walk to an attraction) of the Project site. *See id.* at 1-35, Figure 1-6; *see also* Nelson/Nygaard Consulting Associates, Inc., San Joaquin River Parkway Short Term Transportation Plan Final Report (June 2011) at p. 2-1 (attached hereto as Exhibit D).[2] Residents outside the walk shed must access the Parkway by car, public transportation, or bicycle. *Id.* There is only one bus stop near the Parkway, which a survey showed most people are unaware of and would not use to access the Parkway. *Id.* at 2-18 – 2-19.

[2] These residents also tend to be of higher income than the average Fresno residents. People who live within the walk shed of the Parkway tend to have household incomes of greater than $60,000 annually, compared to the average median household income of Fresno, which is $44,773. Exhibit D at p. 2-1.

Therefore, most users not within walking or biking distance will access the Parkway by private car.

Policies POSS-7-g and POSS-7-i will result in inadequate parking and access for Fresno residents who must drive to the Parkway. Fresno residents who want to access the Parkway, particularly the Lewis S. Eaton Trail, by car must cross over the State Route 41 bridge to Madera County and circle back to access the parking lot at Perrin Avenue, adding approximately 10 miles of driving for each car. Therefore, by depriving residents of the opportunity to access the Parkway via Riverview Drive, policies POSS-7-g and POSS-i significantly discourage Fresno residents who must arrive by car from using the Parkway.

The policies would not only restrict access to the Parkway at Riverview Drive, but also at Palm and Nees Avenues. The easements that allow public access at Palm and Nees state that "[t]his easement will be available for public use only for so long as and such times as the Riverview Drive entrance is open for public access under not less than the same terms and conditions as outlined herein." *See* Easements for Public Access Purpose § 5.c (attached hereto as Exhibit E). Thus, in order to have automobile access at Palm and Nees, as the General Plan contemplates (Gen. Plan at 5-21, Figure POSS-2), Riverview Drive must also allow automobile access to the Parkway at Riverview Drive. Limitations on public access at Riverview Drive will intensify the disparate impact residents of color will experience because the policy will not only prevent access to the Parkway at Riverview Drive but at Palm and Nees as well.

II-3 CONT

In short, the General Plan exacerbates the already disparate access to parklands in Fresno, wherein residents of color have significantly less access to parks in the neighborhood, as well as key regional parks, such as the Parkway. The City has an obligation to ensure that this disparate impact is not worsened by the General Plan Update. By prohibiting automobile access to the Parkway from Riverview Drive, the City fails to meet these obligations.

III. Policies POSS-7-g and POSS-7-i Result in an Internally Inconsistent General Plan in Violation of State Planning and Zoning Law.

The General Plan violates the State Planning and Zoning Law, Government Code section 65000 *et seq.,* because it includes internally inconsistent goals and policies related to access to the Parkway. Government Code section 65300.5 requires that a general plan must "comprise an integrated, internally consistent and compatible statement of policies for the adopting agency." A general plan "that, on its face, displays

II-4

substantial contradictions and inconsistencies cannot serve as an effective plan because those subject to the plan cannot tell what it says should happen or not happen." *Concerned Citizens of Calavares Cnty. v. Bd. of Supervisors* (1985) 166 Cal.App.3d 90, 97.

The General Plan Update is internally inconsistent because it plans for automobile access to the Parkway at Palm and Nees, while prohibiting access at Riverview Drive. Gen. Plan at 5-39, 5-40. As explained above, any access at Palm and Nees is contingent on the same type of access at Riverview Drive. Therefore, the City cannot provide access at Palm and Nees without doing so at Riverview Drive. The City must revise the General Plan Update to remove this inconsistency.

In addition, restrictions on access at Riverview Drive contradict other public access goals in the General Plan. The General Plan recognizes the need to provide access to parklands for all Fresno residents. Gen. Plan at 5-6. It also recognizes that residents of particular neighborhoods are underserved by parks. *Id.* at 5-9, Table 5-3. The General Plan sets goals of providing 5 acres of parkland per 1,000 residents, two acres of which should be from regional parks, such as the Parkway. *Id.* at 5-12. Yet policies POSS-7-g and POSS-7-i work against these goals by limiting the ability of residents that do not live in neighborhoods directly adjacent to the Parkway to access it. II-4 CONT

Moreover, the General Plan Update adopts the goals of the San Joaquin River Parkway Master Plan ("Master Plan") and thus must be consistent with the Master Plan. *See* Gen. Plan at 5-39, 5-40 (stating that the General Plan Update "support[s] the extension of the Lewis Eaton Trail into the River West Fresno Project Area consistent with the San Joaquin River Parkway Master Plan" and "[s]trive[s] to provide public access to the parkway."). A central goal of the Parkway is to "enhance the quality of life of its residents" as well as "provide recreational and educational opportunities to *all segments of the population.*" Master Plan at 9, 29 (emphasis added). In order to provide such opportunities to all community members, the Master Plan requires "sufficient on-site parking at each public recreational facility to provide adequate parking supply for the desired usage level during peak periods." *Id.* at 32. Indeed, the San Joaquin River Conservancy recognizes the need for equal access and thus has included the option of vehicle access and parking at Riverview Drive and Palm and Nees Avenues as part of the River West project.

Restricting non-resident vehicular access to Riverview Drive is inconsistent with the Master Plan's goals of providing access to the Parkway for all Fresno residents.

It also undermines the Conservancy's planning process for a River West project that complies with the Master Plan.

In addition, the City has established a goal of providing 5 acres of parkland per 1,000 residents; 3 acres of neighborhood, community and pocket parks and 2 acres of regional parks. Draft MEIR at 5.13-33. Regional parks are intended to serve 100,000 residents. Gen. Plan at 5-6. However, to serve this number of Fresno residents, the Parkway must be accessible. This requires adequate parking and convenient access points for those residents who do not live near the Parkway. If regional parks, such as the Parkway, are not accessible to the number of residents they are meant to serve, they do not meet the goals established by the General Plan Update. By preventing the public from accessing the Parkway by car at Riverview Drive and Palm and Nees, policies POSS-7-g and POSS-7-i thwart the General Plan goal to provide access for 100,000 residents at regional parks. II-4 CONT

IV. The Draft MEIR Fails to Meet the Requirements of CEQA.

A. The Draft MEIR Incorrectly Concludes the General Plan Update Will Not Conflict with the Master Plan.

The Draft MEIR states that the General Plan Update will result in significant land use impacts unless "[t]he project would not conflict with any applicable land use plan, policy, or regulation with jurisdiction over the project . . . adopted for the purpose of avoiding or mitigating an environmental effect." Draft MEIR at 5.10-14. The Draft MEIR concludes that the General Plan Update does not conflict with the Master Plan, which it defines as an "applicable land use plan." *Id.* at 5.10-19. Yet, as discussed above, General Plan Policies POSS-7-g and POSS-7-i conflict with numerous goals and policies included in the Master Plan. The Final MEIR must discuss these conflicts and provide feasible mitigation measures to lessen the significant impact, or avoid the conflicts by removing the access limitations in these policies. Pub. Res. Code § 21002. II-5

The Master Plan makes clear that the Parkway should be accessible to all residents of Fresno, and the surrounding communities, as indicated by the following goals and policies:

- Fundamental Goal 6: "Provide land use and management policies for the San Joaquin River and areas of the riverbottom included in the Parkway that will enhance the attractiveness of the Fresno-Madera metropolitan area and *enhance the quality of life of its residents*. Master Plan at 9 (emphasis added).

- Recreation Area Goal 2: "Provide recreational and educational opportunities *to all segments of the population.*" Master Plan at 29 (emphasis added).

- Recreation Parking Policy 1: "*Develop sufficient on-site parking at each public recreational facility to provide adequate parking supply for the desired usage level during peak periods* and to meet the parking requirements of the affected local jurisdiction, while avoiding excess parking which would increase environmental impacts of construction and promote overuse of the site. On-site parking design should consider harmony with the natural environment while ensuring safety and security for users." Master Plan at 32.

By prohibiting the possibility of parking at Riverview Drive and, as a result, at the intersection of Palm and Nees, policies POSS-7-g and POSS-7-i conflict with these policies and goals. The policies will make it impossible to provide adequate parking for the Parkway, particularly to the Lewis S. Eaton Trail, the multi-use trail being developed by the San Joaquin River Conservancy that runs from Spano Park to SR-41. II-5 CONT

Moreover, as explained above, cutting off parking and access at Riverview Drive and Palm and Nees means that residents who do not live within walking and biking distance must cross over the State Route 41 bridge to Madera County and circle back to access the parking lot at Perrin Avenue, adding approximately 10 miles of driving for each car entering and parking at Perrin Avenue. Further, parking at other areas is infeasible. The nearest parking lot to the Eaton Trail is located at Woodward Park, which is east of Perrin Avenue. However, this lot cannot provide adequate parking for the Eaton Trail because it is already at capacity during most weekends, when the Parkway is at its highest demand.

By cutting off access at Riverview Drive and Palm and Nees, policies POSS-7-g and POSS-7-i significantly obstruct access to the Parkway, specifically the Eaton Trail. This conflicts with the Master Plan's goals of providing access and parking for all Fresno residents, and the Final MEIR must discuss and mitigate for this significant environmental impact, or revise the policy to avoid the impact.

B. The Draft MEIR Fails to Evaluate whether a Parking Lot at Riverview Drive Would Lessen the Project's Significant Environmental Impacts to Air Quality, Greenhouse Gas Emissions, and Traffic. II-6

CEQA prohibits a public agency from approving a project with significant environmental impacts if there are "feasible alternatives or feasible mitigation measures"

that "would substantially lessen the significant environmental effects" of the project. Pub. Res. Code § 21002. The Draft MEIR finds that the General Plan Update will result in significant and unavoidable impacts related to air quality, greenhouse gas emissions, and traffic. Prohibiting access to the Parkway from Riverview Drive and Palm and Nees adds to these environmental impacts because it forces Fresno residents driving to the Parkway to cross over the river on SR-41 and circle back. Although providing access and parking from Riverview Drive to the Parkway would help reduce these impacts, the Draft MEIR fails to evaluate this as a feasible mitigation measure, in violation of CEQA.

The Draft MEIR finds that the General Plan Update would result in a considerable net increase of criteria pollutants for which the region is in non-attainment and thus will result in a significant environmental impact. Draft MEIR at 5.3-38-50. The region is out of attainment for ozone. *Id.* at 5.3-8, Table 5.3-3. The precursors to ozone include reactive organic gases (ROG) and nitrous oxide (NOx). *Id.* at 5.3-39. Motor vehicles are a significant contributor to ROG and NOx, and indeed, motor vehicles are the largest contributor to air emissions generally in the area. *Id.* at 5.3-1, 5.3-42.

Although the General Plan Update includes policies to reduce these air pollutants, the policies do not reduce the impact to a less than significant level. Draft MEIR at 5.3-49-50. The Draft MEIR incorrectly states that no other measures are available that would reduce the impacts. *Id.* at 5.3-50. In fact, providing for a direct access point to the Parkway, from Riverview Drive and potentially Palm and Nees, would reduce vehicle emissions from a significant number of visitors arriving by car to the Parkway.

II-6
CONT

The Draft MEIR's treatment of greenhouse gas emissions and traffic is similar to its air quality analysis. The Draft MEIR finds that greenhouse gas emissions after 2020 will result in a significant environmental impacts. Draft MEIR at 5.7-45-56. It also finds that there are no feasible mitigation measures to lessen this significant impact, so it concludes that impacts after 2020 are significant and unavoidable. *Id.* at 5.7-56. Like its air quality analysis, the Draft MEIR states that the General Plan includes policies to reduce greenhouse gas emissions, in particular from motor vehicles, and it finds that mitigation beyond these policies is infeasible. *Id.* at 5.7-52, 5.7-56.

As with its treatment of air quality impacts, the Draft MEIR also fails to include access at Riverview Drive as a possible way to lessen traffic congestion on the portion of SR-41 that crosses the San Joaquin River. The General Plan Update will increase demand for travel and thus congestion on streets and highways. Draft MEIR at 5.14-29. The Draft MEIR acknowledges that both the Project, as well as cumulative

conditions after the General Plan build-out, will result in unacceptable levels of service for the section of SR-41 that crosses over the San Joaquin River. *See id.* at 5.14-37-39, Exhibits 5.14-7, 5.14-8; *see also id.* at 5.14-53-57, 5.14-73-78. However, the Draft MEIR fails to include mitigation measures to reduce impacts from Parkway users. *Id.* at 5.14-79-80.

In both cases, the Draft MEIR should identify a mitigation measure that provides access to the Parkway via Riverview Drive and Palm and Nees. These access points would reduce both traffic on SR-41 and greenhouse gas emissions because Fresno residents would no longer need to drive over the San Joaquin River on SR-41 to access the Parkway. The failure to consider all feasible mitigation measures to reduce significant air quality, greenhouse gas, and traffic impacts violates CEQA. II-6 CONT

V. Limiting Access to the Parkway Implicates the City's Responsibilities under the Public Trust Doctrine.

Finally, the City holds the San Joaquin River in trust for the public purposes of commerce, navigation, fishery, and recreation. *See Zack's*, 165 Cal.App.4th at 1174-75. The public trust restricts governmental authority in three ways: "first, the property subject to the trust must only be used for a public purpose, but it must be held available for use by the general public; second, the property may not be sold, even for a fair cash equivalent; and third, the property must be maintained for particular types of uses." Joseph L. Sax, The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention, 68 MICH. L. REV. 471, 477 (1970). The General Plan Update conflicts with the first public trust restriction on the City's authority,

In accordance with the public trust doctrine, the City has an obligation to ensure the San Joaquin River is accessible so that the public may use the river for its trust purposes. *See Zack's*, 165 Cal.App.4th . at 1175 ("the public rights of commerce, navigation, fishery, and recreation are so intrinsically important and vital to free citizens that their unfettered availability to all is essential in a democratic society."). Thus, the public trust doctrine limits the ways in which an agency may restrict access and use of a public trust resource, such as the San Joaquin River. *See id.* at 1176. By cutting off access to the Parkway via Riverview Drive and Palm and Nees, the City limits the public's access to the river substantially. This action is contrary to the City's obligation to ensure "unfettered availability" to the San Joaquin River. *Id.* at 1175. II-7

As explained by a leading scholar on the public trust, "certain historical interests are so intrinsically important to every citizen that their free availability tends to

mark the society as one of citizens rather than of serfs [and that] …certain interests are so particularly the gifts of nature's bounty that they ought to be reserved for the whole of the populace." Joseph L. Sax, The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention, 68 MICH. L. REV. at 484. The restrictions on access to the San Joaquin River in the General Plan Update are inconsistent with these core principles of the public trust doctrine. Including parking and automobile access at Riverview Drive in the General Plan Update would help ensure that the City was not violating its obligations under the public trust doctrine.

VI. Conclusion

II-7
CONT

The City and General Plan Update recognize the importance of ensuring access to the Parkway for everyone in the community. Yet the proposed language in the General Plan Update would prevent vehicular access to the Parkway at two critical access points: Riverview Drive and Palm and Nees Avenues. As detailed above, this would violate numerous state and federal laws. The Trust urges the City to modify the current language in the General Plan Update to allow everyone to access the Parkway at Riverview Drive and not allow a small group of influential residents to prevent convenient Parkway access for the majority of Fresno residents.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Tamara S. Galanter

cc (via U.S. mail):
Bruce Rudd, Fresno City Manager
Melinda Marks, Executive Officer, San Joaquin River Conservancy
John Laird, Secretary, California Natural Resources Agency
Claudia Polsky, Deputy Attorney General, California Attorney General's Office
United States Department of Energy, Office of Economic Impact and Diversity

617681.4

THIS PAGE INTENTIONALLY LEFT BLANK

Letter II: Shute Mihaly & Weinberger, Tamara S. Galanter, September 25, 2014

Response to Comment II-1
The commenter indicates that several General Plan Update policies located in Chapter 5 of the document would conflict with federal and State laws, as well as create an internal inconsistency within the General Plan. The commenter asserts that Policy POSS-7g would result in access restrictions to the San Joaquin River Parkway ("Parkway"). General Plan Update Policy POSS-7g was not intended to restrict vehicular access on existing roadways Please see Response to Comment AA-1 above, regarding access to the San Joaquin River Parkway via Riverview Drive.

Response to Comment II-2
The commenter asserts that Policy POSS-7g would unlawfully restrict access to public streets within the Riverview Drive neighborhood, and indicates that the policy "prohibits through traffic on Riverview Drive and limits vehicular access to neighborhood residents and emergency vehicles". Please refer to the response to Comment No. AA-1, above. Policy POSS-7g would not conflict with State law regarding public streets.

Response to Comment II-3
As discussed in Response to Comment. AA-1 above, Policy POSS-7-g would not restrict vehicular public access into this neighborhood along any existing public roadways. As the General Plan Update would still provide public access to the existing roadways and neighborhoods at and near Riverview Drive, the proposed policy would not result in a violation of federal law.

Response to Comment II-4
As discussed in Response to Comment AA-1 above, Policy POSS-7-g would not restrict vehicular public access into this neighborhood along any existing public roadways.

Response to Comment II-5
As discussed in Response to Comment AA-1 above, Policy POSS-7g would not restrict vehicular public access into this neighborhood along any existing public roadways. The vehicular restrictions identified in POSS-7-g (and reiterated in POSS-7-i) would be limited only to a public access easement from this area that extends toward the Parkway. As the General Plan Update would still provide public access to the existing roadways and neighborhoods at and near Riverview Drive, the proposed policy would not result in a conflict with the Master Plan.

Response to Comment II-6
The commenter asserts that a parking lot at Riverview Drive should have been considered as mitigation for significant impacts to Air Quality, Greenhouse Gas, and Traffic. As discussed in those responses, Policy POSS-7g would not restrict vehicular public access into this neighborhood along any existing public roadways. The vehicular restrictions identified in POSS-7g (and reiterated in POSS-7i) would be limited only to a public access easement from this area that extends toward the Parkway. As the General Plan Update does not establish any intensive urban uses or mandate that an easement or extension of West River View Drive would provide access to the San Joaquin River, adoption of the General Plan Update would not result in an increased demand for travel or increased traffic congestion beyond those planned uses in the area, which were considered in the Draft Master EIR. The construction of a parking lot in this area would not meet currently identified parking

demand in this neighborhood and would not substantially lessen the environmental effects identified in those MEIR sections. As noted in Response to Comment AA-1, the City will work with the San Joaquin River Conservancy as it brings forward specific projects to implement its Parkway Plan, including Conservancy proposals to acquire and open easements affording safe vehicular travel onto Parkway land; at that time. The Conservancy may also acquire land from willing sellers toward development of parking lots proximal to these access points.

Response to Comment II-7

The commenter's assertion that limiting access to the Parkway would conflict with the City's responsibilities under the Public Trust Doctrine do not directly relate to the analysis provided in the Draft Master EIR. The City consults State Lands Commission (the designated Trustee agency for sovereign land and public trust easements in the San Joaquin River corridor) when land divisions and other development projects afford an opportunity to expand safe public access to the River. Inasmuch as the Conservancy's enabling legislation prohibited use of eminent domain to acquire land, it would not be appropriate for the Conservancy to seek to require the City to use its eminent domain powers to acquire property interests on behalf of the Conservancy. As discussed previously in Response to Comment AA-1, above, Policy POSS-7g would not restrict vehicular public access into this neighborhood along any existing public roadways. The vehicular restrictions identified in POSS-7g (and reiterated and clarified in POSS-7i) would be limited only to an existing non-vehicular access easement from this area that extends toward/ into the Parkway, because no public vehicular access easement exists, and it is beyond the authority of a General Plan Update to create one by fiat.

SHUTE, MIHALY & WEINBERGER LLP

396 HAYES STREET, SAN FRANCISCO, CA 94102
T: (415) 552-7272 F: (415) 552-5816
www.smwlaw.com

October 8, 2014

Via E-mail

Ashley Werner
Attorney
Leadership Counsel for Justice and
Accountability
2115 Kern Street, Suite 320
Fresno, CA 93721

Re: Draft Master Environmental Impact Report For The Draft General Plan and Development Code Update For The City Of Fresno (SCH # 2012111015)

Dear Ms. Werner:

As requested, Shute Mihaly & Weinberger LLP has completed a review of the draft master environmental impact report ("DMEIR") for the City of Fresno General Plan and Development Code Update ("General Plan" or "Project"). We focused our review on the DMEIR's analyses of traffic, air quality, public health, greenhouse gases and noise impacts. Our review of the DMEIR reveals serious violations of the California Environmental Quality Act ("CEQA") (Public Resources Code section 21000 *et seq.*) and CEQA Guidelines (California Code of Regulations, title 14 section 15000 *et seq.*).

The DMEIR is fundamentally inconsistent with CEQA. The DMEIR fails to disclose, analyze, and propose mitigation for significant environmental impacts related to land use, traffic, air quality, public health, and climate change among others. What analysis the DMEIR does present is fraught with errors. For example, the DMEIR's analysis of the Project's traffic impacts relies on a model that is inaccurate and substantially underestimates future traffic volumes. Reliance on an inaccurate traffic model in turn implicates the EIR's air quality, public health, and noise analyses. In addition, the countless vague, voluntary, and unenforceable policies relied on as mitigation measures in the DMEIR fail to comply with CEQA, which requires enforceable, concrete commitments to mitigation. As a result, the DMEIR fails to describe measures that could avoid or substantially lessen the General Plan's numerous

JJ-1

significant impacts. The pervasive flaws in the document demand that the DMEIR be substantially modified and recirculated for review and comment by the public and public agencies. JJ-1 CONT

The EIR is "the heart of CEQA." *Laurel Heights Improvement Ass'n v. Regents of University of California* (1988) 47 Cal. 3d 376, 392 (citations omitted) (*Laurel Heights I*). It is "an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return. The EIR is also intended 'to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.' Because the EIR must be certified or rejected by public officials, it is a document of accountability." *Id.* (citations omitted). Where, as here, the environmental review document fails to fully and accurately inform decision-makers, and the public, of the environmental consequences of proposed actions, it does not satisfy the basic goals of CEQA. *See* Pub. Res. Code § 21061.

For all the reasons set forth below, it is our opinion that the DMEIR does not comply with the requirements of CEQA. The DMEIR's failings will impact all Fresno residents, but will most directly and significantly impact low-income, disadvantaged residents and communities, especially communities of color in Central, Southeast, and Southwest Fresno. These communities are the most vulnerable to the impacts the DMEIR fails to adequately analyze or effectively mitigate. Thus, the DMEIR not only violates CEQA but results in violations of state and federal fair housing and civil rights laws, including but not limited to 42 U.S.C. §§ 2000d, 3601 *et seq*., 5304(b)(2), 5306(s)(7B), and 12705, and Cal. Gov. Code §§ 1135, 12955 *et seq*. JJ-2

The City must revise and recirculate the DMEIR to provide the public an accurate assessment of the environmental issues at stake, and a mitigation strategy—developed *before* General Plan approval—that fully addresses the Project's significant impacts. The City must also take a serious look at alternatives that can avoid or lessen the Project's significant impacts. The revised DMEIR should include the changes to the General Plan requested in the General Plan comments submitted by the Leadership Counsel for Justice and Accountability on August 18, 2014. These proposed revisions to the General Plan are feasible mitigation measures that can effectively reduce the Project's impacts.

This letter, along with the transportation report prepared by MRO Engineers (Exhibit A) and the air quality report prepared Baseline Environmental, Inc. (Exhibit B) constitute our comments on the DMEIR. Please refer to these reports for further detail

and discussion of the DMEIR's inadequacies with regard to impacts to transportation and air quality.

JJ-2 CONT

I. General Comments

The following are our general comments on the legal inadequacies of the DMEIR. More specific comments on individual sections of the document follow.

A. The DMEIR Improperly Attempts to Avoid Analysis and Mitigation of the General Plan's Impacts by Concluding that They Are Significant and Unavoidable.

JJ-2

Where all available and feasible mitigation measures have been proposed but are inadequate to reduce an environmental impact to a less-than-significant level, an EIR may conclude that the impact is significant and unavoidable. *See* CEQA Guidelines § 15126.2. If supported by substantial evidence, the lead agency may make findings of overriding considerations and approve the project in spite of its significant and unavoidable impacts. *Id.* at §§ 15091, 15093. However, the lead agency cannot simply conclude that an impact is significant and unavoidable and move on. A conclusion of residual significance does not excuse the agency from (1) performing a thorough evaluation and description of the impact and its severity before and after mitigation, and (2) proposing *all* feasible mitigation to "substantially lessen the significant environmental effect." CEQA Guidelines § 15091(a)(1); *see also id.* § 15126.2(b) (requiring an EIR to discuss "any significant impacts, *including those which can be mitigated but not reduced to a level of insignificance*" (emphasis added). "A mitigation measure may reduce or minimize a significant impact without avoiding the impact entirely." 1 Stephen Kostka & Michael Zischke, *Practice Under the California Environmental Quality Act* § 14.6 (2d ed. 2008).

JJ-3

The DMEIR finds that the City's plans for future growth and development as set out in the General Plan will result in 22 significant and unavoidable impacts in 10 different areas. DMEIR at 2-10 – 2-55. As detailed below, in numerous instances, the DMEIR fails to thoroughly assess impacts deemed to be significant and unavoidable or to identify all feasible mitigation measures to reduce the severity of the impacts.

B. The DMEIR Fails to Analyze the Impacts of All Development That Could Occur as a Result of Buildout Under the General Plan.

The General Plan acknowledges the harmful effects of unrestricted growth in the City, including increased reliance on personal automobile use and the inability to provide efficient public transit service to new development, which leads to increased air pollution and greenhouse gas emissions. General Plan at 3-6, 3-7, and 7-7. Yet, the General Plan proposes land use policies that fail to limit development in future growth areas. Specifically, the Plan includes objectives and policies that call for regulating growth by "promoting" development in certain parts of the City. (*See*, e.g., Objective UF-12 directing the City to locate *roughly* one half of future residential development in infill areas; emphasis added.) However, the Plan provides liberal definitions for terms such as "roughly" and "approximately" as applied in the Plan. Specifically, the Plan states that use of these terms is intended to be flexible so that depending on context, a reference to "approximately one-half" could vary at least 10 to 15 percent and use of the term "roughly" could include twice that amount or more. General Plan at 1-30. These vague definitions have important implications when applied to planning policy.

JJ-4
CONT

For example, General Objective UF-12 directs the City to locate "roughly one half" of future residential development in infill areas. But given the General Plan's flexible definition of the word "roughly," anywhere from 20 percent to over 80 percent of future development could occur in infill areas. However, the DMEIR presents only one set of estimates for the amount of anticipated development at build-out. *See* DMEIR Table 3-3. Thus, the DMEIR fails to disclose its assumptions for the amount of infill used (*i.e.*, 20 percent, 50 percent, or 80 percent of development in infill areas at build-out) for the analyses of the Project's environmental impacts. Given that the Plan allows a broad range of development to occur outside of infill areas, the DMEIR must evaluate potential impacts that would occur if only 20 percent of anticipated future development were to take place in identified infill areas, or better yet, revise General Objective UF-12 to ensure the majority of future development occurs in infill areas. If the majority of Project-related growth takes place outside the identified infill areas, Project impacts related to transportation, air quality and greenhouse gases would be much worse that the DMEIR indicates. These impacts would be even more severe in disadvantaged communities that are already over-burdened with inadequate access to transit and pollution.

C. The DMEIR Ignores Feasible Mitigation, Such as Changes to the Land Use Designations and Densities and Intensities Proposed in the General Plan.

For several of the General Plan's significant and unavoidable impacts, notably the Project's significant impact related to greenhouse gas emissions, the DMEIR concludes that no feasible mitigation is available. However, the DMEIR never considers changes to land use designations or densities and intensities as potential mitigation even though such changes could significantly reduce greenhouse gas emissions and other significant impacts disclosed in the DMEIR. CEQA requires the EIR to consider such mitigation.

The City cannot approve projects with significant environmental impacts if any feasible mitigation measure or alternative is available that will substantially lessen the severity of any impact. Pub. Res. Code § 21002; CEQA Guidelines § 15126(a). The City is legally required to mitigate or avoid the significant impacts of the projects it approves whenever it is feasible to do so. Pub. Res. Code § 21002.1(b). "In the case of the adoption of a plan, policy, regulation, or other public project [such as the General Plan], mitigation measures can be incorporated into the plan, policy, regulation, or project design." CEQA Guidelines § 15126.4(a)(2). Mitigation is defined by CEQA to include "[m]inimizing impacts by limiting the degree or magnitude of the action and its implementation." CEQA Guidelines § 15370(b). In addition to proposing new "policies" as mitigation, mitigation should include changes in where development is planned, what kind is planned, and how dense or intense that development is planned to be, *i.e.*, changes to land use diagram and land use designations.

JJ-5

There is no indication that the DMEIR considered modifications to land use designations or densities and intensities to mitigate the impacts of the General Plan. Yet those changes are the easiest, most effective, and most obvious ways to lessen or avoid many of the General Plan's impacts. For example, the Plan will result in locating a substantial amount of new industrial uses in close proximity to existing and proposed residential areas. DMEIR at Exhibit 3-4 Planned Land Use. This will in turn result in increased exposure of sensitive receptors, especially disadvantaged communities, to substantial pollutant concentrations. DMEIR at 5.3-62. Exploring alternative land use scenarios would go a long way toward reducing numerous significant General Plan impacts identified in the DMEIR, such as air quality, public health, climate change, traffic, and noise.

D. The DMEIR Cannot Rely on Unenforceable and Noncommittal General Plan Policies to Mitigate the Project's Significant Impacts.

Mitigation measures proposed in an EIR must be "fully enforceable" through permit conditions, agreements, or other legally binding instruments. Pub. Res. Code § 21081.6(b); CEQA Guidelines § 15126.4(a)(2). The DMEIR relies on a number of General Plan policies to mitigate significant environmental impacts. *See*, for example, DMEIR at 5.3-48, 5.7-52, 5.10-11, Many of these General Plan policies and programs are vague, optional, directory, or otherwise unenforceable.

For example, the Plan fails to provide enforceable policies that direct stepped, orderly growth. Instead, the Plan includes policies that call for "promoting" development in certain parts of the City. (*See*, e.g., Policy LU-1-a directing the City to *promote* development within the existing City Limits and in infill areas and Policy LU-1-c directing the City to *promote* orderly land use development in pace with public facilities and services needed to serve development; emphasis added.) These vague and unenforceable policies fail to describe how the City will promote and enforce an orderly growth process and fail to ensure infill development will occur prior to development in the Growth Areas. General Plan Implementation Element at 12-30.

A few other examples of ineffective mitigation—out of numerous instances—include the following (emphases added): JJ-6

- Policy RC-8-c: Energy Conservation in New Development. *Consider* providing an incentive program for new buildings that exceeds California Energy Code requirements by fifteen percent. DMEIR at 5.3-29.

- Policy RC-8-j: Alternative Fuel Network. *Support* the development of a network of integrated charging and alternate fuel stations for both public and private vehicles, and *if feasible*, open up municipal stations to the public as part of network development. *Id.*

- Policy LU-2-b: Infill Development for Affordable Housing. *Consider* a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City limits as a strategy to help to meet the affordable housing needs of the community. DMEIR at 5.7-25.

- Policy LU-6-b: *Consider* adopting commercial development guidelines to assure high quality design and site planning for large commercial

developments, consistent with the Urban Form policies of this Plan. DMEIR at *Id.*

- Policy LU-1-e: Annexation Requirements. *Consider* implementing policies and requirements that achieve annexations to the City that conform to the General Plan Land Use Designations and open space and park system, and are revenue neutral and cover all costs for public infrastructure, public facilities, and public services on an ongoing basis. DMEIR at 5.10-11.

- Policy LU-2-a: Infill Development and Redevelopment. *Promote* development of vacant, underdeveloped, and redevelopable land within the City Limits where urban services are available by *considering* the establishment and implementation of supportive regulations and programs. DMEIR at 5.10-12.

- Policy D-4-b: Incentives for Pedestrian-Oriented Anchor Retail. *Consider* adopting and implementing incentives for new pedestrian-friendly anchor retail at intersections within Activity Centers and along corridors to attract retail clientele and maximize foot traffic. DMEIR at 5.7-26.

JJ-6
CONT

- Policy D-4-f: Design Compatibility with Residential Uses. *Strive to ensure* that all new nonresidential land uses are developed and maintained in a manner complementary to and compatible with adjacent residential land uses, to minimize interface problems with the surrounding environment and to be compatible with public facilities and services. DMEIR at 5.10-13.

A general plan's goals and policies are necessarily general and aspirational. The City may rely on such policies to mitigate environmental impacts under CEQA, however, only if they will be implemented through specific implementation programs that represent a firm, enforceable commitment to mitigate. *See Napa Citizens for Honest Gov't v. Napa County Bd. of Supervisors* (2001) 91 Cal. App. 4th 342, 358 (citing *Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal. App. 4th 351, 377). CEQA requires that mitigation measures actually be implemented—not merely adopted and then disregarded. *Anderson First Coalition v. City of Anderson* (2005) 130 Cal. App. 4th 1173, 1186-87 ; *Fed'n of Hillside & Canyon Ass'ns v. City of Los Angeles*(2000) 83 Cal. App. 4th 1252, 1261 .

Here, the General Plan's vague, unenforceable, and noncommittal policies and programs (and policies for which no implementation programs are identified) allow the

City to decide to take no action and thus fail to mitigate impacts. As a result, the DMEIR cannot ensure that the policies relied on will in fact be implemented to mitigate the General Plan's impacts. Therefore they cannot serve as CEQA mitigation. *See Anderson First*, 130 Cal. App. 4th at 1186-87.

JJ-6 CONT

II. The DMEIR's Analyses of and Mitigation for the General Plan's Environmental Impacts Are Legally Inadequate.

The evaluation of a proposed project's environmental impacts is the core purpose of an EIR. *See* CEQA Guidelines § 15126.2(a) ("An EIR shall identify and focus on the significant environmental effects of the proposed project"). As explained below, the DMEIR fails to analyze the Project's numerous environmental impacts, including those affecting land use, transportation and circulation, air quality, odor, climate change, public health and safety, and noise. In addition, in numerous instances, the DMEIR also fails to adequately analyze the Project's cumulative impacts. These inadequacies require that the DMEIR be revised and recirculated so that the public and decision-makers are provided with a proper analysis of the Project's significant environmental impacts and feasible mitigation for those impacts. See CEQA Guidelines, § 15002(a)(1) (listing as one of the "basic purposes" of CEQA to "[i]nform governmental decision makers and the public about the potential, significant environmental effects of proposed activities").

The "programmatic" nature of this DMEIR is no excuse for its lack of detailed analysis. CEQA requires that a program EIR provide an in-depth analysis of a large project, looking at effects "as specifically and comprehensively as possible." CEQA Guidelines § 15168(a), (c)(5). Because it looks at the big picture, a program level EIR must provide "more exhaustive consideration" of effects and alternatives than an EIR for an individual action, and must consider "cumulative impacts that might be slighted by a case-by-case analysis." CEQA Guidelines § 15168(b)(1)-(2).

JJ-7

Further, it is only at this early stage that the City can design wide-ranging measures to mitigate City-wide environmental impacts. *See* CEQA Guidelines § 15168(b)(4) (programmatic EIR "[a]llows the lead agency to consider broad policy alternatives and program wide mitigation measures at an early time when the agency has greater flexibility. . . ."). A "program" or "first tier" EIR is expressly not a device to be used for deferring the analysis of significant environmental impacts. *Stanislaus Natural Heritage Project v. County of Stanislaus* (1996) 48 Cal. App. 4th 182, 199. It is instead an opportunity to analyze impacts common to a series of smaller projects, in order to avoid repetitious analyses. Thus, it is particularly important that the DMEIR for the General Plan analyze the overall impacts for the complete level of development it is

authorizing now, rather than when individual specific projects are proposed at a later time.

The DMEIR, here, fails to provide the legally required analysis of the substantial growth that the General Plan allows and promotes. Thus, the City must revise the DMEIR to accurately disclose the impacts of the maximum density allowed by the General Plan it does propose to adopt. Detailed below are the specific legal inadequacies of the DMEIR's various impact sections. JJ-7 CONT

A. The DMEIR's Analysis of and Mitigation for the General Plan's Transportation Impacts Is Factually and Legally Deficient.

The DMEIR's transportation and traffic analysis contains numerous deficiencies that must be remedied if the public and decisionmakers are to fully understand this Project's potential effects. Specifically, the evaluation of the Project's transportation and traffic impacts must be revised to address: (1) use of a deficient forecasting model; (2) use of outdated level of service ("LOS") analysis methodology; (3) use of obsolete traffic volume data; (4) failure to consider the effects of truck traffic; (5) deficient safety analysis; (6) failure to analyze impacts to pedestrians and bicyclists; and (7) deficient analysis of the Project's impacts on emergency access. These issues are discussed in greater detail in the September 10, 2014, letter of MRO Engineers ("MRO Letter"), which is attached as Exhibit A. JJ-8

1. The DMEIR Contains No Evidence that Its Travel Demand Forecasting Model Actually Reflects Buildout Conditions Under the General Plan.

The DMEIR relies on what it describes as "a modified version of the Fresno COG countywide travel demand forecasting model" ("model") to develop its trip generation and vehicle miles traveled projections. DMEIR at 5.14-28. The theory behind use of this model is that if it can accurately predict existing traffic volumes (based on existing land uses and transportation system), then it will accurately predict future traffic volumes (based on future land use and transportation system projections). To ensure forecasting models accurately forecast existing, and hence future, traffic, they are subject to a model validation process by which analysts attempt to make the model replicate existing traffic volumes. Based on evidence presented in the DMEIR, the forecast model used for this analysis is not statistically valid (i.e. does not pass the validation tests) and thus fails to accurately predict project-related future traffic. MRO Letter at 2 and 3. JJ-9

The model was subjected to three validation tests. DMEIR Appendix H-5 at 77. According to the DMEIR, the model failed all three tests. *Id.* In the first validation test, to pass, the traffic forecasts for 75 percent of the roadway links must fall within the allowable deviation. In other words, only 25 percent of the roadway links may fall outside that allowable value. In fact, only 60 percent of the roadway links met the target, meaning that a full 40 percent failed to do so. In this case, 199 of the 495 tested roadway links had traffic forecasts that were either excessively high or low, compared to the actual traffic counts. *Id.*

For the second validation test (the model validation for Percent Root Mean Square Error), the goal is less than 40 percent. The actual model validation result was 46 percent, six percent higher than the established goal. Thus, this validation test, consistent with the first test, reveals that the modified Fresno COG model does not accurately predict existing traffic.

And finally, the third validation test (the Correlation Coefficient) measures the degree of straight-line or linear association between two variables. MRO Letter at 3. A value of 1.00 would indicate a perfect relationship between the two variables. *Id.* That is, as one variable increases, the other variable increases in a linear fashion. *Id.* Under this test, the model accurately predicts traffic volume if the Correlation Coefficient *exceeds* 0.88. In this case, the Correlation Coefficient was 0.88, which missed the goal of *exceeding* 0.88. DMEIR Appendix H-5 at 77. JJ-9 CONT

The use of a model that failed all three validation tests cannot provide accurate forecasts of future traffic volumes – it can't even predict existing volumes. MRO Letter attached as Exhibit A at 3. Clearly, more effort needs to be devoted to the model refinement process, with the goal of creating a travel demand forecasting model that actually provides credible forecasts of travel demand; the modified Fresno COG model used in the DMEIR traffic analysis fails in this regard. Once the model has been improved to the point that it is capable of replicating existing traffic volumes, then it will generate meaningful future traffic projections. The DMEIR traffic analysis must then be revised and the document needs to be recirculated for further public review. *Id.* Moreover, as discussed further below, because traffic volumes inform in large part the DMEIR's analysis of air quality, noise, and greenhouse gas impacts, those analyses must be revised and recirculated as well as they are compromised by the defective traffic forecasts.

2. The DMEIR Substantially Underestimates Project-Related Traffic at Buildout.

The traffic model's inaccuracy results in an analysis that substantially underestimates traffic volumes. As discussed above, 199 of the 495 tested roadway links had traffic forecasts that were either excessively high or low, compared to the actual traffic counts. MRO Letter at 3. Of those 199 deficient traffic forecasts, 120 (60 percent) were lower than the corresponding actual traffic count. *Id.* Moreover, of the 495 total roadway links, the traffic forecasts at 281 links (57 percent) were lower than the actual count. *Id. See* Attachment A to the MRO Letter Report at Appendix A. Thus, the DMEIR's traffic analysis underestimated existing traffic and thus underestimated future traffic impacts as well. Once the City accurately models the Project's increase in traffic volumes, it must revise the traffic analysis and other sections of the EIR implicated by the model results (*i.e.*, air quality, greenhouse gases, and noise). JJ-10

3. The DMEIR's Analysis of Level of Service is Faulty.

The DMEIR's analysis of traffic impacts is also inadequate because it relies on an outdated methodology for analyzing intersection LOS. The LOS analysis was based on the year 2000 version of the Highway Capacity Manual ("HCM") rather than the current (year 2010) version. This violates the City of Fresno Traffic Impact Study Report Guidelines (City of Fresno, Department of Public Works, Updated February 2, 2009, at 3), which requires that the most current edition of the Highway Capacity Manual be used when analyzing projected traffic in the City. The DMEIR acknowledges that the methodologies described in the 2010 HCM manual set the prevailing standard for LOS analysis, but then inexplicably fails to use it. MRO Letter at 4. Moreover, the DMEIR fails to provide information regarding the specific input parameters that were used in the analysis. MRO at 4 and 5. The EIR's failure here to use current methodologies and fully describe the assumptions used results in an inaccurate analysis of traffic impacts and undermines CEQA's purpose of fully informing the public of the Project's environmental impacts. *See Laurel Heights I*, 47 Cal.3d at 404. JJ-11

4. The DMEIR Relies on Obsolete Traffic Volume Data.

According to the City of Fresno's Traffic Impact Study Report Guidelines, the City's standard for use of existing traffic counts is that counts should be no more than 12 months old. City of Fresno Traffic Impact Study Report Guidelines at 7. The DMEIR bases its intersection analysis results on traffic counts obtained in 2012. DMEIR at 5.14-4. Therefore, the traffic counts used in the DMEIR are now two years old, which violates JJ-12

the City's standard. In addition, use of the outdated traffic data violates accepted practice within the traffic engineering profession. Specifically, the Institute of Transportation Engineers specifies that ". . . traffic volume data should generally be no older than 1 year." 2006 Institute of Transportation Engineers (ITE), Transportation Impact Analyses for Site Development at 19. MRO Letter at 7.

JJ-12 CONT

Traffic volumes represent "the most critical input parameter" in evaluating level of service. MRO Letter at 7. If the traffic analysis uses the wrong numbers, it will misrepresent the environmental setting and project impacts. *Id.* Thus, the traffic impacts of the Project must be reanalyzed using up-to-date traffic volume data, and the EIR must be revised to reflect the corrected analysis.

5. The DMEIR Fails to Analyze the Project's Effects Related to Truck Traffic.

As discussed in detail in the MRO Letter, the DMEIR's analysis fails to explain the assumptions incorporated into the traffic analysis. MRO Letter at 5 and 7. Without an understanding of the input parameters that were applied to the analysis, it is impossible to determine whether the specific effects of project-related truck traffic were taken into account. *Id.* The proposed General Plan calls for substantial industrial land uses, particularly in the south and west Fresno areas. DMEIR at Exhibit 3-4. Consequently, the road system in those areas will be called upon to accommodate substantial truck traffic, which can add to congestion on area roadways. An analysis of truck traffic is important because trucks operate differently from passenger vehicles. For example, they are slower to accelerate, they need longer braking distances, and need a greater separation between vehicles. MRO Letter at 8.

JJ-13

Moreover, the DMEIR includes no discussion or analysis of auto-truck conflicts and the potential safety issues associated with mixing automobile traffic with a considerable amount of heavy vehicle traffic. This is a substantial deficiency in the DMEIR, given the extent of nearby residential land uses. A revised EIR must correct this deficiency.

6. The DMEIR Presents a Deficient Safety Analysis.

The DMEIR's analysis of safety conditions at build-out is incomplete and misleading. The DMEIR basis its analysis of safety impacts solely on the number of collisions at a small number of locations in Fresno. DMEIR at 5.14-15. Unfortunately, as the MRO Letter explains, this information is virtually meaningless because it fails to

JJ-14

account for the total volume of traffic at any given location. MRO Letter at 7. A valid traffic safety analysis will include the development and comparison of accident rates, in terms of collisions per million-vehicle-miles for key roadway segments. *Id.* The DMEIR, though, provides no such assessment and, therefore, it is impossible to determine whether the accident data indicates an existing safety problem. *Id.* The DMEIR must be revised to include a detailed analysis of plan-related safety impacts and to identify needed mitigation measures.

JJ-14 CONT

7. The DMEIR Fails to Analyze Project Impacts On Pedestrians and Bicyclists.

As noted above, the DMEIR relies on outdated methodology contained in the 2000 HCM. DMEIR at 5.14-4. Because it relies on outdated methodology, the DMEIR necessarily fails to consider potential impacts on pedestrians, bicyclists, and transit users as the 2000 HCM does not incorporate these modes of travel into its method of analysis. *Id.* By contrast, the 2010 HCM does. MRO Letter at 9. Therefore, the DMEIR's reliance on outdated methods results in a truncated analysis that fails to address multi-modal travel (*e.g.*, travel using different modes, including automobile, public transit, bicycle, or walking). This omission results in disproportionate impacts to residents in low-income neighborhoods, who are more likely to rely on walking, bicycling, and public transit for transportation.

JJ-15

Nor does the DMEIR provide a separate analysis (quantitative or qualitative) to address the potential impacts of the proposed General Plan with regard to the performance or safety of multi-modal roads and other facilities that will be used by pedestrians and bicyclists. DMEIR at 5.14-85. Instead, the DMEIR lists General Plan policies and objectives that address multi-modal travel. However, these policies fail to address pedestrian and bicyclist safety. For example, Policy LU-1-a directs the City to promote development within the existing City Limits and to promote infill development; Policy LU-1-c directs the City to promote orderly development in pace with public facilities to serve development; and Policy MT-4-I directs the City to promote the integration of bicycling with public transit by providing bike racks, etc. These and other listed policies do not address the safety or performance of multi-modal roads and roads and facilities. Consequently, there is simply no basis for the DMEIR's finding that implementation of the General Plan will result in less-than-significant impacts on pedestrians and bicyclists.

The DMEIR ignores Project factors that could lead to significant operational and safety-related impacts throughout the City as the plan is implemented. At the very minimum, transit users will suffer from the extensive travel delays imposed by a roadway system where LOS E and F are prevalent. Pedestrians and bicyclists are likely to be exposed to unsafe conditions, as frustrated motorists become impatient and make poor decisions leading to unsafe conditions. Moreover, the substantial increase in truck traffic associated with the increase in industrial uses will also increase safety risks for pedestrians and bicyclists. There have already been several incidents of pedestrian fatalities associated with trucks travelling to industrial facilities near neighborhoods in southwest Fresno, and pedestrian fatalities in the City are generally on the rise. *See* http://www.fresnobee.com/2014/08/19/4077804_woman-70-killed-in-fresno-when.html?rh=1 and http://abc30.com/news/more-pedestrians-are-being-hit-and-killed-by-cars-in-fresno/193481/ .

JJ-15 CONT

As pointed out in the MRO Letter, given the importance of non-automotive travel within the proposed plan, it is essential that the DMEIR include a meaningful analysis of the plan's impacts on those alternative modes. Such an analysis is absent from the current document.

8. The DMEIR Fails to Adequately Analyze the Project's Impacts on Emergency Access.

The DMEIR concludes that the Project would not adversely impact emergency access. DMEIR at 5.14-85. The DMEIR relies on the rationale that "an enhanced roadway network that accommodates forecasted travel demand would also provide adequate emergency access." DMEIR at 5.14-83. However, as discussed above and in the MRO Letter, the DMEIR itself demonstrates that the City's road system will not be able to accommodate forecasted traffic demand. MRO Letter at 10.

JJ-16

Specifically, the General Plan will allow most roadways in the City to operate at LOS F. DMEIR at 5.14-41. According to the definition of LOS F provided in the DMEIR:

> "LOS F is used to define *forced or breakdown conditions*. This condition exists wherever the volume of traffic *exceeds the capacity of the roadway*. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion." (Emphasis added.) DMEIR at 5.14-4

As the definition makes clear, the City's future roadways will not provide adequate emergency access. Roads operating at LOS F will be clogged with traffic, which will impede all traffic, including emergency vehicles, resulting in delays in emergency response times. Delays in response times translate directly to patient fatalities. MRO Letter at 11. This is a significant impact that was ignored in the DMEIR.

JJ-16 CONT

B. The DMEIR Fails to Adequately Analyze and Mitigate the General Plan's Air Quality Impacts.

The City of Fresno, and the surrounding San Joaquin Valley Air Basin, suffer from some of the nation's worst air quality. Therefore, it is imperative that the DMEIR provide an accurate assessment of the Plan's potential to further degrade air quality. By its own admission, implementation of the General Plan would cause a substantial increase in air pollution. DMEIR at 5.3-62. However, the DMEIR's analysis of air quality impacts is grossly inadequate. In several instances, the DMEIR fails to analyze the Project's effects at all. Where the document does attempt to analyze impacts, it underestimates the increase in emissions because it underestimates the Project's increase in predicted traffic volumes. Moreover, the DMEIR fails to analyze the health effects that would occur as a result of exposure to these pollutants. Thus the DMEIR's analysis of air quality impacts does not comply with CEQA.

JJ-17

The fact is that this Project will have a devastating impact on local and regional air quality. Disadvantaged communities and people of color, who already suffer from health impacts of poor air quality, will feel these impacts more acutely than other City residents. Unfortunately, the details remain unknown because the DMEIR does not provide anything close to a complete analysis of these impacts. The most egregious flaws in the air quality analysis are described below. In addition, we incorporate by reference the letter dated October 7, 2014 from Baseline Environmental, Inc. ("Baseline Report").

1. The DMEIR Underestimates the Project's Air Quality Impacts Because it Underestimates the Amount of Traffic That Would Be Generated.

As discussed above, use of the deficient model has substantial ramifications for the environmental analysis. The DMEIR underestimates predicted traffic volumes because it relies on an inaccurate traffic model. Inasmuch as the air quality emissions are dependent on the transportation analysis assumptions, any underestimation of vehicular trips necessarily results in an underestimation of vehicular emissions. Once the City accurately models the Project's increase in traffic volumes, it must revise the air quality impact analysis. JJ-18

2. The DMEIR Contains No Evidence that Its Air Emissions Model Actually Reflects Buildout Conditions Under the General Plan.

The estimates of future emissions in the DMEIR are not representative of the changes in emissions that would result from the proposed land uses changes in the General Plan Update. Baseline at 3. To forecast Project-related air quality emissions, the DMEIR does not look to the land uses in the General Plan, but rather relies on population growth estimates that are independent of the General Plan Update (i.e., the population growth estimates would be the same without the General Plan Update) . DMEIR at 3-25. Because the assumptions employed in the air emissions model are not presented in the DMEIR, it is not possible to determine if the model uses the same population and employment assumptions as the draft General Plan itself or if and how it considers the General Plan's land use designations. In other words, there is no evidence that the air emissions model is actually analyzing the impacts of the General Plan rather than some other scenario. JJ-19

3. Violation of the Applicable Air Quality Plan

The DMEIR concludes the Project would not conflict with or obstruct implementation of the applicable air quality plans ("AQPs"). The applicable AQPs adopted by the San Joaquin Valley Air Pollution Control District ("SJVAPCD") include the following: JJ-20

- The 2004 Extreme Ozone Attainment Demonstration Plan;
- The 2007 Ozone Plan;
- The 2007 PM10 Maintenance Plan and Request for Redesignation;
- The 2008 PM2.5 Plan;

- The 2012 PM2.5 Plan; and
- The 2013 Plan for the Revoked 1-hour Ozone Standard.

Baseline Report at 1.

The DMEIR explains that "[T]he growth projections used for the General Plan assume that growth in population, vehicle use and other source categories will occur at historically robust rates that are consistent with the rates used to develop the SJVAPCD's attainment plans." DMEIR at 5.3-32. However, the DMEIR fails to quantify population, vehicle use, and other source category growth projections used in the six applicable AQPs or the General Plan Update. JJ-20 CONT

Similarly, the DMEIR states that "[R]eview of the proposed goals and policies of the General Plan Update found them to be consistent with the applicable control measures of the SJVAPCD attainment plan." DMEIR at 5.3-33. However, the DMEIR fails to document the review process relied upon to substantiate this conclusion. There is no discussion of the primary goals and control measures contained in the six applicable AQPs and how they compare to the goals and policies of the General Plan Update. We can find no evidence in the record to substantiate the conclusion that the Project is consistent with the applicable AQPs. An EIR must contain facts and analysis, not just an agency's bare conclusions. *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal. 3d 553, 568.

4. Criteria Air Pollutant Emissions

There are numerous flaws in the DMEIR's criteria air pollutant analysis. First, the DMEIR's estimates of Project-related criteria pollutant emissions are inconsistent with estimates for the region made by the California Air Resources Board ("CARB") in the 2013 edition of The California Almanac of Emissions and Air Quality. Each year, CARB publishes a new Almanac that summarizes existing criteria pollutant emissions trends in each county and forecasts emissions from all stationary (including fuel combustion), area, and mobile sources. The forecasts take into account the most recent emissions data, projected growth rates, and future adopted control measures to estimate emissions in future years. JJ-21

As described further in the Baseline Report, based on the CARB estimates of reactive organic gas ("ROG") emissions in 2010 in Fresno County, ROG emissions in the City would be approximately 12,000 tons. Baseline Report at 3. This estimate of

ROG emissions is about *four times greater* than the total 2010 estimate of 3,105 tons reported in Table 5.3-9 of the DMEIR at 5.3-42. Thus the DMEIR relies on an inaccurate baseline to analyze the General Plan air quality impacts. CEQA requires an accurate description of the existing environment. CEQA Guidelines § 15125(a); *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 722. Without an adequate baseline, the DMEIR cannot meaningfully analyze the air quality impacts of the General Plan. Moreover, as further discussed in the Baseline Report and below, the faulty methodology used for preparation of the DMEIR results in inadequate analysis of pollutant emissions, including construction emissions, on-road motor vehicle emissions, electricity and natural gas emissions, and stationary and area source emissions. Baseline Report at 2.

The DMEIR's analysis of criteria pollutants is misleading. The DMEIR assumes that emissions from stationary sources will remain the same over the next 40 years because "it would be impossible to predict if the emissions would increase or decrease in the future." DMEIR at Table 5.3-9 footnote. This assumption is unsupportable. Stationary sources include industrial and manufacturing facilities that emit substantial amounts of criteria pollutants. DMEIR at Table 5.3-9. Inasmuch as the Plan's proposed land use map would result in more than 40 million square feet of new industrial uses likely to include stationary source emissions, the DMEIR's statement that future emissions from stationary sources may decrease is highly unlikely. DMEIR at 3-24. JJ-21 CONT

The DMEIR's analysis of criteria pollutants also fails to include $PM_{2.5}$ emissions from stationary sources, stating only that this information is not available. DMEIR at Table 5.3-9. As explained in the Baseline Report, the CARB's database for the 2013 Almanac provides forecasts of pollutant emissions from stationary and area sources, including the emissions of $PM_{2.5}$, which are forecasted to increase over time. Baseline Report at 4. Using these existing trends and forecasts of pollutant emissions provided by CARB, the DMEIR can estimate $PM_{2.5}$ emissions, contrary to the DMEIR's claim. Without an analysis of $PM_{2.5}$ emissions, the current analysis of stationary and area source pollutant emissions violates CEQA. As discussed further below, an analysis of the Plan's increase in $PM_{2.5}$ emissions is particularly critical since $PM_{2.5}$ causes public health impacts. *See* $PM_{2.5}$ Designations Under the Clean Air Act, U.S. Environmental Protection Agency, attached as Exhibit C.

In addition, the DMEIR inappropriately employs project-level thresholds of significance to evaluate plan-level criteria pollutants. DMEIR at 5.3-38. As Baseline explains, project-level thresholds are meaningless when applied to an evaluation of the

total pollutant emissions estimated for all existing and future projects under the General Plan Update. The DMEIR should have, and could have, developed and applied thresholds of significance appropriate for planning documents. For example, the Bay Area Air Quality Management District provides guidance on preparing plan-level analyses and recommends the following criteria to evaluate operational-related criteria pollutants emissions for plans:

- Consistency with current AQP control measures; and
- A proposed plan's projected VMT or vehicle trips (either measure may be used) increase is less than or equal to its projected population increase.

The DMEIR could have used these criteria or other criteria appropriate for plan level projects. JJ-21 CONT

As discussed above, the DMEIR presents an inadequate analysis of the General Plan's consistency with applicable AQP control measures, relies on an inadequate traffic analysis that underestimates the Project's increase in VMT, and fails to adequately analyze criterial air pollutants.

Meaningful analysis of impacts effectuates one of CEQA's fundamental purposes: to "inform the public and responsible officials of the environmental consequences of their decisions before they are made." *Laurel Heights Improvement v. Regents of Univ. of Cal.*(1994) 6 Cal. 4th 1112, 1123 (*Laurel Heights II*). The DMEIR fails to achieve this fundamental goal.

5. The DMEIR's Fails to Adequately Analyze the Project's Potential to Impact Public Health.

Air pollution studies indicate that living close to high traffic and the associated emissions may lead to adverse health effects beyond those associated with regional air pollution in urban areas. *See* California Air Resources Board, Air Quality and Land Use Handbook: A Community Health Perspective, attached as Exhibit D. Measurements of traffic-related pollutants show that concentrations within 300 meters (approximately 1,000 feet) downwind of freeways are higher than regional values. *Id.* at 8. In addition to respiratory health effects, proximity to freeways increases potential cancer risk. *Id.* JJ-22

The DMEIR acknowledges that transportation is a major source of toxic air contaminants and particulate matter. DMEIR at 5.14-31. The DMEIR also acknowledges

that the build-out under the General Plan update would result in more than double the vehicle miles travelled in the City and the surrounding area. DMEIR at 5.14-29. Yet, the DMEIR fails to adequately analyze the Project's potential to expose nearby sensitive receptors to emissions of toxic air contaminants ("TACs") resulting from future increased VMT.

JJ-22 CONT

In addition, build-out of the proposed General Plan will result in a substantial additional industrial land uses, which are also sources of TAC emissions. The DMEIR impermissibly defers analysis and mitigation of these emissions. DMEIR at 5.3-60 and 5.3-61. These serious omissions are discussed further below.

(a) **The DMEIR Fails to Provide an Adequate Description of the Existing Setting.**

The DMEIR provides no information about existing exposure to TACs in the Planning Area, the starting point for any adequate analysis of a project's potential to impact public health. (See, DMEIR at 5.3-58 and 5.3-59 where the document provides information only about the risk at the County level.) This omission violates CEQA's core requirement that an EIR include an adequate "description of the physical environmental conditions in the vicinity of the project." CEQA Guidelines § 15125(a). Investigating and reporting existing conditions are "crucial function[s] of the EIR." *Save Our Peninsula Comm. v. Monterey County* (2001) 87 Cal. App. 4th 99, 122 ("SOPC"). "[W]ithout such a description, analysis of impacts, mitigation measures and project alternatives becomes impossible." *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal. App. 4th 931, 953. Decision-makers must be able to weigh the project's effects against "real conditions on the ground." *City of Carmel-by-the-Sea v. Board of Supervisors* (1986) 183 Cal. App. 3d 229,246. "Because the chief purpose of the EIR is to provide detailed information regarding the significant environmental effects of the proposed project on the physical conditions which exist within the area, it follows that the existing conditions must be determined." SOPC, 87 Cal. App. 4th at 120 (internal quotations omitted). Unless the DMEIR adequately describes the public's existing exposure to TACs, decision-makers cannot: (1) understand the scope of the existing TAC problem; (2) measure the Project's new TAC impacts against a baseline of current TAC emissions; (3) evaluate mitigation of those impacts; or (4) intelligently decide whether the Project's approval is worth the risk.

JJ-23

Although not disclosed in the DMEIR, South Fresno neighborhoods, including in particular, West Fresno, Southeast Fresno, and Calwa are already subject to emissions

from existing industrial uses in the area and freeway traffic emissions. In fact, under the California Environmental Protection Agency's CalEnviroScreen 2.0, a screening methodology that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution, neighborhoods in South Fresno rank among the most burdened by multiple sources of pollution in the State of California.[1] Fifteen of the twenty highest scoring census tracts in California, and thus most burdened by multiple sources of pollution, under CalEnviroScreen 2.0 are located in Fresno within the 93706, 93721, 93725, 93701, and 93703 zip codes – all Southeast, Southwest, and Central Fresno zip codes. Census tracts in West Fresno rank as the first, second, and third most burdened census tracts in the State of California. Given the fact that the surrounding community is already disproportionally impacted by the number of industrial and refinery projects in the area, one would expect the DMEIR to comprehensively describe each of the sensitive receptors that could be potentially impacted by the Project. Unfortunately, this is not the case.

An adequate impact analysis would necessarily begin with a thorough description of existing sensitive receptors (*i.e.*, those segments of the population most susceptible to poor air quality (*i.e.*, children, the elderly, and those with pre-existing serious health problems affected by air quality). These receptor locations include residential communities, schools, daycare centers, playgrounds, and medical facilities. Yet, other than a generic statement that sensitive receptors located near TAC sources may be exposed to substantial pollutant concentrations, the EIR does not identify the specific location of any of these sensitive receptors. Nor does it describe the existing health of nearby sensitive receptors. It is imperative that the EIR disclose this information because a Project's potential to result in significant environmental impacts varies by setting. CEQA Guidelines § 15064(b). Thus, individuals who already suffer from high rates of asthma and other respiratory disease may experience greater-than-average sensitivity to Project-generated TAC emissions.

JJ-23
CONT

The EIR preparers could easily have obtained current TAC data from any of the following sources: EPA's AirData reports, or the TAC predictions in the National Air Toxic Assessment Model, which are available for every U.S. census tract.

[1] See Microsoft Excel spreadsheet: A spreadsheet showing raw data and calculated percentiles for individual indicators and CalEnviroScreen scores for individual census tracts with additional demographic information: CalEnviroScreen_v.2.0.xls, available at http://oehha.ca.gov/ej/ces2.html.

http://www.epa.gov/nata2002/methods.html , or CalEnviroScreen_v.2.0.xls, available at http://oehha.ca.gov/ej/ces2.html. JJ-23 CONT

(b) **The DMEIR's Analysis Fails to Correlate the Project's Emissions to Related Impacts on Human Health.**

The DMEIR's deficient analysis of the Project's health risks extends beyond its failure to describe the existing environmental setting. The DMEIR fails to include a health risk assessment ("HRA"). Given the Plan's enormous increase in VMT and in industrial uses – more than 40 million square feet – most of which will be concentrated in the southern portion of the City, there is a strong likelihood that the increase in TAC emissions would also be significant. *See* DMEIR at Table 5.14-3, indicating a significant increase in VMT and at Exhibit 3-4, indicating a high percentage of heavy industrial uses located in the western and southern areas of the City.

The increased VMT will in turn result in greater exposure to $PM_{2.5}$. The serious health risks associated with $PM_{2.5}$ exposure are well-documented. In its final rule designating attainment and non-attainment of $PM_{2.5}$ standards, the U.S. EPA noted the "significant relationship between $PM_{2.5}$ levels and premature mortality, aggravation of respiratory and cardiovascular disease . . . , lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia," particularly among "older adults, people with heart and lung disease, and children." See generally Air Quality Designations and Classifications for the Fine Particles ($PM_{2.5}$) National Ambient Air Quality Standards, 70 Fed. Reg. 944, 945 (Jan. 5, 2005) [Vol. 2, Ex. 28-e]; see also Land Use Guidance for Roadway Proximity Health Effects, attached as Exhibit E. This latter document elaborates on the health effects of particulate matter exposure, the epidemiology of roadway proximity health effects, and provides guidance for assessing these effects. JJ-24

In addition to respiratory health effects, proximity to freeways increases potential cancer risk. *See* California Air Resources Board, Air Quality and Land Use Handbook: A Community Health Perspective at 8, attached as Exhibit D. The General Plan proposes development of residential uses in close proximity to super arterial roadways and major freeways. *See*, 2035 Fresno General Plan Land Use Diagram, dated August 8, 2012. For example, the Plan proposes dense residential neighborhoods immediately adjacent to super arterials in the northwestern portion of the City between Grantland and Herndon and in the southern portion of the City along Jensen, and in close proximity to SR 180. *Id.* In another example, General Plan Policy POSS-2-d directs the City to pursue

development of remnant parcels along freeway corridors for recreational uses, potentially locating neighborhood parks immediately adjacent to freeways and polluted air. Consequently, one would expect the DMEIR to vigorously examine the Project's impact on sensitive receptors in these communities and to mitigate for potential health risks. Unfortunately, the DMEIR fails to undertake this analysis.

With regard to exposure to TACs from stationary sources, the DMEIR is equally deficient. The DMEIR acknowledges that "new sensitive receptors located near existing toxic air contaminant sources may be exposed to substantial pollutant concentrations" (DMEIR at 5.3-54) and recognizes that "projects located near facilities with large numbers of diesel trucks such as distribution centers or loading docks in close proximity to receptors" may result in significant impacts. DMEIR at 5.3-55. But, the DMEIR stops short of analyzing those impacts. The DMEIR fails to map the location of existing TAC sources (e.g., freeways and gasoline dispensing facilities) and fails to analyze whether the proposed land use changes would increase exposure of sensitive receptors to TACs. Baseline Report at 6. Rather than conduct the necessary analysis to disclose the extent and severity of resulting health impacts on existing residents and proposed future residents from toxic air contaminants, the DMEIR defers the analysis to the future when individual projects are proposed. DMEIR at 5.3-55. This approach violates CEQA.

JJ-24
CONT

As discussed above, the City cannot defer its assessment of important environmental impacts until after the project is approved. *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 306-07. In addition, an agency is not relieved from its obligation to provide environmental analysis simply because the task may be difficult. As explained by the Court, "[w]e find no authority that exempts an agency from complying with the law, environmental or otherwise, merely because the agency's task may be difficult." *Id.* at 399.

Moreover, courts have made clear that the EIR must not just identify that a project will result in health impacts from pollutants, but must analyze the impact of those emissions on the health of affected residents; in other words, the analysis must include a health risk assessment. *See Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-20. Here, as explained above, health impacts to disadvantaged, pollution-burdened neighborhoods are likely to be even more severe than other areas of the City. The revised EIR must "correlate the identified adverse air quality impacts to resultant adverse health effects." *Id.* at 1219.

Health risk assessment procedures for mobile source toxics are well established. *See* Land Use Guidance for Roadway Proximity Health Effects, attached as Exhibit E. Relying upon available guidance, the revised DMEIR must include a health risk assessment that evaluates the Project's potential to result in cancer and respiratory health risks for nearby sensitive receptors.

JJ-24 CONT

(c) **The DMEIR Impermissibly Defers Analysis of the Project's Significant Impacts on Public Health.**

As the DMEIR itself explains, the Air Resources Board Land Use Handbook (2005) provides recommendations regarding siting sensitive uses (*e.g.*, residential uses, schools, etc.) to avoid or lessen impacts to public health. DMEIR at 5.3-55. For example, the Air Resources Board specifies that, because transport refrigeration unit operations and truck travel in and out of distribution centers are the largest onsite diesel PM emission sources, sensitive receptors should be located at least 1,000 feet away from such uses. Air Resources Board Land Use Handbook at Table 1-1 and Table 1-2. But once again, the DMEIR fails to apply those recommendations to the Project. Instead, the DMEIR defers analysis and mitigation of the Plan's impacts on public health and proposes a requirement that health risk assessments be prepared in the future. DMEIR at 2-12, 2-13 and 5.3-60.

JJ-25

As explained above, the EIR is obliged to identify feasible, enforceable measures to reduce significant impacts. Pub. Res. Code § 21081.6(b); CEQA Guidelines § 15126.4(a)(2). The California Attorney General recently weighed in on the importance and feasibility of measures to protect public health from the risks posed by transportation sources of pollution. In February 2013, the Attorney General settled a case in connection with the 1.1 million square-foot Mira Loma Commerce Center in Jurupa Valley. *See* Consent Judgment, Case No. RIC1112063, attached as Exhibit F. The settlement requires the City of Mira Loma and/or the developer to implement specific measures to reduce health risks from additional traffic. For example, they must provide air-filtration systems to nearby homes, monitor air quality, install solar panels and charging stations for e-vehicles, and ban heavy trucks on a major road near impacted residents. *Id.*

The City must consider and adopt measures to protect sensitive receptors from the health impacts caused by the increase in air pollutants that will accompany implementation of the General Plan. These should include the measures identified in the Consent Decree. The DMEIR's deferral of the analysis and mitigation of these health impacts violates CEQA. The DMEIR must be revised to include a health risk assessment

of all of these Project-related emissions and must identify feasible, enforceable mitigation to eliminate or reduce significant impacts to public health. JJ-25 CONT

6. The DMEIR Fails to Adequately Analyze the Potential for Development Under the General Plan to Create Objectionable Odors.

Industrial and commercial uses proposed by the General Plan have the potential to generate odors and to impact nearby sensitive receptors. As CARB makes clear "the types of facilities that can cause odor complaints are varied and can range from small commercial facilities to large industrial facilities…". California Environmental Protection Agency and California Air Resources Board Air Quality and Land Use Handbook: A Community Health Perspective, 2005 at 29 and 30 ; excerpts attached as Exhibit D. Odors can cause health symptoms such as nausea and headache. *Id.* Facilities with odors may also be sources of toxic air pollutants. *Id.* Despite these facts, the DMEIR pays short shrift to this important issue. The DMEIR's cursory discussion omits any actual analysis of how sources of odorous emissions caused by implementation of the General Plan would impact sensitive receptors. The DMEIR defers this important analysis to the future, when specific projects are proposed and concludes, absent any evidence, that impacts relating to odorous emissions would be less than significant. DMEIR at 5.3-64. The DMEIR can hardly conclude that no sensitive receptors will be affected by manufacturing and industrial odors if there is no plan to ensure that such receptors will not be located near the odor sources. JJ-26

The purpose of the General Plan is to guide the growth and development of the City. Locating adequate sites for industrial and commercial development will become more difficult upon buildout of the City. Sensitive land uses must be protected from these incompatible uses. Under the General Plan as currently proposed, with its lack of effective policies to avoid odor-related land use conflicts, the DMEIR must assume that the City will be built out to the maximum density allowable. It must then be revised to include a comprehensive assessment of odors caused by the proposed Project. The San Joaquin Valley Air Pollution Control District ("SJVAPCD") provides guidance for conducting this analysis. Exhibit G at 26-28 and 50-51 (SJVAPCD Guide For Assessing And Mitigating Air Quality Impacts). Should the analysis determine that the Project's odor impacts are significant, the EIR must identify feasible mitigation measures to avoid and minimize impacts on sensitive receptors.

7. The DMEIR Fails to Identify Feasible Measures to Mitigate the Project's Significant Air Quality Impacts.

Despite that fact that the DMEIR discloses that the Project would have a significant impact related to cumulative increases in ozone precursors and PM emissions, the document fails to identify feasible measures to lessen those impacts. Instead, the DMEIR relies on a list of proposed General Plan policies to mitigate the identified impacts and summarily states that " no mitigation measures beyond the General Plan policies, ordinances, and regulations are available to further reduce this impact." DMEIR at 5.3-50. Contrary to this statement, and as explained in the Baseline Report, the SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts ("District Guide") provides guidance regarding additional mitigation measures. The District Guide recommends incorporating as many of the policies from the SJVAPCD's Air Quality Guidelines for General Plans (AQGGP) into a General Plan as possible. See AQGGP attached as Exhibit H. The AQGGP, which was adopted in 1994 and amended in 2005, is a guidance document that contains 75 examples of policies that the cities can directly incorporate into their General Plan. Baseline Report at 6. The General Plan incorporates some, but not all, of the policies from the AQGGP, yet the DMEIR fails to explain why many of the applicable policies were not included. *Id.* JJ-27

The District Guide also recommends evaluating plan-level mitigation measures by quantifying the associated reductions in mobile and area source emissions. The DMEIR foregoes this analysis entirely. The DMEIR contains no discussion or quantification of the effectiveness of the proposed policies to reduce air quality impacts. Therefore, the DMEIR fails to show that the proposed policies would be effective or to what degree they would mitigate the Project's impacts.

8. The DMEIR Fails to Adequately Analyze or Mitigate the Plan's Cumulative Air Quality Impacts.

The DMEIR's analysis of cumulative impacts is incomplete, cursory and superficial. The DMEIR initially relies on the Project's consistency with the applicable AQPs to conclude that cumulative impacts would be less than significant. DMEIR at 5.3-49. It then goes on to state that since Project-related emissions exceed the SJVAPCD quantitative thresholds for criteria pollutants, cumulative air emissions impacts would be potentially significant. As described above, and in the Baseline report, the DMEIR lacks the evidentiary support to conclude that the Plan is consistent with the applicable AQPs. JJ-28

Furthermore, applying project-level thresholds of significance is inappropriate and fails to disclose the extent and severity of the Project's cumulative impacts.

The EIR must be revised to include a proper Plan-specific and cumulative air quality analysis. In regards to the cumulative analysis, the EIR preparers must examine the combined effects of both the proposed Plan and the other related projects in the air basin. There are two parts to this question: (a) is there a significant impact to the environment that is the result of the effects of the General Plan combined with the effects of other projects, and (b) is the General Plan's contribution to this impact cumulatively considerable? CEQA Guidelines § 15064(h)(1), 15355(b). The DMEIR must then identify mitigation for this contribution. JJ-28 CONT

C. The DMEIR Fails to Adequately Analyze and Mitigate for the General Plan's Greenhouse Gas Emissions.

Analysis of greenhouse gas emissions is particularly important with regard to climate change because existing conditions are such that we have already exceeded the capacity of the atmosphere to absorb additional greenhouse ("GHG") emissions without risking catastrophic and irreversible consequences. Therefore, even seemingly small additions of GHG emissions into the atmosphere must be considered cumulatively considerable. *See Communities for Better Env't v. California Resources Agency* (2002) 103 Cal. App. 4th 98, 120 ("the greater the existing environmental problems are, the lower the threshold for treating a project's contribution to cumulative impacts as significant."); *see also Center for Biological Diversity v. National Highway Traffic Safety Administration*, 508 F.3d 508, 550 (9th Cir. 2007) ("we cannot afford to ignore even modest contributions to global warming."). Here, the DMEIR underestimates emissions, presents an incomplete analysis, and fails to identify feasible mitigation measures. JJ-29

1. The DMEIR Underestimates the Project's GHG Emissions.

As discussed above, the DMEIR underestimates predicted traffic volumes because it relies on an inaccurate traffic model. Inasmuch as the greenhouse gas emissions are dependent on the transportation analysis assumptions, any underestimation of vehicular trips necessarily results in an underestimation of vehicle-related greenhouse gas emissions. Once the City accurately models the Project's increase in traffic volumes, it must revise the greenhouse gas emissions impact analysis. JJ-30

2. The DMEIR's Conclusion that the Project Will Not Conflict With Relevant Plans to Reduce GHG Emissions Is Not Supported By Substantial Evidence.

The DMEIR recognizes that the Project will have significant GHG-related impacts if it will conflict with an applicable plan, policy, or regulation that was adopted for the purpose of reducing the emissions of GHGs. DMEIR at 5.7-41. However, the DMEIR concludes that the Project will not conflict with any such plan, and therefore will not have a significant impact. DMEIR at 5.7-60. The EIR's analysis on this point is flawed.

The DMEIR errs in two ways. First, the DMEIR considers the Project's consistency with only a subset of relevant plans and policies. The DMEIR limits its analysis to whether the Project will conflict with Assembly Bill 32 and the California Air Resources Board's Scoping Plan implementing AB 32. DMEIR at 5.7-56 ("Currently, the only applicable plan, policy or regulation of the City of Fresno is the Air Resources Board's Scoping Plan implementing AB 32."). However, AB 32 and the Scoping Plan are not the only relevant policies and plans that have been adopted for the purpose of reducing GHG emissions. The DMEIR fails to analyze the Project's consistency with Senate Bill 375 and the recently adopted regional transportation plan/sustainable communities strategy ("RTP/SCS") for Fresno County. DMEIR at 5.7-56-59 and 5.10-14 (describing and analyzing consistency with various local, regional and statewide plans, but not SB 375 or the RTP/SCS); DMEIR at 5.7-54 (describing SB 375 and RTP/SCS). In addition, the DMEIR fails to analyze the Project's consistency with Executive Order ("EO") S-3-05, which sets forth state policy related to GHG reduction, including that it is the policy of the state to reduce GHG emissions to 80% below 1990 levels by 2050. The DMEIR's failure to analyze the Project's consistency with the above plans and laws means that the City has failed to proceed in the manner required by law. JJ-31

Second, the DMEIR lacks substantial evidence to support its conclusion that policies for new development will achieve the stated reductions or that those reductions will meet the goals of AB 32. The DMEIR acknowledges the Project will result in a doubling of greenhouse gas emissions at Project build-out. DMEIR at Table 5.7-2 (indicating that 2010 baseline GHG emissions total 3, 652,521 MTCO2e) and Table 5.7-6 (indicating that 2056 GHG emissions at build-out will total 6,286,229 MTCO2e). The DMEIR then relies on vague and unenforceable General Plan objectives and policies to mitigate Project-related GHG emissions. See DMEIR at 5.7-52. For example, the DMEIR policies focusing on infill development and sequencing of future growth are unenforceable. As discussed earlier in this letter, objective UF-12-a and Policies LU-1-a and LU-1-c fail to reduce GHG impacts because orderly growth is not guaranteed.

Because these policies will not ensure sequenced growth in infill areas, the DMEIR cannot rely on them to reduce GHG emissions. Therefore, the DMEIR fails to provide evidence that the General Plan policies will result in emissions reductions at build-out sufficient to comply with all applicable plans and laws, including EO S-3-05. See Pub. Res. Code § 21082.2(c) ("[a]rgument, speculation, unsubstantiated opinion or narrative, [and] evidence which is clearly inaccurate or erroneous" does not constitute substantial evidence); see also *Californians for Alternatives to Toxics v. Dept. of Food & Agric.* (2005) 136 Cal. App. 4th 1, 17 ("[C]onclusory statements do not fit the CEQA bill.").

Finally, the Plan establishes land uses and densities to 2056, yet the DMEIR only identifies mitigations for development to the year 2035, based on the AB 32 target date. The DMEIR states that "*If* the State ultimately sets targets based on achieving 80 percent reduction below 1990 levels by 2050, additional reductions beyond currently adopted regulations will almost certainly be needed by 2035." DMEIR at 5.7-50; emphasis added. This approach is not permissible under CEQA. The State *has already* set the target of achieving 80 percent reduction below 1990 levels by 2050 in Executive Order S3-05.

JJ-31
CONT

In *Cleveland National Forest Foundation v. San Diego Association of Governments*, the Superior Court held that SANDAG's EIR for its Regional Transportation Plan was

> "impermissibly dismissive of Executive Order S-03-05. SANDAG argue[d] that the Executive Order does not constitute a 'plan' for GHG reduction, and no state plan has been adopted to achieve the 2050 goal. [ROA 62 at 34] The EIR therefore does not find the RTP/SCS's failure to meet the Executive Order's goals to be a significant impact. This position fails to recognize that Executive Order S-3-05 is an official policy of the State of California, established by a gubernatorial order in 2005, and not withdrawn or modified by a subsequent (and predecessor) governor. Quite obviously it was designed to address an environmental objective that is highly relevant under CEQA (climate stabilization). . . SANDAG thus cannot simply ignore it."

Ruling on Petitions for Writ of Mandate, Dec. 3, 2012, pp. 11-12, attached as Exhibit I. So too here, the City ignores EO S-03-05 when analyzing the significance of the Project's GHG impacts. The City cannot have it both ways. If it is not prepared to implement policies to ensure the necessary emission reductions to achieve targets in 2050, than it cannot approve a plan that allows the proposed densities to 2056.

3. The DMEIR Fails to Include Mitigation Measures for the Project's Significant GHG Emissions.

The DMEIR fails to meet the requirements of CEQA because it fails to propose feasible mitigation measures to reduce the Project's significant impacts on climate change. Instead, it states that there are no feasible mitigation measures beyond the General Plan policies already identified. DMEIR at 5.7-56. However, because the Project's GHG emissions will cause a significant impact, the DMEIR must analyze, and the City must adopt, all feasible mitigation to reduce those impacts.

The DMEIR estimates the Project's resulting vehicle miles travelled ("VMT") at build-out will increase by almost 9,000,000 vehicle miles, an increase of 95 percent. DMEIR at Table 5.14-3. Under cumulative conditions, total VMT is projected to increase by over 111 percent to 10,487,655 vehicle miles. *Id.* This increase in VMT translates directly to an increase in greenhouse gases. Yet, despite this shocking increase in VMT, the DMEIR fails to identify *any* feasible measures to reduce VMT. DMEIR at 2-37 to 2-38. JJ-32

California has committed itself to a substantial reduction in greenhouse gas emissions, a vast majority of which are supplied by vehicular travel. In September 2013, the Governor signed into law Senate Bill 743, which calls for a shift away from automobile delay as a metric for determining significant transportation impacts under CEQA and a recognition of the importance of reducing VMTs to reduce GHG emissions. This shift will encourage smart growth and infill development and reduce the amount of GHG produced by vehicle travel. *See* Final Preliminary Discussion Draft of Updates to the CEQA Guidelines Implementing Senate Bill 743 ("SB 743 Guidelines") attached as Exhibit J. To this end, the SB 743 Guidelines direct lead agencies to analyze *and mitigate* vehicle miles traveled, induced travel, and safety. *Id.* at 8.

Even though the SB 743 Guidelines implementing SB 743 operate prospectively and are still in draft form, the City should recognize the importance of reducing VMT to minimize not just greenhouse gas emissions but traffic, air quality, and noise impacts as well. SB 743 was passed a year ago and its mandate is clear. Unfortunately, the DMEIR largely ignores the impact of the increase in VMTs and the opportunity to reduce VMTs as effective mitigation for GHG impacts.

There are numerous feasible mitigation measures the City could adopt to reduce the Plan's GHG, air quality and other impacts. Some examples include:

- Create funding incentives for projects that conform to the General Plan and development approvals to smart growth and infill development standards such as LEED Neighborhood Development standards. Alternatively, the City could adopt a policy that it will not provide future funding for widening roadways to serve sprawl developments, but will instead prioritize funding for projects that serve development adjacent to or within already developed areas.

- Institute city-wide parking pricing policies.

- Adopt any number of policies that apply to new development within its jurisdiction. For example, it could:

  - Adopt an ordinance requiring payment of indirect source impact fees from development projects, similar to what the San Joaquin Valley Air Pollution Control District requires in order to offset air pollution. The fee could be tailored to address traditional air pollution, toxic air contaminants, as well as GHG emissions.

  - Adopt energy efficient building standards that are higher than Title 24. More than 35 cities and counties in the state have applied to and/or received approval from the California Energy Commission to set energy efficiency standards that are more strict than Title 24. *See* Energy Commission fact sheet, available at http://www.energy.ca.gov/title24/2008standards/ordinances/; *see also* Public Resources Code Section 25402.1(h)(2); *see also* Exhibit K [Institute for Local Govt Best Practices] at 9.

  - Adopt an ordinance requiring new development to install a certain amount of solar or other alternative electric generation capacity. As demonstrated by the meteoric rise of distributed solar energy generation, installing such

JJ-33

generation is feasible. In fact, other cities in California already require that all new housing within their city provide solar energy generation capacity. In 2013 the City of Lancaster, for example, updated its municipal code to require that all new homes constructed in the city provide a minimum average solar generating capability of .5 to 1.5 kW per unit depending on lot size and location; new multi-family developments are also covered by the ordinance. (In lieu of constructing solar equipment on site, developers may elect to purchase solar energy credits from other facilities within the city.) *See* Spreading Sunshine All Over the Place, attached as Exhibit L; *see also* http://www.greentechmedia.com/articles/read/Lancaster-CA-Becomes-First-US-City-to-Require-Solar. Likewise, the City of Sebastopol now requires "new residential and commercial buildings -- as well as major additions and remodels -- to include a photovoltaic energy-generation system. The system would have to provide 2 watts of power per square foot of insulated building area or offset 75 percent of the building's annual electric load." *See* Press Democrat article at http://www.pressdemocrat.com/csp/mediapool/sites/PressDemocrat/News/story.csp?cid=2224191&sid=555&fid=181.

JJ-33
CONT

- o Adopt a policy conditioning funding of certain transportation projects on a demonstration that the project will reduce vehicle-miles traveled.

- o Offer fee reductions, waivers, loans or grants to developers and contractors who commit to verifiable green building practices that exceed state minimum standards. See Exhibit K[Institute for Local Govt Best Practices] at 9.

- o Provide incentives for new development projects to install home or business electric vehicle charging stations, alternative energy systems or energy efficiency upgrades. See Exhibit K [Institute for Local Govt Best Practices] at 11.

- o Review and adopt other policies such as those outlined in the Institute for Local Government's Best Practices guide. See Exhibit K.

Even if the City cannot feasibly adopt some of these measures as part of its approval of the General Plan, it certainly can commit to developing and adopting specific measure in the future, provided it includes proper performance standards that will guide it in developing the measures. *Gray v. County of Madera* (2008) 167 Cal. App. 4th 1099

Other agencies routinely require mitigation for residential and mixed-use development projects that include requirements to use renewable energy or install on-site solar power. For instance, Riverside County has previously required large development projects to meet the following standard: "80 percent of residential units shall meet 60 percent of their baseline demand power energy needs with renewable energy; and 80 percent of commercial building square footage shall meet 40 percent of their baseline demand power energy needs with renewable energy." Travertine Point Specific Plan Conditions of Approval, attached as Exhibit M, p. 118. If the developer cannot show that the local electricity provider is meeting these standards, than renewable energy must be provided from on-site sources. *Id.* Likewise, Riverside County also required this project to install cool pavement and cool roofs. *Id.* (see p. 90, measure 30. Planning 111); see also *id.*, pp. 88-94 (requiring other energy and water efficiency measures). JJ-33 CONT

Likewise, the building industry is rapidly advancing in its ability to offer energy efficient homes. For example, Shea homes now offers a zero-energy home that offsets all of the home's energy use by using efficient building techniques and having solar power on the roof. See Exhibit N. Courts have made clear that "if [a] project can be economically successful with mitigation, then CEQA requires that mitigation …." *Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587, 599-600. Given that Shea has sold more than 1,000 zero-energy homes, and that the technology for providing solar power has become much more affordable over the past few years, it is certainly feasible for the City to require Fresno developers to provide zero-energy homes to mitigate the Project's GHG impacts. The DMEIR has certainly offered no evidence to the contrary.

D. The DMEIR Fails to Adequately Analyze the Project's Noise Impacts.

The noise that will result from implementation of the General Plan will detrimentally effect communities of color and other low-income residents living near freeways, arterial roadways, and industrial sites. Some of the worst-affected sensitive receptors are located immediately adjacent to area freeways and arterials. The DMEIR admits that operational noise at General Plan buildout would adversely affect residential and other noise-sensitive uses. DMEIR at 5.11-25. However, given that the DMEIR's traffic analysis underestimates Project-related traffic, operational noise impacts at adjacent residential areas are likely to be even higher than the DMEIR discloses. JJ-34

The World Health Organization recognizes noise, and in particular traffic noise, as a serious public health problem. See excerpts from *Traffic Noise Reduction in Europe*, attached as Exhibit O. Given the severity of the Project's potential noise impacts, coupled

with the effect that elevated noise levels has on public health, the DMEIR should have rigorously examined this issue. Yet, the DMEIR falls far short in this regard. The DMEIR fails to adequately analyze or effectively mitigate noise impacts, thus violating CEQA.

JJ-34 CONT

1. The DMEIR Fails to Evaluate Single Noise Events and Nighttime Noise.

One particularly egregious oversight is the DMEIR's failure to evaluate single noise events or nighttime noise. Motor vehicle noise is characterized by a high number of individual events, which often create a higher sustained noise level in proximity to areas sensitive to noise exposure. *See* Riverside County General Plan excerpts, at 19, attached as Exhibit P. Moreover, heavy trucks and tractor-trailers generate significantly more single noise events than other vehicle types. Revving truck engines and screeching brakes rise above the continuous roar of freeway traffic. *Id.*

The DMEIR acknowledges that transportation sources are the primary source of substantial noise in the City. DMEIR at 5.11-8. In addition, as discussed above, VMT in the City is projected to more than double at build-out of the General Plan. DMEIR at Table 5.14-3. Much of the increase in VMT will likely take place on area freeways and arterial roadways. The DMEIR's noise analysis should have evaluated how single noise events from trucks traveling along the freeway would impact nearby sensitive receptors.

JJ-35

In addition, the location of industrial development adjacent to residential uses means more trucks travelling to industrial sites along community streets that serve residences and schools. This too will result in significant single event noise impacts that the DMEIR fails to adequately analyze. These impacts are exacerbated at night when residents are asleep and background noise is low.

Analyzing only average noise impacts has been rejected by California courts because impacted residents do not hear noise averages, but single events. *See Berkeley Keep Jets Over the Bay Committee v. Port of Oakland* (2001) 91 Cal.App.4th 1344, 1382. Single event noise levels have been shown to disrupt sleep, interfere with speech, and cause stress and annoyance. Noting that "sound exposure level [SEL] has been found to be the most appropriate and useful descriptor for most types of single event sounds," the court in *Berkeley Keep Jets* held that the Port must prepare a supplementary noise analysis calculating the impacts of single-event sounds. *Id.* at 1382. Accordingly, the revised DMEIR for the Project must analyze the impacts of daytime and nighttime single event noise on schools, sleep, speech, stress, and annoyance levels, and analyze adequate measures to mitigate those impacts.

2. The DMEIR Does Not Evaluate Noise Impacts From Soundwalls.

CEQA requires that an EIR analyze whether identified mitigation measures would cause significant effects in addition to those that would be caused by the project. *See* CEQA Guidelines § 15126.4(a)(1)(D) and *Stevens v. City of Glendale* (1981) 125 Cal.App.3d 986. The DMEIR fails to examine the noise implications from implementing the soundwalls proposed as mitigation for roadway noise. While soundwalls generally reduce traffic noise, as studies show, the sound waves that travel around the ends and over the top of the sound walls can be significant, as well as the sound waves reflecting off of other nearby buildings and structures. *See* Sound Walls: Absorptive versus reflective design and effectiveness, Sound Fighter® Systems, attached as Exhibit Q. As the cited study explains, reflection is a critical factor when a vehicle (such as a truck) is almost as tall as the wall, or in many cases, taller than the wall. The sound levels at the receiver can be easily increased perhaps 3 to 5 dB, and sometimes up to 7 dB via reflective noise. *Id.* The DMEIR fails to account for these effects and fails to provide substantial evidence supporting its conclusion that soundwalls would effectively reduce noise. The revised DMEIR must study the effect that the soundwalls may have on sensitive receptors. JJ-36

3. The DMEIR Fails to Mitigate Significant Noise Impacts.

The DMEIR specifies that operational noise would exceed the City's standards and could be as high as 76 dBA CNEL. DMEIR at Table 5.11-13. Clearly these severe increases in noise levels warrant a comprehensive identification of mitigation measures that would minimize impacts on sensitive receptors. Yet, once again, the DMEIR states that no other mitigation is available. As discussed above, the DMEIR should have considered the most obvious mitigation - modifications to land use designations to minimize impacts to sensitive receptors. JJ-37

Moreover, as explained in the August 18, 2014 letter to the City from the Leadership Council for Justice and Accountability, the proposed General Plan policies regarding noise should be strengthened. Specifically, Policy NS-1-k should require that developers reduce the noise impacts of new development "on properties adjacent to the project or roadways that will receive vehicle traffic associated with the project through appropriate means." See LCJA letter to the City dated August 18, 2014 at 51. Policy NS-1-j should be revised to ensure that cumulative noise impacts are evaluated and mitigated separately from project-level noise impacts. *Id.* at 52. The City is obliged to consider

these and other mitigation measures capable of reducing the Project's significant noise impacts. JJ-37 CONT

III. The DMEIR Should Be Recirculated.

CEQA requires recirculation of an EIR when significant new information is added to the document after notice and opportunity for public review was provided. CEQA § 21092.1; CEQA Guidelines § 15088.5. "Significant new information" includes: (1) information showing a new, substantial environmental impact resulting either from the project or from a mitigation measure; (2) information showing a substantial increase in the severity of an environmental impact not mitigated to a level of insignificance; (3) information showing a feasible alternative or mitigation measure that clearly would lessen the environmental impacts of a project and the project proponent declines to adopt the mitigation measure; or (4) instances where the draft EIR was so fundamentally and basically inadequate and conclusory in nature that public comment on the draft EIR was essentially meaningless. CEQA Guidelines § 15088.5(a); *Laurel Heights II*, 6 Cal. 4th at 1130. JJ-38

As this letter explains, the General Plan DMEIR clearly requires extensive new information and analysis. This analysis will likely result in the identification of new, substantial environmental impacts or substantial increases in the severity of significant environmental impacts. Moreover, the flaws that permeate the entire document, particularly the DMEIR's deferred analysis and mitigation, constitute precisely the sort of pervasive flaws in the document that independently require recirculation under CEQA Guidelines section 15088.5(a)(4). *See Mountain Lion Coalition v. Fish & Game Comm'n*, 214 Cal. App. 3d 1043, 1052-53 (1989). Consequently, the City must revise and recirculate the revised DMEIR for public review and comment.

IV. Conclusion

As described above, the DMEIR violates CEQA in numerous respects. Unfortunately, the impact of the CEQA violations will be felt most acutely by low-income residents and communities of color. If not remedied, this disproportionate impact on people of color will result in violations of both state and federal civil rights and fair housing laws. Through the environmental review process, the City has an opportunity to develop a final General Plan that minimizes the Project's significant impacts and complies with CEQA, while at the same time ensuring that the most disadvantaged neighborhoods in Central, Southeast, and Southwest Fresno don't bear the burdens of the City's growth. JJ-39

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Tamara Galanter

Carmen Borg, AICP, Urban Planner

Exhibits:

Exhibit A: MRO Engineers Letter Report

Exhibit B: Baseline Environmental, Inc. Report

Exhibit C: Fact Sheet $PM_{2.5}$ Designations under the Clean Air Act, August 2008, United States Environmental Protection Agency Region 10

Exhibit D: Air Quality and Land Use Handbook: A Community Perspective, April 2005, California Environmental Protection Agency California Air Resources Board

Exhibit E: Land Use Guidance for Roadway Proximity Health Effects, May 6, 2008, Rajiv Bhatia and Thomas Rivard

Exhibit F: Consent Judgment, Case No. RIC1112063, *CNFF v. SANDAG*

Exhibit G: Guide for Assessing and Mitigating Air Quality Impacts, January 10, 2002, Mobile Source /CEQA Section of the Planning Division of the San Joaquin Valley Air Pollution Control District

Exhibit H: Air Quality Guidelines for General Plans, Revised June 2005, San Joaquin Valley Air Pollution Control District

Exhibit I:	Ruling on Petitions for Writ of Mandate, Case No. 2011-00101593, *Cleveland National Forest Foundation, et al., v. San Diego Association of Governments*
Exhibit J:	CEQA Guidelines Implementing Senate Bill 743
Exhibit K:	Sustainability Best Practices Framework, Institute for Local Government
Exhibit L:	Spreading Sunshine All Over the Place, June 2013, City of Lancaster, CA
Exhibit M:	Travertine Point Specific Plan Conditions of Approval
Exhibit N:	*Zero-net-energy homes: More feasible, still rare,* March 29, 2013, Blanca Torres, San Francisco Business Times
Exhibit O:	*Traffic noise reduction in Europe*, August 2007, L.C. den Boer and A. Schroten
Exhibit P:	Chapter 7: Noise Element, Riverside County General
Exhibit Q:	PlanSound Walls: Absorptive versus reflective design and effectiveness, Sound Fighter® Systems, LLC

Letter JJ: Shute Mihaly & Weinberger, Tamara S. Galanter, October 8, 2014

Response to Comment JJ-1

The commenter asserts that the Draft Master EIR violated CEQA and the CEQA Guidelines. The City disagrees with the commenter. The commenter asserts that the Draft Master EIR did not adequately analyze the potential environmental effects associated with land use, transportation and circulation, air quality, odor, climate change, public health and safety, and noise. This comment does not provide any specific comments on the contents of the Draft Master EIR in this comment; however, specific comments on land use are provided in Comments JJ-4 and JJ-5 and responses are provided below. Specific comments on transportation and circulation are provided in Comments JJ-8 through JJ-16 and responses are provided below. Specific comments on air quality are provided in Comments JJ-17 through JJ-21 and JJ-27 and responses are provided below. A specific comment on odor is provided in Comment JJ-26 and a response is provided below. Specific comments on climate change are provided in Comments JJ-29 through JJ-33 and responses are provided below. Specific comments on public health and safety are provided in Comments JJ-22 through JJ-25 and responses are provided below. Specific comments on noise are provided in Comments JJ-34 through JJ-37 and responses are provided below. Finally, a specific comment on cumulative air quality is provided in Comment JJ-28 and a response is provided below. As discussed in the Response to Comments JJ-2 though JJ-39, the environmental documentation provided in the Draft Master EIR adequately addresses the potential environmental effects associated with the implementation of the General Plan Update.

Response to Comment JJ-2

The commenter asserts that the Draft Master EIR did not comply with the requirements of CEQA and did not adequately analyze or mitigate impacts. The commenter also asserts that the Draft Master EIR must be revised and recirculated. There are no specific comments on the contents of the Draft Master EIR in this comment; however, the commenter has various comments the remainder of Comment Letter JJ. Please see Response to Comment JJ-1 for a summary of the comments. Responses to these comments are provided below.

Response to Comment JJ-3

The commenter asserts that the Draft Master EIR avoided analysis and mitigation of the impacts that are identified as significant and unavoidable. The City disagrees with the commenter. Section 5 of the Draft Master EIR includes an evaluation of project and cumulative impacts associated with the implementation of the General Plan Update. As summarized in Section 6.3 of the Draft Master EIR, there are 8 environmental categories that include significant and unavoidable impacts. The analysis in Section 5 included an evaluation prior to the inclusion of objectives and policies and after the inclusion of objectives and policies. In each evaluation, a determination of potential significance was made for each issue. Mitigation measures were considered for those issues that would remain significant after the inclusion of objectives and policies. Although mitigation measures were considered, mitigation measures were available for some environmental issues; however, for others, there were no feasible measures available to reduce the significant impact.

The commenter provided specific comments below and responses are provided in Response to Comments JJ-4 through JJ-39.

Response to Comment JJ-4
The commenter raises a concern that the Draft Master EIR only addressed half of the anticipated buildout of the General Plan Update and asserted that the location of the development was not known. Full buildout of the General Plan Update was evaluated in the Draft Master EIR. The description of full development buildout is provided in Table 3-3 in Section 3 of the Draft Master EIR. Table 3-3 shows the incremental development that is planned to occur with the full buildout of the General Plan Update.

The objective portion of UF-12 was not modified, but the commentary has been updated. To clarify the intent of Policy UF-12, the full new commentary paragraph is as follows:

> "The Planning Director will provide an annual report describing the City's compliance with the Plan and progress toward meeting the goals and objectives to City Council, and prepare, every five years, an updated plan for achieving this goal, with recommended appropriate policy amendments and also new implantation strategies necessary to meet this goal by 2035. The rate of progress toward meeting this goal is not expected to occur in a linear or "one-to-one" pattern. Development in infill areas versus growth areas may progress in an uneven pattern, depending upon the schedule of relevant key incentive programs (such as those related to BRT) and the impact of market forces. However, the City expects to make steady progress toward all the goals and objectives and anticipates meeting them at or near the close of General Plan Horizon in 2035. See the Implementation Element for additional implementation strategies for this objective."

As described above, a timeframe has been provided to meet this objective. The commenter misinterpreted the timeframe for this objective as full buildout.

Response to Comment JJ-5
This commenter states that the Draft Master EIR identified various significant impacts that were found to be significant, and no feasible mitigation measures were available beyond the policies provided in the General Plan Update. This comment is correct and the significant and unavoidable impact issues are discussed in Sections 5 and 6.3 of the Draft Master EIR.

Section 7 of the Draft Master EIR includes an evaluation of alternatives to the proposed project. One of these alternatives, Growth Area Reduction as discussed in Section 7.3.4 of the Draft Master EIR, is a substantial reduction in the amount of growth that would be accommodated by the City of Fresno Planning Area. This alternative includes modifications to the land uses within the Southeast Development Area from urban uses to the existing rural uses including agricultural uses. With the implementation of this alternative, the potential significant impacts associated with the proposed General Plan Update would be reduced. Section 7.4 of the Draft Master EIR found that the Growth Area Reduction alternative would be considered the Environmentally Superior Alternative.

Response to Comment JJ-6
The commenter asserts that the mitigation measures in the Draft Master EIR are unenforceable and noncommittal. The commenter misinterprets the provision of policies as mitigation measures in the Draft Master EIR. The policies are project design features that would reduce potential impacts

associated with development in accordance with the General Plan Update. The Draft Master EIR includes a discussion of mitigation measures when feasible measures are available to implement.

The commenter also refers to the policies promoting orderly development and asserts that the General Plan Update does not ensure that infill development would occur prior to development in the Growth Areas. To clarify the pattern of future development, Objectives UF-12 and UF-13 have been modified to include commentary. Please see Response to Comment G-1 regarding the revision to Objective G-1 and please see Response to Comment F-1 regarding the modification to Objective UF-13. The clarification includes the provision of the timing to achieve the objectives.

Furthermore, the commenter identifies additional policies and asserts that these policies are not enforceable and the City could decide to take no action and thus fail to mitigate impacts as future development occurs. As identified above, the policies that are provided in the General Plan Update and referenced in the Draft Master EIR are project design features and not mitigation measures. The design features that are listed in the Draft Master EIR as reducing potential significant impacts are required to be implemented with future development, as applicable. As future development is proposed, the City will need to ensure that the appropriate policies are in place to reduce potential significant impacts associated with a specific development project.

The CEQA Guidelines require that mitigation measures be fully enforceable and they allow for mitigation measures to be incorporated into a plan, policy, regulation, or project design. (CEQA Guidelines section 15126.4(a)(2).) However, while actual mitigation measures must be fully enforceable, general plan policies are subject to interpretation by the adopting agency, as articulated by *Save our Peninsula Committee v. Monterey County Board of Supervisors*. " Because policies in a general plan reflect a range of competing interests, the governmental agency must be allowed to weigh and balance the plan's policies when applying them, and it has broad discretion to construe its policies in light of the plan's purposes." *Save our Peninsula Committee v. Monterey County Board of Supervisors* (2001) 87 Cal.App.4th 99, 142. (citing *Sequoyah Hills Homeowners Assn. v. City of Oakland* (1993) 23 Cal.App.4th 704; *Greenebaum v. City of Los Angeles* (1984) 153 Cal.App.3d 391, 407.)

It would follow then that for subsequent projects, if a policy is not implemented, the effects of not implementing the policy would need to be assessed with further environmental review.

Response to Comment JJ-7
The commenter asserts that the Draft Master EIR did not adequately analyze the potential environmental effects associated with land use, transportation and circulation, air quality, odor, climate change, public health and safety, and noise. This comment does not provide any specific comments on the contents of the Draft Master EIR; however, specific comments on land use are provided in Comments JJ-4 and JJ-5 and responses are provided above. Specific comments on transportation and circulation are provided in Comments JJ-8 through JJ-16 and responses are provided below. Specific comments on air quality are provided in Comments JJ-17 through JJ-21 and JJ-27 and responses are provided below. A specific comment on odor is provided in Comment JJ-26 and a response is provided below. Specific comments on climate change are provided in Comments

JJ-29 through JJ-33 and responses are provided below. Specific comments on public health and safety are provided in Comments JJ-22 through JJ-25 and responses are provided below. Specific comments on noise are provided in Comments JJ-34 through JJ-37 and responses are provided below. Finally, a specific comment on cumulative air quality is provided in Comment JJ-28 and a response is provided below. As discussed in the Response to Comments JJ-1 though JJ-39, the environmental documentation provided in the Draft Master EIR adequately addresses the potential environmental effects associated with the implementation of the General Plan Update.

Response to Comment JJ-8
The commenter asserts that the transportation and traffic analysis within the Draft Master EIR contains numerous deficiencies. This comment refers to a letter received from MRO Engineers. Please see Response to Comments BB-1 through BB-10 regarding the adequacy of the evaluation.

Response to Comment JJ-9
The commenter asserts that the Draft Master EIR contains no evidence that its travel demand forecasting model reflects buildout conditions under the General Plan. Please see Response to Comments BB-1 through BB-3 regarding the model, the LOS methodology, and the use of traffic data.

Response to Comment JJ-10
The commenter asserts that the Draft Master EIR substantially underestimated project-related traffic at buildout. Please see Response to Comment BB-1 regarding the traffic model and its adequacy to forecast future traffic.

Response to Comment JJ-11
The commenter asserts that the Draft Master EIR analysis of the level of service was inadequate. Please see Response to Comment BB-2 regarding the adequacy of the LOS methodology used for the traffic evaluation.

Response to Comment JJ-12
The commenter asserts that the traffic analysis used obsolete traffic volume data. Please see Response to Comment BB-3 regarding the traffic data that was used.

Response to Comment JJ-13
The commenter asserts that the traffic analysis did not analyze the project's effect related to truck traffic. Please see Response to Comment BB-2 regarding the LOS methodology and Response to Comment BB-5 regarding traffic safety.

Response to Comment JJ-14
The commenter asserts that the traffic analysis presented a deficient safety analysis. Please see Response to Comment BB-5 regarding traffic safety.

Response to Comment JJ-15
The commenter asserts that the traffic analysis did not analyze project impacts on pedestrians and bicyclists. Please see Response to Comment BB-7 regarding pedestrians and bicyclists.

Response to Comment JJ-16
The commenter asserts that the traffic analysis did not adequately analyze the project's impacts on emergency access. Please see Response to Comment BB-10 regarding emergency access.

Response to Comment JJ-17
The commenter provides general comments that the Draft Master EIR analysis of air quality impacts and mitigation is inadequate. The City disagrees with the assertions as will be described below. The assertion that the project will have a "devastating impact on local and regional air quality" is not supported by fact and is opposite the intent and purpose of the General Plan Update. The commenter jumps to a conclusion that growth must be bad without considering the evidence provided throughout the Draft Master EIR that growth can be accommodated in a way that results in continued progress in attaining air quality standards on schedule, and lower exposures to toxic air contaminants while making Fresno a more sustainable community. The commenter asserts that increases in traffic volumes are understated. As stated in Response to Comment K-1, the methodology used by the transportation consultant to determine vehicle miles traveled uses well accepted professional practices.

Response to Comment JJ-18
The commenter asserts that the traffic model used to generate traffic volumes is deficient. As stated in Response to Comment K-1, the methodology used by the transportation consultant to determine vehicle miles traveled (VMT) uses well accepted professional practices and is appropriate for identifying the City's VMT.

Response to Comment JJ-19
The commenter states that the Draft Master EIR contains no evidence that its air emission model actually reflects buildout conditions under the General Plan. This assertion is incorrect. The Draft Master EIR uses population and employment projections delineated in the Project Description that are consistent throughout the Draft Master EIR. The modeling appendices contains all modeling assumptions used in providing emission estimates for each analysis year. The population and employment numbers are presented on the first page of the spreadsheet for each analysis year. The source of the data is provided in detail for each analysis component. The traffic data used for the air analysis is based on the land uses included in the regional transportation model that reflect the General Plan Update through buildout. Analyzing the General Plan Update air quality impacts by individual land use designation would not improve the analysis for two reasons. First, for impacts other than transportation, the physical location of individual land use designations is not needed to capture the emission increase. Population and employment are entirely suitable growth surrogates for this purpose. Second, at the General Plan analysis level, localized impacts at individual sites cannot be determined until specific development projects are proposed and would be speculative. In addition, the plan level analysis prepared for the General Plan Update identifies the potential for localized impacts and mechanisms to ensure that future projects are assessed at the appropriate time to draw meaningful conclusions and to identify mitigation when needed.

Response to Comment JJ-20
The commenter repeats comments on Air Quality Plan consistency in the letter from Baseline Environmental Consultants (see Comment Letter K). Please see Response to Comment K-1 regarding the project's consistency with the Air Quality Plan.

Response to Comment JJ-21
The commenter restates criticisms of the criteria pollutant emissions analysis from the Baseline Environmental Consultants (see Comment Letter K). Please see Response to Comments K-2, K-3, and K-4 regarding criteria pollutant emissions analysis performed for the proposed project.

The commenter focuses on a statement in the Draft Master EIR that growth in stationary source emissions is impossible to predict. The commenter believes that it is possible to predict stationary source emissions. The City agrees that it is not impossible to provide a prediction of stationary source emissions since one was accomplished by ARB for Fresno County; however, the ARB data was not available at the time the analysis was prepared. In addition, from a regional perspective, the SJVAPCD permitting regulations are designed to ensure that stationary source emissions do not increase in the air basin. This is accomplished by requiring emission offsets for new projects exceeding SJVAPCD thresholds. The amount of offsets required are higher than 1 to 1 based on distance from the source that results in emission reductions that offset growth. Other reductions from existing stationary sources are achieved through compliance with SJVPCD rules requiring retrofits or replacement of polluting equipment. The full stationary source regulatory program provides reductions that are intended to allow the air basin to reach attainment. Therefore, the statement that stationary emissions may increase or decrease during the General Plan buildout is technically correct in that emissions in the City may increase or decrease depending on the location of the emission offsets and sources subject to SJVAPCD retrofit rules.

The commenter also states that the Draft Master EIR did not include a stationary PM2.5 emissions analysis. The City acknowledges that the analysis did not include stationary PM2.5 emissions because the data was not available at the time the analysis was prepared. The SJVAPCD is the agency with primary authority over stationary source emissions. Although industrial land within the City is likely to be developed with projects that emit PM2.5 emissions, the amount of PM2.5 emitted is entirely dependent on the equipment and processes used by the projects. Regional PM2.5 emissions will be mitigated through compliance with SJVAPCD regulations and is not dependent on City land use decisions or controls. Therefore, it is reasonable to conclude that the General Plan Update would be consistent with the stationary source measures of the SJVAPCD air quality plans. Revising the analysis to include PM2.5 for stationary sources would not change any significance conclusions and would not provide data needed to understand the impacts that are similar to those of PM10 that includes PM2.5 as a subset.

Response to Comment JJ-22
The commenter states that the Draft Master EIR fails to adequately analyze the potential impact to public health from TAC emissions. The Draft Master EIR contains a detailed discussion of the health impacts of air pollutants in Table 5.3-4 and on page 5.3-16 of the Draft Master EIR. The ARB siting criteria for TAC sources from its Air Quality Land Use Handbook is provided in Table 5.3-5. The analysis of TAC impacts begins on page 5.3-52 of the Draft Master EIR. The analysis identifies the

sources from the ARB Handbook that warrant special consideration and provides procedures for assessing individual projects that are proposed during General Plan buildout. The analysis discloses the cumulative risk from TAC emissions in the City and fully describes the measures that are in place to reduce the impact. Analysis of potential impacts based only on land use designation would be speculative, since the actual locations of sources in relation to receptors and project specific emission amounts are needed to determine if impacts would exceed thresholds. Therefore, the analysis provided in the Draft Master EIR is appropriate and does not defer analysis or mitigation.

Response to Comment JJ-23

The commenter states that the Draft Master EIR fails to provide an adequate description of the existing setting in that it provides no information about existing exposure to TACs in the Planning Area. This statement is incorrect. The Draft Master EIR goes to great lengths to describe existing TAC impacts to the extent that accurate information is available. It is important to recognize that TAC emissions are only monitored at a single location in the City and only for a fraction of the TAC emissions. Inventory based tools such as CalEnviroScreen use incomplete data to allocate emissions and do not address the transport and mixing of TAC emissions throughout the region. The ARB Almanac data used in the Draft Master EIR, provide regional average levels that reflect background emissions in the San Joaquin Valley, but as stated in the Draft Master EIR, actual TAC risk will vary substantially at receptor locations close to large sources of TAC emissions. The National Toxic Assessment Model does not include diesel PM that is responsible for over 70 percent of the risk in the San Joaquin Valley and has the same problem with inventory accuracy as CalEnviroScreen and ARB's CHAPIS database. The Office of Environmental Health Hazard Assessment (OEHHA) warns against using CalEnviroScreen for CEQA purposes. The CalEnviroScreen guidance document states:

> "The CalEnviroScreen score is not an expression of health risk, and does not provide quantitative information on increases in cumulative impacts for specific sites or projects. Further, as a comparative screening tool, the results do not provide a basis for determining when differences between scores are significant in relation to public health or the environment. Accordingly, the tool is not intended to be used as a health or ecological risk assessment for a specific area or site.
>
> Additionally, the CalEnviroScreen scoring results are not directly applicable to the cumulative impacts analysis required under the California Environmental Quality Act (CEQA). The statutory definition of "cumulative impacts" contained in CEQA is substantially different than the working definition of "cumulative impacts" used to guide the development of this tool. Therefore, the information provided by this tool cannot be used as a substitute for an analysis of the cumulative impacts of any specific project for which an environmental review is required by CEQA."

The commenter's suggestion that locations of specific sensitive receptors throughout the planning area should be identified in the Draft Master EIR would not be a useful exercise at the General Plan analysis level. The distance criteria identified in the Draft Master EIR in Table 5.3-5 allow all readers to know if they are within those distances from a specific source. TAC impacts are normally assessed on the impact to the maximally exposed individual receptor that includes children, the elderly and

sensitive receptors and the locations where they can be found. Most live in houses and apartments that are located throughout the Planning Area. New land uses containing sensitive receptors are subject to assessment when proposed, which is the appropriate time to determine if significant impacts from TAC emissions will occur and to identify project specific mitigation measures to reduce those impacts. Mapping a 1,000-foot zone along every freeway corridor serving the City would not be of value without a risk analysis that includes an estimate of the actual risk. Although such a tool is available for Bay Area freeways, the SJVAPCD has not accomplished this task, and it is beyond the City's resources and purview to prepare.

Response to Comment JJ-24

The commenter states that the Draft Master EIR fails to correlate the project's emissions to related impacts on human health. The commenter is incorrect. The Draft Master EIR provides an appropriate health correlation for each criteria pollutant and TAC.

The Draft Master EIR shows the current attainment status, monitoring data showing the number of days people are exposed to unhealthy air, and the maximum levels of pollutants. The Draft Master EIR includes a complete discussion of the health impacts of each pollutant beginning on page 5.3-10. The applicable SJVAPCD attainment plans show attainment of all current air quality standards everywhere in the air basin by 2023 accounting for the growth in emissions. This includes areas with disadvantaged populations. Once in attainment, the SJVAPCD prepares maintenance plans to ensure that the air basin stays in attainment accounting for growth after attainment. Therefore, the approval of the General Plan Update results in no new health impacts from regional criteria pollutant emissions beyond those that currently exist, and health impacts will actually decline as the Plan builds out due to the effectiveness of the control programs in place to reduce emissions from all sources. Two figures from the 2012 PM2.5 Plan provided below are illustrative of this concept:

Figure ES-1 San Joaquin Valley Emissions Reductions, *2012 PM2.5 Plan*

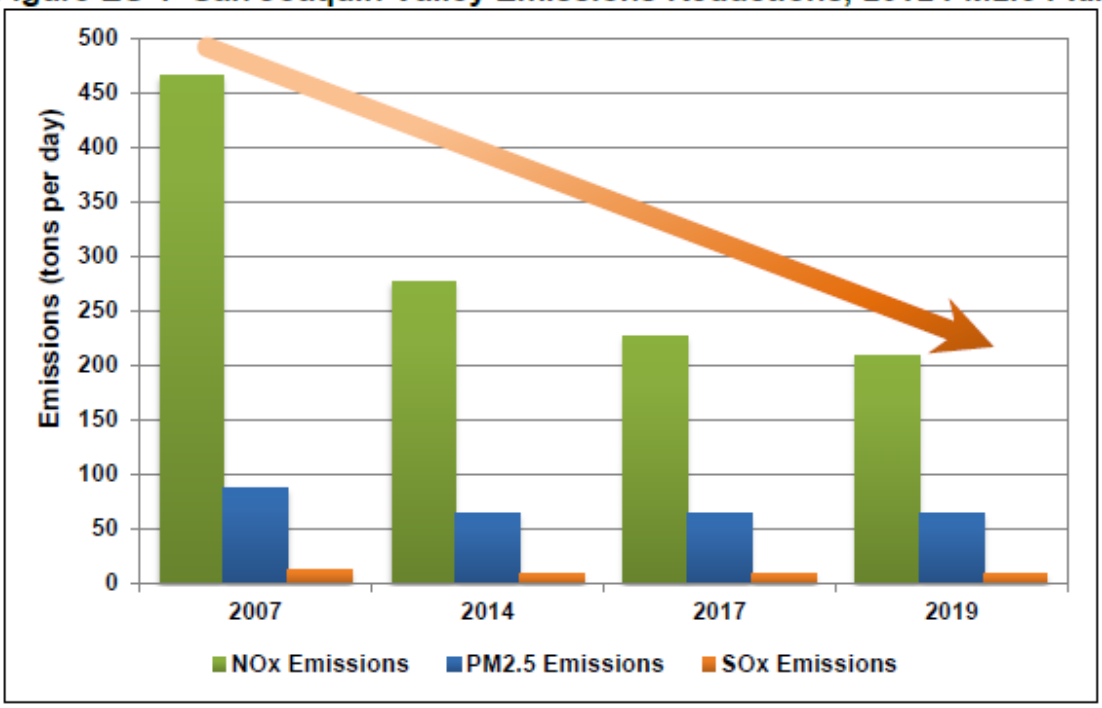
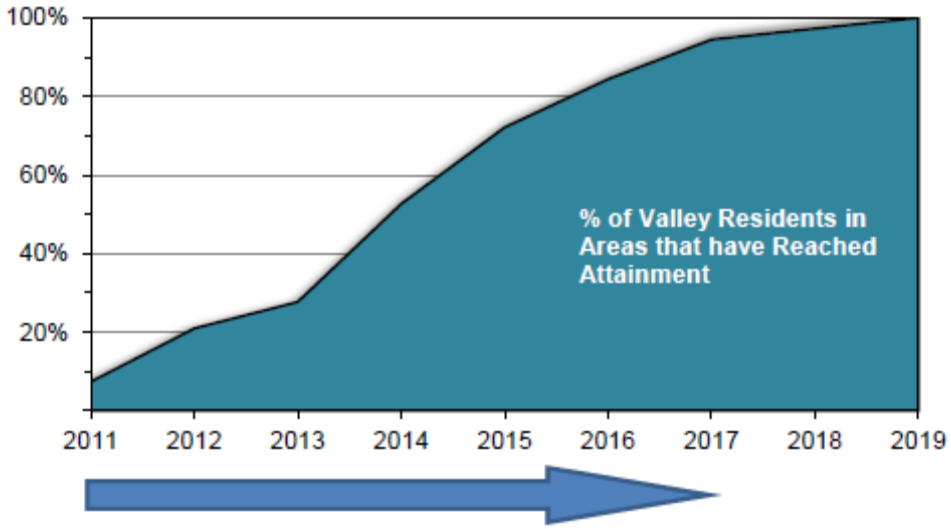


Figure 10-1 Valley Residents with PM2.5 Concentrations below the Federal 24-hour PM2.5 standard



The other air pollutant health concern is from localized emissions of criteria pollutants and TACs on sensitive receptors. For criteria pollutant emissions, localized exceedances of ambient air quality standards can occur if a project is located near large sources of carbon monoxide (CO), oxides of nitrogen (NOx), PM10, and PM2.5. It is not possible to accurately assess hot spot impacts without

project specific information. As a rule of thumb, pollutant concentrations decline by about 80 percent within 1,000 feet of a source due to dispersion. The distance between the source and the receptor and the concentration of pollutants at the source are needed to estimate local impacts. As described in Response to Comment K-9, CO is no longer a problem in the San Joaquin Valley. The potential exists for localized impacts from NOx, PM10, and PM2.5; however, project specific information is needed to determine if health standards would be exceeded and mitigation measures required to reduce the impact to less than significant. In addition, as emissions from motor vehicles and other sources continue to decline, health impacts from these pollutants will decline. Adding traffic in new development areas will result in emission concentrations similar to those in existing development areas because the types of emissions from residential and commercial development and the emissions generated per acre are similar and will be on similar attainment schedules as the rest of Fresno. Emissions from industrial development will depend on the actual facilities that are constructed; however, as described in Response to Comment JJ-21, existing SJVAPCD regulations will ensure that overall stationary source emissions growth is offset.

The health impacts from existing TAC sources are described in the Draft Master EIR on page 5.3-10. Review of SJVAPCD records found no stationary source facilities in Fresno that exceed the 10 in a million cancer risk threshold. New facilities that exceed the SJVAPCD threshold would not be issued an Authority to Constuct. The largest source of health impacts from TAC emissions is from diesel particulate matter (PM). The emissions from diesel PM are predicted to decline by 85 percent by 2020 through compliance with the ARB's Diesel Risk Reduction Plan. As stated earlier, diesel PM comprises over 70 percent of the TAC risk in the San Joaquin Valley and nearly all the risk from freeways. This rate of reduction means that even though VMT will increase during General Plan buildout, risk will continue to decline with regulation. Although the health impacts of TAC emissions will continue to decline, this impact will remain significant. See Draft Master EIR page 5.3-61 for additional discussion on this topic.

Response to Comment JJ-25
The commenter states that the Draft Master EIR defers analysis of significant impacts on public health.

The impacts referred to by the commenter from the Mira Loma Commerce Center regarding public health was accomplished for an actual development project where the type of use had been determined. If such a project were proposed in Fresno, it would be required to prepare a detailed health risk assessment (HRA) and mitigate project emissions if a significant impact was identified. Impacts from industrial development vary greatly by the type of use proposed. Just because a parcel is designated industrial does not mean it will be developed with a project that produces large quantities of TAC or criteria pollutant emissions. Requiring studies to be prepared without knowing the emission sources that will be part of the project and their location in relation to sensitive receptors would be worthless. As recommended by the commenter, the City will use the ARB Air Quality Land Use Handbook along with consultation with the SJVAPCD in determining which projects require further review. Recognizing that industrial land has the potential for development projects with substantial emissions from combustion sources, volatile organic compounds, and diesel trucks,

the General Plan policy that requires these projects to undergo analysis once a specific use is proposed is entirely appropriate and consistent with CEQA.

The commenter lists specific project level mitigation measures such as installing air filtration systems on homes near toxic sources. As stated in the Draft Master EIR on page 5.3-61, the identification of applicable project specific mitigation measures is not feasible without site-specific information. Project specific mitigation measures will depend on the types and amounts of pollutants that are present, the design characteristic of the site, and the location of the receptors in relation to the site. The City will consider all feasible mitigation measures including those listed by the commenter and others recommended by the SJVAPCD in their comments on individual projects.

Response to Comment JJ-26
The commenter states that the Draft Master EIR fails to adequately analyze the potential for development under the General Plan to create objectionable odors. The commenter claims that an analysis of how sources of odorous emissions caused by the implementation of the General Plan would impact sensitive receptors is required.

The commenter is incorrect. The level of analysis in the Draft Master EIR is appropriate considering the level of detail available from the General Plan. Until a specific use is proposed, its potential for causing odor impacts is unknown. The Response to Comment JJ-25 also applies to potential odor impacts. Both require information regarding the activities that would occur at a project site that is not known until a project is proposed to the City. By having a list of projects that are potential odor sources, the City can determine during its review process whether additional analysis and mitigation measures would be required. Doing otherwise would be speculative.

Response to Comment JJ-27
The commenter states that the project fails to identify feasible mitigation measures and describes the policies in the SJVAPCD Air Quality Guidelines for General Plans. Please see Response to Comment K-8 regarding feasible mitigation measures.

Response to Comment JJ-28
The commenter states that the Draft Master EIR fails to adequately analyze or mitigate the Plan's cumulative air quality impacts and should include other projects in the Air Basin. The commenter is incorrect. The Air Quality Section includes a thorough discussion of cumulative impacts under each CEQA checklist impact question. Please also see Response to Comment K-1.

Air quality impacts are inherently cumulative in nature. The air quality problem in the San Joaquin Valley is the result of a multitude of individual sources from large industrial sources to personal cars, homes, and commercial businesses. The place where cumulative impacts are comprehensively addressed is in the applicable air quality plans for the air basin. It is the job of the SJVAPCD to prepare plans to attain ambient air quality standards at all locations within the air basin by schedules mandated by the Clean Air Act. The SJVAPCD and the eight Regional Transportation Planning Agencies (RTPA) coordinate to provide latest planning information, population, employment, and VMT estimates for each County that are used to forecast growth in the air quality plans. The Fresno General Plan Update uses population and employment data from Fresno COG and VMT data

generated with the land use assumption in the Fresno COG model that is consistent with the data used in the air quality plans. This means that emissions growth forecasted for the General Plan Update is consistent with the data used to predict attainment in the San Joaquin Valley Air Basin. Therefore, the Draft Master EIR was able to find the General Plan Update less than significant for the plan consistency criteria for cumulative impacts. SJVAPCD guidance recommends use of its quantitative thresholds for cumulative analysis in recognition that growth, although accounted for in its plans, still slows progress toward attainment. The General Plan Update includes numerous policies to reduce this significant impact, but the Draft Master EIR found cumulative criteria pollutant for ozone precursors and fine particulate matter impacts to be significant and unavoidable since emissions cannot be reduced to less than the SJVAPCD significance thresholds even with implementation of the air quality policies.

Response to Comment JJ-29
The commenter states that the Draft Master EIR fails to adequately analyze and mitigate greenhouse gas emissions. The City disagrees with this assertion. The analysis used well-accepted quantification techniques and models to determine the City's greenhouse gas contribution. The General Plan Update improves the City's long-term sustainability in a very comprehensive manner. It includes policies that help reduce emissions from greenhouse gas emission sectors under the City's authority or ability to influence.

Response to Comment JJ-30
The commenter states that the Draft Master EIR underestimate the Project's GHG emissions because it was based on an inaccurate traffic model. As stated in Response to Comment K-1, the methodology used by the transportation consultant to determine vehicle miles traveled (VMT) uses well-accepted professional practices and is appropriate for identifying the City's VMT.

Response to Comment JJ-31
The commenter states that the Draft Master EIR's conclusion that the project would not conflict with relevant plans to reduce greenhouse gas emissions is not supported by substantial evidence. The City disagrees with this assertion. The Scoping Plan is the State's comprehensive strategy for achieving targets set by AB 32 and covers all relevant policies and regulations for determining plan consistency through 2020. Beyond 2020, there are only goals for the state contained in Executive Order S-05-03 but no strategy for how to get there. Without a strategy, there is nothing for cities to use to determine if a conflict would exist. Until such a time that the state develops a comprehensive plan with a new regulatory schedule and targets, continued implementation of the General Plan Update policies remain consistent with the Scoping Plan, AB 32, and Executive Order S-05-03. It is important to recognize that the State does not currently rely on local government to provide any reductions in greenhouse gas emissions to meet the 2020 target. The state encourages local governments to implement land use and transportation strategies to reduce motor vehicle travel and energy efficiency programs. The General Plan Update fulfills the State's vision for the role of local government to take action under its authority for land use and transportation infrastructure. The Draft Master EIR lists the policies that will provide the State's vision beginning on page 5.7-23. The policies comprehensively address for all avenues available to local government to reduce greenhouse gas emissions.

The commenter demands that land use policies encouraging infill development must be enforceable to require sequential development and to claim emission reductions. The Draft Master EIR does not rely upon reductions from land use measures to demonstrate consistency with 2020 targets. The General Plan sets the policy framework for future development. Projects must demonstrate consistency with the General Plan. The City will track development that actually occurs during General Plan buildout and can make adjustments to its plan as circumstances warrant as with any plan. Clairvoyance is not possible or expected in long-range planning. Course adjustments are required for any large endeavor to respond to unforeseen circumstances. Please also see Response to Comment G-1 and Response to Comment F-1 regarding modifications to Objectives UF-12 and UF-13, respectively that clarifies timing of development within and outside the existing City limits.

The Draft Master EIR recognizes the 2050 goal of reducing emissions to 80 percent below 1990 levels and shows the trajectory that will be required to achieve that target for the City's emission inventory for 2035 and 2050. See Draft Master EIR pages 5.7-50 and 5.7-51. This is described in greater detail in the draft Greenhouse Gas Reduction Plan on page 39 (see Appendix F.2 of the Draft Master EIR). The General Plan Update policies apply throughout General Plan buildout in 2056 unless revised in some future General Plan Update. Until the State develops a greenhouse gas regulatory program applicable to later years, it is unknown how many, if any, additional reductions from local government will be required. The First Update to the Climate Change Scoping Plan describes in general terms what will be required to reach the 2050 target.

> "Together, they show that achieving the 2050 target will require energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and rapid market penetration of efficiency and clean energy technologies that requires significant efforts to deploy and scale markets for the cleanest technologies immediately. The studies agree that large efficiency improvements can be achieved in transportation, buildings, and industry; that the electricity sector will have to be essentially zero carbon; and that electricity or hydrogen will have to power much of the transportation sector, including almost all passenger vehicles, and that near-zero carbon biofuels will have to power most other vehicles. They recognize a need for the natural environment to play an important role, providing carbon sinks to offset emissions, and a need to integrate and coordinate policy across a number of objectives and planning processes."

The vast majority of the actions described above are not within local government's purview. Vehicles and fuels are the responsibility of the State and federal government. Power generation is a regulated by the State. Industrial machinery is regulated by air pollution control districts and the choice of fuel used by industry is outside City authority. The areas where the City can help are with transportation infrastructure and land use authority. Actions to reduce vehicle miles traveled will be important, but will be a small and decreasing fraction of the reductions obtained by use of zero emission and renewable fueled vehicles. The City can encourage the move toward zero net energy homes and commercial buildings, but will only be responsible for a small fraction of the reductions compared to those required by future revisions to Title 24 that make net zero emissions mandatory for all development. In conclusion, City actions can only provide a small but important increment of

reductions required to reduce emissions by 80 percent below 1990 levels. The amount of the City contribution, if any, is required to reach this goal remains to be determined. In the interim, implementation of the General Plan Update will set course on a trajectory consistent with long-term targets.

Response to Comment JJ-32

The commenter states the Draft Master EIR fails to include mitigation measures for the project's significant GHG emissions. The commenter is shocked that VMT is projected to double in 46 years. The VMT projections reflect assumptions that travel will increase proportionally with population growth. In the next four decades, many factors will affect the amount of travel that will actually occur. No reductions in VMT from the changes in land use and transportation systems are reflected in the VMT projections. However, the land use assumptions in the General Plan Update are included in the Fresno COG Sustainable Community Strategy (SCS) that predicts an 11 percent reduction in per capita emissions from passenger vehicles by 2035. Although VMT reductions are important as recognized throughout the General Plan and Draft Master EIR, they will be a minor component of reduction in emissions from vehicle travel. The vast majority of reductions will come from changing to zero emission electric vehicles and vehicles that use renewable fuels. The policies contained in the General Plan Update are the state of the art for communities in suburban settings such as Fresno. SB 743 will help to make the City's numerous infill and smart growth policies more effective. The General Plan Update is consistent with SB 743.

Response to Comment JJ-33

The commenter lists example mitigation measures to reduce greenhouse gas emissions. Additional mitigation measures are not required to achieve reductions in excess of State 2020 targets. It appears that the commenter did not read the policy section of the Draft Master EIR. The City will be implementing programs included as General Plan policies that will provide additional reductions throughout General Plan buildout that are very similar to the measures listed by the commenter. For example:

From Policy RC-5-c:

- Promote the expansion of incentive-based programs that involve certification of projects for energy and water efficiency and resiliency. These certification programs and scoring systems may include public agency "Green" and conservation criteria, Energy Star™ certification, CALGreen Tier 1 or Tier 2, Leadership in Energy Efficient Design (LEED™) certification, etc.
- Promote appropriate energy and water conservation standards and facilitate mixed-use projects, new incentives for infill development, and the incorporation of mass transit, bicycle and pedestrian amenities into public and private projects.
- Require energy and water audits and upgrades for water conservation, energy efficiency, and mass transit, pedestrian, and bicycle amenities at the time of renovation, change in use, change in occupancy, and change in ownership for major projects meeting review thresholds specified in an implementing ordinance.

Other examples are listed below:

Policy RC-8-b: Energy Reduction Targets. Strive to reduce per capita residential electricity use to 1,800 kWh per year and non-residential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings.

Policy RC-8-d: Incentives. Consider providing an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Policy RC-7-i: PACE Financing. Develop a residential Property Assessed Clean Energy (PACE) program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.

Policy RC-8-e: Energy Use Disclosure. Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

Policy RC-8-f: City Heating and Cooling. Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.

Policy RC-8-g: Revolving Energy Fund. Create a City Energy Fund, which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Policy RC-8-h: Solar Assistance. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Policy RC-8-i: Renewable Target. Adopt and implement a program to increase the use of renewable energy to meet a given percentage of the city's peak electrical load within a given time frame.

Policy RC-8-j: Alternative Fuel Network. Create a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

Policy MT-2-b: Reduce Vehicle Miles Traveled and Trips. Partner with major employers and other responsible agencies, such the San Joaquin Valley Air Pollution Control District and the Fresno Council of Governments, to implement trip reduction strategies, such as eTRIP, to reduce total vehicle miles traveled and the total number of daily and peak hour vehicle trips, thereby making better use of the existing transportation system.

Numerous other policies will improve pedestrian and bicycle travel, reduce water consumption, reduce solid waste, and improve the transit system. No additional mitigation measures are required beyond the policies included in the General Plan Update since those measures were the result of an exhaustive review of policies suitable for the City of Fresno. The City prefers market based solutions

as opposed to the command and control measures listed by the commenter. For example, mandating the amount of renewable power required by an individual development would be considered overreach on an issue under the purview of the State. A local GHG fee program similar to Rule 9510 would create an un-level playing field that would likely result in development moving farther from the Fresno urban area to locations with no fees. Solar energy provides a good example of a highly effective incentive based program. Fresno has one of the highest rates of solar installation in the State due to state and federal incentives and lower panel prices due to market forces supported by efficient permitting processes by Fresno's Building Department. The State's zero net energy initiative will likely be incorporated into Title 24 or other State energy efficiency regulation. A program adopted by the City would be duplicative of State efforts and a waste of resources. In addition, developers may provide zero energy homes as a sales feature as pointed out by the commenter without any action by the City. Finally, to summarize, no additional mitigation is required to mitigate emissions to less than significant prior to 2020. After 2020, regulations requiring net zero energy development is likely at the State level that would provide reductions to achieve a 2030 or 2035 midterm target and a trajectory toward achieving the State's 2050 goal.

Response to Comment JJ-34

The commenter states that the operational noise levels associated with the General Plan Update are likely to be higher than those disclosed in the Draft Master EIR because the traffic analysis under estimates project traffic. As discussed in Response to Comment K-1, the traffic modeling conducted for the General Plan Update follows accepted professional practices for describing the traffic model and modeling assumptions. The traffic consultant, Fehr and Peers, verified that the model was correctly calibrated for existing conditions. In addition, project traffic volumes were adequately added to existing conditions to determine potential future traffic volumes with the implementation of the General Plan Update. The noise analysis used the existing and project traffic volumes to adequately assessed potential operational noise impacts.

The commenter asserts that the Draft Master EIR did not adequately analyze or effectively mitigate noise impacts. The City disagrees with the commenter. Although this comment does not provide specific examples of the inadequacies, please see the discussion below as well as Response to Comments JJ-35 through JJ-37 for responses related to trucks travelling along freeways and along local streets.

Response to Comment JJ-35

The commenter refers to single noise events from trucks travelling along roadways. The commenter references case law related to increase nighttime flights associated with the Oakland International Airport. As discussed on page 5.11-3 of the Draft Master EIR, there is a discussion of an additional noise descriptor that is used primarily for the assessment of aircraft noise impacts. This descriptor is the Sound Exposure Level, which is also called the Single Event Level (SEL). SELs are not used as a standard by jurisdictions for truck traffic or automobile traffic noise thresholds because local jurisdictions cannot create regulations for trucks or automobiles travelling on public roadways. These regulations are created by federal and state governments (i.e., the vehicle code or manufacturing standards). Furthermore, determining the specific location and frequency of these single-event sounds is speculative and depends on roadway, traffic, and vehicle conditions.

Truck traffic is evaluated using noise thresholds that are commonly based on community noise equivalent level (CNEL) which is a 24-hour average measurement. As discussed in Section 5.11.1 of the Draft Master EIR, the CNEL is similar to the Day-Night Average Sound Level (Ldn) which is a weighted average of the intensity of the sound with corrections for the time of day. The time of day correction requires the addition of 10 dB to sound levels at night between 10 p.m. and 7 a.m. While the CNEL is similar to Ldn, the CNEL has another addition of 4.77 dB to sound levels during the evening hours between 7 p.m. and 10 p.m. Therefore, the use of CNEL adequately account for potential nighttime noise.

Response to Comment JJ-36
The commenter asserts that the noise implications from implementing the soundwalls proposed for mitigating roadway noise was not provided. The commenter is not correct. Table 5.11-11 in Section 5.11-29 of the Draft Master EIR identified the wall height needed to attenuate noise levels to meet the 65 dBA CNEL standard for noise sensitive land uses located adjacent to the roadways.

The commenter also states that there is no supporting evidence that soundwalls would effectively reduce noise levels. Noise attenuation from soundwalls depend on the height of the soundwalls. Traffic noise modeling was conducted for existing, existing plus project, and cumulative traffic noise along various types of roadways throughout the Planning Area (see Appendix I-1 in the Draft Master EIR). The model that was used was the Federal Highways Administration's (FHWA) FHWA-RD-77-108 Highway Traffic Noise Prediction Model. This model predicts noise levels based on various noise parameters and also predicts noise levels based on specific barrier heights. These barrier heights were modeled and provided in Appendix I-1 in the Draft Master EIR. The use of the FHWA Traffic Noise Prediction Model is an accepted practice for planning purposes. As specific development applications consistent with the General Plan Update are submitted to the City, specific conditions associated with a project may require further noise evaluation to take into account specific elevation changes or other characteristics associated with a specific site.

Response to Comment JJ-37
The commenter states that the project noise increases shown on Table 5.11-13 in Section 5.11 of the Draft Master EIR requires a comprehensive identification of mitigation measures to minimize impacts on sensitive receptors. As discussed in Impact NOI-3 in Section 5.11 of the Draft Master EIR, the implementation of the General Plan Policies NS-1-a through NS-1-p would, in most instances, reduce traffic noise impacts to less than significant. Specifically, the implementation of Policy NS-1-f would implement performance standards for noise reductions for new residential and noise sensitive uses exposed to exterior noise levels from transportation sources above 65 dB Ldn or CNEL. In addition, Policy NS-1-I requires mitigation by new development through the preparation of an acoustical analysis to determine specific impacts associated with a development application that is consistent with the General Plan Update. The acoustical analysis would evaluate the specific land uses, traffic noise levels, and orientation of the specific uses in related to the roadway(s). Although the implementation of the policies (including noise barriers) could reduce the traffic noise to the City's performance standards, there are some instances where traffic noise levels would substantially increase (i.e., from 50 dBA CNEL to 68 dBA CNEL shown on Table 5.11-14 under "4-Lane Arterial" on page 5.11-38 of the Draft Master EIR). These substantial increases could occur due to very low traffic

volumes under existing conditions and high volumes under the proposed project. Even though the high traffic volumes results in high noise levels, the high noise levels could be reduced to the City performance standard through attenuation or other means. There are certain circumstances that the traffic noise levels cannot be reasonably reduced due to certain situations such as the orientation of an existing noise sensitive land use that has a front yard facing a major street. It is not reasonable to place a sound attenuation barrier between the roadway and the front yard, especially if the noise-sensitive land use gains access from the major street. As specific details of development applications that are consistent with the General Plan Update are submitted to the City, then a more focus evaluation may be required.

Response to Comment JJ-38

This comment asserts that comments provided in Letter JJ clearly requires extensive new information and analysis. The City disagrees with the commenter. The discussions provided in Responses to Comment JJ-1 through JJ-37 demonstrate the adequacy of the environmental evaluation within the Draft Master EIR.

Response to Comment JJ-39

This commenter asserts that the Draft Master EIR violates CEQA. This City disagrees with the commenter. The discussions provided in Responses to Comment JJ-1 through JJ-37 demonstrate the adequacy of the environmental evaluation within the Draft Master EIR.

ATT:

Trai Her

RE: General Plan Update

From: Sue Williams, SPOA

Sunnyside Property Owners Association
P.O. Box 8096-Fresno, CA 93747-8096

August 18, 2014

Jennifer K Clark, Director
Re: Draft General Plan
Development and Resource Management
2600 Fresno Street, Room 3065
Fresno, CA 93722

Ms. Clark,

The Board of Directors of the Sunnyside Property Owners Association (SPOA) appreciates the opportunity to provide comment on the General Plan Update.

We are encouraged that several of the key themes of the Plan reflect the need to improve the quality of life of its residents with goals and policies designed to preserve and enhance community character and that the Plan identifies the disparity between neighborhoods north and south of Herndon Avenue.

The Sunnyside area, generally bounded by Peach Avenue to the west, Temperance Avenue to the east, Kings Canyon Avenue to the north and Jensen Avenue to the south is a mix of older rural large lot residential parcels generally located within the unincorporated area of Fresno County and newer small lot subdivisions developed within the City. While new growth has brought additional amenities to the area, it has also increased traffic, noise and the potential to negatively impact the residential areas adjacent to proposed infill, transit corridors and activity centers. KK-1

The Roosevelt Community Plan (RCP) has guided development in the southeast area for over twenty years. While advocating a diversity of residential and density types, it provides policies and implementation measures to ensure established neighborhoods are protected. It also requires enhanced standards for landscape setbacks for arterial and collector streets south of Belmont and East of Chestnut Avenues and Minnewawa Avenue, a scenic route. Finally, the Roosevelt Community contains properties whose historic significance has been formally recognized for their eligibility to appear on the Local Official Register of Historic Resources.

Key issues:

<u>Under the General Plan update the Roosevelt Community Plan will be repealed. Consider incorporating the following provisions from the RCP to the updated general plan and development code</u>:

- Policy 1-8.3 Establish a Boulevard Overlay (BA) District with a minimum 20-foot landscaped setback along Kings Canyon Road east of Chestnut Avenue to be implemented at the time of property development or major modification as defined by the Fresno Municipal Code.
- Policy 1-5.8 Enhance the appearance of major transportation corridors by applying the following standards and policies:
    - A 15 foot (or larger, as specified by this Plan) landscaped boulevard overlay standard along arterial and collector streets south of Belmont Avenue and East of Chestnut Avenues.
- Policy 2-3.11 Designate Minnewawa Avenue (which shall not cross Fancher Creek) as a scenic street to be developed with a minimum 50-foot (measured from the right of way line) landscaped setback between Fancher Creek and Kings Canyon Road; with a 20 foot landscaped setback between Church and Jensen Avenues and also between Kings Canyon Road and Belmont Avenue.
- Incorporate Figure EIR-14, which delineates Local Historic sites potentially eligible for the National Register, within the citywide preservation program to identify, protect and assist in the preservation of Fresno's historic and cultural resources.
- Goal 1-7 Establish and maintain safe, attractive and stable residential neighborhoods with compatible relationships between housing types and densities.
    - Policy 1-7.1 Apply the following standards and guidelines to all development proposed within areas designated for low, medium low or medium density residential use. A.) Arrange lot patterns and sizes to maintain compatibility with surrounding uses and improvements (either existing or planned), and to facilitate the development of adjacent parcels with similar lotting patterns.

KK-1
CONT

- Goal 1-6 Plan for the diversity of residential types, densities and locations necessary to achieve the plan concept and accomplish the plan goals to provide for adequate housing opportunities, balanced growth, and efficient use of resources. (Policies 1.6-1 and 2 have been incorporated within the General Plan update)
    - Policy 1-6.8 In order to provide a desirable range and distribution of housing opportunities, the designation of additional medium high density residential uses (*and by definition Urban Neighborhood Density*) should have either direct access to a major street or to a local street of sufficient vehicular capacity, which does not pass through an existing or planned single-family residential neighborhood prior to intersecting a major street.

<u>The Corridor/Center Mixed-Use (CMX) designation of Kings Canyon Road between Chestnut and Sunnyside Avenues allows for a maximum Floor Area Ratio (FAR) of 1.5, or up to 3 stories in height.</u> A sizeable portion of the corridor east of Peach Avenue south of Kings Canyon is adjacent to low to medium-low density residential

properties. Several of the parcels located on the southeast corner of Kings Canyon and Minnewawa are only one acre in size. While the Neighborhood Mixed Use designation prohibits automobile orientated uses, without benefit of the Development Code update, it is unclear as to what type of uses would be allowed in the CMX districts. We are encouraged however, that several of the objectives identified in the Urban Form, Land Use and Design component of the General Plan address the potential impact to adjacent uses; most notably, UF-12-d, "Ensure land use compatibility between mixed-use districts in Activity Centers and surrounding neighborhoods;" UF-12-g, "Establish design standards and buffering requirements for high intensity Activity Centers to protect surrounding residential uses from increased impacts from traffic noise and vehicle emissions, visual intrusion, interruption of view and air movement, and encroachment upon solar access"; and D-4-f, "Strive to ensure all new non-residential land uses are developed and maintained in a manner complementary to and compatible with adjacent residential land use, to minimize interface problems with the surrounding environment and to be compatible with public facilities and services." We would hope that the City invites public participation and is able to address neighborhood concerns whenever projects are developed within the CMX land use designation.

KK-1 CONT

The new Urban Neighborhood Land Density Land Use Designation allows 16-30 units an acre and is being proposed for parcels adjacent to parkland and community facilities with access to frequent transit service. We would ask that the provision in the RCP requiring multi-family uses to have direct access to a major street or local street of sufficient capacity that does not pass through an existing or planned single family residential neighborhood prior to intersecting a major street be implemented to better serve the project residents and to protect adjacent residential areas.

Finally, we support Alternative 7.3.4, the Growth Area Reduction Alternative within the Southeast Development Area (SEDA). As stated in the Master Environmental Impact Report, "The Growth Area Reduction Alternative would reduce most of the environmental impacts of the proposed project and would be considered the Environmentally Superior Alternative."

KK-2

The General Plan Update is an ambitious document that purports to solve numerous issues identified within the planning area. We look forward to a collaborative relationship with the City that fosters improved quality of life for its residents through compatible land uses that stabilize and enhance existing neighborhoods.

KK-3

Respectfully,

Sue Williams

Sue Williams
Corresponding Secretary
Sunnyside Property Owners Association

Cc: Councilman San Quintero
Supervisor Debbie Poochigian

Letter KK: Sunnyside Property Owners Association, Sue Williams, August 18, 2014

Response to Comment KK-1

This comment requests certain provisions from the Roosevelt Community Plan to be incorporated into the General Plan and Development Code Update. Since there is no specific comment on the environmental conclusions of the Draft Master EIR, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment KK-2

This comment provides support for Alternative 7.3.4, Growth Area Reduction Alternative. This comment is noted. Since there is no specific comment on the environmental conclusions of the Draft Master EIR, no further response is required. (CEQA Guidelines, Section 15088.)

Response to Comment KK-3

This comment states that the commenter looks forward to a collaborative relationship with the City that fosters improved quality of life for its residents. This comment is noted. Since there is no specific comment on the environmental conclusions of the Draft Master EIR, no further response is required. (CEQA Guidelines, Section 15088.)

THIS PAGE INTENTIONALLY LEFT BLANK

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

1640 5th Street, Suite 204
Santa Monica, California 90401

Matt Hagemann, P.G., C.Hg.
(949) 887-9013
mhagemann@swape.com

October 8, 2014

Ashley Werner
Leadership Counsel for Justice and Accountability
2115 Kern Street, Suite 320, Fresno, CA 93721

Subject: Comments on the Draft Master Environmental Impact Report for the General Plan Update, Fresno, California

Dear Ms. Werner:

I have reviewed the July 22, 2014 Draft Master Environmental Impact Report (DMEIR) for the City of Fresno's General Plan and Development Code Update ("Project"). The Project will accommodate development through 2056 to include an estimated 145,000 residential units, 63.3 million square feet of commercial/office/public facility uses, 20.8 million square feet of mixed use, and 40.5 million square feet of industrial uses. With the increase in development, the amount of existing vacant land and open space will be reduced and existing agricultural uses will be removed. The anticipated population at buildout in 2056 is estimated to be 970,000, an increase of 425,000 people. In addition, the Project is projected to accommodate 393,200 new jobs and 145,000 new housing units for a total of approximately 332,000 units by 2056 (p. 5.12-10). LL-1

Areas of the DMEIR that I have reviewed include Hydrology and Water Quality and Hazards and Hazardous Materials. I have found the DMEIR to inadequately disclose impacts in these subject areas and, where impacts are significant, to fail to identify all feasible mitigation measures that would be necessary to reduce impacts. A revised DMEIR should be prepared to address these inadequacies and to identify additional mitigation.

Hydrology and Water Quality

Population and job growth under provisions of the Project will lead to depletion of groundwater supplies, an impact identified as significant from both Project-specific and cumulative standpoints (Impact HYD-2). The DMEIR fails to identify all feasible mitigation measures to reduce water demand that will result in groundwater depletion. A revised DMEIR should be prepared to identify additional mitigation to consider additional water conservation and recharge measures.

According to the DMEIR (Impact HYD□2):

> The project could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

Groundwater underlying Fresno is in a condition known as overdraft, where the amount of water withdrawn by pumping exceeds the amount of water that recharges the groundwater basin over a period of years of average conditions. The groundwater under Fresno is actually in a condition known as critical overdraft defined where "continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."[1] Fresno taps groundwater with 270 municipal supply wells completed in the Kings Subbasin, part of the greater San Joaquin Valley Groundwater Basin.[2]

LL-1
CONT

The DMEIR Must Incorporate Additional Mitigation Measures

Additional mitigation must be incorporated into a revised DMEIR to conserve water supplies. Some of the measures that should be considered and incorporated into the revised DMEIR include measures to (1) increase the amount of land designated for urban and high density housing as compared to lower density housing, (2) preserve existing agricultural and undeveloped land through growth management measures, and (3) require water efficient landscaping.

---

[1] 2010 Fresno Urban Water Management Plan, 2012, p. 4-8 http://www.fresno.gov/NR/rdonlyres/3795B9BD-E030-492D-8215-1A6654C1D932/0/TextFinal2010CityofFresnoUWMPNovember2012.pdf (incorporated by reference into the DMEIR, 1:17)

[2] 2010 Fresno Urban Water Management Plan, 2012, p. 4-4 (incorporated by reference into the DMEIR, 1:17)

Urban and High Density Housing

Designation of additional parcels in growth areas for urban and high density housing which are currently slated in the 2035 Draft General Plan Land Use Diagram for lower density housing would also help to reduce water demand. Such "smart growth" has been shown to be much more water wise than development of traditional single family homes. The General Plan Update itself recognizes that, "water demand can be minimized through efficient land use. Compact and infill development generally requires significantly less pipe and lower water per capita demand…as compared to low density developments" (p. 7-36). In Utah, planners have determined that water demand drops from approximately 220 gallons per capita per day at a density of two units per acre, to about 110 gallons per acre at a density of five units per acre.[3] However, the DMEIR contains no consideration of how smart growth, or how higher density housing development in particular, would help to conserve water resources.

Urban and high density housing development at least 20units per acre should be stressed in a revised DMEIR. The DMEIR should identify all existing and planned low and medium density residential neighborhoods that lack higher density residential land use designations and identify sites in those neighborhoods for re-designation for urban and high density residential land uses.. Examples of neighborhoods which lack higher density land use designations and for which the DMEIR should identify additional urban and high density residential land use include but are not limited to the following neighborhoods:

- Neighborhoods within the area East of Grantland, South of Clinton, North of Belmont and West of Marks;
- SEDA, South of McKinley St. and North of Tulare St.; and
- Low-density residential neighborhoods in existing city limits, including in particular neighborhoods North of Shaw Avenue with limited to no higher density housing.

Affordable housing could also be integrated into the high density developments meeting the objective stated in the DMEIR

LL-1
CONT

Preserve Agricultural and Undeveloped Land

Converting undeveloped land to roads, houses, shopping malls, and businesses will increase the area of impervious surfaces. By avoiding or slowing the rate of development of existing agricultural and undeveloped land, infiltration will be enhanced by creating less impervious areas. The DMEIR should mitigate water usage impacts associated with this Project by limiting the rate of development in growth areas and requiring development in growth areas to meet density thresholds to prevent unnecessary and premature conversion of agricultural and

[3] http://www.epa.gov/smartgrowth/pdf/growing_water_use_efficiency.pdf, p. 3 (Exhibit A)

undeveloped land. Examples of measures the DMEIR should include to this end include but are not limited to the following:

- Require that at least 57% of new residential development to be located within existing city limits as of December 21, 2012 and establish a mechanism for monitoring compliance with this target.
- Require all new residential subdivision developments in growth areas to include urban and high density residential units.
- Establish buffer zones on all sides of the City that establish an ultimate limit to outward growth and the expansion of city limits.

Require Water-Efficient Landscaping

The DMEIR, as written, only weakly encourages water-efficient landscaping in Policy RC□7□a through "support" of programs that result in decreased water demand, such as xeriscape landscaping (p. 5.9□25).

Where landscaping is part of both residential and commercial development, water efficient landscaping, to include xeriscaping, should be required. Xeriscaping, which uses plants and landscaping techniques to reduce water use, can conserve long-term water by 70 percent or more.[4] Instead of offing to only "support" water efficiency in landscaping, a revised DMEIR should be prepared to identify a mitigation measure to require it by adoption of local ordinances. In fact, all local agencies were to adopt a water efficient landscape ordinance by January 1, 2010 to comply with Assembly Bill 1881 (Laird).[5] No mention of such law-making was identified in the DMEIR.

LL-1
CONT

A revised DMEIR should be prepared to include ordinance language to require water efficient landscaping. Some specific language to consider in a revised DMEIR includes the following measures other communities have included in their water efficient landscape ordinances:

- The ordinance applies to all new construction, and rehabilitated irrigated landscape areas equal to or greater than 1,000 square feet;
- The ordinance applies to all new landscapes regardless of size or occupancy type;
- The ordinance limits the allowable turf area to 25% of the irrigated area, unless the project applicant chooses to develop a water budget;
- The ordinance requires at least 80% of the plants in non-turf areas shall be native plants, low-water using plants, or no-water using plants, unless project applicant chooses to develop a water budget;

[4] http://www.epa.gov/smartgrowth/pdf/growing_water_use_efficiency.pdf, p. 21 (Exhibit A)
[5] http://www.water.ca.gov/wateruseefficiency/landscapeordinance/ (incorporated by reference; copy available upon request from Leadership Counsel)

- The ordinance requires dedicated irrigation meters at all accounts with landscaping that exceeds 5,000 square feet;
- The local agency will implement budget-based tiered-rate billing structures to discourage excessive outdoor water use;
- The ordinance requires that the precipitation rate of all overhead spray nozzles be less than one inch per hour; and
- The ordinance requires a final physical site inspection of the landscape installation, and irrigation system installation.[6]

A Revised DMEIR Must Identify and Incorporate All Feasible Measures to Reduce Water Consumption and Reduce Impacts on Groundwater Supply

To reduce water demand, the DMEIR states that a conservation program would reduce per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035 through adoption of a program of incentives, design and operation standards, and user fees (p. 5.9-25). As mitigation, DMEIR emphasizes water conservation measures "to reduce the per capita water use to 215 gallons per capita per day" (MM HYD□1).

This mitigation measure does not go nearly far enough. The 2005 California state average for per-capita water consumption was 192 gallons per day[7], approximately the same as the Project goal for 2035. The State of California has established a per-capita consumption goal of 154 gallons per day by 2020[8], a level that is 89 gallons per day less that the Project goal of 243 gallons per day in the same year.

LL-1
CONT

Some California cities have gone much further in water conservation: per-capita consumption in the City of Santa Cruz area declined from about 126 gallons per capita per day (gpcd) in 2001 to 93 gpcd in 2010. Currently, in Santa Cruz, because of drought conditions, a four-person household is limited to 249 gallons of water, about 60 gallons per person each day.[9]

The DMEIR fails to recognize the State conservation goal of 154 gallons per day by 2020 and the measures other cities have taken to meet water demands, especially in times of drought. Even at the very limited rate of conservation, the DMEIR offers very vague assurances that water consumption would not outstrip supplies in stating (p. 5.9-24):

> To accommodate the buildout population of 970,000 people, additional water conservation measures would need to be developed to reduce water demand from 250 gallons per capita per day to 215 gallons per capita per day. At 215 gallons per capita per

[6] http://www.water.ca.gov/wateruseefficiency/docs/LandscapOrdinanceReport_to_Leg-4-22-2011.pdf, p. 6 (incorporated by reference; copy available upon request from Leadership Counsel)
[7] http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/docs/20x2020plan.pdf, p. ix (Exhibit B)
[8] http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/docs/20x2020plan.pdf, p. x (Exhibit B)
[9] http://www.fresnobee.com/2014/04/26/3897507/fresno-water-supply-holds-up-vs.html#storylink=cpy (Exhibit C)

day, the population of 970,000 people would demand 233,606 acre-feet/year of water. This demand would be less than the total water supply of 234,400 acre-feet/year.

The estimate of Project demand above is barely less than the supply (800 acre-feet/year) and highlights that there is very little margin for error when making predictions for future water availability, especially when considering external forces like drought. No mention of drought is made in making this prediction and the impacts a sustained drought would have on water supplies, both surface water and groundwater. In fact, no mention of the word "drought" is made in the Hydrology and Water Quality section, a significant oversight in terms of predicting the long-term viability of a groundwater supply that is already over-utilized and in the face of the population and development growth envisioned by the Project. A revised DMEIR should evaluate water supplies in light of the current and future droughts. A number of water supply scenarios should be considered that envision droughts of various severity and the estimate the impact on groundwater and surface water under those scenarios.

To partially meet water demands, the DMEIR states that groundwater pumping would remain at 85,000 AF/year in approximately 2035 and beyond (p. 5.9-24). Given the current drought conditions and demands on groundwater from both municipal, industrial and agricultural uses, assuming a constant supply of groundwater is anything but assured. Fresno's water table dropped 80 feet over several decades in the past century due to pumping.[10] The DMEIR acknowledges this drop and states the water level has decreased from 30 feet below ground surface to more than 128 feet below ground surface in the past 80 years (p. 5.15□2). Some news reports have stated that groundwater declines are on the order of 30 feet per year in the Fresno area.[11] Some of the declines are due to increased groundwater demand in the face of the current drought which has set off a boom in well drilling to further tap underground supplies.[12]

LL-1
CONT

The DMEIR makes no prediction about further water table declines from implementation of the Project. A revised DMEIR should predict the amount of drawdown that would result from implementation of the Project and the resultant lowering of the water table. The DMEIR should identify the economic costs of increased electrical use from increased pumping lifts and from the need to lower well screens or the abandonment of wells that would result from falling water levels as a result of Project implementation.

Mitigation to reduce impacts on groundwater supply, as identified in the DMEIR, is inadequate. A revised DMEIR needs to be prepared to identify all feasible and implementable mitigation. The DMEIR touts participation in the Kings Basin IRWMP as mitigation (MM HYD-2) along with efforts to reduce the per capita water use to 215 gallons per capita per day" (MM HYD□1).

---

[10] http://www.fresnobee.com/2014/04/26/3897507/fresno-water-supply-holds-up-vs.html#storylink=cpy (Exhibit C)

[11] http://www.latimes.com/business/la-fi-drought-drilling-20140726-story.html (Exhibit D)

[12] http://news.nationalgeographic.com/news/2014/08/140815-central-valley-california-drilling-boom-groundwater-drought-wells/ (Exhibit E)

Efforts by the Kings Basin IRWMP to reduce groundwater overdraft are cited in the DMEIR and include:

- Increase conjunctive use of water and groundwater storage.
- Precipitation enhancement.
- Increase surface storage.
- Regional conveyance enhancement.
- Increase recycled water use for recharge.
- Remediation of contaminated groundwater and reinjection of the treated water.
- Encourage the use of stormwater runoff for recharge by agencies that collect and discharge stormwater.
- Increasing number and storage capacities of basins to store flood flows.
- Protect recharge areas from urban development.

The DMEIR goes on to say that these measures would reduce potential impacts but that the implementation of the Project would be cumulatively considerable and a significant cumulative impact related to water supplies (p. 5.15□43).

Therefore, all feasible mitigation needs to be identified and added to the DMEIR to reduce water consumption to meet or exceed State goals and to ensure a reliable supply for Project needs. A revised DMEIR should consider mitigation that goes well beyond the measures outlined in MM HYD□1 and MM HYD□2.

LL-1
CONT

The DMEIR fails to reference the Water Shortage Contingency Plan (WSCP) developed for the last Fresno Urban Water Management Plan. Implementation of certain measures of the WSCP, as part of the Project, should be a consideration for mitigation measures to meet demand through Project buildout in 2056, especially considering likely impacts of global warming and the potential for more frequent and more severe droughts in California.

The DMEIR should be revised to update the WSCP, and to incorporate measures, as mitigation, that were identified in the WSCP, as permanent requirements to ensure a water supply that is available through 2056. Consistent with the WSCP, additional water use restrictions and prohibitions, to be considered as a permanent part of the Project, should include: (1) the reduction of summer outdoor watering to two days and to the prohibition of outdoor watering in times of critical shortages; (2) stopping of issuance of building permits or a variation allowing building permits, but not allow new landscaping to be installed; (3) elimination of potable water for dust control; (4) requiring swimming pools to have a cover when not in use; and (5) requiring fountains, decorative lakes and ponds to use recycled water.[13]

[13] file:///H:/DEIRs%20and%20AFCs/Fresno%20General%20Plan/FRES%20UWMP.pdf

As shown, safeguards in the form of additional conservation beyond the weak goal of a per capita usage of 215 gallons per day as made in the DMEIR, is feasible and implementable. The DMEIR should be revised to commit to lower per capita water use consistent with State goals. Additional conservation measures should be identified in a revised DMEIR and a revised DMEIR should also quantify impacts of drought on surface water supplies and on groundwater withdrawals and declines in water levels. Furthermore, the DMEIR should include policies and programs to ensure coordination with other entities engaged in groundwater management to guard protect against groundwater depletion and promote regional sustainability.

LL-1
CONT

Hazards and Hazardous Waste

Implementation of the Project will disturb contaminated soils at numerous locations. During Project construction, workers and adjacent residents may be exposed to residual contaminants in soil and which become airborne, as dust. The placement of residences and businesses atop contaminated soil and groundwater may subject future residents to health risks though direct contact with soil and through inhalation of vapors emanating from the subsurface through a process known as vapor intrusion.

The DMEIR documents many contaminated sites that are known to regulators and are listed on agency websites. These contaminated sites are described to be associated with: leaking underground storage tanks predominately clustered south of downtown; Fresno Yosemite International Airport; Palm Bluffs Corporate Center (northwest Fresno) and along the Union Pacific Railroad Tracks (DMEIR, p. 5.8□3). The DMEIR also lists a number of sites that are included in the DTSC EnviroStor Database, including landfills, agricultural facilities, metal foundries, and three regional contaminated groundwater plumes (p. 5.8□4).

LL-2

The DMEIR makes no attempt to identify where the contaminated sites are located in relation to Project construction. The DMEIR only states:

> Contaminated sites are mainly associated with leaking underground storage tanks and are predominately clustered south of downtown, Fresno Yosemite International Airport, Palm Bluffs Corporate Center (northwest Fresno) and along the Union Pacific Railroad Tracks. These sites may include Superfund, Environmental Protection Agency, Storage and Disposal Facilities, Toxic Release Inventory System, National Discharge Elimination System Majors, Large Quantity Generators, Major Discharge of Air Pollutants, Corrective Actions, Risk Management Plan, Section Seven Tracking System (pesticides) and Brownfield Properties, as defined by the Environmental Protection Agency (City of Fresno Map Atlas 2011). (p. 5.8□23)

The DMEIR should be revised to create an overlay of the Project in relation to contaminated sites. Those contaminated sites that underlie Project development should be prioritized for cleanup under regulatory agency supervision.

The overlay should also identify where development will take place in relation to former agricultural lands. Organochlorine pesticides, such as DDT, were applied to agricultural land in the 1940s until they were banned in the early 1970s. Residual concentrations of organochlorine pesticides may be found in soil farmed during that time frame along with elevated levels of arsenic which was also used in pesticides prior to the 1950s. Development of former agricultural land that is contaminated with pesticides may place workers at risk during construction and future residents at risk who may come into contact with contaminated soil. Prior to development of Project construction on former agricultural land, sampling for residual pesticides should be conducted in accordance with the California Department of Toxics Substances Control (DTSC) Interim Guidance for Sampling Agricultural Properties.[14] If pesticides are found in soil at concentrations above regulatory thresholds, including the California Human Health Screening Levels[15], cleanup of the contaminated soils should be undertaken prior to project development. The DMEIR does not, but must, include such mitigation.

LL-2
CONT

The mitigation identified in the DMEIR does not address the potential for contamination in any systematic way. The DMEIR only includes vague provisions to:

> Soil and Groundwater Contamination Reports. Require an investigation of potential soil or groundwater contamination whenever justified by past site uses. Require appropriate mitigation as a condition of project approval in the event soil or groundwater contamination is identified or could be encountered during site development. (Policy NS□4□c, p. 5.8-18).

Instead of reacting to contamination upon development, as envisioned in the DMEIR, a systematic approach that maps areas of known contamination and addresses those areas prior to development is needed. The DMEIR should be revised to include an analysis that identifies contaminated areas and which sets for a system where the contaminated sites that are slated for development are cleaned up first.

Sincerely,

M Hagemann

Matt Hagemann, P.G., C.Hg., QSD, QSP

[14] http://www.energy.ca.gov/sitingcases/palmdale/documents/2011-02-02_Exhibits_FSA_TN-59585.pdf (incorporated by reference herein; copies available upon request by Leadership Counsel)
[15] http://oehha.ca.gov/risk/chhsltable.html (Exhibit F)

THIS PAGE INTENTIONALLY LEFT BLANK

Letter LL: SWAPE, Matt Hagemann, October 8, 2014

Response to Comment LL-1

The commenter indicates that the Draft Master EIR insufficiently analyzes impacts to hydrology and water quality. Specifically, the commenter states that the Draft Master EIR should incorporate additional mitigation in order to conserve water supplies, and provides a number of suggested mitigation measures. The impacts associated with groundwater recharge were evaluated in Draft Master EIR in Section 5.9 in Impact HYD-2, and impacts to water supplies and water facilities were analyzed in Section 5.15, under Impact USS-2 and USS-4. As indicated in the analysis, potentially significant impacts associated with these issues were identified in both Sections 5.9 and 5.15. As noted previously in Responses to Comments F-2, J-1, P-2, T-2, T-4 through T-7, U-2, and V-15, Mitigation Measures HYD-1, HYD-2, USS-5 and USS-21 within the Draft Master EIR would implement water conservation measures and restrict development if water supply capacity would be exceeded. The implementation of these mitigation measures would ensure that all impacts associated with groundwater recharge/water supply would be reduced to less than significant. Therefore, no additional mitigation would be necessary including measures proposed by the commenter.

Response to Comment LL-2

The commenter accurately summarizes the findings provided in Section 5-8, Hazards and Hazardous Materials in the Draft Master EIR that sites within the Planning Area contain contaminated soils. The commenter also indicates that the analysis in the Draft Master EIR does not identify where the contaminated sites are in relation to Project construction. The Draft Master EIR analyzes impacts associated with the General Plan Update, and does not address individual projects. The contaminates sites lists posted by the responsible agencies (often referred to as the "Cortese List") is continually changing as new sites are discovered and contaminated sites are remediated (or found not to be contaminated after conclusion of soil testing). For that reason, it is not useful to incorporate a changeable list of contaminated sites into long-term planning documents such as the General Plan Update and its Master EIR. California Government Code Sections 65962.5(f) and 65943, as well as Draft Master EIR Impact HAZ-1 address future grading and excavation of sites for new development. Contaminated properties are required to be identified, fully assessed and remediated prior to the commencement of construction activities. The General Plan Update includes Policy NS-4-c to require an investigation of soil and groundwater contamination whenever justified by past site uses. As individual development projects are proposed, Policy NS-4-c and the pertinent Government Code Sections (and related regulations) will be implemented.

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 4: ERRATA

The following provides the corrections and additions to the sections of the Draft EIR. The corrections and additions are organized by page number. Additional text is shown in underline, and deleted text is shown in ~~strikethrough~~ format.

Page 3-25, Project Description

Page 3-25 of the Draft Master EIR is revised as follows:

> "[3] The 'Other' category for the General Plan Update does not include ~~SEGA~~ SEDA because the individual land uses are included in the land use designations. This category includes roads canals, railroads, etc. and the buffer area designated in Southeast Development Area."

Page 3-33, Project Description

The bottom of Table 3-6 on page 3-33 of the Draft Master EIR is revised as follows:

> "Notes: Single-family residential uses include low density (1.0 to ~~3.0~~ 3.5 du/acre), medium low density (3.5 to 6.0 du/acre), and medium density (5.0 to 12.0 du/acre) residential uses. Multiple family residential uses include medium high (12.0 to 16.0 du/acre), urban neighborhood (16.0 to 30 du/acre), and high density residential uses (30 to 45 du/acre)."

Page 5-2, Environmental Impact Analysis

The last sentence in the first paragraph on page 5-2 of the Draft Master EIR is revised as follows:

> "Given this, a major goal of the historian is to determine accurate themes of analysis, a task that can only be undertaken by a thorough review of previous researchers' thoughts and ideas, as well as reviewing the primary and secondary sources of information, such as Sanborn Fire Insurance maps, building permits and the like. ~~literature of the resources."~~

Page 5.2-12, Agricultural Resources

The following is added after Policy RC-9-b.

> **"Policy RC-9-c.** Farmland Enrollment. Farmland Preservation Program. In coordination with regional partners or independently, establish a Farmland Preservation Program. When Prime Farmland, Unique Farmland, or Farmland of State Importance is converted to urban uses, this program would require that the developer of such a project permanently protect an equal amount of similar farmland elsewhere through easement. Advocate for the enrollment of all prime farmland outside of the City's SOI in agricultural land conservation programs.

Commentary: Scenic or resource conservation easements also are options for protecting farmland."

Page 5.2-13, Agricultural Resources

The following is added after Policy RC-9-b.

"Policy RC-9-c. Farmland Enrollment. Farmland Preservation Program. In coordination with regional partners or independently, establish a Farmland Preservation Program. When Prime Farmland, Unique Farmland, or Farmland of State Importance is converted to urban uses, this program would require that the developer of such a project permanently protect an equal amount of similar farmland elsewhere through easement. Advocate for the enrollment of all prime farmland outside of the City's SOI in agricultural land conservation programs.

Commentary: Scenic or resource conservation easements also are options for protecting farmland."

Page 5.2-13, Agricultural Resources

The reference to Policy RC-8-c is revised as follows:

"Policy ~~RC-8-c~~ RC-9-c. Farmland Enrollment. Advocate for the enrollment …"

Page 5.3-19, Air Quality

The following is added as an Advisory Recommendation for Distribution Centers in Table 5.3-5 on page 5.3-19 of the Draft Master EIR.

"Review the ARB Air Quality Land Use Handbook siting criteria to determine when additional analysis is required."

Page 5.3-25, Air Quality

The date referenced in Objective UF-12 is revised as follows:

"December ~~21~~ 31, 2012"

Page 5.3-39, Air Quality

The change to paragraph 5 as shown below:

"Rule 9510 – Indirect Source Review requires projects to reduce exhaust related construction emissions by 20 percent for NOx and by ~~50~~ 45 percent for PM10; however, significance for

these emissions is based on whether projects exceed the SJVAPCD annual quantitative thresholds."

Page 5.3-52, Air Quality

The following statement will be included in the Errata Section as a new paragraph 3 on page 5.3-52:

"Exposures to toxic air contaminants can also result in acute (short-term) impacts. In a manner similar to assessment of chronic hazard impacts, acute hazard impacts are calculated using a hazard index. However, in the case of acute exposures, the air concentration of toxic air contaminants is calculated over a 1-hour average."

Page 5.5-6, Cultural Resources

The fourth sentence in the third paragraph on page 5.5-6 of the Draft Master EIR is revised as follows:

"Named for the Spanish word for "ash tree," Fresno has its roots in the form of a large farm established in 1867 by A.Y. Easterby in an area approximately 4.5 miles east of what is now central downtown."

Page 5.5-7, Cultural Resources

The second and fourth sentences in the fourth paragraph on page 5.5-7 of the Draft Master EIR are revised as follows:

"Development straddled the rail corridor and was located on both the east and west sides of the tracks. ~~was restricted to a six-block area beginning at and northeast from the Central Pacific Depot; development was concentrated at Mariposa and H Street.~~ Development of the infrastructure needed to support increases in agricultural and commercial industry soon followed and once diversity of industry was established, immigrant populations also began to increase. ~~Chinese, Armenian and Volga Germans began to arrive and settle."~~

Page 5.5-7, Cultural Resources

The last paragraph on page 5.5-7 and extending onto page 5.5-8 is deleted as shown below.

"~~As Fresno grew from its founding as a regional agricultural center, municipal infrastructure and amenities also increased. One of the first projects to build Fresno's infrastructure was the electric intra-urban railway. By 1905, Fresno Traction Company had laid 15.5 miles of track on Fresno streets before being purchased in 1910 by Southern Pacific Railroad. In addition, the Fresno Traction Company built an amusement park on eight acres of San Joaquin River bottomland eleven miles from downtown Fresno named Fresno Beach. They~~

~~extended the tracks to the beach in 1913. The Fresno Beach route was terminated at Herndon Avenue in 1930 due to increasing automobile use. Fresno Traction Company continued to cut back all of its routes and in 1939 streetcar service in Fresno ended.~~"

Page 5.5-8, Cultural Resources

The second and third sentence in the second paragraph are deleted as shown below.

"~~Numerous project-level historical studies have taken place in the City during the last ten years (Bungalow Courts 2004; Chinatown Survey 2006; Germantown Historical Context 2006; Arts and Culture District 2006-7; Pinedale 2007; Mid-Century Modern Historic Context 2008; North Park 2008; South Stadium 2008; Wilson Island 2009), and each have focused on the background history of specific areas in the City. Future historical research is likely to occur at neighborhood analytical levels because of the City's status as a NPS-SHPO Certified Local Government.~~

Page 5.5-8, Cultural Resources

The third paragraph on page 5.5-8 of the Draft Master EIR is revised as follows:

"The first three decades of the 20th Century were a period of steady growth and increasing prosperity for Fresno during which the city established itself as the primary city of the San Joaquin Valley. The City's first electric streetcar was in use in 1902. By 1905, Fresno Traction Company had laid 15.5 miles of track on Fresno streets before being purchased in 1910 by Southern Pacific Railroad. By 1909, the first double- track streetcar line was installed along J Street. By the early 1920s, streetcar lines would radiate out from the central business district to the north, east, south, and west where farmland was being subdivided for suburban development. The expanding transit infrastructure, along with exponentially increasing private automobile ownership, made living further from the city center possible. Land within the central city increasingly became used for commercial and civic purposes.

Page 5.5-9, Cultural Resources

The second paragraph on page 5.5-9 of the Draft Master EIR is revised as follows:

"Approximately 60,000 service members were stationed in and around Fresno during the War. Military activity was concentrated at two locations. One, the Hammer Field bomber base, was constructed in 1941 just beyond what was then the eastern boundary of the City. Today it is the site of Fresno Yosemite International Airport. The second, Camp Pinedale, was located six miles east of Downtown Fresno in the (then) unincorporated community of Pinedale on the site of the defunct Sugar Pine Lumber Company. The Army had acquired the site in March of 1942 for use as an Army Signal Training School. During World War II,

Japanese-Americans were detained in two assembly centers; one located at the Fairgrounds and the other at the former Sugar Pine Lumber Company."

Page 5.5-9, Cultural Resources

The fifth paragraph on page 5.5-9 of the Draft Master EIR is revised as follows:

"As with many California towns of the nineteenth century, Fresno has a wealth of residential architectural styles. Due to fires and redevelopment in Downtown, the earliest building stock is gone, with a few notable exceptions. Examples of the late Queen Anne style survive, while the 'Victorian' city has largely disappeared. Other residential styles that are well represented in Fresno include Craftman bungalows, Neoclassical cottages, American Foursquare, and Period Revival buildings, such as Tudors and Spanish Eclectic. ~~Fresno is home to a diversity of architectural styles that include Victorian, Revival (Colonial, Italian, Renaissance, Mission, Mediterranean, Spanish, and Tudor), Neoclassical, Craftsman Bungalow, Streamline Moderne, Beaux-Arts, Art Deco, International, Mid-Century Modern, and Ranch among others. While styles focus upon a collection of specific decorative features; types are based on form. Considered a distinctly American type, the Prairie Box— also known as the American Foursquare— was popular in Fresno in the early 20th Century.~~"

Page 5.5-10, Cultural Resources

The first paragraph on page 5.5-10 of the Draft Master EIR is revised as follows:

"As of August 19, 2014, there are 29~~There are also 26~~ National Register-listed structures within the Planning Area ~~in the downtown core~~."

Page 5.5-14, Cultural Resources

The third paragraph on page 5.5-14 of the Draft Master EIR is revised as follows:

"The City of Fresno retains many of its historically significant properties ~~buildings and structures~~ through listings on various registers; local and national. Within the Planning Area there are 29 historical resources listed on the National Register of Historic Places, and as of August 19, 2014, there are 271 designated properties ~~240 existing structures that are designated by the City~~ on the Local Register of Historic Resources~~. Additionally, there are~~ and 15 ~~13~~ Heritage Properties, which are not Historic Resources for the purposes of the City's Historic Preservation Ordinance but could potentially be treated as historical resources for the purposes of CEQA at the City's discretion. (http://www.historicfresno.org/). According to the Map Atlas – Existing Conditions Report prepared for the City of Fresno, there are three designated Local Historic Districts: the Porter Tract, the Wilson Island, and the Chandler Airfield/Fresno Municipal Airport. Since 1995, numerous historic building surveys have been undertaken by the City's Historic Preservation Division and technically qualified consultants, resulting in a potential of an additional 11 historic districts identified

but not formally designated by the City on the ~~local~~ Local Register ~~register~~ as Local Historic Districts."

Page 5.5-14, Cultural Resources

The third paragraph on page 5.5-14 of the Draft Master EIR is revised as follows:

"Unlike the analysis of prehistoric resources, a process for establishing the significance of individual buildings and historic districts was mandated by the City in 1979 in the form of a Historic Preservation Ordinance, which was updated in 1999, 2009, and 2012. The Ordinance has resulted in the identification of close to 5,000 entries ~~over 2,000 older structures~~ within the City limits, and as the City ages more historic-era properties are added to the database each year. Many formal studies have been undertaken, especially in the last 10 years, primarily because the City recognizes the advantages of preservation.

Page 5.5-15, Cultural Resources

The second sentence in the second paragraph is revised as follows:

"First established in 1979, the Ordinance was ~~last~~ updated in 1999, 2009, and 2012."

Page 5.5-20, Cultural Resources

The first sentence under "Local Policies" on page 5.5-20 is revised as follows:

"Following includes a portion of the policies from the 2025 General Plan for Historic Resources. For a complete listing of all of the policies under Objectives G-10 and G-11, please see the 2025 Fresno General Plan that is available for review at the City of Fresno Development and Resources Management Department. ~~are the objectives and policies related to cultural resources from the existing City of Fresno 2025 General Plan."~~

Pages 5.5-22 and 5.5-23, Cultural Resources

The first paragraph under Impact CUL-1 on pages 5.5-22 and 5.5-23 of the Draft Master EIR is revised as follows:

"Known historical resources are located primarily in Downtown Fresno because this is the area where development of the city began in the mid-1800s. These known resources meet the definition of an historical resource under CEQA Section 15064.5(a). As discussed previously, there are 29 historical resources listed on the National Register of Historical Places, 31 historical resources listed on the California Register of Historical Resources, four State Historic Landmarks, and as of August 19, 2014, there are 271 designated properties ~~240 existing structures~~ that are on the City of Fresno's Local Register of Historic Resources~~.~~

~~T~~there are also 13 Heritage Properties, which are not Historic Resources for the purposes of the City's Historic Preservation Ordinance but could potentially be treated as historical resources for the purposes of CEQA at the City's discretion. In addition to the individual resources, there are three designated Local Historic Districts within the Planning Area. As additional surveys for potential historical resources are prepared, such as the surveys that were prepared for the Fulton Corridor Specific Plan in Downtown Fresno, additional resources may be added to the various lists. Many areas of Downtown, as well as other locations within the Planning Area, have not been surveyed. As a result, only a portion of the resources in the Planning Area are known.

Page 5.9-4, Hydrology and Water Quality

The fourth sentence in the last paragraph on page 5.9-4 of the Draft Master EIR is revised as follows:

"This reduction in groundwater pumping will recharge the aquifer by approximately 15,000 acre-feet per year because the safe yield is approximately ~~1000,000~~ 100,000 acre-feet per year."

Page 5.9-4, Hydrology and Water Quality

The last sentence in the first full paragraph is revised to read as follows:

"Based on information provided by City staff, t ~~T~~he intentional recharge quantity in 2009 was approximately 54,600 AF and in 2010, the intentional recharge was approximately 53,100 AF."

Page 5.9-24, Hydrology and Water Quality

The fourth paragraph is a repeat of the third paragraph. Therefore, the fourth paragraph is deleted as shown below.

"~~Additionally, the General Plan Update includes the following policies designed to reduce the potential for groundwater overdraft impacts:~~"

Page 5.9-28, Hydrology and Water Quality

The first sentence under Project Specific under Mitigation Measures is revised to read as follows:

"Implementation of Mitigation Measure USS-5 and ~~USS-17~~ USS-21 is required."

Page 5.9-29, Hydrology and Water Quality

The first sentence under Cumulative under Mitigation Measures is revised to read as follows:

"Implementation of Mitigation Measure USS-5, USS-~~17~~21, HYD-1, and HYD-2 is required."

Page 5.10-21, Land Use and Planning

The third sentence in the second paragraph is revised as follows:

"No HCPs or NCCPs occur within the ~~c~~cumlative impact study area."

Page 5.11-26, Noise

The last sentence in the third paragraph is revised to read as follows:

"The distance from the centerline to the 55-, 60-, 65-, and 70-dBA noise levels have been calculated and are also shown in Table 5.11-10 with the noise calculation spreadsheets provided in Appendix ~~C~~ I-1."

Page 5.13-7, Public Services

The first note for Table 5.13-3 is revised to reflect the Planning Area and not the City.

"Given that school boundaries do not mirror ~~city~~ Planning Area boundaries, students may attend schools outside of the ~~city~~ Planning Area while students that live outside of the ~~city~~ Planning Area may attend schools within the ~~city~~ Planning Area. Enrollment figures are as of 2011."

Page 5.14-19, Transportation and Traffic

On Page 5.14-19 from the list of state routes in the planning area. SR 168 is revised as follows in the second sentence in the first paragraph on page 5.14-19:

"In the project vicinity, State Routes 41, 99, 168, and 180, along with the freeway ramp terminal intersections, fall under Caltrans jurisdiction."

Page 5.14-28, Transportation and Traffic

The first sentence in the second paragraph is revised to read as follows:

"Land use inputs for the City of Fresno General Plan Update were developed with City of Fresno staff based on the Draft General Plan Land Use Diagram (August 8, ~~2013~~ 2012)."

Page 5.14-85,Transportation and Traffic

Page 5.14-85 of the Draft Master EIR is revised as follows:

"Implementation of the City of Fresno General Plan Update would increase demand for public transit, bicycle, and pedestrian facilities, which would require those facilities to be improved and expanded as development occurs ~~e improvement and expansion~~."

Page 5.15-7, Utilities and Service Systems

The first sentence of the last paragraph on page 5.15-7 of the Draft General Plan is revised as follows:

"The City of Fresno commissioned a team of engineering consultants to prepare the City's Recycled Water Master Plan, which is was formally adopted by the City in April 2013."

Page 5.15-28, Utilities and Service Systems

The first sentence in the fourth paragraph on page 5.15-28 of the Draft Master EIR is revised as follows:

"The Water Quality Control Plan for the Tulare Lake Basin (~~Bain~~ Basin Plan) designates beneficial uses, established water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates by reference plans and policies of the State Water Resources Control Board."

Page 5.15-47, Utilities and Service Systems

The last sentence on page 5.15-47 is revised to read as follows:

"~~**Error! Reference source not found.**~~ Table 5.15-3 below shows the estimated generated wastes for each land use."

Page 9-1, Information Resources

The following is revised in Section 9.1.1 on page 9-1 of the Draft Master EIR and in Section 9.2.1 of the Draft Master EIR.

"Arnoldo ~~Rodriquez~~ Rodriguez"

THIS PAGE INTENTIONALLY LEFT BLANK

Master Environmental Impact Report
General Plan and Development Code Update
City of Fresno, Fresno County, California

Planned Land Use Requests
Environmental Evaluation

Prepared for:

City of FRESNO

City of Fresno
2600 Fresno Street
Fresno, CA 93721

Contact: Jennifer Clark, AICP

Prepared by:

FirstCarbon Solutions
1234 O Street
Fresno, CA 93721
888.826.5814

Contact: Michael Houlihan, AICP

December 5, 2014

SECTION 1: INTRODUCTION

During the preparation of the General Plan and Development Code Update and the Master Environmental Impact Report (EIR), the City of Fresno staff recorded requests from property owners and non-property owners to modify land use designations identified on the City of Fresno General Plan Land Use Diagram, Figure LU-1, in the General Plan. The City of Fresno staff also requested revisions to the General Plan land uses. The land uses illustrated on Figure LU-1 include those uses that were identified by the City of Fresno City Council in August 2012 to be further evaluated in the Master EIR. The land uses illustrated on Figure LU-1 were fully evaluated in the Draft Master EIR.

Subsequent to distributing the Draft Master EIR for public review, the City of Fresno has prepared this additional environmental evaluation to assess the potential effects associated with the requested land use changes.

Based on Section 15088.5(a) of the California Environmental Quality Act (CEQA) Guidelines, the City of Fresno is required to recirculate an EIR when significant new information is added to the Master EIR after public notice is given to the availability of the Master EIR for public review but before certification.

> "New information added to an EIR is not 'significant' unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. 'Significant new information' requiring recirculation include, for example, a disclosure showing that
>
> (1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
>
> (2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
>
> (3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.
>
> (4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. *(Mountain Lion Coalition v. Fish and Game Com. (1989) 214 Cal.App.3d 1043)*.

According to Section 15088.5(b) of the CEQA Guidelines, the City of Fresno is not required to recirculate the Master EIR where the new information added to the Master EIR merely clarifies or amplifies or makes insignificant modifications in an adequate Master EIR.

SECTION 2: PROPOSED LAND USE CHANGE REQUESTS

The requested land use changes are provided in Attachment 1 to this appendix. Tables 1.1, 1.2, and 1.3 in Attachment 1 provide the proposed land use changes. Table 1.1 includes those requests by property owners and non-property owners for specific parcels, as well as proposed land use changes for the same specific parcels by the City of Fresno staff. Where there were multiple land use change requests for a parcel, the change request that would result in the greatest traffic volume increase is identified as the worst-case request and further evaluated. The worst-case change request for each parcel is highlighted in red. Table 1.2 includes land use change request by the City of Fresno staff for parcels not identified in Table 1.1. In addition, Table 1.3 includes land use change requests by the City of Fresno staff for existing, approved Final Maps that either have been fully constructed, substantially constructed, and those that do not have any lots constructed on the parcels. The Final Maps with no lots constructed on the parcels are the first four Final Maps listed in Table 1.3.

The Final Maps that have been fully constructed or substantially constructed would not result in substantial changes to the traffic volumes evaluated in the Draft Master EIR because even though the General Plan land uses are recommended to be revised, the proposed land use designations would be consistent with the densities that have been constructed on the sites of these Final Maps and consistent with the traffic volumes evaluated in the Draft Master EIR for these sites.

Additional data for each of the land use change requests are provided in Tables 1.3, 1.4 and 1.5 in Attachment 1. These tables provide information on the changes in dwelling units, square footage of non-residential uses, employment, and daily trips for each proposed land use change request.

.

SECTION 3: ENVIRONMENTAL EVALUATION

The initial evaluation of the proposed land use change requests included a qualitative traffic impact evaluation by Fehr & Peers, the traffic consultant who prepared the traffic evaluation in the Master EIR. The volume to capacity ratios, corresponding levels of service, and the significance thresholds for the Traffic Impact Zones (TAZ) identified in General Plan Policy MT-2-I for roadways in the vicinity of each proposed land use change request were evaluated. Attachment 2 to this appendix includes Table 2.1 that categorizes each of the land use requests that would result in a change in traffic volume. The categories that were used include the following:

0 Increase in traffic would not likely create new impact

1 Increase in traffic may cause new impact. Adjacent or nearby roadways operate close to the significance threshold for the Traffic Impact Zone (TAZ). Increase in traffic may cause the threshold to be exceeded or may exacerbate LOS exception. The outcome may depend on development in adjacent areas.

2 Increase in traffic would likely create a new impact.

3 The area in the vicinity of the land use request change would results in less traffic or an increase of less than 10 trips. The request land use change would not create a new impact.

Based on the qualitative traffic evaluation, some of the land use requests could result in additional significant traffic impacts (Categories 1 and 2). These land use requests are identified as Categories 1 and 2 and provided in Table 1 below. If the City of Fresno City Council considers the land use requests in Table 1, a recirculated Master EIR would be required.

Table 1: Land Use Change Requests Within the City of Fresno Planning Area That Could Result in Additional Significant Traffic Impacts

Identification Number1,2	Owner (and Non-Owner Requesters) and Property Location1	Acres1
3.h.1	**West Fresno Community Leaders (Not Owners)** West side of Elm btwn. Church and Jensen	12.21
3.h.2	**West Fresno Community Leaders (Not Owners)** West side of Elm btwn. Church and Jensen	3.96
5.g	**City Councilman Oliver Baines – November 12, 2013** South of Church/Walnut/Grove/Thorne (leave proposed school site)	30
6	**Eisner Family Trust –** 5633 N. Fig Garden Loop (APN 509-290-07) What about southern half of PLU designation at this corner (APN 509-290-06 at 2.05 acres)?	2.29

Identification Number1,2	Owner (and Non-Owner Requesters) and Property Location1	Acres1
17.b	**Fancher Creek Properties – Nov. 2012** NEC Fowler/Fancher Creek	3.64
21.f	**Granville Homes** **NE Grantland/Barstow** **(**APN 505-281-16, 17 and 18)	3.93
41.b	**Parga Partners - College Park Master Planned Community** APN 316-040-77	26.90
41.c	**Parga Partners - College Park Master Planned Community** APN 316-040-66	3.06
41.d	**Parga Partners - College Park Master Planned Community** APN 316-040-63	5.77
41.e	**Parga Partners - College Park Master Planned Community** APN 316-040-17S	19.1
41.f	**Parga Partners - College Park Master Planned Community** APN 316-180-09	19.55
41.k.1	**Parga Partners - College Park Master Planned Community** APN 316-051-07	20
44	**River Park Tower** APN 303-201-29	2.1
46	**Shamlian Property** APN 510-040-30	2.2
47	**Sol Development** APN 507-021-01S, 02S, 03S, 05S, 09S, 10S, 17S, 22S, 37S, 38S, 39S, and 40S	13.04
50	**SEGA Plan Mod – Mansmann/Greenwood** A-08-12 APN 316-051-06	19.02
51	**SEGA Plan Mod - Dennis Simonian** A-08-14 APN 316-051-02	17.53
53.a	**SEGA Plan Mod – Berberian Ranches Inc.** A-08-21 APN 316-040-58	74

Identification Number1,2	Owner (and Non-Owner Requesters) and Property Location1	Acres1
53.b	**SEGA Plan Mod – Berberian Ranches Inc.** A-08-21 APN 316-040-58	25.94
53.c	**SEGA Plan Mod – Berberian Ranches Inc.** A-08-21 APN 316-040-58	8
54.c.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-3a: APN 313-400-09, 15, and 16	47
54.c.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-3a: APN 313-400-09, 15, and 16	22.81
56.e.1	**Ashley Werner** Replace Industrial within the Industrial Triangle between Hwy 99 and 41 with Business Park	2,135.28
56.e.2	**Ashley Werner** Replace Industrial within the Industrial Triangle between Hwy 99 and 41 with Business Park	140.45
56.e.3	**Ashley Werner** Replace Industrial within the Industrial Triangle between Hwy 99 and 41 with Business Park	58.47
56.e.4	**Ashley Werner** Replace Industrial within the Industrial Triangle between Hwy 99 and 41 with Business Park	32.75
F11	**NWC Elm and Jensen**	6.5
F12	**NWC Elm and Jensen**	9.81
Total		1,053

[1] Data obtained from Tables 1.1, 1.2, and 1.3 in Attachment 1
[2] Specific land use requests were obtained from Table 2.1 in Attachment 2.
Source: FirstCarbon Solutions, 2014

The remaining land use change requests that result in a change to the General Plan land use designation on a parcel within the City of Fresno Planning Area are depicted in Table 2, below. These remaining requests are evaluated for each of the environmental issues discussed in the Master EIR.

Table 2: Land Use Change Requests Within the City of Fresno Planning Area Further Analyzed in this Evaluation

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
1	**McCaffrey – NW Herndon/Hayes** (APN 503-020-09) TM 6052	14.15
2	**McCaffrey – NE Herndon/Hayes** (APN 503-020-51) FM 6053	4.10
3.c.4	**West Fresno Community Leaders (Not Owners)** Marks-Valentine-Whites Bridge-Madison	28.2
3.c.5	**West Fresno Community Leaders (Not Owners)** Marks-Valentine-Whites Bridge-Madison	14.5
3.g	**West Fresno Community Leaders (Not Owners)** Marks-Valentine-Whites Bridge-Madison ¼ section NE Marks and Church (Hughes-Marks-Church-Jensen) (Per phone conversation with Bob Mitchell on 11/27/2013, request change from rm to change to rl)	129.65
4	**Lisa Mochizuki – SWC – Kings Canyon and Minnewawa**	9.02
5.b.1	**City Councilman Oliver Baines – November 12, 2013** Hughes-Whites Bridge-Valentine-Kearney	106.46
5.b.2.a	**City Councilman Oliver Baines – November 12, 2013** Marks-Valentine-Whites Bridge-Madison	6.5
5.b.2.b	**City Councilman Oliver Baines – November 12, 2013** Marks-Valentine-Whites Bridge-Madison	52
5.b.2.c	**City Councilman Oliver Baines – November 12, 2013** Marks-Valentine-Whites Bridge-Madison	19.6
5.c	**City Councilman Oliver Baines – November 12, 2013** North-Walnut-West-Annadale	226.64
5.e.1	**City Councilman Oliver Baines – November 12, 2013** Whites Bridge – SR180 – West to Brawley	20
5.e.2	**City Councilman Oliver Baines – November 12, 2013** Whites Bridge – SR180 – West to Brawley	41
5.e.3	**City Councilman Oliver Baines – November 12, 2013** Whites Bridge – SR180 – West to Brawley	38
5.e.4	**City Councilman Oliver Baines – November 12, 2013** Whites Bridge – SR180 – West to Brawley	9
5.e.5	**City Councilman Oliver Baines – November 12, 2013** Whites Bridge – SR180 – West to Brawley	5

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
5.f.1	**City Councilman Oliver Baines – November 12, 2013** South of Church to Jensen between Walnut and Martin Luther King	30.75
5.f.2	**City Councilman Oliver Baines – November 12, 2013** South of Church to Jensen between Walnut and Martin Luther King	19.25
5.h	**City Councilman Oliver Baines – November 12, 2013** SW Hughes/California (reduce 40 acre park to 20)	18.69
5.i.2	**City Councilman Oliver Baines – November 12, 2013** California-Hughes-Church-Marks Res. High to Res. Medium	38.14
5.i.3	**City Councilman Oliver Baines – November 12, 2013** California-Hughes-Church-Marks Res. Urban Neighborhood to Res. Medium	35.50
7.a	**Central Unified School District – June 25,2013** SE Veterans Blvd and Barstow	10.59
7.b	**Central Unified School District – June 25,2013** NE Grantland/Ashlan (labeling issue)	160
7.c	**Central Unified School District – June 25,2013** NW Grantland/Dakota (labeling issue)	15.68
7.d	**Central Unified School District – June 25,2013** North side Shields btwn. Bryan/Hayes (labeling issue)	13.88
7.e	**Central Unified School District – June 25,2013** SE Shields and Valentine TM 5481 (9.81 acres with 80 du)	13.64
7.f	**Central Unified School District – June 25,2013** North side McKinley between Brawley/Valentine	19.24
7.g	**Central Unified School District – June 25,2013** NE Brawley/Madison (labeling issue)	20
7.h	**Central Unified School District – June 25,2013** West side of Brawley between Belmont and Olive	18.33
7.i.1	**Central Unified School District – June 25,2013** North side of California between Valentine and Brawley Change to Ponding Basin	9.15
7.i.2	**Central Unified School District – June 25,2013** North side of California between Valentine and Brawley Change to Res Low	9.15

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
8.a	**Fresno Unified School District – July 2, 2013** West side Marks, south of Ashlan	9
8.b	**Fresno Unified School District – July 2, 2013** Tenaya Middle School - NE Fruit/Bullard (labeling issue)	21.7
8.c	**Fresno Unified School District – July 2, 2013** Cooper Middle School - SW Hughes/Bellaire (labeling issue)	16.6
8.d	**Fresno Unified School District – July 2, 2013** Addicott Elementary School - SW Chestnut/Dayton (labeling issue)	3.8
8.e.1	**Fresno Unified School District – July 2, 2013** Gaston Middle School – SE Church/MLK (labeling issue) Rename Elem and PB/B to Middle School	21.44
8.e.2[2]	**Fresno Unified School District – July 2, 2013**	21.44
8.f	**Fresno Unified School District – July 2, 2013** Sunset Elementary - SE Crystal/Eden (labeling issue)	9.67
8.g.1	**Fresno Unified School District – July 2, 2013** Future Schools: W of West, S of California Ave. (labeling issue)	10.25
8.h	**Fresno Unified School District – July 2, 2013** Sequoia Middle - SW Cedar Hamilton (labeling issue)	16.86
8.i	**Fresno Unified School District – July 2, 2013** Vang Pao Elementary – SW Cedar/Heaton	8.07
8.j	**Fresno Unified School District – July 2, 2013** Bakman Elementary – NE Belmont/Helm	11.5
8.k	**Fresno Unified School District – July 2, 2013** NW Willow/Belmont	8
9.a	**Clovis Unified School District** SE Clinton/Temperance – email 10-25-13 *(CUSD says 775 students & 1,000 trips/day for new school)*	23.53
9.b	**Clovis Unified School District - August 12, 2013 Letter** SE – Olive/De Wolf in SEGA	20.8
9.d	**Clovis Unified School District - August 12, 2013 Letter** New Elem. School -Clinton & Armstrong	13.72
9.e	**Clovis Unified School District - May 23, 2013 Letter** NW Olive/Armstrong – Future Water Treatment facility shown as SS – Spec. School POSS (Correct NW	55.95

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	Treatment Facility designation too)	
10.a.1 and 10.a.2	**Sanger Unified Schools - May 1, 2013 Letter** Correct HS, MS, ES designations N of Jensen between Fowler and Temperance – shown as SS on POSS - Correct Fowler, Church, Armstrong, and Jenson to Public Facility – Middle & High School - Correct school site east of Armstrong and north of Jensen to Public Facility – Elementary School	127
12.b	**Fresno Metro Flood Control District (FMFCD) – July 23, 2013 and Oct. 9, 2013** Basin specific map changes SE corner of McKinley and Bryan Avenue alignment	2.87
12.c	**Fresno Metro Flood Control District (FMFCD) – July 23, 2013 and Oct. 9, 2013** Basin specific map changes SE corner of Jensen and Marks Avenue	10.30
12.e	**Fresno Metro Flood Control District (FMFCD) – July 23, 2013 and Oct. 9, 2013** Basin "AS" at Northwest Corner of California and Valentine	7.8
12.f	**Fresno Metro Flood Control District (FMFCD) – July 23, 2013 and Oct. 9, 2013** Armstrong and Church	6
14.a	**Steve Weil** – West Barstow/Veterans Blvd/Herndon Canal APN 505-060-08. Also, letters from Sol Development dated August 18, 2014, and August 29, 2012, and subsequent emails. (Staff intended CMX – mapping looks like RMX) RMX and Park to CMX (11.28 acre RMX & 5.6 acre Park)	16.88
14.b	**Steve Weil** – West Barstow/Veterans Blvd/Herndon Canal APN 505-060-08. Also, letters from Sol Development dated August 18, 2014, and August 29, 2012, and subsequent emails. (Staff intended CMX – mapping looks like RMX) RMX to CMX (13.22 acres with 175 dwelling units)	13.22
15	**Grubb and Ellis for Owner** – SWC W. Sierra/N. Polk	3.91
16.a	**Grubb and Ellis for Partial Owner**-Veterans/Bryan Or - Expand Highway and Auto for more uses	42.25

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	APN 040-08-081, 83S, 85S, 90S, 91S, 96S and 97S	
16.b	**Grubb and Ellis for Partial Owner** Veterans/Bryan Or - Expand Highway and Auto for more uses APN 040-08-081, 83S, 85S, 90S, 91S, 96S and 97S	2.89
16.c	**Grubb and Ellis for Partial Owner** Veterans/Bryan Or - Expand Highway and Auto for more uses APN 040-08-081, 83S, 85S, 90S, 91S, 96S and 97S	0.63
17.c	**Fancher Creek Properties – Nov. 2012** Add Transit Station or Police Station Precedent/ Consequences	1.5
18.b	**Ken Nguyen** Above NW Maple/California (APN: 471-302-28)	1.97
21.a.1	**Granville Homes** **Copper River** Outlot M	20.52
21.a.2	**Granville Homes** **Copper River** Outlot P (request change to 17.83 acres while the rest can remain Res. Medium High)	17.63
21.a.3.a	**Granville Homes** **Copper River** Outlot Q	16.49
21.a.3.b	**Granville Homes** **Copper River** Village I	30.09
21.a.3.c	**Granville Homes** **Copper River** Outlot LL	2.95
21.a.4	**Granville Homes** **Copper River** Outlot Y	10.08
21.a.5	**Granville Homes** **Copper River** Outlot X	12.85
21.a.6	**Granville Homes** **Copper River**	5.27

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	CRR owned lot adjacent to Lanier lot (APN 579-074-42S and 44S)	
21.a.7	**Granville Homes** **Copper River** Outlot OO	26.82
21.a.8	**Granville Homes** **Copper River** Outlot NN (Street to be realigned directly southerly)	6.66
21.a.9	**Granville Homes** **Copper River** Outlot PP (request change to 12 acres while the rest can remain Commercial)	12
21.a.10	**Granville Homes** **Copper River** Park and Surrounding – NW Chestnut/Copper TM6087	14.5
21.a.11	**Granville Homes** **Copper River** Outlot JJ (Portion)	3.5
21.a.12	**Granville Homes** **Copper River - Approved/Finished Developments** Village A (T5205 Terrabella)	28.44
21.a.13.a	**Granville Homes** **Copper River - Approved/Finished Developments** Village D - Eastern Portion	13
21.a.13.b	**Granville Homes** **Copper River - Approved/Finished Developments** Village A (T5205 Terrabella) Village D - Western Portion	22.8
21.a.14.a	**Granville Homes** **Copper River - Approved/Finished Developments** Village E (T5271 Links) - Western Portion	16.5
21.a.14.b	**Granville Homes** **Copper River - Approved/Finished Developments** Village E (T5271 Links) - Eastern Portion	10.21
21.a.15	**Granville Homes** **Copper River - Approved/Finished Developments** Village G (T892, 6045, 6065)	32.80

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
21.a.16.a	**Granville Homes** **Copper River - Approved/Finished Developments** The Top of portion of Village F	13.07
21.a.16.b	**Granville Homes** **Copper River - Approved/Finished Developments** Village A (T5205 Terrabella)	0.6
21.a.17	**Granville Homes** **Copper River - Approved/Finished Developments** T5963	23.69
21.b.1.A	**Granville Homes** **Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton** APN: 310-041-38 (T6033)	1
21.b.1.B	**Granville Homes** **Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton** APN: 310-041-38 (T6033)	3.56
21.b.1.C	**Granville Homes** **Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton** APN: 310-041-38 (T6033)	31
21.b.3.A	**Granville Homes** **Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton** APN: 310-740-07 (Ensure Live Work Units can happen on this property.	1
21.b.3.B	**Granville Homes** **Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton** APN: 310-740-07 Keep similar to current Light Industrial CM zoning as is under 2025 General Plan and existing zoning code	3.87
21.b.4	**Granville Homes** **Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton** APN: 310-740-08 and 09	14.02
21.c	**Granville Homes** **North side of Bullard near Bryan – to HWY 99** (APN 504-080-16S) (TM 5584)	9.51
21.d	**Granville Homes** **North side Clinton –Bet. Polk/Hayes –**(APN 312-061-	19.51

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	18) TM 5560	
21.e	**Granville Homes** **Grantland – South of Dakota Alignment** (APN 512-141-33)	19.56
21.g.1	**Granville Homes** **Artisan Square Area – NE Ashlan/Bryan/Hayes** (TM 5891)	4
21.g.2	**Granville Homes** **Artisan Square Area – NE Ashlan/Bryan/Hayes** (TM 5891)	1
21.g.3	**Granville Homes** **Artisan Square Area – NE Ashlan/Bryan/Hayes** (TM 5891)	12
21.g.4	**Granville Homes** **Artisan Square Area – NE Ashlan/Bryan/Hayes** (TM 5891)	21
21.h	**Granville Homes** **Bryan, between Ashlan and Dakota (APN 512-050-89)**	17.54
21.i.2	**Granville Homes** **Mission Ranch** Hughes-Marks-Whites Bridge-Kearney	14.02
21.i.3	**Granville Homes** **Mission Ranch**	4.92
21.i.4	**Granville Homes** **Mission Ranch**	16.42
21.i.5.a	**Granville Homes** **Mission Ranch**	3.45
21.i.5.b	**Granville Homes** **Mission Ranch**	3.61
21.i.5.c	**Granville Homes** **Mission Ranch**	7.24
21.i.6.a	**Granville Homes** **Mission Ranch**	14.09
21.i.6.b	**Granville Homes** **Mission Ranch**	5.2
21.i.7	**Granville Homes**	9.75

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	Mission Ranch	
21.i.8	**Granville Homes** **Mission Ranch**	4.95
21.i.9	**Granville Homes** **Mission Ranch**	14.31
21.i.10	**Granville Homes** **Mission Ranch**	9.81
21.i.11	**Granville Homes** **Mission Ranch**	17.95
21.i.12	**Granville Homes** **Mission Ranch**	18.89
21.i.13	**Granville Homes** **Mission Ranch**	18.96
21.i.14	**Granville Homes** **Mission Ranch**	17.65
21.i.15	**Granville Homes** **Mission Ranch**	7.07
21.i.16	**Granville Homes** **Mission Ranch**	19.55
21.j.3	**Westlake – Tract 5915 (Gettysburg, Grantland, Shields, and Garfield)** Eliminate CMX and replace with Medium Density	15
21.j.4	**Westlake – Tract 5915 (Gettysburg, Grantland, Shields, and Garfield)** Reduce size of Commercial (Ashlan and Grantland)	2.9
21.j.5	**Westlake – Tract 5915 (Gettysburg, Grantland, Shields, and Garfield)** Reduce size of Urban Neighborhood	18.2
21.j.6	**Westlake – Tract 5915 (Gettysburg, Grantland, Shields, and Garfield)** Commercial on Shields and Grantland	3.5
21.k.1	**Recorded Final Maps/Under Construction/Already Developed** SW Church/Fowler – Tract 5450 (6.54 du/ac)	18.07
21.k.2	**Recorded Final Maps/Under Construction/Already Developed**	86.87

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	SE Sunnyside/Church – Tracts 5458/5477 (4.19 du/ac)	
21.k.3	**Recorded Final Maps/Under Construction/Already Developed** NE Bullard/Grantland – Tract 5357 (5.46 du/ac)	36.22
21.k.4	**Recorded Final Maps/Under Construction/Already Developed** 4179/4171 W. Sample – Tract 5278 (3.27 du/ac)	17.41
21.k.5	**Recorded Final Maps/Under Construction/Already Developed** NE Garfield and Barstow – Tract 5597 (APN 505-321-01 thru 22, 505-322-01 thru 08, 505-331-01 thru 13, 505-332-01 thru 19 (4.87 du/ac)	27.91
22	**Sol Development for Owner**- West side of Maple between Perrin and Shepherd (developed condo complex)	4.5
23	**Sol Development for Owner**- SWC Valentine and McKinley (APN 449-030-63)	8.77
24.a	**The Kashian Group – Shaw and Hwy 99** APN 508-030-04 and 05	15.54
24.b	**The Kashian Group – Shaw and Hwy 99** APN 508-030-06	27.61
25	**Paul Fourchy** APN 506-130-28	17.6
26	**Art Terzian** APN 433-080-01 and 02	4.89
27	**Troy McKenney** APN 442-022-08 and 09	0.86
28	**Alfonso Manrique** APN 428-340-09	0.37
29	**Will Tackett** APN 494-060-51T	0.3
30	**Arkel Arisian** APN 568-010-20	20
31	**Chestnut and Alluvial (Land owners who have written letters** include: Beth Brown, Dan Taylor, Erica Ayala, Jerry Pohl, Kassandra Booth, Mary Grant Bell, Michael and Barbara Garrison, Dr. and Mrs James Fletcher, Ray Loom and Rick Olsen, Shalea and Mark Pitman, Steve and Lorie Collins, Tiffany and Josh Madsen, William and	18.52

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	Linda Hicks, William Gong, RJ Perez, Norma and Alice Otani, Kerry McGuire, James Olber, Denise and Winfred Nishmine) APN 404-071-45	
32	**Generation Home - Steven Spano** APN 402-030-70 Steve Brandau made same request on behalf of owner	3.06
33	**Kathy Van** APN 480-213-13, 14, and 15 (Request 18a is likely a previous land owner for APN 480-213-14)	1.13
34	**Fresno Pacific University** – Dirk Poeschel APN 472-040-25, 26, 27 and 28	2.56
35	**Gary Giannetta** APN 312-081-12 TM 6091	2.25
36	**Gary Giannetta** APN 472-022-13 TM 5387	8.73
37	**Gary Giannetta** APN 511-011-18 TM 5538 Also, letter from Wagner and Wagner asking for same thing	19.85
38	**John Valentino** APN 459-200-01	0.38
39	**Mark Knox** APN 507-021-02S	0.86
40.a	**Steve Ohanesian** APN 481-020-01	11
40.b	**Steve Ohanesian** APN 481-020-01	5
41.a	**Parga Partners - College Park Master Planned Community** APN 316-071-42	34.83
41.g.1	**Parga Partners - College Park Master Planned Community** APN 316-051-18	7
41.g.2	**Parga Partners - College Park Master Planned Community** APN 316-051-18	30
41.h	**Parga Partners - College Park Master Planned Community**	37.72

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
	APN 316-051-20	
41.i	**Parga Partners - College Park Master Planned Community** APN 316-051-21	80
41.j	**Parga Partners - College Park Master Planned Community** APN 316-051-09	14
41.k.2	**Parga Partners - College Park Master Planned Community** APN 316-051-07	13
42	**Sherman Spalding property – Dirk Poeschel** APN 403-030-07	2.8
43	**Sherman Spalding property – Dirk Poeschel** APN 509-020-35S	12.28
45.a	**Sequoia Fresno Joint Venture** APN 402-220-66 and 67	18.25
45.b	**Sequoia Fresno Joint Venture** APN 402-220-66 and 67	9.15
45.c	**Sequoia Fresno Joint Venture** APN 402-220-66 and 67	0.6
48	**Stone Soup** APN 418-401-10	1.48
49	**Sarkis Atachian** APN 433-210-33, 39 and 40	2.77
52.a	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #5: APN 316-150-01 and 02	18.95
52.b.1	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #6: APN 316-150-11	4.27
52.b.2	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #6: APN 316-150-11	5.65
52.c	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #7: APN 316-150-13	0.97
52.d.1	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #8: APN 316-150-14	8
52.d.2	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #8: APN 316-150-14	10.2
52.e	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #10 and 11: APN 316-150-31 and 32	18.6

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
52.f.1	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #12: APN 316-150-33	4.25
52.f.2	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #12: APN 316-150-33	1.75
52.g.1	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #14: APN 316-150-35	15.74
52.g.2	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #14: APN 316-150-35	3.85
52.h	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #16: APN 316-150-38	2.41
52.i	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #18: APN 316-150-44	2.46
52.j	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #19: APN 316-150-45	7.32
52.k	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #20: APN 316-150-46	12.50
52.l	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #21: APN 316-150-47	7.32
52.m	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #27: APN 316-150-57	3.04
52.n	**SEGA Plan Mod – Ralph and Frances Reitz** A-08-20 Property Owner #16 and 17: APN 316-170-16 and 17	10.83
54.a.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-1a: APN 316-031-21, 22, 23, 24, 26, 27, 61, 62, 62, and 64	104.07
54.a.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-1a: APN 316-031-21, 22, 23, 24, 26, 27, 61, 62, 62, and 64	51
54.b.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-2a: APN 313-410-13 and 15	57.68
54.b.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-2a: APN 313-410-13 and 15	30.8
54.d.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-4a: APN 313-030-35, 40, 50, 51, 52, and 53	47.3
54.d.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-4a: APN 313-030-35, 40, 50, 51, 52, and 53	97.42

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
54.e	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-5a: APN 310-342-04, 05, and 06	33.36
54.g.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-7a: APN 310-090-10 and 11	38.90
54.g.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-7a: APN 310-090-10 and 11	17.83
54.h.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-8a: APN 309-210-41	20.1
54.h.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-8a: APN 309-210-41	9.2
54.i.1	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-8a: APN 309-210-41	37
54.i.2	**SEGA Plan Mod – Greg Gaddie** A-08-24 Exhibit A-8a: APN 309-210-41	11.5
56.c	**Ashley Werner** Replace Regional Business Park adjoining residential near Fig and Muscat with Business Park.	50
F.1	**City of Fresno Staff** **Calwa Industrial Area[3]**	66.41
F.7	**City of Fresno Staff** W. Bullard and Carnegie	8.52
F.8	**City of Fresno Staff** Golden St. and Veteran's Blvd. interchange	118.87
F.14	**City of Fresno Staff** NWC Elm and Jensen	3.16
F.15	**City of Fresno Staff** NEC Whites Bridge and Blyth	39.92
F.17	**City of Fresno Staff** Nielson and Marks	35.69
F.20	**City of Fresno Staff** SWC of S. Marks and W. Whitesbridge	8.87
F.24	**City of Fresno Staff** NWC of Valentine and W. Madison	18.14
F.25	**City of Fresno Staff** Brawley, just north of Madison (north of the school)	32

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
F.26	**City of Fresno Staff** SWC of W. Shaw and N. Brawley	204.06
W.1	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	41.98
W.2	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	23.38
W.3	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	44.82
W.5	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	38.89
W.6	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	35.46
W.7	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	9.74
W.11	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	57.68
W.12	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	18.50
W.14	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	26.83
W.15	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	50.39
W.21	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	27.90
W.22	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	18.38
W.23	**City of Fresno Staff** Vicinity of Hwy 180 and Marks	16.91
4772	**Final Map 4772**	2.85
4983	**Final Map 4983**	12.75
5567	**Final Map 5567**	3.87
5770[4]	**Final Map 5770**	14.9
6028	**Final Map 6028**	14.5
Various	**Final Maps**[5]	11.03

Identification Number[1]	Owner (and Non-Owner Requesters) and Property Location[1]	Acres[1]
Total		4,859

City of Fresno Development and Resource Management Department, 2014

[2] Land use request 8.e.2 is on a parcel that has been recently developed with a land use that is consistent with the proposed land use request. This request is further evaluated below with all other requests identified in Table 2.

[3] Land use request F1 was evaluated as Business Park and would likely result in a significant traffic impact on Jensen Avenue as stated in Table 2.1 in Attachment 2. City staff has modified this land use request as shown in Table 1.2 in Attachment 1. With the revised land use request, no significant traffic impact would occur along Jensen Avenue.

[4] Although this land use request was included as a Category 1 as shown in Table 2.1 in Attachment 2, a further review found the lots associated with this Final Map to be substantially constructed.

[5] The Final Maps include all the Final Maps listed on Table 1.3 in Attachment 1, except for the four Final Maps that are listed at the top of the table. These four Final Maps have not been constructed.

Note: Land use request 5.g in Table 2.1 and listed in Table 1 above is located in an area that would have sufficient capacity as long as other referenced requests are not implemented. As a result, this land use request is further evaluated below with all other requests identified in Table 2.

Source: FirstCarbon Solutions, 2014

The following environmental evaluation addresses the potential effects associated with the land use requests that are provided in Table 2 above. The evaluation determines if the potential effects are new significant effects or substantial changes to the environmental evaluation provided in the Draft Master EIR. The potential impacts associated with each environmental topical issue is discussed below.

3.1 - Aesthetics

Based on the Draft Master EIR, distant views of highly valued features such as the San Joaquin River, the foothills of the Sierra Nevada, and the Downtown Fresno buildings are provided within the Planning Area. However, the implementation of the General Plan and Development Code Update would result in less than significant impacts on scenic vistas and scenic resources within a State scenic highway. The implementation of the above land use change requests would result in a combination of de-intensifying some areas and intensifying some areas within the Planning Area. These proposed land use changes would not substantially alter distant views of highly valued features such as those identified above. In addition, since a State scenic highway is more than 5 miles from the Planning Area, viewsheds from the scenic highway would not be substantially altered due to the land use change requests. Therefore, no new significant effects or substantial changes to the environmental evaluation in the Draft Master EIR regarding scenic vistas and scenic resources within a State scenic highway would occur.

The Draft Master EIR identified the potential for significant visual character impacts from views within the Planning Area as well as from views outside of the Planning Area. In addition, the Draft Master EIR identified potential significant increases in light and glare impacts with the development proposed in the General Plan and Development Code Update. The implementation of the land use change requests would result in some areas with higher intensity uses and others with lower intensity uses. The higher intensity uses include intensifying a planned urban use as well as intensifying areas planned for park, open space, or buffer area that account for approximately 670 acres, representing approximately 0.6 percent of the Planning Area. Collectively, the land use change requests identified in Table 2 would not substantially alter the impact conclusions identified for visual character, light, or glare. Furthermore, with the implementation of the General Plan policies to reduce potential visual character impacts, these impacts would remain significant with the proposed land use requests and these impacts would not be substantially different than those identified in the Draft Master EIR. The land use change requests will also increase light and glare and with the implementation of Mitigation Measures AES-1 through AES-5, potential impacts would be reduced; however, the impacts would remain significant. The level of impact would not be substantially different with the land use change request compared to the impacts identified in the Draft Master EIR.

Based on a review of the aesthetics issues, no new significant or substantial changes to the aesthetics evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.2 - Agricultural Resources

As discussed in the Draft Master EIR, approximately 15,903 acres of Farmland Mapping and Monitoring Program (FMMP) designated farmland and approximately 11,714 acres of existing farmland would be converted to uses other than agriculture. With the implementation of the land use change requests, there would be no change in the amount of FMMP-designated farmland or existing farmland that would be converted to non-farmland. Therefore, the implementation of the proposed land use change request would not alter the agricultural resources impact conclusions provided in the Draft Master EIR. In addition, the land use change requests would not alter the impact on Williamson Act Contract land identified in the Draft Master EIR.

Based on a review of the agricultural resources issues, no new significant or substantial changes to the agricultural resources evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.3 - Air Quality

The Draft Master EIR identified that the General Plan and Development Code Update would not exceed the growth projections used in the applicable attainment plans. In addition, the Draft Master EIR identified that the project's goals, policies, and development standards would not be in conflict with the development related control measures in the attainment plans. The implementation of the land use change requests would not alter the growth projections and would not alter the project's goals, policies, and development standards.

The Draft Master EIR identified that the General Plan and Development Code would not violate any air quality standard, specifically carbon monoxide (CO) and sulfur dioxide (SOx). Based on a review of the land use change requests provided in Tables 1.1, 1.2, and 1.3 in Attachment 1, the amount of daily trips associated with the General Plan and Development Code Update would decrease by approximately 221,000 daily trips. This reduction in trips would reduce CO and SOx emissions. With the incorporation of the land use change requests, the General Plan and Development Code Update would continue to not violate CO and SOx air quality standards.

The Draft Master EIR identified that the project would result in a considerable net increase in criteria pollutants during construction and operational activities. Although the amount of development could reduce with the implementation of the land use change requests and there would be a reduction in air emissions from vehicle trips, the project would continue to reduce criteria air pollutants compared to the year 2010 pollutant levels, but the quantity of criteria pollutants generated with the development of the project with the land use change requests would continue to be significant.

As identified in the Draft Master EIR, the project could expose sensitive receptors to substantial pollutant concentrations. The concentrations include oxides of nitrogen (NOx), CO, NOx, particulate matter less than 10 micrometers in diameter (PM10), and particulate matter less than 2.5 micrometers in diameter (PM2.5). Elevated concentrations of these pollutants can occur where a large number of sources are located in a concentrated area or when particularly large sources are located near sensitive receptors. Based on a review of the land use change requests, no substantial changes to the pollutant concentrations identified in the Draft Master EIR would occur with the implementation of the proposed land use change requests. With the land use change requests, impacts would remain significant and Mitigation Measures AQ-1 and AQ-2 would be required for project-specific impacts and Mitigation Measures AQ-3 and AQ-4 would be required for cumulative impacts. After the implementation of the above mitigation measures, potential impacts would remain significant similar to the conclusion identified in the Draft Master EIR.

The implementation of the General Plan and Development Code Update was found to not result in objectionable odors after the implementation of Mitigation Measure AQ-4. The proposed land use change requests would not alter the odor finding provided in the Draft Master EIR.

Based on a review of the air quality issues, no new significant or substantial changes to the air quality evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.4 - Biological Resources

As discussed in the Draft Master EIR, development in accordance with the General Plan and Development Code Update could result in potential impacts on various biological resources. With the proposed land use change requests, the potential impacts on biological resources would remain because the land use changes would continue to result in disturbance of the parcels within the Planning Area. Mitigation Measures BIO-1 through BIO-9 would continue to be required with the

proposed land use requests, and the level of impact after the implementation of the mitigation measures would be less than significant.

Therefore, based on a review of the biological resources issues, no new significant or substantial changes to the biological resources evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.5 - Cultural Resources

As discussed in the Draft Master EIR, the General Plan and Development Code could result in significant impacts on historical resources after the implementation of mitigation measures. With the implementation of the land use change requests, Mitigation Measure CUL-1 would be required; however, the potential significant impacts on historical resources would remain.

Potential impacts would also occur on archaeological, paleontological, and human remains as identified in the Draft Master EIR. These impacts would remain with the proposed land use change requests, even after the implementation of Mitigation Measures CUL-2 through CUL-4. The resulting impacts would remain significant.

Therefore, based on a review of the cultural resources issues, no new significant or substantial changes to the cultural resources evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.6 - Geology and Soils

According to the Draft Master EIR, the implementation of the General Plan and Development Code Update would result in less than significant impacts associated with earthquakes, seismic ground shaking, seismic ground failure, landslides, soil erosion/topsoil loss, unstable geologic soils, expansive soils, and soils capable of supporting wastewater disposal systems. The implementation of the proposed land use change requests will continue to allow development and/or grading on parcels, and future development of these parcels would be required to comply with local, state, and federal regulations regarding geotechnical issues.

Therefore, based on a review of the geological resources issues, no new significant or substantial changes to the geological resources evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.7 - Greenhouse Gases

The Draft Master EIR identified that the proposed project would result in the generation of a substantial amount of greenhouse gases through the use of motor vehicles, electricity, natural gas, waste, offroad equipment, and ozone depleting substance substitutes (refrigerants). The evaluation found that the project could achieve and exceed the 21.7 percent greenhouse gas reduction required to show consistency with Assembly Bill (AB) 32 targets and would be considered less than significant for growth occurring through 2020. In addition, the Draft Master EIR identified the greenhouse gas

reductions for the year 2035, 2050, and 2056 (buildout). These reductions would meet the 2020 target reductions; however, if the State ultimately sets targets based on achieving 80 percent reduction below 1990 levels by 2050, greenhouse gas impacts after the year 2020 would be significant.

The proposed land use change requests would result in the reduction of approximately 221,000 daily trips within the Planning Area. In addition, the proposed land use change requests would reduce residential densities. Based on a review of the total revised number of units with the land use change requests (332,004 + 2,309 = 334,313 units) and a revised residential acreage (45,566 + 1,242 [shown in Table 3.1 in Attachment 3] = 46,808 acres), the residential density would change from 7.286 units per acre (332,004 divided by 45,566) under the General Plan and Development Code Update to 7.142 units per acre (334,313 divided by 46,808) with the proposed land use change requests. This revision in density throughout the Planning Area is not considered to be a substantial change. Therefore, the generation of greenhouse gas emissions with the land use change request would not be substantially different than the generation of greenhouse gas emission identified in the Draft Master EIR.

Therefore, based on a review of the greenhouse gas emissions issues, no new significant or substantial changes to the greenhouse gas emissions evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.8 - Hazards and Hazardous Materials

The Draft Master EIR identified that the General Plan and Development Code Update would result in less than significant hazards and hazardous waste impacts related to routine use of hazardous materials, potential hazards to the public or environment from accidents, hazardous emissions near schools, hazardous materials on specific sites, and wildland fires. The proposed land use request would alter land uses in specific locations and potential hazards and hazardous materials impacts would remain; however, existing local, state, and federal regulations as well as the objectives and policies within the General Plan Update would reduce potential impacts to less than significant.

The Draft Master EIR identified potential hazard impacts in the vicinity of public airports. Mitigation measures were recommended to reduce these potential impacts to less than significant. The implementation of the proposed land use change requests would still require the implementation of Mitigation Measures HAZ-1 through HAZ-5, and the resulting impact would remain less than significant. Similar to the finding in the Draft Master EIR, the proposed land use requests would result in less than significant impacts associated with hazards in the vicinity of private airports.

Therefore, based on a review of the hazards and hazardous materials issues, no new significant or substantial changes to the hazards and hazardous materials evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.9 - Hydrology and Water Quality

The Draft Master EIR identified less than significant impacts to water quality, erosion, flooding, and mudflows. Water quality impacts would be less than significant with the implementation of regulatory mechanisms such as the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and the Municipal Separate Storm Sewer Systems (MS4) Permit. Erosion impacts were found to be less than significant after the implementation of the grading permit process as well as the General Plan policies. Flooding impacts were found to be less than significant with the implementation of the grading permit process and the General Plan policies. Due to the limited development proposed in areas that could be exposed to mudflows such as the San Joaquin River Bluffs, potential impacts were found to be less than significant. The implementation of the proposed land use change requests would result in similar impacts associated with water quality, erosion, flooding, and mudflows.

Potential significant impacts related to groundwater supplies and runoff were found with the implementation of the General Plan and Development Code Update. These impacts would be reduced with General Plan policies; however, mitigation measures (Mitigation Measures HYD-1, HYD-2, HYD-5.1 through HYD-5.5) were required to reduce potential impacts to less than significant. With the implementation of the proposed land use change requests, Mitigation Measures HYD-1, HYD-2, HYD-5.1 through HYD-5.5 would be required and the resulting impact would be less than significant, similar to the General Plan and Development Code evaluated in the Draft Master EIR.

Therefore, based on a review of the hydrology and water quality issues, no new significant or substantial changes to the hydrology and water quality evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.10 - Land Use and Planning

The findings in the Draft Master EIR identified less than significant impacts associated with the project causing a division of an established community and conflict with applicable plans, policies, or regulations. No project or cumulative impacts were found associated with conflicts with conservation plans. With the implementation of the proposed land use changes, the potential land use planning impacts would remain less than significant because the proposed changes would not result in a division of an established community and would not conflict with current plans, policies or regulations with the implementation of the proposed General Plan objectives and policies. The proposed land use changes would not conflict with conservation plans because there are no conservation plans that encompass any portion of the Planning Area.

Therefore, based on a review of the land use and planning issues, no new significant or substantial changes to the land use and planning evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.11 - Noise

The Draft Master EIR stated that the implementation of the General Plan and Development Code Update will result in temporary and long-term increases in noise levels. Construction activities will increase noise levels; however, compliance with the existing noise ordinance would reduce potential construction noise to less than significant. With the proposed land use changes, similar construction noise increases would occur, and these increases would be less than significant with the implementation of the City's noise ordinance.

Long-term noise levels will result from stationary sources, motor vehicles, and aircraft. The Draft Master EIR identified the increases in long-term noise levels could be reduced with the implementation of Policy NS-1-a through Policy NS-1-p, which includes several structural design measures. However, these policies and the measures that they would implement are ultimately limited, as even advanced policies and measures are limited in what they can do to remediate or reduce the magnitude of noise effect on many existing noise sensitive land uses in areas with current high noise exposures or where substantial noise increases are expected with the implementation of General Plan and Development Code Update buildout. Therefore, potential impacts were found to be significant and unavoidable. In addition, potential impacts from aircraft noise were found; however, the General Plan Policy NS-1-p would reduce the potential impact to less than significant. The implementation of the proposed land use changes would contribute to the increase in noise levels, and the noise findings would remain the same.

Therefore, based on a review of the noise issues, no new significant or substantial changes to the noise evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.12 - Population and Housing

As discussed in the Draft Master EIR, the implementation of the General Plan and Development Code would not induce substantial population growth or displace housing or people. With the project, the number of employees who are projected to reside in the Planning Area and leave the Planning Area for employment is approximately 10,517 employees in the year 2056. This is a decrease in employees leaving the Planning Area compared to the 2010 estimate of approximately 17,937 employees. With the proposed land use changes, there would be approximately 2,309 more housing units which would result in approximately 2,956 (2,309 housing units x 1.28 employees per house) more employees who could reside within the Planning Area. Therefore, the projected year 2056 number of employees who would need to leave the Planning Area for employment would reduce from 10,517 employees to 7,561 employees. As a result, the proposed land use changes would provide a closer balance of the number of jobs provided in the Planning Area compared to the number of employees who reside within the Planning Area.

In addition, the implementation of the proposed land use change request would not displace housing or people after the implementation of the General Plan and Development Code Update.

Therefore, based on a review of the population and housing issues, no new significant or substantial changes to the population and housing evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.13 - Public Services

The implementation of the General Plan and Development Code Update would increase the need for public services such as police protection, fire protection, schools, parks/recreation, courts, libraries, and hospitals. This increased need could result in an increase in the construction of facilities to provide additional services. As discussed in the Draft Master EIR, the provision of additional facilities could result in significant environmental impacts; however, Mitigation Measures PS-1 through PS-5 would reduce the potential construction impacts to less than significant. With the implementation of the proposed land use changes, the implementation of the project would still result in potential significant environmental impacts due to the construction of facilities to increase public services; however, the impact would be less than significant.

Therefore, based on a review of the public services issues, no new significant or substantial changes to the public services evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.14 - Transportation and Traffic

As discussed towards the beginning of this environmental evaluation, the land use changes requests were qualitatively evaluated by Fehr & Peers, the traffic consultant who prepared the traffic evaluation in the Master EIR. The volume to capacity ratios, corresponding levels of service, and the significance thresholds for the Traffic Impact Zones (TAZ) identified in General Plan Policy MT-2-I for roadways in the vicinity of each proposed land use change request were evaluated. The increase in traffic volumes identified in Table 1.1 in Attachment 1 were converted to peak hour trips and identified in Table 2.1 in Attachment 2. Each of the land use requests were evaluated and those requests identified in Table 2 were qualitatively determined that either the increase traffic would not likely create a new impact, or the traffic volumes in the area would result in less traffic or an increase of less than 10 peak hour trips. As discussed in the Draft Master EIR, traffic volumes associated with the project could result in significant and unavoidable adverse traffic impacts. The proposed land use changes identified in Table 2 would not alter the significance determinations for any of the roadway segments within the Planning Area.

Therefore, based on a review of the transportation and traffic issues, no new significant or substantial changes to the transportation and traffic evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.15 - Utilities and Service Systems

The implementation of the General Plan and Development Code Update would increase the need for wastewater, water, drainage/flood control, and solid/hazardous waste services. This increased need could result in an increase in the construction of facilities to provide additional services. As

discussed in the Draft Master EIR, the provision of additional facilities could result in significant environmental impacts; and various mitigation measures are provided to reduce potential impacts. However, it is anticipated that some of the impacts resulting from construction could remain significant after the implementation of mitigation measures. The implementation of the proposed land use change requests would result in similar impacts as those evaluated in the Draft Master EIR.

Therefore, based on a review of the utilities and service systems issues, no new significant or substantial changes to the utilities and service systems evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

3.16 - Energy Consumption

As discussed in the Draft Master EIR, the proposed General Plan and Development Code Update would increase the demand for energy in the form of electricity, natural gas, and fuel. The analysis concluded that with the implementation of the objectives and policies within the General Plan Update, the project would result in no impact related to the inefficient, wasteful, and unnecessary consumption of energy. With the proposed land use change requests, the amount of energy consumed would not be substantially different than the amount identified in the Draft Master EIR. Furthermore, the implementation of the land use change request would also result in no impact related to the inefficient, wasteful, and unnecessary consumption of energy.

Therefore, based on a review of the energy consumption issues, no new significant or substantial changes to the energy consumption evaluation in the Draft Master EIR would occur with the implementation of the proposed land use change requests.

SECTION 4: CONCLUSION

Based on the findings and the information contained in the Draft Master EIR and the environmental evaluation above, the proposed land use changes requests identified in Table 2 above would not result in any new significant or substantial changes to the evaluation of the environmental resources within and outside of the Planning Area that was addressed in the Draft Master EIR.

Attachment 1:
Data for Proposed Land Use Change Request

Table 1.1: Fresno General Plan – Workbook of Planned Land Use Requests and Corresponding CEQA Impacts – December 05, 2014

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
Assume ALL GPAs Approved before Update Are Approved							
1. McCaffrey – NW Herndon/Hayes (APN 503-020-09) TM 6052	14.15	Res. Urban Neighborhood	Res. Medium (95 du mapped)	From 20 to 6.71 du/ac	**-188 du -978 daily trips**	Res. Medium	**-188 du -978 daily trips**
2. McCaffrey – NE Herndon/Hayes (APN 503-020-51) FM 6053	4.10	Res. Medium	Res. Medium Low (15 du mapped)	From 6.5 to 3.65 du/ac	**-12 du -114 daily trips**	Res. Medium Low	**-12 du -114 daily trips**
3. West Fresno Community Leaders (Not Owners) - Per phone conversation with Bob Mitchell on 11/27/2013, requests were modified from the letter to what is represented below.							
a. Valentine-Marks-California-Whites-Bridge	320	No change	No change	No change	**No impact**	No change to the GP Update map.	**No impact**
b. Hughes-Marks-Whites Bridge-Kearney *1. **(Same area as 5b.1 and 21i.1)***	106.46	Res. Medium	Res. Low	From 6.5 to 1.5 du/ac	**-532 du -5,065 daily trips**	Res. Low	From 6.5 to 1.5 du/ac = **-532 du -5,054 daily trips**
*2. **(Same area as 21i.2)***	14	Res. Urban Neigh.	Res. Low	From 20 to 1.5 du/ac	**-259 du -1,662 daily trips**	Res. Low	From 20 to 1.5 du/ac = **-259 du -1,662 daily trips**
c. Marks-Valentine-Whites Bridge-Madison *1. **(Same area as 5b.2.a)***	6.5	Res. Medium	Res. Low	From 6.5 to 1.5 du/ac	**-33 du -314 daily trips**	Res. Low	**-33 du -314 daily trips**
2. ***(Same area as 5b.2.b)***	52	Res. Medium	Res. Low	From 6.5 to 1.5 du/ac	**-260 du -2,475 daily trips**	Res. Medium	**No impact**
3. ***(Same area as 5b.2.c)***	19.6	Res. Medium	Res. Low	From 6.5 to 1.5 du/ac	**-98 du -933 daily trips**	Res. Low	**-98 du -933 daily trips**
4. ***(Same area as 5b.2.d)***	28.2	Res. Medium	Res. Low	From 6.5 to 1.5 du/ac	**-141 du -1,342 daily trips**	Res. High	**+776 du +7,292 daily trips**
5.	14.5	Res. Urban Neigh.	Res Low	From 20 to 1.5 du/ac	**-268 du -1,720 daily trips**	Res. Urban Neigh.	**No impact**
d. Zoning Near Cargill (North-Fig-Walnut-Edgar alignment) (Per phone conversation with Bob Mitchell on 11/27/2013, request withdrawn)	320	No change	No change	No change	**No impact**	No change to the GP Update map.	**No impact**
e. ¼ section NE of Marks and North (Annadale-North-Hughes-Marks) (Per phone conversation with Bob Mitchell on 11/27/2013, request withdrawn)	160	No change	No change	No change	**No impact**	No change to the GP Update map.	**No impact**
f. ¼ section NE Marks and Annadale (Hughes-Marks-Jensen-Annadale) (Per phone conversation with Bob Mitchell on 11/27/2013, request withdrawn)	160	No change	No change	No change	**No impact**	No change to the GP Update map.	**No impact**
g. ¼ section NE Marks and Church (Hughes-Marks-Church-Jensen) (Per phone	129.65	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-324 du -3,084 daily trips**	Res. Medium	**No impact**

[1] Reasonable dwelling unit per acre and FAR build out capacity estimate for unmapped vacant lots: Low = 1.5 du/ac; Med-Low = 4 du/ac; Medium = 6.5 du/ac; Medium-High = 14.0 du/ac; Urban Neighborhood = 20.0 du/ac; High = 34.0 du/ac; NMX = 14.0 (x .5 net); CMX = 20.0 (x .4 net); RMX = 34.0 (x .3 net); Community Commercial = .3 FAR; Community Recreational = .2 FAR; General Commercial = .35 FAR; Main Street = .5 FAR; Neighborhood Commercial = .35 FAR; Regional Commercial = .25, Highway and Auto = .25 FAR; Office = .5 FAR; Business Park = .4 FAR; Regional Business Park = .4 FAR; Light Industrial = .3 FAR; Heavy Industrial = .3 FAR; CMX = .25 FAR; CMX (SEGA) = .2 FAR; RMX = .25 FAR; RMX (SEGA) = .15 FAR; and NMX = .25

[2] Daily trip generation taken from Spack Consulting calculator table based on ITE Trip Generation Rates - 9th Edition.

[3] Fresno COG Employment Factors by Land Use: Community Commercial = 500; General Commercial 600, all Mixed-Use = 425; Regional Commercial and Commercial Recreation = 400; Highway & Auto = 700; Office = 400; Light and Heavy Industrial = 1100; and Business Park and Regional Business Park = 925.

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
conversation with Bob Mitchell on 11/27/2013, request change from rm to change to rl)							
h. West side of Elm btwn. Church and Jensen *1.* ***(Same area as 5d, 19 and 20)***	12.21	Res. Medium High	General Commercial	From 14 to 0 du/ac From 0 to .35 FAR (12.21 acres x .35 FAR x 43,560 sq. ft.)	**-171 du** **+186,153 sq. ft.** commercial/office space **+9,028 daily trips**	Res. Medium High	**No impact**
2. ***(Same area as 5d, 19 and 20)***	3.96	Res. Medium High	General Commercial	From 14 to 0 du/ac From 0 to .35 FAR (3.96 acres x .35 FAR x 43,560 sq. ft.)	**-55 du** **+60,374 sq. ft.** commercial/office space **+101 employment** **+4,506 daily trips**	Community Commercial	**-55 du** From 0 to .3 FAR (3.96 acres x .3 FAR x 43,560 sq. ft.) **+51,749 sq. ft.** commercial/office space **+4,057 daily trips**
4. Lisa Mochizuki – SWC – Kings Canyon and Minnewawa	9.02	Community Park	Corridor/Center Mixed-Use	From 0 to 8 du/ac From 0 to .25 FAR (9.02 acres x .6 net acres x .25 FAR x 43,560 sq. ft.)	**+72 du** **+124,603 sq. ft.** commercial/ office space **+293 employment** **+4,100 daily trips**	Community Park	**No impact**
5. City Councilman Oliver Baines – November 12, 2013							
a. Darling and Foster Farms at Belgravia and Fruit Relocated to Regional Waste Water Treatment Plant	30.77	Heavy Industry (28.77 acres) Light Industry (2 acres)	No change requested to planned land use	No change	**No impact**	Outside of SOI	**No impact**
b. 1. Hughes-Whites Bridge-Valentine-Kearney ***(Same area as 3b.1 and 21i.1)***	106.46	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-266 du** **-2,546 daily trips**	Res. Low	From 6.5 du/ac to 1.5 **-532 du** **-5,057 daily trips**
2. Marks-Valentine-Whites Bridge-Madison a. ***(Same area as 3c.1)***	6.5	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-16 du** **-152 daily trips**	Res. Low	**-33 du** **daily trips**
b. ***(Same area as 3c.2)***	52	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-130 du** **-1,238 daily trips**	Res. Medium	**No Impact**
c. ***(Same area as 3c.3)***	19.6	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-49 du** **-466 daily trips**	Res. Low	**-98 du** **-933 daily trips**
d. ***(Same area as 3c.4)***	28.2	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-71 du** **-676 daily trips**	Res. High	**+776 du** **+7,292 daily trips**
c. North-Walnut-West-Annadale	226.64	Res. Medium-Low	Res. Medium (Leave RUN and Parks)	From 4 to 6.5 du/ac	**+567 du** **-5,398 daily trips**	Res. Medium	**+567 du** **-5,398 daily trips**
d. West side of Elm Street Corridor between Church and Jensen ***(Same as 3h.1 and 3h.2, 19 and 20)***	16.17	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2
e. Whites Bridge – SR180 – West to Brawley 1.	20	Business Park	General Commercial	From .4 to .35 FAR (20 acres x .05 FAR x 43,560 sq. ft.)	**-43,560 sq. ft.** commercial/office space **-47 employment** **-541 daily trips**	Business Park	**No Impact**
2.	41	Business Park	General Commercial	From .4 to .35 FAR	**-89,298 sq. ft.**	Community	From .4 to .3 FAR

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
				(41 acres x .05 FAR x 43,560 sq. ft.)	commercial/office space **-97 employment** **-1,111 daily trips**	Commercial	(41 acres x .1 FAR x 43,560 sq. ft.) = **-178,596 sq. ft.** **-2,222 daily trips**
3.	38	Business Park	General Commercial	From .4 to .35 FAR (38 acres x .05 FAR x 43,560 sq. ft.)	**-82,764 sq. ft.** commercial/office space **-89 employment** **-1,029 daily trips**	Corridor/Center Mixed-Use	From 0 to 8 du/ac **+304 du** (38 acres x .6 x .25 FAR x 43,560 sq. ft.) = **- 413,820 sq. ft.** **-5,148 daily trips**
4.	9	Business Park	General Commercial	From .4 to .35 FAR (9 acres x .05 FAR x 43,560 sq. ft.)	**-19,602 sq. ft.** commercial/office space **-21 employment** **-244 daily trips**	Park	From .4 to 0 FAR (9 acres x .4 FAR x 43,560 sq. ft.) = **-156,816 sq. ft.** **-1,951 daily trips**
5.	5	Business Park	General Commercial	From .4 to .35 FAR (5 acres x .05 FAR x 43,560 sq. ft.)	**-10,890 sq. ft.** commercial/office space **-12 employment** **-136 daily trips**	Ponding Basin	From .4 to 0 FAR (5 acres x .4 FAR x 43,560 sq. ft.) = **-87,120 sq. ft.** **-1,084 daily trips**
f. South of Church to Jensen between Walnut and Martin Luther King 1.	30.75	Res. Urban Neighborhood	Res. Medium High	From 20 to 14 du/ac	**-185 du** **-1,230 daily trips**	Res. Urban Neighborhood	No Impact
2.	19.25	Res. Urban Neighborhood	Res. Medium High	From 20 to 14 du/ac	**-116 du** **- 771 daily trips**	Res. Medium	From 20 to 6.5 du/ac **-260 du** **-1,370 daily trips**
g. South of Church/Walnut/Grove/Thorne (leave proposed school site)	30	Res. Urban Neigh. (10 acres) Res. Medium (20 acres)	Res. Medium High	From 20 to 14 du/ac From 6.5 to 14 du/ac	-60 du +150 du **Total +90 du** **+225 daily trips**	Res. Medium High	-60 du +150 du **Total +90 du** **+225 daily trips**
h. SW Hughes/California (reduce 40 acre park to 20) ***(Same area as 21i.17)***	18.69	Park	Res. Medium	From 0 to 6.5 du/ac	**+122 du** **+1,126 daily trips**	Res. Low	From 0 to 1.5 du/ac **+28 du** **+231 daily trips**
i. California-Hughes-Church-Marks							
1. Insert ponding basin east ½ of 40 acres on NE Marks/California (located in area north of bounds designated in 5i) ***(Same area as 21i.12)***	18.84	Res. High	Ponding Basin	From 34 du/ac to 0	**-640 du** **-4,256 daily trips**	Ponding Basin	**-640 du** **-4,256 daily trips**
2. Res. High to Res. Medium ***(Same area as 21i.18)***	38.14	Res. High	Res. Medium	From 34 to 6.5 du/ac	**-1,048 du** **-2,160 daily trips**	Res. Low	**-1,245 du** **-8,113 daily trips**
3. Res. Urban Neigh. to Res. Medium ***(Same area as 21i.19)***	35.50	Res. Urban Neigh.	Res. Medium	From 20 to 6.5 du/ac	**-479 du** **+1,293 daily trips**	Res. Low	**-816 du** **-5,237 daily trips**
6. **Eisner Family Trust –** 5633 N. Fig Garden Loop (APN 509-290-07) What about southern half of PLU designation at this corner (APN 509-290-06 at	2.29	Office	Community Commercial	From .5 to .3 FAR (2.29 acres x .2 FAR x 43,560 sq. ft.)	**-19,950 sq. ft.** commercial/office space **-50 employment**	Office	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
2.05 acres)?					**+729 daily trips**		
7. **Central Unified School District** – June 25,2013							
a. SE Veterans Blvd and Barstow	10.59	Elementary School	Res. Urban Neighborhood	From 0 to 20 du/ac	**+212 du** **+410 daily trips**	Res. Urban Neighborhood	**+212 du** **+410 daily trips**
b. NE Grantland/Ashlan (labeling issue)	160	Special School	High, Middle, & Elem. School	No change	No impact	High, Middle, & Elem. School	**No impact**
c. NW Grantland/Dakota (labeling issue)	15.68	Special School	Elementary School	No change	No impact	Elementary School	**No impact**
d. North side Shields btwn. Bryan/Hayes (labeling issue)	13.88	Elementary School	Elementary School	No change	No impact	Elementary School	**No impact**
e. SE Shields and Valentine TM 5481 (9.81 acres with 80 du)	13.64	Elem. School	Res. Medium	Unmapped - From 0 to 14 du/ac (3.83 ac) Mapped - From 0 to (9.81 acres with 80 du)	**+134 du** **+276 daily trips**	Res. Medium	**+134 du** **+276 daily trips**
f. North side McKinley between Brawley/Valentine	19.24	Elem. School	Res. Medium	From 0 to 6.5 du/ac	**+125 du** **+190 daily trips**	Res. Medium	**+125 du** **+190 daily trips**
g. NE Brawley/Madison (labeling issue)	20	Special School	Elementary School	No change	No impact	Elementary School	**No impact**
h. West side of Brawley between Belmont and Olive	18.33	Elem. School	Res. Medium	From 0 to 4 du/ac	**+73 du** **-305 daily trips**	Res. Medium	**+73 du** **-305 daily trips**
i. North side of California between Valentine and Brawley 1. Change to Ponding Basin	9.15	Elem. School	Ponding Basin		**-1,000 daily trips**	Ponding Basin	**-1,000 daily trips**
2. Change to Res Low	9.15	Elem. School	Res. Low	From 0 to 1.5 du/ac	**+14 du** **-867 daily trips**	Res. Low	**+14 du** **-867 daily trips**
8. **Fresno Unified School District** – July 2, 2013							
a. West side Marks, south of Ashlan	9	Elem. School	Res. Medium	From 0 to 6.5 du/ac	**+59 du** **-438 daily trips**	Res. Medium	**+59 du** **-438 daily trips**
b. Tenaya Middle School - NE Fruit/Bullard (labeling issue)	21.7	Elem. School	Middle School	No change	No impact	Middle School	**No impact**
c. Cooper Middle School - SW Hughes/Bellaire (labeling issue)	16.6	Middle School (M) Correct POSS map	Middle School	No change	No impact	Middle School	**No impact**
d. Addicott Elementary School - SW Chestnut/Dayton (labeling issue)	3.8	Special School (SS) Correct POSS map	Elementary School	No change	No impact	Elementary School	**No impact**
e. Gaston Middle School – SE Church/MLK (labeling issue) 1. Rename Elem and PB/B to Middle School	21.44	Elem. School and PB/P	Middle School	No change	No impact	Middle School	**No impact**
2. Change Elem School to Res. Medium High	4.56	Elem. School	Res. Medium High	From 0 to existing 72 du apartment complex	**+72 du** **+1,131 daily trips**	Res. Med. High	**+72 du** **+1,131 daily trips**
f. Sunset Elementary - SE Crystal/Eden (labeling issue)	9.67	Middle School	Elementary School	No change	No impact	Elementary School	**No impact**
g. Future Schools: 1. W of West, S of California Ave. (labeling issue) 2. E of Marks, S of Kearney Ave. (labeling issue) ***(Same area as 21i.7)***	20 (2 sites)	Special School	Elementary School	No change	No impact	Elementary School	**No impact**
h. Sequoia Middle - SW Cedar Hamilton (labeling issue)	16.86	Elementary School	Middle School	No change	No impact	Middle School	**No impact**
i. Vang Pao Elementary – SW Cedar/Heaton	8.07	Res. Medium High (5 acres)	Elementary School	From 14 du/ac to 0 From 6.5 du/ac to 0	-70 du -14 du	Elementary School	-70 du -14 du

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
		Res. Medium (2.1 acres) Public Facility (.96 acres)			**Total -84 du** **+401 daily trips**		**Total -84 du** **+401 daily trips**
j. Bakman Elementary – NE Belmont/Helm	11.5	Res. Medium High (3.8 acres) Res. Medium Low (4.1 acres) Comm. Commercial (2.9 acres) Office (.7 acres)	Elementary School	From 14 du/ac to 0 From 4 du/ac to 0 From .3 FAR to 0 FAR (2.9 acres x .3 FAR x 43,560 sq. ft.) From .5 FAR to 0 FAR (.7 acres x .5 FAR x 43,560 sq. ft.)	-53 du -16 du **Total -69 du** -37,897 sq. ft. -15,246 sq. ft. **Total -53,143 sq. ft.** office/commercial space **-114 employment** **-1,786 daily trips**	Elementary School	53 du -16 du **Total -69 du** -37,897 sq. ft. -15,246 sq. ft. **Total -53,143 sq. ft.** office/commercial space **-1,786 daily trips**
k. NW Willow/Belmont	8	Elem. School	Res. Low	Existing 3.3 du/acre	**+24 du** **-772 daily trips**	Res. Medium	**+24 du** **-772 daily trips**
l. No Schools shown in Downtown Inset	No change	No change	No change	No change	No impact	No changes proposed.	**No impact**
m. Edison High, Computech & Roosevelt not shown on POSS	No change	No change	No change	No change	No impact	No changes proposed.	**No impact**
n. Problem w/Policy POSS-8-b – GPA Req'd (page 5-29)	No change	No change	No change	No change	No impact	No land use changes proposed.	**No impact**
o. Symbol for possible new SE High School - Church & Peach	Can't assess	Can't assess	High School	Can't assess	Can't assess	No changes proposed.	**No impact**
9. **Clovis Unified Schools**							
a. SE Clinton/Temperance – email 10-25-13 *(CUSD says 775 students & 1,000 trips/day for new school)*	23.53	Res. Medium Low	Elementary School	From 4 du/ac to 0	**+94 du** **+105 daily trips**	Elementary School	**+94 du** **+105 daily trips**
August 12, 2013 Letter							
b. SE – Olive/De Wolf in SEGA	20.8	School with Park	Res. Medium	From 0 to 6.5 du/ac	**+135 du** **-1,285 daily trips**	Res. Medium	**+135 du** **-1,285 daily trips**
c. Shields/Locan Elem. School (request replaced by 9a)	No change	No Change	No Change	No change	No Impact	No changes proposed.	**No Impact**
d. New Elem. School -Clinton & Armstrong	13.72	Park (10) Res Medium (3.72)	Elementary School	From 6.5 du to 0	**-65 du** **+370 daily trips**	Elementary School	**-65 du** **+370 daily trips**
May 23, 2013 Letter							
e. NW Olive/Armstrong – Future Water Treatment facility shown as SS – Spec. School POSS (Correct NW Treatment Facility designation too)	55.95	Public Facility	Public Facility – Surface Water Treatment Facility	No change	No Impact	Public/Quasi-public Facility	**No Impact**
10. **Sanger Unified Schools** May 1, 2013 Letter							
a. Correct HS, MS, ES designations N of Jensen between Fowler and Temperance – shown as SS on POSS 1. Correct Fowler, Church, Armstrong, and Jenson to Public Facility – Middle & High School 2. Correct school site east of Armstrong	127	No designation	Middle & High School Elementary School	No change	No Impact	Middle & High School Elementary School	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
and north of Jensen to Public Facility – Elementary School							
b. Flexibility requested on SEGA school site locations and Problem w/Policy POSS-8-b – GPA Req'd (p. 5-29)	No change	No Change	No Change	No change	No Impact	No land use changes proposed	**No Impact**
11. **Washington Unified Schools** – West Fresno – Nothing							
12. **Fresno Metro Flood Control District** (FMFCD) – July 23, 2013 and Oct. 9, 2013							
a. Basin specific map changes SE corner of Cornelia and Belmont Avenues (located outside SOI)	No change	No Change	No Change	No change	No Impact	Outside of SOI	**No Impact**
b. Basin specific map changes SE corner of McKinley and Bryan Avenue alignment	2.87	Elementary School	Ponding Basin	No change	**-1,000 daily trips**	Ponding basin	**-1,000 daily trips**
c. Basin specific map changes SE corner of Jensen and Marks Avenue	10.30	Res. Medium Low	Ponding Basin	From 4 du/ac to 0	**-41 du** **-390 daily trips**	Ponding basin	**-41 du** **-390 daily trips**
d. Potentially 3 more locations for future ponding basins, but locations not provided at this time	Can't assess	Can't assess	Can't assess	Can't assess	Can't assess	No land use changes proposed	**No Impact**
e. Basin "AS" at Northwest Corner of California and Valentine	7.8	Res. Medium Low	Ponding Basin	From 4 du/ac to 0	**-31 du** **-295 daily trips**	Ponding basin	**-31 du** **-295 daily trips**
f. Armstrong and Church	6	Res. Urban Neighborhood	Ponding Basin	From 20 du/ac to 0	**-120 du** **-798 daily trips**	Ponding basin	**-120 du** **-798 daily trips**
13. **WG Enterprises (Rick Ginder)** – SWC Herndon and Milburn (portion wrapping existing shopping center – total parcel 17 acres) (Light Industrial in General Commercial?) ***See request 47 submitted on behalf of owner***	See request 47 below	See request 47	See request 47	See request 47	**See request 47**	See request 47	**No Impact**
14. **Steve Weil** – West Barstow/Veterans Blvd/Herndon Canal APN 505-060-08. Also, letters from Sol Development dated August 8, 2014, and August 29, 2012, and subsequent emails. (Staff intended CMX – mapping looks like RMX) a. RMX and Park to CMX (11.28 acre RMX & 5.6 acre Park) b. RMX to CMX (13.22 acres with 175 dwelling units)	30.1	Regional Mixed-Use and Park Regional Mixed-Use	Corridor/Center Mixed-Use Residential Medium High	14a. From 34 du/ac (.3) (11.28 acres) to 20 du/ac (.4) (11.28 acres); From (11.28 acres x .7 x .25 FAR x 43,560 sq. ft.) to (11.28 acres x .6 x .25 FAR x 43,560 sq. ft.) = **-25 du and – 12,283 sq ft** From 0 to 20 du/ac (.4) (5.6 acres) and from 0 to (5.6 acres x .6 x .25 FAR x 43,560 sq. ft.) = **+45 du and + 36,590 sq ft** 14b. From 34 du/ac (.3) to 175 du (mapped) From (13.22 acres x .7 x .25 FAR x 43,560 sq. ft.) to 0 = **+165 du and -136,343 sq. ft.**	**+185 du** **-112,036 sq. ft.** office/commercial space **-264 employment** **-3,734 daily trips**	Corridor/Center Mixed-Use Residential Medium High	**+185 du** **-112,036 sq. ft.** office/commercial space **-3,734 daily trips**
15. **Grubb and Ellis for Owner** – SWC W. Sierra/N. Polk	3.91	Office	Res. Urban Neighborhood	From 0 to 20 du/ac From .5 FAR to 0 FAR (3.91 acres x .5 FAR x 43,560 sq. ft.)	**+78 du** **-85,160 sq. ft.** office/commercial space **-213 employment** **-419 daily trips**	Office	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
16. **Grubb and Ellis for Partial Owner**- Veterans/Bryan Or - Expand Highway and Auto for more uses APN 040-08-081, 83S, 85S, 90S, 91S, 96S and 97S	42.25 2.89 .63	a. Highway and Auto b. Res. Urban Neighborhood c. Community Commercial	RMX RMX	From 0 to 10 du/ac From 20 to 10 du/ac From .25 FAR to .25FAR From (42.25 acres x .25 FAR x 43,560 sq. ft.) to (42.25 acres x .7 x .25 FAR x 43,560 sq. ft.) From .3 FAR to .25FAR From (.63 acres x .3 FAR x 43,560 sq. ft.) to (.63 acres x .7 x .25 FAR x 43,560 sq. ft.)	+429 du -29du **Total = +400 du** **-141,461 sq. ft.** office/commercial space **-3,611 daily trips**	a. Light Industrial (42.25 ac) b. Res Medium High (2.89 ac) and c. Park (.63 ac)	From .25 FAR to .3FAR (42.25 acres x .05 FAR x 43,560 sq. ft.) = +92,020 sq. ft. From .3 FAR to 0 (.63 acres x .3 FAR x 43,560 sq. ft.) = -8,233 sq. ft. **+83,787 sq. ft.** office/commercial space **+88 employment** From 20 to 14 du/ac **-17 du** **+3,601 daily trips**
17. **Fancher Creek Properties** – Nov. 2012							
a. Fancher Creek Parkway and Trail – add to map – Actually is shown on POSS Path & Trails Map	No change	No Change	No Change	No change	No Impact	No change to the Planned Land Use map.	**No Impact**
b. NEC Fowler/Fancher Creek	3.64	Res. Medium	Community Commercial	From 6.5 du/ac to 0 From 0 to .3 FAR (3.64 acres x .3 FAR x 43,560 sq. ft.)	**-24 du** **+47,568 sq. ft.** office/commercial space **+95 employment** **+1,779 daily trips**	Res. Medium	**No Impact**
c. Add Transit Station or Police Station Precedent/ Consequences	1.5	Corridor/Center Mixed-Use	Public/Quasi Public Facility	From 8 to 0 du/ac From (1.5 acres x .6 x .25 FAR x 43,560 sq. ft.) to 0	**-12 du** **-9,801 sq. ft.** office/commercial space **-23 employment** **+10 daily trips**	Public/Quasi Public Facility	**-12 du** **-9,801 sq. ft.** office/commercial space **+10 daily trips**
d. Add Lake near Clovis at Town Center to map? Precedent/ Consequences?	Can't assess	Can't assess	Can't assess	Can't assess	Can't assess	Not a land use item.	**No Impact**
18. Ken Nguyen							
a. NW Chestnut/Church (APN: 480-213-14) *Same request as item 33.*	0.38	Res. Medium	Community Commercial	From 6.5 du/ac to 0 From 0 to .3 FAR (.38 acres x .3 FAR x 43,560 sq. ft.)	**-3 du** **+4,966 sq. ft.** office/commercial space **+10 employment** **+185 daily trips**	Refer to item 33	**No Impact**
b. Above NW Maple/California (APN: 471-302-28)	1.97	Res. Medium	Res. Urban Neighborhood	From 6.5 to 20 du/ac	**+27 du** **+142 daily trips**	Res. Medium	**No Impact**
19. **Jeff Wolpert of Grubb and Ellis for Owners** – West side of Elm Ave. south of Church – Split Zoning RA and C-6 ***(same request as 3h.1 and 3h.2, 5d, and 20)***	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2
20. **Sol Development for Owners** – West side of Elm Ave. south of Church – Split Zoning RA and C-6 ***(same request as 3h.1 and 3h.2, 5d, and 19)***	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2	See 3h.1 and 3h.2
21. **Granville Homes**							
a. Copper River							

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
1. Outlot M	20.52	Res. High	Res. Urban Neighborhood	From 34 to 20 du/ac	**-288 du** **-1,915 daily trips**	Res. High	**No Impact**
2. Outlot P (request change to 17.83 acres while the rest can remain Res. Medium High)	17.63	Res. Medium High	Res. Urban Neighborhood	From 14 to 20 du/ac	**+110 du** **+732 daily trips**	Res. Medium High	**No Impact**
3. 3a. Outlot Q	16.49	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-41 du** **-390 daily trips**	Res. Medium Low	**-41 du** **-390 daily trips**
3b. Village I	30.09	Res. Medium Low	Res. Low	From 4 to 1.5 du/ac	**-75 du** **-714 daily trips**	Res. Medium Low	**No Impact**
3c. Outlot LL	2.95	Res. Medium High	Res. Medium Low	From 14 to 4 du/ac	**-29 du** **- 159 daily trips**	Res. Medium High	**No Impact**
4. Outlot Y	10.08	Res. Medium High	Res. Medium	From 14 to 6.5 du/ac	**-75 du** **-310 daily trips**	Res. Medium High	**No Impact**
5. Outlot X	12.85	Res. Medium High	Res. Medium Low	From 14 to 4 du/ac	**-129 du** **-702 daily trips**	Res. Medium High	**No Impact**
6. CRR owned lot adjacent to Lanier lot (APN 579-074-42S and 44S	5.27	Open Space	Res. Medium	From 0 to 6.5 du/ac	**+34 du** **+324 daily trips**	Open Space	**No Impact**
7. Outlot OO	26.82	Res. Medium High	Res. Medium	From 14 to 6.5 du/ac	**-202 du** **- 834 daily trips**	Res. Medium High	**No Impact**
8. Outlot NN (Street to be realigned directly southerly)	6.66	Res. Medium High (5.31) Community Commercial (1.35)	Res. Medium	From 14 to 6.5 du/ac From 0 to 6.5 du/ac From .3 to 0 FAR (1.35 acres x .3 FAR x 43,560 sq. ft.)	**-30 du** **-17,642 sq. ft.** office/commercial space **-35 employment** **-799 daily trips**	Res. Medium High (5.31) Community Commercial (1.35)	**No Impact**
9. Outlot PP (request change to 12 acres while the rest can remain Commercial)	12	Community Commercial	Res. Medium High	From 0 to 14 du/ac From .3 to 0 FAR (12 acres x .3 FAR x 43,560 sq. ft.)	**+168 du** **-156,816 sq. ft.** office/commercial space **-314 employment** **-5,554 daily trips**	Community Commercial	**No Impact**
10. Park and Surrounding – NW Chestnut/Copper TM6087	14.5	Park (4.88) Res. Medium High (4.48) Res. Medium (5.14)	Res. Medium Low	From 0 to 4 du/ac From 14 to 4 du/ac From 6.5 to 4 du/ac	**-37 du** **-191 daily trips**	Res. Medium Low	**-37 du** **-191 daily trips**
11. Outlot JJ (Portion)	3.5	Community Commercial	Res. Medium Low	From 0 to 4 du/ac From .3 to 0 FAR (3.5 acres x .3 FAR x 43,560 sq. ft.)	**+14 du** **-45,738 sq. ft.** office/commercial space **-91 employment** **-1,789 daily trips**	Community Commercial	**No Impact**
Approved/Finished Developments (Copper River)							
12. Village A (T5205 Terrabella)	28.44	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-71 du** **-676 daily trips**	Res. Medium Low	**-71 du** **-676 daily trips**
13. Village D a. Eastern Portion	13	Res. Medium Low	Res. Low	From 4 du/ac x 13 ac = 52 du to 56du	**+4 du** **+38 daily trips**	Res. Low	**+4 du** **+38 daily trips**
b. Western Portion	22.8	Res. Medium Low	Res. Low	From 4 du/ac x 22.8 ac = 91 du to 50 du	**-41 du** **-390 daily trips**	Res. Medium Low	**No Impact**
14. Village E (T5271 Links) a. Western Portion	16.5	Res. Medium Low	Res. Low	From 4 to 1.5 du/ac	**-41 du** **-392 daily trips**	Res. Low	**-41 du** **-392 daily trips**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
b. Eastern Portion	10.21	Res. Medium Low	Res. Low	From 4 to 1.5 du/ac	**-26 du** **-243 daily trips**	Res. Low	**-26 du** **-243 daily trips**
15. Village G (T892, 6045, 6065)	32.80	Res. Medium Low	Res. Medium	From 4 to 6.5 du/ac	**+82 du** **+781 daily trips**	Res. Medium	**+82 du** **+781 daily trips**
16. 16a. Village F	13.07	Res. Medium	Res. Low	From 6.5 to 1.5 du/ac	**-65 du** **-619 daily trips**	Res. Low	**-65 du** **-619 daily trips**
16b. The Top of portion of Village F	0.6	Res. Medium	Golf Course/Open Space	From 6.5 to 0 du/ac	**-4 du** **-35 daily trips**	Golf Course/Open Space	**-4 du** **-35 daily trips**
17. T5963	23.69	Res. Medium Low	Res. Medium	From 4 to 6.5 du/ac	**+59 du** **+562 daily trips**	Res. Medium	**+59 du** **+562 daily trips**
b. Tract 5717 and 6033 – NE ¼ Section Fowler/Clinton							
1. APN: 310-041-38 (T6033) A.	1	Business Park	Community Commercial	From .4 to .3 FAR (1 acres x .1 FAR x 43,560 sq. ft.)	**-4,356 sq. ft.** office/commercial space **-5 employment** **+121 daily trips**	Business Park	**No Impact**
B.	3.56	Business Park	Res. Medium	From 0 to 6.5 du/ac From .4 to 0 FAR (3.56 acres x .4 FAR x 43,560 sq. ft.)	**+23 du** **-62,029 sq. ft.** office/commercial space **-67 employment** **-552 daily trips**	Business Park	**No Impact**
C.	31	Res. Urban Neighborhood (28) Business Park (3)	Res. Medium Low	From 20 du/ac x (28 ac) = 560 du to 169 du From .4 to 0 FAR (3 acres x .4 FAR x 43,560 sq. ft.)	**-391 du** **-20,909 sq. ft.** office/commercial space **-23 employment** **-1,252 daily trips**	Res. Medium Low	**-391 du** **-20,909 sq. ft.** office/commercial space **-1,252 daily trips**
2. APN: 310-041-39 (This is a reconfiguration of Community Commercial, but maintains same area)	2.18	Community Commercial	Community Commercial	No Change	**No change**	Community Commercial	**No Impact**
3. APN: 310-740-07 A. (Ensure Live Work Units can happen on this property.	1	Business Park	Community Commercial	From .4 to .3 FAR (1 acres x .1 FAR x 43,560 sq. ft.)	**-4,356 sq. ft.** office/commercial space **-5 employment** **+121 daily trips**	Business Park	**No Impact**
B. Keep similar to current Light Industrial CM zoning as is under 2025 General Plan and existing zoning code	3.87	Business Park	Light Industrial	From .4 to .3 FAR (3.87 acres x .1 FAR x 43,560 sq. ft.)	**-16,858 sq. ft.** office/commercial space **-18 employment** **-87 daily trips**	Light Industrial	**-16,858 sq. ft.** office/commercial space **-87 daily trips**
4. APN: 310-740-08 and 09	14.02	Business Park	Res. Urban Neighborhood	From 0 to 20 du/ac From .4 to 0 FAR (14.02 acres x .4 FAR x 43,560 sq. ft.)	**+280 du** **-244,285 sq. ft.** office/commercial space **-264 employment** **-1,173 daily trips**	Business Park	**No Impact**
c. North side of Bullard near Bryan – to HWY 99 (APN 504-080-16S) (TM 5584)	9.51	Res. Medium High	Res. Medium Low	From 14 to 4 du/ac	**-95 du** **-522 daily trips**	Res. Medium	From 14 to 6.5 du/ac **-71 du** **-294 daily trips**
d. North side Clinton –Bet. Polk/Hayes –(APN 312-061-18) TM 5560	19.51	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-49 du** **-466 daily trips**	Res. Medium	**No Impact**
e. Grantland – South of Dakota Alignment	19.56	Res. High	Res. Medium	From 34 to 6.5 du/ac	**-538 du**	Res. Urban	From 34 to 20 du/ac

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
(APN 512-141-33)					**-3,213 daily trips**	Neighborhood	**-274 du** **-1,822 daily trips**
f. NE Grantland/Barstow (APN 505-281-16, 17 and 18)	3.93	Res. Urban Neighborhood	Community Commercial	From 20 to 0 du/ac From 0 to .3 FAR (3.93 acres x .3 FAR x 43,560 sq. ft.)	**-79 du** **+52,357 sq. ft.** office/commercial space **+105 employment** **+1,695 daily trips**	Community Commercial	**-79 du** **+52,357 sq. ft.** office/commercial space **+1,695 daily trips**
g. <u>Artisan Square Area</u> – NE Ashlan/Bryan/Hayes (TM 5891) 1. Change to Res. Medium 2. Change to Res. Med Low (33 acres) 3. Change to Res. High (5 acres) 4. Change to Community Commercial (1 acre)	39	Community Commercial (4) Res. Medium (1) Parks (12) Res. Medium (21)	Res. Medium High (4) Res. Medium High (1) Res. Medium Low (12) Res. Medium Low (21)	From 0 to 14 du/ac From .3 FAR to 0 FAR (4 acres x .3 FAR x 43,560 sq. ft.) From 6.5 to 14 du/ac From 0 to 4 du/ac From 6.5 to 4 du/ac	**+56 du** **+8 du** **+48 du** **-53 du** **+59 Total du** **-52,275 sq. ft.** office/commercial space **+105 employment** **-893 daily trips**	Community Commercial (4) Res. Medium (1) Parks (12 acres) Res. Medium (21)	**No Impact**
h. Bryan, between Ashlan and Dakota (APN 512-050-89)	17.54	Res. Urban Neighborhood	Res. Medium	From 20 to 6.5 du/ac	**-237 du** **-1,249 daily trips**	Res. Urban Neighborhood	**No Impact**
i. Mission Ranch							
Change all to Medium Low Density						Low Res.	See 21i1 thru 21i19 below
Eliminate Connector Street(s)						Connector streets omitted from map.	**No Impact**
1. ***(Same area as 3b.1 and 5b.1)***	Same as 5b.1	Same as 5b.1	Same as 5b.1	Same as 5b.1	Same as 5b.1	Same as 5b.1	Same as 5b.1
2. ***(Same area as 3b.2)***	14.02	Res. Urban Neighborhood	Res. Medium Low	From 20 to 4 du/ac	**-224 du** **-1,329 daily trips**	Low Res.	From 20 to 1.5 du/ac **-259 du** **-1,662 daily trips**
3.	4.92	Open Space/Park	Res. Medium Low	From 0 to 4 du/ac	**+20 du** **+190 daily trips**	Low Res.	From 0 to 1.5 du/ac **+7 du** **+70 daily trips**
4.	16.42	Res. Low	Res. Medium Low	From 1.5 to 4 du/ac	**+41 du** **+390 daily trips**	Low Res.	**No Impact**
5.a.	3.45	Res. Low	Res. Medium Low	From 1.5 to 4 du/ac	**+9 du** **+85 daily trips**	Low Res.	**No Impact**
b.	3.61	Res. Low	Res. Medium Low	From 1.5 to 4 du/ac	**+9 du** **+85 daily trips**	Ponding Basin	From 1.5 to 0 du/ac **-5 du** **-48 daily trips**
c.	7.24	Res. Low	Res. Medium Low	From 1.5 to 4 du/ac	**+18 du** **+172 daily trips**	Low Res.	**No Impact**
6. a.	14.09	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-35 du** **-335 daily trips**	Low Res.	From 6.5 to 1.5 du/ac **-70 du** **-669 daily trips**
b.	5.2	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-13 du** **-124 daily trips**	Ponding Basin	From 6.5 to 0 du/ac **-34 du** **-321 daily trips**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
7. ***(Same area as 8g.2)***	9.75	Elementary School	Res. Medium Low	From 0 to 4 du/ac	**+39 du** **+371 Daily trips**	Low Res.	**No Impact**
8.	4.95	Open Space/Park	Res. Medium Low	From 0 to 4 du/ac	**+20 du** **+190 daily trips**	Low Res.	From 0 to 1.5 du/ac **+7 du** **+70 daily trips**
9.	14.31	Res. Urban Neighborhood	Res. Medium Low	From 20 to 4 du/ac	**-229 du** **-1,359 daily trips**	Low Res.	From 20 to 1.5 du/ac **-264 du** **-1,693 daily trips**
10.	9.81	Res. Medium	Res. Medium Low	From 6.5 to 4 du/ac	**-25 du** **-238 daily trips**	Low Res.	From 6.5 to 1.5 du/ac **-49 du** **-466 daily trips**
11.	17.95	Res. Urban Neighborhood	Res. Medium Low	From 20 to 4 du/ac	**-287 du** **-1,702 daily trips**	Low Res.	From 20 to 1.5 du/ac **-332 du** **-2,130 daily trips**
12. ***(Same area as 5i.1)***	18.84	Res. High	Res. Medium Low	From 34 to 4 du/ac	**-567 du** **-3,545 daily trips**	Ponding Basin	**-640 du** **-4,256 daily trips**
13.	18.96	Res. High	Res. Medium Low	From 34 to 4 du/ac	**-569 du** **-3,565 daily trips**	Low Res.	From 34 to 1.5 du/ac **-617 du** **-4,022 daily trips**
14.	17.65	Community Commercial	Res. Medium Low	From 0 du/ac to 4 du/ac From .3 FAR to 0 FAR (17.65 acres x .3 FAR x 43,560 sq. ft.)	**+71 du** **-230,650 sq. ft.** office/commercial space **-461 employment** **-11,013 daily trips**	Low Res.	From 0 to 1.5 du = **+27du** From .3 to 0 FAR (17.65 acres x .3 FAR x 43,560 sq. ft.)= **-230,650 sq. ft.** office/commercial space **-11,649 daily trips**
15.	7.07	Res. Urban Neighborhood	Res. Medium Low	From 20 to 4 du/ac	**-113 du** **-671 daily trips**	Low Res.	From 20 to 1.5 du/ac **-130 du** **-838 Daily trips**
16.	19.55	Open Space/Park	Res. Medium Low	From 0 to 4 du/ac	**+78 du** **+743 daily trips**	Low Res.	From 0 to 1.5 du/ac **+29 du** **+242 daily trips**
17. **(*Same area as 5h)***	18.69	Open Space/Park	Res. Medium Low	From 0 to 4 du/ac	**+75 du** **+714 daily trips**	Low Res.	From 0 to 1.5 du/ac **+28 du** **+231 daily trips**
18. **(*Same area as 5i.2)***	38.14	Res. High	Res. Medium Low	From 34 to 4 du/ac	**-1,144 du** **-7,172 daily trips**	Low Res.	From 34 to 1.5 du/ac **-1,245 du** **-8,113 daily trips**
19. **(*Same area as 5i.3)***	35.50	Res. Urban Neighborhood	Res. Medium Low	From 20 to 4 du/ac	**-568 du** **-3,370 daily trips**	Low Res.	From 20 to 1.5 du/ac **-816 du** **-5,237 daily trips**
j. Westlake – Tract 5915 (Gettysburg, Grantland, Shields, and Garfield)							
1. Eliminate Connector Streets and replace with "Special Collector" streets						Connector streets omitted from map.	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
2. Consider this area "Annexed" and "Priority Development Area" #1							
3. Eliminate CMX and replace with Medium Density	15	Corridor/Center Mixed-Use	Res. Medium	From 8 to 6.5 du/ac From (15 acres x .6 x .25 FAR x 43,560 sq. ft.) to 0	**-23 du** **-98,010 sq. ft.** office/commercial space **-231 employment** **+1,111 daily trips**	Res. Medium	**-23 du** **-98,010 sq. ft.** office/commercial space **+1,111 daily trips**
4. Reduce size of Commercial (Ashlan and Grantland)	2.9	Community Commercial	Res. Medium	From 0 to 6.5 du/ac From .3 to 0 FAR (2.9 acres x .3 FAR x 43,560 sq. ft.)	**+19 du** **-37,897 sq. ft.** office/commercial space **-76 employment** **-1,399 daily trips**	Community Commercial	**No Impact**
5. Reduce size of Urban Neighborhood	18.2	Res. Urban Neighborhood	Res. Medium	From 20 to 6.5 du/ac	**-246 du** **-1,298 daily trips**	Res. Urban Neighborhood	**No Impact**
6. Commercial on Shields and Grantland	3.5	Community Commercial	Res. Medium	From 0 to 6.5 du/ac From .3 to 0 FAR (3.5 acres x .3 FAR x 43,560 sq. ft.)	**-23 du** **-45,738 sq. ft.** office/commercial space **-91 employment** **-1,703 daily trips**	Res. Medium	**-23 du** **-45,738 sq. ft.** office/commercial space **-1,703 daily trips**
k. Recorded Final Maps/Under Construction/Already Developed							
1. SW Church/Fowler – Tract 5450 (6.54 du/ac)	13.24 4.83	Res. Urban Neighborhood Res. Medium High	Res. Medium	From (20 du/ac x 13.24) + (14 du/ac x 4.83) = 333 du to 118 du	**-215 du** **-1,430 daily trips**	Res. Medium	**-215 du** **-1,430 daily trips**
2. SE Sunnyside/Church – Tracts 5458/5477 (4.19 du/ac)	86.87	Res. Medium	Res. Medium Low	From 6.5 du/ac x 86.87 ac = 565du to 364 du	**-201 du** **-1,914 daily trips**	Res. Medium Low	**-201 du** **-1,914 daily trips**
3. NE Bullard/Grantland – Tract 5357 (5.46 du/ac)	36.22	Res. Medium	Res. Medium Low	From 6.5 du/ac x 36.22 = 235 du to 198 du	**-37 du** **-352 daily trips**	Res. Medium Low	**-37 du** **-352 daily trips**
4. 4179/4171 W. Sample – Tract 5278 (3.27 du/ac)	17.41	Res. Medium Low	Res. Low	From 4 du/ac x 17.41 ac = 70 du to 75du	**+5 du** **+48 daily trips**	Res. Low	**+5 du** **+48 daily trips**
5. NE Garfield and Barstow – Tract 5597 (APN 505-321-01 thru 22, 505-322-01 thru 08, 505-331-01 thru 13, 505-332-01 thru 19 (4.87 du/ac)	27.91	Res. Medium High	Res. Medium Low	From 14 du/ac x 27.91 ac = 391du to 136 du	**-254 du** **-2,418 daily trips**	Res. Medium Low	**-254 du** **-2,418 daily trips**
22. **Sol Development for Owner**- West side of Maple between Perrin and Shepherd (developed condo complex)	4.5	Res. Medium Low	Res. Medium High	From 4 to 14 du/ac	**+45 du** **+248 daily trips**	Res. Medium Low	**No Impact**
23. **Sol Development for Owner**- SWC Valentine and McKinley (APN 449-030-63)	8.77	Res. Low	Res. Medium	From 1.5 to 6.5 du/ac	**+44 du** **+419 daily trips**	Res. Medium	**+44 du** **+419 daily trips**
24. **The Kashian Group** – Shaw and Hwy 99 24a. APN 508-030-04 and 05	15.54	Community Commercial	Regional Mixed-Use	From 0 du/ac to (34 du/ac x .3) From (15.54 acres x .3 FAR x 43,560 sq. ft.) to (15.54 acres x .7 net x .3 FAR x 43,560 sq. ft.)	**+171 du** **-60,923 sq. ft.** office/commercial space **-122 employment** **-1,238 daily trips**	Regional Mixed-Use	**+171 du** **-60,923 sq. ft.** office/commercial space **-1,238 daily trips**
24b. APN 508-030-06	27.61	Community Commercial	Regional Mixed-Use	From 0 du/ac to (34 du/ac x .3) From (27.61 acres x .3 FAR x 43,560 sq. ft.) to (27.61 acres x .7 net x .3 FAR x 43,560 sq. ft.)	**+282 du** **-108,242 sq. ft.** office/commercial space	Regional Mixed-Use	**+282 du** **-108,242 sq. ft.** office/commercial space

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
					-216 employment **-2,327 daily trips**		**-2,327 daily trips**
25. **Paul Fourchy** APN 506-130-28	17.6	Highway & Auto	Res. Urban Neighborhood	From 0 to 20 du/ac From .25 to 0 FAR (17.6 acres x .25 FAR x 43,560 sq. ft.)	**+352 du** **-191,664 sq. ft.** office/commercial space **-9,484 daily trips**	Light Industrial	From .25 FAR to .3 FAR (17.6 acres x .05 FAR x 43,560 sq. ft.) **+38,333 sq. ft.** office/commercial space **35 employment** **+268 daily trips**
26. **Art Terzian** APN 433-080-01 and 02	4.89	Res. Medium	Light Industrial	From 6.5 to 0 du/ac From 0 to .3 FAR (4.89 acres x .3 FAR x 43,560 sq. ft.)	**-32 du** **+63,903 sq. ft.** office/commercial space- **58 employment** **+141 daily trips**	Res. Medium	**No Impact**
27. **Troy McKenney** APN 442-022-08 and 09	0.86	Office	Commercial General	From (.86 acres x .5 FAR x 43,560 sq. ft.) to (.86 acres x .35 FAR x 43,560 sq. ft.)	**-5,619 sq. ft.** office/commercial space **-14 employment** **+356 daily trips**	Office	**-5,619 sq. ft.** office/commercial space **+356 daily trips**
28. **Alfonso Manrique** APN 428-340-09	0.37	Office	Res. Urban Neighborhood	From 0 du/ac to 20 du/ac From (.37 acres x .5 FAR x 43,560 sq. ft.) to 0 sq. ft.	**+7 du** **-8,058 sq. ft.** office/commercial space **-20 employment** **-41 daily trips**	Office	**+7 du** **-8,058 sq. ft.** office/commercial space **-41 daily trips**
29. **Will Tackett** APN 494-060-51T	.3	Fire Station	Light Industrial	From 0 sq. ft. to (.3 acres x .3 FAR x 43,560 sq. ft.)	**+3,920 sq. ft.** office/commercial space **+4 employment** **+27 daily trips**	Light Industrial	**+3,920 sq. ft.** office/commercial space **+27 daily trips**
30. **Arkel Arisian** APN 568-010-20	20	Community Commercial	Corridor/Center Mixed Use	From 0 du/ac to 8 du/ac From (20 acres x .3 FAR x 43,560 sq. ft.) to (20 acres x .6 net x .25 FAR x 43,560 sq. ft.)	**+160 du** **-130,680 sq. ft.** office/commercial space **-261 employment** **-4,319 daily trips**	Corridor/Center Mixed Use	**+160 du** **-130,680 sq. ft.** office/commercial space **-4,319 daily trips**
31. **Chestnut and Alluvial (Land owners who have written letters** include: Beth Brown, Dan Taylor, Erica Ayala, Jerry Pohl, Kassandra Booth, Mary Grant Bell, Michael and Barbara Garrison, Dr. and Mrs James Fletcher, Ray Loom and Rick Olsen, Shalea and Mark Pitman, Steve and Lorie Collins, Tiffany and Josh Madsen, William and Linda Hicks, William Gong, RJ Perez, Norma and Alice Otani, Kerry McGuire, James Olber, Denise and Winfred Nishmine) APN 404-071-45	18.52	Res. Medium High	Res. Medium Low	From 14 to 4 du/ac	**-185 du** **-1,025 daily trips**	Res. Medium	From 14 to 6.5 du/ac **-139 du** **-587 daily trips**
32. **Generation Home - Steven Spano** APN 402-030-70 Steve Brandau made same request on behalf of owner	3.06	Community Commercial	Corridor/Center Mixed Use	From 0 to 8 du/ac From (3.06 acres x .3 FAR x 43,560 sq. ft.) to (3.06 acres x .6 net x .25 FAR x 43,560 sq. ft.)	**+25 du** **-20,190 sq. ft.** office/commercial space **-40 employment** **-656 daily trips**	Community Commercial	**No Impact**
33. Kathy Van APN 480-213-13, 14, and 15	1.13	Res. Medium	Community Commercial	From 6.5 to 0 du/ac From 0 to .3 FAR	**+7 du** **+14,767 sq. ft.**	Community Commercial	**+7 du** **+14,767 sq. ft.** office/commercial space

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
(Request 18a is likely a previous land owner for APN 480-213-14)				(1.13 acres x .3 FAR x 43,560 sq. ft.)	office/commercial space **+30 employment** **+561 daily trips**		**+561 daily trips**
34. **Fresno Pacific University** – Dirk Poeschel APN 472-040-25, 26, 27 and 28	2.56	Res. Medium High	Corridor/Center Mixed Use	From 14 to 8 du/ac From 0 to (2.56 acres x .6 net x .25 FAR x 43,560 sq. ft.)	**-15 du** **+16,727 sq. ft.** office/commercial space **+39 employment** **+640 daily trips**	Corridor/Center Mixed Use	**-15 du** **+16,727 sq. ft.** office/commercial space **+640 daily trips**
35. **Gary Giannetta** APN 312-081-12 TM 6091	2.25	Res. Low	Res. Medium Low	From 1.5 du/ac x 2.25 ac = 4 du to 7 du	**+3 du** **+29 daily trips**	Res. Medium Low	**+3 du** **+29 daily trips**
36. **Gary Giannetta** APN 472-022-13 TM 5387	8.73	Open Space/ Community Park	Res. Low	From 0 to 1.95 du/ac	**+17 du** **+162 daily trips**	Res. Low	**+17 du** **+162 daily trips**
37. **Gary Giannetta** APN 511-011-18 TM 5538 Also, letter from Wagner and Wagner asking for same thing	19.85	Res. Medium High	Res. Medium Low	From 14 du/ac x 19.85 ac = 278 du to 93 du	**-185 du** **-964 daily trips**	Res. Medium Low	**-185 du** **-964 daily trips**
38. **John Valentino** APN 459-200-01	0.38	Open Space	No current PLU to match request	Can't assess	**Can't assess**	Open Space (Dual Designation of Light Industrial)	**No Impact**
39. **Mark Knox** APN 507-021-02S	0.86	Community Commercial	Light Industrial	Same FAR of .3	**No Change to sq. ft. nor daily trips**	Light Industrial	**No Change to sq. ft. nor daily trips**
40. **Steve Ohanesian** APN 481-020-01 **a.**	11	Open Space Park	Res. Medium	From 0 to 6.5 du/ac	**+72 du** **+684 daily trips**	Res. Medium (11 ac)	**+72 du** **+684 daily trips**
b.	5	Open Space Park	Res. Medium	From 0 to 6.5 du/ac	**+32 du** **+304 daily trips**	Open Space Park (5 ac)	**No Impact**
41. **Parga Partners** - College Park Master Planned Community							
a. APN 316-071-42	34.83	Light Industrial (17.83) Business Park (17)	Heavy Industrial	Same FAR of .3 From (17 acres x .4 FAR x 43,560 sq. ft.) to (17 acres x .3 FAR x 43,560 sq. ft.)	**-74,052 sq. ft.** office/commercial space **-80 employment** **-4,623 daily trips**	Light Industrial (17.83) Business Park (17)	**No Impact**
b. APN 316-040-77	26.90	Res. Medium	Light Industrial	From 6.5 to 0 du/ac From 0 to (26.9 acres x .3 FAR x 43,560 sq. ft.)	**-175 du** **+351,529 sq. ft.** office/commercial space **+320 employment** **+780 daily trips**	Res. Medium	**No Impact**
c. APN 316-040-66	3.06	Res. Urban Neighborhood (1.86) Res. Medium (1.2) Canal	Regional Business Park	From 20 to 0 du/ac From 0 FAR to .4 FAR (3.06 acres x .4 FAR x 43,560 sq. ft.) From 6.5 du/ac to 0du/ac	**-45 du** **+53,317 sq. ft.** office/commercial space **+58 employment** **+936 daily trips**	Res. Urban Neighborhood (1.86) Res. Medium (1.2) Canal	**No Impact**
d. APN 316-040-63	5.77	Res. Urban Neighborhood (4.77) Res. Medium (1)	Regional Business Park	From 20 to 0 du/ac From 0 FAR to .4 FAR (5.77 acres x .4 FAR x 43,560 sq. ft.) From 6.5 du/ac to 0 du/ac	**-102 du** **+100,537 sq. ft.** office/commercial space **+109 employment**	Res. Urban Neighborhood (4.77) Res. Medium (1)	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
		Canal			**+936 daily trips**	Canal	
e. APN 316-040-17S	19.1	Res. Urban Neighborhood (18) Res. Medium (1.1)	Regional Business Park	From 20 to 0 du/ac From 0 FAR to .4 FAR (19.1 acres x .4 FAR x 43,560 sq. ft.) From 6.5 du/ac to 0 du/ac	**-367 du** **+332,798 sq. ft.** office/commercial space **+360 employment** **+1,669 daily trips**	Res. Urban Neighborhood (18) Res. Medium (1.1)	**No Impact**
f. APN 316-180-09	19.55	Res. Medium	Regional Business Park	From 6.5 to 0 du/ac From 0 FAR to .4 FAR (19.55 acres x .4 FAR x 43,560 sq. ft.)	**-127 du** **+340,639 sq. ft.** office/commercial space **+368 employment** **+3,021 daily trips**	Res. Medium	**No Impact**
g. APN 316-051-18 1.	7	Corridor/Center Mixed Use	Res. Urban Neigh.	From 8 to 20 du/ac From (7acres x .6 net x .25 FAR x 43,560sq. ft.) to 0	**+84 du** **-45,738 sq. ft.** office/commercial space **-108 employment** **-2,025 daily trips**	Corridor/Center Mixed Use	**No Impact**
2.	30	Office	Res. Medium	From 0 to 6.5 du/ac From (30 acres x .5 FAR x 43,560sq. ft.) to 0	**+195 du** **-653,400 sq. ft.** office/commercial space **-1,634 employment** **-7,207 daily trips**	Office	**No Impact**
h. APN 316-051-20	37.72	Office	Res. Medium	From 0 to 6.5 du/ac From (37.72 acres x .5 FAR x 43,560sq. ft.) to 0	**+245 du** **-821,542 sq. ft.** office/commercial space **-2,054 employment** **-6,729 daily trips**	Office	**No Impact**
i. APN 316-051-21	80	Regional Business Park	Res. Medium	From 0 to 6.5 du/ac From .4 FAR to 0 FAR (80 acres x .4 FAR x 43,560 sq. ft.)	**+520 du** **-1,393,920 sq. ft.** office/commercial space **-1,507 employment** **-12,379 daily trips**	Regional Business Park	**No Impact**
j. APN 316-051-09	14	School with Park	Res. Medium	From 0 to 6.5 du/ac	**+91 du** **-144 daily trips**	School with Park	**No Impact**
k. APN 316-051-07 1.	20	Res. Urban Neighborhood	Corridor/Center Mixed Use	From 20 to 8 du/ac From 0 to (20 acres x .6net x .25FAR x 43,560 sq ft)	**-240 du** **+130,680 sq. ft.** office/commercial space **+307 employment** **+4,197 daily trips**	Res. Urban Neighborhood	**No Impact**
2.	13	School with Park	Res. Medium	From 0 to 6.5 du/ac	**+85 du** **-201 daily trips**	School with Park	**No Impact**
42. **Sherman Spalding property** – Dirk Poeschel APN 403-030-07	2.8	Res. Urban Neighborhood	Res. Medium High	From 20 to 14 du/ac	**-17 du** **-113 daily trips**	Res. Medium High	**-17 du** **-113 daily trips**
43. **Sherman Spalding property** – Dirk Poeschel APN 509-020-35S	12.28	Res. Urban Neighborhood	Res. Medium High	From 20 to 14 du/ac	**-74 du** **-492 daily trips**	Res. Medium High	**-74 du** **-492 daily trips**
44. **River Park Tower** APN 303-201-29	2.1	Office	Corridor/Center Mixed Use	From 0 to 8 du/ac From (2.1acres x .5FAR x 43,560 sq ft) to (2.1acres x .6net x .25FAR x 43,560 sq ft)	**+16 du** **-32,017 sq. ft.** office/commercial space **-80 employment**	Office	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
					+209 daily trips		
45. **Sequoia Fresno Joint Venture** APN 402-220-66 and 67 45a.	18.25	Corridor/Center Mixed Use (17) Park (1.25)	Recreation Commercial	From 8 to 0 du/ac (17 acres x .6 net x .25 FAR x 43,560 sq ft) to (17 acres x .2 FAR x 43,560sq. ft.) From 0 to (1.25 acres x .2 FAR x 43,560sq. ft.)	**-136 du** **-26,136 sq. ft.** office/commercial space **-61 employment** **+93 daily trips**	Recreation Commercial	**-136 du** **-26,136 sq. ft.** office/commercial space **+93 daily trips**
45b.	9.15	Corridor/Center Mixed Use (5.25) Park (3.9)	Office	From 8 to 0 du/ac (5.25 acres x .6 net x .25 FAR x 43,560 sq ft) to (5.25acres x .5 FAR x 43,560sq. ft.) From 0 to (3.9 acres x .5 FAR x 43,560sq. ft.)	**-42 du** **+148,649 sq. ft.** office/commercial space **+372 employment** **-223 daily trips**	Office	**-42 du** **+148,649 sq. ft.** office/commercial space **-223 daily trips**
45c.	.6	Corridor/Center Mixed Use	Community Commercial	From 8 to 0 du/ac (.6 acres x .6 net x .25 FAR x 43,560 sq ft) to (.6 acres x .2 FAR x 43,560sq. ft.)	**-5 du** **+1,307 sq. ft.** office/commercial space **+3 employment** **+4 daily trips**	Community Commercial	**-5 du** **+1,307 sq. ft.** office/commercial space **+4 daily trips**
46. **Shamlian Property** APN 510-040-30	2.2	Res. Urban Neighborhood	Community Commercial	From 20 to 0 du/ac From 0 to (2.2 acres x .2 FAR x 43,560sq. ft.)	**-44 du** **+19,166 sq. ft.** office/commercial space **+38 employment** **+523 daily trips**	NMX	From 20 du/ac to 7 du/ac **-29 du** From 0 to (2.2 acres x .25 FAR x .5 x 43,560sq. ft.) **+11,979 sq. ft.** office/commercial space **+334 daily trips**
47. **Sol Development** APN 507-021-01S, 02S, 03S, 05S, 09S, 10S, 17S, 22S, 37S, 38S, 39S, and 40S	13.04	Community Commercial	General Commercial	From .3 to .35 FAR (13.04 acres x .05 FAR x 43,560 sq. ft.)	**+28,401 sq. ft.** office/commercial space **+47 employment** **+1,259 daily trips**	Light Industrial	From .3 to .3 FAR 0 sq. ft. office/commercial space **No Impact**
48. **Stone Soup** APN 418-401-10	1.48	Corridor/Center Mixed Use	Office	From 8 to 0 du/ac From (1.48 acres x .6 net x .25 FAR x 43,560 sq ft) to (1.48 acres x .5 FAR x 43,560sq. ft.)	**-12 du** **+22,564 sq. ft.** office/commercial space **+56 employment** **-155 daily trips**	Office	**No Impact**
49. **Sarkis Atachian** APN 433-210-33, 39 and 40	2.77	Res. Medium	Light Industrial	From 6.5 to 0 du/ac From 0 to (2.77 acres x .3 FAR x 43,560 sq. ft.)	**-18 du** **+36,198 sq. ft.** office/commercial space **+33 employment** **+ 81 daily trips**	Res. Medium	**No Impact**
50. **SEGA Plan Mod – Mansmann/Greenwood** A-08-12 APN 316-051-06	19.02	School with Park	Community Commercial	From 0 to (19.02 acres x .2 FAR x 43,560sq. ft.)	**+165,702 sq. ft.** office/commercial space **+331 employment** **+8,430 daily trips**	School with Park	**No Impact**
51. **SEGA Plan Mod - Dennis Simonian** A-08-14 APN 316-051-02	17.53	Res. Medium	Community Commercial	From 20 to 0 du/ac From 0 to (17.53 acres x .2 FAR x 43,560sq. ft.)	**-351 du** **+152,721 sq. ft.** office/commercial space **+305 employment** **+3,426 daily trips**	Res. Medium	**No Impact**
52. **SEGA Plan Mod – Ralph and Frances Reitz** A-08-20	18.95	Regional Business Park	Corridor/Center Mixed Use	From 0 to 8 du/ac From (18.95 acres x .4 FAR x 43,560 sq. ft.) to	**+152 du** **-206,366 sq. ft.**	Regional Business Park	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
a. Property Owner #5: APN 316-150-01 and 02				(18.95 acres x .6 x .25 FAR x 43,560 sq. ft.)	office/commercial space **-223 employment** **-1,557 daily trips**		
b. Property Owner #6: APN 316-150-11	9.92	Regional Business Park	1. Res. Urban Neigh. (4.27)	From 0 to 20 du/ac From (4.27 acres x .4 FAR x 43,560 sq. ft.) to 0	**+85 du** **-74,400 sq. ft.** office/commercial space **-80 employment** **+361 daily trips**	Regional Business Park	**No Impact**
			2. Res. Medium (5.65)	From 0 to 6.5 du/ac From (5.65 acres x .4 FAR x 43,560 sq. ft.) to 0	**+37 du** **-98,446 sq. ft.** office/commercial space **-106 employment** **-874 daily trips**	Regional Business Park	**No Impact**
c. Property Owner #7: APN 316-150-13	0.97	Regional Business Park	Res. Medium	From 0 to 6.5 du/ac From (0.97 acres x .4 FAR x 43,560 sq. ft.) to 0	**+6 du** **-16,901 sq. ft.** office/commercial space **-18 employment** **-153 daily trips**	Regional Business Park	**No Impact**
d. Property Owner #8: APN 316-150-14	18.20	Regional Business Park	1. Res. Urban Neigh. (8)	From 0 to 20 du/ac From (8 acres x .4 FAR x 43,560 sq. ft.) to 0	**+160 du** **-139,392 sq. ft.** office/commercial space **-151 employment** **-1677 daily trips**	Regional Business Park	**No Impact**
			2. Res. Medium (10.2)	From 0 to 6.5 du/ac From (10.2 acres x .4 FAR x 43,560 sq. ft.) to 0	**+66 du** **-177,725 sq. ft.** office/commercial space **-192 employment** **-1,583 daily trips**	Regional Business Park	**No Impact**
e. Property Owner #10 and 11: APN 316-150-31 and 32	18.6	Regional Business Park	Corridor/Center Mixed Use	From 0 to 8 du/ac From (18.6 acres x .4 FAR x 43,560 sq. ft.) to (18.6 acres x .6 x .25 FAR x 43,560 sq. ft.)	**-149 du** **-202,554 sq. ft.** office/commercial space **-219 employment** **-1,529 daily trips**	Regional Business Park	**No Impact**
f. Property Owner #12: APN 316-150-33	6	Regional Business Park	1. Res. Urban Neigh. (4.25)	From 0 to 20 du/ac From (4.25 acres x .4 FAR x 43,560 sq. ft.) to 0	**+85 du** **-74,052 sq. ft.** office/commercial space **-80 employment** **-357 daily trips**	Regional Business Park	**No Impact**
			2. Res. Medium (1.75)	From 0 to 6.5 du/ac From (1.75 acres x .4 FAR x 43,560 sq. ft.) to 0	**+11 du** **-30,492 sq. ft.** office/commercial space **-33 employment** **-274 daily trips**	Regional Business Park	**No Impact**
g. Property Owner #14: APN 316-150-35	19.59	Regional Business Park	1. Res. Urban Neigh. (15.74)	From 0 to 20 du/ac From (15.74 acres x .4 FAR x 43,560 sq. ft.) to 0	**+315 du** **-274,254 sq. ft.** office/commercial space **-296 employment** **-1,317 daily trips**	Regional Business Park	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
			2. Res. Medium (3.85)	From 0 to 6.5 du/ac From (3.85 acres x .4 FAR x 43,560 sq. ft.) to 0	**+25 du** **-67,082 sq. ft.** office/commercial space **-73 employment** **-597 daily trips**	Regional Business Park	**No Impact**
h. Property Owner #16: APN 316-150-38	2.41	Regional Business Park	Regional Business Park	No Change	**No Change**	Regional Business Park	**No Impact**
i. Property Owner #18: APN 316-150-44	2.46	Regional Business Park	Regional Business Park	No Change	**No Change**	Regional Business Park	**No Impact**
j. Property Owner #19: APN 316-150-45	7.32	Regional Business Park	Regional Business Park	No Change	**No Change**	Regional Business Park	**No Impact**
k. Property Owner #20: APN 316-150-46	12.50	Regional Business Park	Regional Business Park	No Change	**No Change**	Regional Business Park	**No Impact**
l. Property Owner #21: APN 316-150-47	7.32	Regional Business Park	Res. Medium	From 0 to 6.5 du/ac From (7.32 acres x .4 FAR x 43,560 sq. ft.) to 0	**+48 du** **-127,544 sq. ft.** office/commercial space **-138 employment** **-1,129 daily trips**	Regional Business Park	**No Impact**
m. Property Owner #27: APN 316-150-57	3.04	Regional Business Park	Res. Medium	From 0 to 6.5 du/ac From (3.04 acres x .4 FAR x 43,560 sq. ft.) to 0	**+20 du** **-52,969 sq. ft.** office/commercial space **-57 employment** **-469 daily trips**	Regional Business Park	**No Impact**
n. Property Owner #16 and 17: APN 316-170-16 and 17	10.83	Regional Business Park	Res. Medium	From 0 to 6.5 du/ac From (10.83 acres x .4 FAR x 43,560 sq. ft.) to 0	**+70 du** **-188,702 sq. ft.** office/commercial space **-204 employment** **-1,681 daily trips**	Regional Business Park	**No Impact**
53. **SEGA Plan Mod – Berberian Ranches Inc.** A-08-21 APN 316-040-58	74	School (10) with Park (5) Res. Medium (39) Res. Urban Neighborhood (20)	a. Light Industrial	From 0 to (74 acres x .3 FAR x 43,560 sq. ft.) From 0 to 6.5 du/ac From 0 to 20 du/ac	**+654 du** **+967,032 sq. ft.** office/commercial space **+879 employment** **+653 daily trips**	School (10) with Park (5) Res. Medium (39) Res. Urban Neighborhood (20)	**No Impact**
	25.94	Res. Urban Neighborhood	b. Office	From 0 to 20 du/ac From (25.94 acres x .5 FAR x 43,560 sq. ft.) to 0 sq. ft.	**-519 du** **+564,973 sq. ft.** office/commercial space **+1,412 employment** **+2,781 daily trips**	Res. Urban Neighborhood	**No Impact**
	8	Corridor/Center Mixed Use	c. Community Commercial	From 8 to 0 du/ac (8 acres x .6 net x .25 FAR x 43,560 sq ft) to (8 acres x .2 FAR x 43,560sq. ft.)	**-64 du** **+17,424 sq. ft.** office/commercial space **+35 employment** **+1,753 daily trips**	Corridor/Center Mixed Use	**No Impact**
54. **SEGA Plan Mod – Greg Gaddie** A-08-24							
a. Exhibit A-1a: APN 316-031-21, 22, 23, 24, 26, 27, 61, 62, 62, and 64	155.07	Buffer	1. Res. Medium (104.07)	From 0 to 6.5 du/ac	**+676 du** **+6436 daily trips**	Buffer	**No Impact**
			2. Res. Low (51)	From 0 to 1.5 du/ac	**+77 du**	Buffer	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
					+733 daily trips		
b. Exhibit A-2a: APN 313-410-13 and 15	88.48	Buffer	1. Res. Medium (57.68)	From 0 to 6.5 du/ac	**+375 du +3,570 daily trips**	Buffer	**No Impact**
			2. Res. Low (30.8)	From 0 to 1.5 du/ac	**+46 du +438 daily trips**	Buffer	**No Impact**
c. Exhibit A-3a: APN 313-400-09, 15, and 16	69.81	Buffer	1. Res. Medium (47)	From 0 to 6.5 du/ac	**+307 du +2,923 daily trips**	Buffer	**No Impact**
			2. Res. Low (22.81)	From 0 to 1.5 du/ac	**+34 du +324 daily trips**	Buffer	**No Impact**
d. Exhibit A-4a: APN 313-030-35, 40, 50, 51, 52, and 53	144.72	Buffer	1. Res. Medium (47.3)	From 0 to 6.5 du/ac	**+307 du +2,923 daily trips**	Buffer	**No Impact**
			2. Res. Low (97.42)	From 0 to 1.5 du/ac	**+146 du +1,390 daily trips**	Buffer	**No Impact**
e. Exhibit A-5a: APN 310-342-04, 05, and 06	33.36	Buffer	Res. Low	From 0 to 1.5 du/ac	**+50 du +476 daily trips**	Buffer	**No Impact**
f. Exhibit A-6a: APN 310-240-14, 22, and 23	23.08	Buffer	No contact by applicant with these land owners	No Change	**No Change**	No land use change proposed.	**No Impact**
g. Exhibit A-7a: APN 310-090-10 and 11	56.73	Buffer	1. Res. Low (38.90)	From 0 to 1.5 du/ac	**+58 du +552 daily trips**	Buffer	**No Impact**
			2. Res. Low (17.83)	From 0 to 1.5 du/ac	**+27 du +257 daily trips**	Buffer	**No Impact**
h. Exhibit A-8a: APN 309-210-41	29.30	Buffer	1. Res. Medium (20.1)	From 0 to 6.5 du/ac	**+131 du +1,247 daily trips**	Buffer	**No Impact**
			2. Res. Low (9.2)	From 0 to 1.5 du/ac	**+14 du +133 daily trips**	Buffer	**No Impact**
i. Exhibit A-8a: APN 309-210-41	48.5	Buffer	1. Res. Medium (37)	From 0 to 6.5 du/ac	**+241 du +2,294 daily trips**	Buffer	**No Impact**
			2. Res. Low (11.5)	From 0 to 1.5 du/ac	**+17 du +162 daily trips**	Buffer	**No Impact**
55. **SEGA Plan Mod – BN Childers** A-08-25 APN 310-052-25	21.5	Res. Medium	Res. Medium	No Change	**No Change**	No land use change proposed.	**No Impact**
56. **Ashley Werner**							
a. Replace Industrial and Business Park in the area bounded by Whites Bridge, Blythe, Belmont, and Downtown Planning Area with mix of medium and high density residential, office, commercial, mixed-use, open space, and public facilities.	+-1,416	Industrial and Business Park	Mix of medium and high density residential, office, commercial, mixed-use, open space, and public facilities.	No Change	**No Change**	Industrial and Business Park	**No Impact**
b. Replace Industrial and Business Park in vicinity of West & Church and Fruit & Church with mix of medium and high density residential, commercial, mixed-use, open space, and public facilities.	+-182	Industrial and Business Park	Mix of medium and high density residential, commercial, mixed-use, open space, and public facilities.	No Change	**No Change**	Industrial and Business Park	**No Impact**
c. Replace Regional Business Park adjoining residential near Fig and Muscat with Business Park.	50	Regional Business Park	Business Park	Same FAR of .4 therefore no change in commercial/office square footage	**No Change**	Business Park	**No Impact**

Owner (and Non-Owner Requesters) and Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	Change Request			City of Fresno Preferred PLU	
			Planned Land Use	Density or Square Footage Change[1]	CEQA Impacts[1,2,3]	Planned Land Use	CEQA Impacts[1,2]
d. Replace Highway & Auto and Industrial between Jensen and North and Elm and Hwy 180 with a mix of Residential, Office, Business Park, Commercial, Open Space and Public Facilities.	49	Highway & Auto and Industrial	Mix of Residential, Office, Business Park, Commercial, Open Space and Public Facilities	No Change	**No Change**	Highway & Auto and Industrial	**No Impact**
e. Replace Industrial within the Industrial Triangle between Hwy 99 and 41 with Business Park							
1.	2,135.28	Heavy Industrial	Business Park	From .3 to .4 FAR (2,135.28 acres x .1 FAR x 43,560 sq. ft.)	**+9,301,280 sq. ft.** office/commercial spac **+10,055 employment** **+420,974 daily trips**	Heavy Industrial	**No Impact**
2.	140.45	Heavy Industrial	Business Park	From .3 to .4 FAR (140.45 acres x .1 FAR x 43,560 sq. ft.)	**+611,800 sq. ft.** office/commercial space **+661 employment** **+27,688 daily trips**	Light Industrial	**No change in sq. ft.** office/commercial space **-10,040 daily trips**
3.	58.47	Heavy Industrial	Business Park	From .3 to .4 FAR (58.47 acres x .1 FAR x 43,560 sq. ft.)	**+254,695 sq. ft.** office/commercial space **+275 employment** **+11,528 daily trips**	Light Industrial	**No change in sq. ft.** office/commercial space **-4,180 daily trips**
4.	32.75	Light Industrial	Business Park	From .3 to .4 FAR (32.75 acres x .1 FAR x 43,560 sq. ft.)	**+142,659 sq. ft.** office/commercial space **+154 employment** **+4,116 daily trips**	Light Industrial	**No Impact**
f. Replace Industrial within ½ mile of Downtown, Calwa and Southeast Fresno residential neighborhoods with a mix of medium and high density residential, office, commercial, mixed-use, open space, and public facilities.	+-1,245	Industrial	Mix of medium and high density residential, office, commercial, mixed-use, open space, and public facilities.	No Change	**No Change**	Industrial	**No Impact**

Table 1.2: Fresno Staff Change Request – Workbook of Planned Land Use Requests and Corresponding CEQA Impacts made by City staff. These were not requested land use change – December 05, 2014

Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	City Staff Change Requested To:	Density or Sq. Ft. Change[1]	Other CEQA Impacts[2]
F1. Calwa Industrial Area	64.26	Light Industrial (55.35) Light Industrial (6.68) General Commercial (1.09) Community Commercial (1.14)	Business Park Residential Residential Residential	0 du, +157,300 sq. ft. and +4,535 daily trips +23 du, -74,800 sq. ft. and -651 daily trips + 6 du, -15,000 sq. ft. and -584 daily trips +7 du, -16,600 sq. ft. and -642 daily trips	**+36 du** **+50,900 sq. ft.** office/commercial space **+2,658 daily trips**
F7. W. Bullard and Carnegie	8.52	Highway & Auto Commercial	Business Park	From .25 to .4 FAR (8.52 acres x .15 FAR x 43,560 sq. ft.)	**+55,670 sq. ft.** office/commercial space **-1,150 daily trips**
F8. Golden St. and Veteran's Blvd. interchange	118.87	Highway & Auto Commercial	Light Industrial	From .25 to .3 FAR (118.87 acres x .05 FAR x 43,560 sq. ft.)	**+258,899 sq. ft.** office/commercial space **-30,985 daily trips**
F11. NWC Elm and Jensen	6.5	Res. Medium	Ponding Basin	From 6.5 to 0 du/ac	**-42 du** **-400 daily trips**
F12. NWC Elm and Jensen	9.81	Res. Medium	Res. Medium High	From 6.5 to 14 du/ac	**+74 du** **+302 daily trips**
F14. NWC Elm and Jensen	3.16	Res. Medium	Park	From 6.5 to 0 du/ac	**-21 du** **-194 daily trips**
F15. NEC Whites Bridge and Blyth	39.92	Light Industrial	Public Facility/Cemetery (alternative PLU should be Light Industrial)	From .3 to 0 FAR (39.92 acres x .3 FAR x 43,560 sq. ft.)	**-521,675 sq. ft.** office/commercial space **-3,447 daily trips**
F17. Nielson and Marks	35.69	Light Industrial	Public Facility/Ponding Basin (alternative PLU should be Light Industrial)	From .3 to 0 FAR (35.69 acres x .3 FAR x 43,560 sq. ft.)	**-466,397 sq. ft.** office/commercial space **-3,251 daily trips**
F20. SWC of S. Marks and W. Whitesbridge	8.87	Community Commercial	Corridor/Center Mixed-Use	From 0 to 8 du/ac From .3 to .25 FAR (8.87 acres x .3 FAR x 43,560 sq. ft.) - (8.87 acres x .6 net acres x .25 FAR x 43,560 sq. ft.)	**+71 du** **-57,956 sq. ft.** office/commercial space **-2,382 daily trips**
F24. NWC of Valentine and W. Madison	18.14	Res. Medium	Res. Medium-high	From 6.5 to 14 du/ac	**+136 du** **+1,295 daily trips**
F25. Brawley, just north of Madison (north of the school)	32	Res. Urban Neighborhood (27) and Park (5)	Res. Medium	From 20 to 6.5 du/ac From 0 to 6.5 du/ac	**+332 du** **-1,971 daily trips**
F26. SWC of W. Shaw and N. Brawley	204.06	Regional Business Park	Light Industrial	From .4 to .3 FAR (204.06 acres x .1 FAR x 43,560 sq. ft.)	**-888,885 sq. ft.** office/commercial space **-25,643 daily trips**
W1	41.98	Light Industrial	Business Park	From .3 to .4 FAR (41.98 acres x .1 FAR x 43,560 sq. ft.)	**+182, 865 sq. ft.** office/commercial space **+5,276 daily trips**
W2	23.38	Light Industrial	Business Park	From .3 to .4 FAR (23.38 acres x .1 FAR x 43,560 sq. ft.)	**+101,843 sq. ft.** office/commercial space **+2,939 daily trips**
W3	44.82	Light Industrial	Business Park	From .3 to .4 FAR	**+195,236 sq. ft.**

[1]Reasonable dwelling unit per acre and FAR build out capacity estimate for unmapped vacant lots: Low = 1.5 du/ac; Med-Low = 4 du/ac; Medium = 6.5 du/ac; Medium-High = 14.0 du/ac; Urban Neighborhood = 20.0 du/ac; High = 34.0 du/ac; NMX = 14.0 (x .5 net); CMX = 20.0 (x .4 net); RMX = 34.0 (x .3 net); Community Commercial = .3 FAR; Community Recreational = .2 FAR; General Commercial = .35 FAR; Main Street = .5 FAR; Neighborhood Commercial = .35 FAR; Regional Commercial = .25, Highway and Auto = .25 FAR; Office = .5 FAR; Business Park = .4 FAR; Regional Business Park = .4 FAR; Light Industrial = .3 FAR; Heavy Industrial = .3 FAR; CMX = .25 FAR; CMX (SEGA) = .2 FAR; RMX = .25 FAR; RMX (SEGA) = .15 FAR; and NMX = .25

[2] Daily trip generation taken from Spack Consulting calculator table based on ITE Trip Generation Rates - 9th Edition.

Property Location	Size (acres)	GP Update PLU (Aug. 9, 2012 Initiation Map)	City Staff Change Requested To:	Density or Sq. Ft. Change[1]	Other CEQA Impacts[2]
				(44.82 acres x .1 FAR x 43,560 sq. ft.)	office/commercial space **+5,632 daily trips**
W5	38.89	Light Industrial	Highway and Auto	From .3 to .25 FAR (38.89 acres x .05 FAR x 43,560 sq. ft.)	**-84, 702 sq. ft.** office/commercial space **+1,726 daily trips**
W6	35.46	Light Industrial	Highway and Auto	From .3 to .25 FAR (35.46 acres x .05 FAR x 43,560 sq. ft.)	**-77,254 sq. ft.** office/commercial space **+1,574 daily trips**
W7	9.74	Light Industrial	Park	From .3 to 0 FAR (9.74 acres x .3 FAR x 43,560 sq. ft.)	**-127,282 sq. ft.** office/commercial space **-887 daily trips**
W11	57.68	Light Industrial	Res. Medium	From 0 to 6.5 du/ac From .3 to 0 FAR (57.68 acres x .3 FAR x 43,560 sq. ft.)	**+375 du** **-753, 762 sq. ft.** office/commercial space **-5,254 daily trips**
W12	18.50	Light Industrial	Res. Medium	From 0 to 6.5 du/ac From .3 to 0 FAR (18.50 acres x .3 FAR x 43,560 sq. ft.)	**+120 du** **-241,758 sq. ft.** office/commercial space **-1,685 daily trips**
W14	26.83	Light Industrial	Res. Medium-high	From 0 to 14 du/ac From .3 to 0 FAR (26.83 acres x .3 FAR x 43,560 sq. ft.)	**+376 du** **-350,614 sq. ft.** office/commercial space **-2,444 daily trips**
W15	50.39	Light Industrial	Res. Medium-high	From 0 to 14 du/ac From .3 to 0 FAR (50.39 acres x .3 FAR x 43,560 sq. ft.)	**+706 du** **-658,497 sq. ft.** office/commercial space **-4,590 daily trips**
W21	27.90	Light Industrial	Res. Medium-low	From 0 to 4 du/ac From .3 to 0 FAR (27.90 acres x .3 FAR x 43,560 sq. ft.)	**+112 du** **-364,597 sq. ft.** office/commercial space **-2,541 daily trips**
W22	18.38	Light Industrial	Res. Urban Neighborhood	From 0 to 20 du/ac From .3 to 0 FAR (18.38 acres x .3 FAR x 43,560 sq. ft.)	**+368 du** **-240,190 sq. ft.** office/commercial space **-1,674 daily trips**
W23	16.91	Light Industrial	Res. Urban Neighborhood	From 0 to 20 du/ac From .3 to 0 FAR (16.91 acres x .3 FAR x 43,560 sq. ft.)	**+338 du** **-220,980 sq. ft.** office/commercial space **-1,546 daily trips**

Table 1.3: Land Use Change Requests - Recorded Final Maps (3)

Final Map #	Exhibit Page	# of vacant lots	# of total lots	Acres	calculated density (du/ac)	Initiation Draft GP Land Use (Aug. 9, 2012)	City of Fresno Staff Preferred Land Use				Development Area	Location
							Staff preferred land use (2)	Change in # of dwelling units (1)	Change of Daily Trips	Dwelling unit type		
4772	2	9	9	2.85	3.16	Medium	Low	-10	-90	Single family	EN South of Shaw	City
4983	4	53	53	12.75	4.16	Medium	Medium Low	-30	-284	Single family	DA-1 North	City
5567	1	17	17	3.87	4.4	Medium	Medium Low	-8	-77	Single family	DA-1 North	City
6028	6	93	93	14.5	6.41	Medium Low (12.1) and Low (2.4)	Medium	42	399	Single family	EN South of Shaw	City
							Total:	**-6**	**-53**			
4173	2	7	113	35.7	3.17	Medium	Low			Single family	EN North of Shaw	City
4281	2	3	140	100.6	1.39	Medium Low	Low			Single family	EN North of Shaw	City
4422	2	5	6	2.09	2.87	Medium	Low			Single family	EN North of Shaw	City
4487	3	3	37	11.68	3.17	Medium Low	Low			Single family	EN North of Shaw	City
4544	4	0	89	18	4.94	Medium	Medium Low			Single family	DA-1 North	City
4682	8, 9, 11	4	107	22.75	4.70	Medium Low and Medium High (4.5)	Medium Low			Single family	EN South of Shaw	City
4697	4	1	34	7.64	4.45	Medium Low and Medium (5.4)	Medium Low			Single family	DA-1 North	City
4701	4	0	95	19.07	4.98	Medium	Medium Low			Single family	DA-1 North	City
4723	2	2	32	13.6	2.35	Medium Low	Low			Single family	EN North of Shaw	City
4743	4	0	52	10.69	4.86	Medium	Medium Low			Single family	DA-1 North	City
4772	2	9	9	2.85	3.16	Medium	Low			Single family	EN South of Shaw	City
4831	8, 11	0	91	23.55	3.86	Medium	Medium Low			Single family	EN North of Shaw	City
4868	2	0	221	65	3.40	Medium Low	Low			Single family	EN North of Shaw	City
4903	3	0	60	17.2	3.49	Medium Low	Low			Single family	EN North of Shaw	City
4933	1	0	81	19.43	4.17	Medium	Medium Low			Single family	EN North of Shaw	City
4971	2	0	6	1.52	3.95	Medium	Medium Low			Single family	EN South of Shaw	City
4974	5	0	95	19.2	4.95	Medium	Medium Low			Single family	DA-4 West	City
4983	4	53	53	12.75	4.16	Medium	Medium Low			Single family	DA-1 North	City
4988	4	0	8	4.39	1.82	Medium Low	Low			Single family	EN North of Shaw	City
5000	2	3	123	47.22	2.60	Medium Low	Low			Single family	EN North of Shaw	City
5010	1	3	95	35.4	2.68	Medium Low	Low			Single family	EN North of Shaw	City
5011	1	0	108	30.34	3.56	Medium Low	Medium Low			Single family	EN South of Shaw	City
5014	9, 11	0	21	4.16	5.05	Medium	Medium Low			Single family	EN South of Shaw	City
5070	8, 11	0	42	9.48	4.43	Medium	Medium Low			Single family	EN North of Shaw	City
5071	2	0	74	15.1	4.90	Medium (8) and Medium High (7.1)	Medium Low			Single family	DA-4 West	City
5078	4	0	209	51.82	4.03	Medium	Medium Low			Single family	EN North of Shaw	City
5081	2	0	224	17.33	12.93	Medium Low	Medium High			Multi-family	EN North of Shaw	City
5082	1	3	107	21.8	4.91	Medium	Medium Low			Single family	DA-4 West	City
5086	4	4	42	16.31	2.58	Medium Low	Low			Single family	EN North of Shaw	City
5101	2	0	52	19	2.74	Medium Low	Low			Single family	EN North of Shaw	City
5103	1	0	49	9.55	5.13	Medium Low and Medium High (4.7)	Medium Low			Single family	EN South of Shaw	City
5107	9, 11	0	18	6.2	2.90	Medium High	Low			Single family	DA-1 North	City
5109	4	0	85	24.57	3.46	Medium Low	Low			Single family	EN South of Shaw	City
5110	9, 11	1	48	17.74	2.71	Medium Low	Low			Single family	EN North of Shaw	City
5117	1	3	35	7.18	4.87	Medium	Medium Low			Single family	DA-4 West	City

(1) Reasonable dwelling unit per acre and FAR build out capacity estimate for unmapped vacant lots: Low = 1.5 du/ac; Med-Low = 4 du/ac; Medium = 6.5 du/ac; Medium-High = 14.0 du/ac; Urban Neighborhood = 20.0 du/ac; High = 34.0 du/ac; NMX = 14.0 (x .5 net); CMX = 20.0 (x .4 net); RMX = 34.0 (x .3 net); Community Commercial = .3 FAR; Community Recreat
General Commercial = .35 FAR; Main Street = .5 FAR; Neighborhood Commercial = .35 FAR; Regional Commercial = .25, Highway and Auto = .25 FAR; Office = .5 FAR; Business Park = .4 FAR; Regional Business Park = .4 FAR; Light Industrial = .3 FAR; Heavy Industrial = .3 FAR; CMX = .25 FAR; CMX (SEGA) = .2 FAR; RMX = .25 FAR; RMX (SEGA) = .15 FAR; and NMX = .25

(2) Land Use based on calculated density

(3) These are all Recorded Final Maps from 2002 through 2014 and those prior to 2002 that have vacant lots. Recorded Final Maps 4772, 4983, 5567, 6028, are currently undeveloped as of December 5, 2014. A change in dwelling unit count is provided for these maps only since they could potentially develop at the Staff Preferred Land Use density. All other maps a
administrative change to reflect the mapped density.

Final Map #	Exhibit Page	# of vacant lots	# of total lots	Acres	calculated density (du/ac)	Initiation Draft GP Land Use (Aug. 9, 2012)	City of Fresno Staff Preferred Land Use				Development Area	Location
							Staff preferred land use (2)	Change in # of dwelling units (1)	Change of Daily Trips	Dwelling unit type		
5127	4	0	49	14.07	3.48	Medium Low (5.4) and Medium (8.67)	Low			Single family	EN South of Shaw	City
5129	9, 11	0	188	10.5	17.90	Medium High	Urban Neigh.			Multi-family	EN North of Shaw	City
5134	1	0	92	19.95	4.61	Medium	Medium Low			Single family	DA-1 North	City
5135	2, 4	0	189	55	3.44	Medium Low	Low			Single family	EN South of Shaw	City
5136	9, 11	0	19	4.21	4.51	Medium	Medium Low			Single family	DA-1 North	City
5137	4	4	131	27	4.85	Medium	Medium Low			Single family	DA-4 West	City
5141	4	2	142	36	3.94	Medium	Medium Low			Single family	EN North of Shaw	City
5145	2	0	16	3.4	4.71	Medium	Medium Low			Single family	DA-1 North	City
5148	4	0	35	7.01	4.99	Medium	Medium Low			Single family	DA-1 North	City
5150	4	13	28	12.51	2.24	Medium Low	Low			Single family	EN North of Shaw	City
5163	1	0	68	15.03	4.52	Medium	Medium Low			Single family	DA-1 North	City
5171	2	70	82	17	4.82	Medium (12.7) and Medium High (4.3)	Medium Low			Single family	EN South of Shaw	City
5184	9, 11	4	23	4.93	4.67	Medium	Medium Low			Single family	EN North of Shaw	City
5189	2	0	60	14.43	4.16	Medium	Medium Low			Single family	EN South of Shaw	City
5190	6	0	55	11.8	4.66	Medium	Medium Low			Single family	DA-4 West	City
5195	4	8	23	14.35	1.60	Medium Low	Low			Single family	EN South of Shaw	City
5206	8, 9, 11	3	58	17.75	3.27	Medium Low	Low			Single family	DA-1 South	City
5210	7	9	41	16.8	2.44	Medium (1.57) and Medium High (15.23)	Low			Single family	EN South of Shaw	City
5215	8, 11	0	35	7.36	4.76	Medium	Medium Low			Single family	EN South of Shaw	City
5220	8	3	61	20.6	2.96	Medium Low	Low			Single family	EN South of Shaw	City
5229	8, 11	4	8	4.6	1.74	Medium Low	Low			Single family	EN North of Shaw	City
5232	1	216	412	118.73	3.47	Medium	Medium Low			Single family	EN South of Shaw	City
5247	6, 9	0	250	80	3.13	Medium	Low			Single family	DA-1 North	City
5251	2	0	84	17.04	4.93	Medium	Medium Low			Single family	DA-4 West	City
5258	4	0	97	34	2.85	Medium Low (32.7) and Medium (1.3)	Low			Single family	EN South of Shaw	City
5259	9, 11	1	12	3.27	3.67	Medium	Medium Low			Single family	DA-1 North	City
5260	4	3	60	22.42	2.68	Medium Low	Low			Single family	EN North of Shaw	City
5261	1	10	21	8.13	2.58	Medium Low	Low			Single family	EN North of Shaw	City
5281	1	0	43	9.08	4.74	Medium	Medium Low			Single family	EN South of Shaw	City
5284	6	0	115	25.23	4.56	Low (.85), Medium (16.38) and Medium High (8)	Medium Low			Single family	DA-4 West	City
5287	4	0	186	42.29	4.40	Medium	Medium Low			Single family	EN South of Shaw	City
5295	8, 10, 11	0	21	5.21	4.03	Medium	Medium Low			Single family	EN South of Shaw	City
5300	9, 11	30	62	14.53	4.27	Low (5.5), Medium (2.4) and Medium High (6.63)	Medium Low			Single family	DA-1 North	City
5312	4	0	95	19.4	4.90	Medium	Medium Low			Single family	EN South of Shaw	City
5313	6	0	75	19.19	3.91	Medium (10) and Medium High (9.19)	Medium Low			Single family	EN South of Shaw	City
5316	8, 11	9	98	23	4.26	Medium (18.75) and High (4.25)	Medium Low			Single family	DA-1 North	City
5321	4	0	86	18.06	4.76	Medium	Medium Low			Single family	DA-4 West	City
5338	4	8	109	38.66	2.82	Medium	Low			Single family	DA-1 North	City
5352	2	3	109	24	4.54	Medium	Medium Low			Single family	DA-1 North	City
5358	2	131	230	50.8	4.78	Medium	Medium Low			Single family	EN North of Shaw	City
5368	2	0	38	9.57	3.97	Medium	Medium Low			Single family	DA-1 North	City
5370	4	0	81	22.48	3.60	Medium	Medium Low			Single family	EN South of Shaw	City
5374	6	5	96	19.83	4.84	Medium (9.83) and Medium High (10)	Medium Low			Single family	EN South of Shaw	City
5376	8, 11	1	31	9.15	3.39	Medium Low	Low			Single family	EN South of Shaw	City
5377	9, 11	0	91	20.7	4.40	Low (2.3) and Medium Low	Medium Low			Single family	EN South of Shaw	City
5395	9, 11	3	52	14.32	3.63	Medium	Medium Low			Single family	DA-1 North	City
5396	2	0	47	10.96	4.29	Medium	Medium Low			Single family	DA-1 North	City

Final Map #	Exhibit Page	# of vacant lots	# of total lots	Acres	calculated density (du/ac)	Initiation Draft GP Land Use (Aug. 9, 2012)	City of Fresno Staff Preferred Land Use				Development Area	Location
							Staff preferred land use (2)	Change in # of dwelling units (1)	Change of Daily Trips	Dwelling unit type		
5400	2	0	231	57.4	4.02	Medium	Medium Low			Single family	DA-1 North	City
5406	4	48	256	55.26	4.63	Medium Low and Medium (51.13)	Medium Low			Single family	DA-1 North	City
5409	4	0	106	4.55	23.30	Medium High	Urban Neigh.			Multi-family	EN South of Shaw	City
5414	5	0	64	13.9	4.60	Medium	Medium Low			Single family	EN South of Shaw	City
5427	4	99	174	43.2	4.03	Medium	Medium Low			Single family	EN South of Shaw	City
5433	6	0	168	22.22	7.56	Medium High	Medium			Single family	EN North of Shaw	City
5445	2	40	77	20.9	3.68	Medium	Medium Low			Single family	EN South of Shaw	City
5446	9, 11	9	75	21.72	3.45	Medium Low (4.9) and Medium (16.82)	Low			Single family	EN South of Shaw	City
5447	9, 11	33	75	17.8	4.2	Medium	Medium Low			Single family	EN South of Shaw	City
5455	6	0	199	26.21	7.59	Medium High	Medium			Single family	EN North of Shaw	City
5457	2	0	66	14.69	4.49	Medium	Medium Low			Single family	DA-1 North	City
5461	2	219	257	66.3	3.88	Low (26) and Medium Low	Medium Low			Single family	EN South of Shaw	City
5462	6	6	10	1.9	5.26	Medium High	Medium			Single family	EN North of Shaw	City
5482	2	26	79	18.1	4.37	Medium High	Medium Low			Single family	EN South of Shaw	City
5489	8, 11	0	79	8.5	9.29	Medium High	Medium			Single family	DA-1 North	City
5510	4	0	8	1.92	4.17	Medium	Medium Low			Single family	EN South of Shaw	City
5512	5	99	126	29.95	4.2	Medium	Medium Low			Single family	DA-1 North	City
5517	4		117	28.07	4.17	Medium	Medium Low			Single family		City
5557	6	0	20	1.94	10.31	High	Medium			Single family	DA-1 North	City
5564	2		6	2.62	2.29	Medium Low	Low			Single family		City
5567	1	17	17	3.87	4.4	Medium	Medium Low			Single family	DA-1 North	City
5600	4	0	82	20	4.1	Medium (18.2) and Medium Low (1.8)	Medium Low			Single family	DA-1 North	City
5614	2	0	14	4.6	3.04	Medium	Low			Single family	DA-1 North	City
5646	2	0	32	3.76	8.51	Low	Medium			Single family	EN North of Shaw	City
5686	3	3	165	36.7	4.5	Medium	Medium Low			Single family	EN South of Shaw	City
5710	6	34	46	7.14	6.44	Medium High	Medium			Single family	DA-1 North	City
5728	4	57	155	34	4.56	Medium (30.82) and Urban Neigh. (3.18)	Medium Low			Single family	DA-1 North	City
5770	4	70	76	14.9	5.1	Medium and low (10.6)	Medium			Single family	DA-1 North	City
5856	4	0	30	2.83	10.6	Medium Low	Medium			Single family	EN North of Shaw	City
5951	2	0	88	4.4	20	Medium	Urban Neigh.			Multi-family	EN North of Shaw	City
5983	2	0	65	3.56	18.26	Office	Urban Neigh.			Multi-family	EN North of Shaw	City
5987	2	0	36	4.67	7.71	Low	Medium			Single family	EN North of Shaw	City
5995	2	0	44	6.5	6.8	Medium High	Medium			Single family	EN North of Shaw	City
5996	2	0	50	3.57	14	Office	Medium High			Multi-family	EN North of Shaw	City
5997	1	0	8	2.33	3.43	Medium Low	Low			Single family	EN North of Shaw	City
6037	2	38	56	11.03	5.08	Medium High	Medium Low			Single family	DA-1 North	City

:ional = .2 FAR;
;

are an

Table 1.4 CEQA Impacts for all General Plan Change of Planned Land Use Requests - Worse Case Senario

I.D.	du	sq. ft.	employment factor	employment	daily trips
1	-188				-978
2	-12				-114
3c4	776				7292
3c5	-268				-1720
3g	-324				-3,084
3h1	-171	186153	600	310	9,028
3h2	-55	60374	600	101	4506
4	72	124603	425	293	4100
5b1	-266				-2546
5b2a	-16				-152
5b2b	-130				-1238
5b2c	-49				-466
5c	567				-5398
5e1		-43560	925	-47	-541
5e2		-89298	925	-97	-1111
5e3		-82764	925	-89	-1029
5e4		-19602	925	-21	-244
5e5		-10890	925	-12	-136
5f1	-185				-1230
5f2	-116				-771
5g	90				225
5h	122				1126
5i2	-1048				-2160
5i3	-479				1293
6		-19950	400	-50	729
7a	212				410
7e	134				276
7f	125				190
7h	73				-305
7i1	0				-1,000
7i2	14				-867
8a	59				-438
8e	72				1131
8i	-84				401
8j	-69	-37897	500	-76	-1618
		-15246	400	-38	-168
8k	24				-772
9a	94				105
9b	135				-1285
9d	-65				370
12b					-1000
12c	-41				-390
12e	-31				-295
12f	-120				-798
14a and 14b	185	-112036	425	-264	-3734

Table 1.4 CEQA Impacts for all General Plan Change of Planned Land Use Requests - Worse Case Senario

15	78	-85160	400	-213	-419
16 a, b, c	-17	83787	950	88	3601
17b	-24	47568	500	95	1779
17c	-12	-9801	425	-23	10
18b	27				142
21a1	-288				-1915
21a2	110				732
21a3a	-41				-390
21a3b	-75				-714
21a3c	-29				-159
21a4	-75				-310
21a5	-129				-702
21a6	34				324
21a7	-202				-834
21a8	-30	-17642	500	-35	-799
21a9	168	-156816	500	-314	-5554
21a10	-37				-191
21a11	14	-45738	500	-91	-1789
21a12	-71				-676
21a13a	4				38
21a13b	-41				-390
21a14a	-41				-392
21a14b	-26				-243
21a15	82				781
21a16a	-65				-619
21a16b	-4				-35
21a17	59				562
21b1A		-4356	925	-5	121
21b1B	23	-62029	925	-67	-552
21b1C	-391	-20909	925	-23	-1252
21b3A		-4356	925	-5	121
21b3B		-16858	925	-18	-87
21b4	280	-244285	925	-264	-1173
21c	-71				-294
21d	-49				-466
21e	-274				-1822
21f	-79	52357	500	105	1695
21g1	56				
21g2	8				
21g3	48				
21g4	-53	-52275	500	-105	-893
21h	-237				-1249
21i2	-224				-1329
21i3	20				190
21i4	41				390
21i5a	9				85
21i5b	9				85

Table 1.4 CEQA Impacts for all General Plan Change of Planned Land Use Requests - Worse Case Senario

21i5c	18				172
21i6a	-35				-335
21i6b	-13				-124
21i7	39				371
21i8	20				190
21i9	-229				-1359
21i10	-25				-238
21i11	-287				-1702
21i12	-567				-3545
21i13	-569				-3565
21i14	71	-230650	500	-461	-11013
21i15	-113				-671
21i16	78				743
21j3	-23	-98010	425	-231	1111
21j4	19	-37897	500	-76	-1399
21j5	-246				-1298
21j6	-23	-45738	500	-91	-1703
21k1	-215				-1430
21k2	-201				-1914
21k3	-37				-352
21k4	5				48
21k5	-254				-2418
22	45				248
23	44				419
24a	171	-60923	500	-122	-1238
24b	282	-108242	500	-216	-2327
25		38333	1100	35	268
26	-32	63903	1100	58	141
27		-5619	400	-14	356
28	7	-8058	400	-20	-41
29		3920	1100	4	27
30	160	-130680	500	-261	-4319
31	-139				-587
32	25	-20190	500	-40	-656
33	7	14767	500	30	561
34	-15	16727	425	39	640
35	3				29
36	17				162
37	-185				-964
40a	72				684
40b	32		0		304
41a		-74052	925	-80	-4623
41b	-175	351529	1100	320	780
41c	-45	53317	925	58	936
41d	-102	100537	925	109	936
41e	-367	332798	925	360	1669
41f	-127	340639	925	368	3021

Table 1.4 CEQA Impacts for all General Plan Change of Planned Land Use Requests - Worse Case Senario

41g1	84	-45,738	425	-108	-2025
41g2	195	-653400	400	-1634	-7207
41h	245	-821542	400	-2054	-6729
41i	520	-1393920	925	-1507	-12379
41j	91				-144
41k1	-240	130680	425	307	4197
41k2	85				-201
42	-17				-113
43	-74				-492
44	16	-32017	400	-80	209
45a	-136	-26136	425	-61	93
45b	-42	148649	400	372	-223
45c	-5	1307	500	3	4
46	-44	19166	500	38	523
47		28401	600	47	1259
48	-12	22564	400	56	-155
49	-18	36198	1100	33	81
50		165702	500	331	8430
51	-351	152721	500	305	3426
52a	152	-206366	925	-223	-1557
52b1	85	-74400	925	-80	361
52b2	37	-98446	925	-106	-874
52c	6	-16901	925	-18	-153
52d1	160	-139392	925	-151	-1677
52d2	66	-177725	925	-192	-1583
52e	-149	-202554	925	-219	-1529
52f1	85	-74052	925	-80	-357
52f2	11	-30492	925	-33	-274
52g1	315	-274254	925	-296	-1317
52g2	25	-67082	925	-73	-597
52l	48	-127544	925	-138	-1129
52m	20	-52969	925	-57	-469
52n	70	-188702	925	-204	-1681
53a	654	967032	1100	879	653
53b	-519	564973	400	1412	2781
53c	-64	17424	500	35	1753
54a1	676				6436
54a2	77				733
54b1	375				3570
54b2	46				438
54c1	307				2923
54c2	34				324
54d1	307				2923
54d2	146				1390
54e	50				476
54g1	58				552
54g2	27				257

Table 1.4 CEQA Impacts for all General Plan Change of Planned Land Use Requests - Worse Case Senario

54h1	131				1247
54h2	14				133
54i1	241				2294
54i2	17				162
55	0	0			0
56b	0	0			0
56c	0	0			0
56d	0	0			0
56e1		9301280	925	10055	420974
56e2		611800	925	661	27688
56e3		254695	925	275	11528
56e4		142659	925	154	4116
56f	0	0			0
Total	**-1582**	**7761404**		**6554**	**416066**

Conclusions:

With 1,582 fewer residential units as a result of the proposed land use changes, there would be approximately **2,024** fewer employees (1,582 units x 1.28 employees to housing ratio).

With the 6,554 increase in jobs due to proposed land use requests changes, there would be approximately **3,963** (10,517 - 6,554) jobs lacking to employ residents in the Planning Area.

Therefore, there would be approximately **1,939** (3,963 - 2,024) employees who are projected to live in the Planning Area that will be required to leave the Planning Area due to lack of employment in the Planning Area.

With **1,939** employees living in the Planning Area projected to leave the Planning Area for employment the Planning Area will remain job poor.

Table 1.5: CEQA Impacts for City of Fresno Staff Change Requests

I.D.	du	sq. ft.	Employment Factor	Employment	daily trips
F1	36	50900	925	55	2658
F7		55670	925	60	1150
F8		258899	1100	235	-30985
F11	-42				-400
F12	74				302
F14	-21				-194
F15		-521675	1100	-474	-3447
F17		-466397	1100	-424	-3251
F20	71	-57,956	500	-116	-2382
F24	136				1295
F25	332				-1971
F26		-888885	925	-961	-25643
W1		182865	925	198	5276
W2		101843	925	110	2939
W3		195236	1100	177	5632
W5		-84702	1100	-77	1726
W6		-77254	1100	-70	1574
W7		-127282	1100	-116	-887
W11	375	-753762	1100	-685	-5254
W12	120	-241758	1100	-220	-1685
W14	376	-350614	1100	-319	-2444
W15	706	-658497	1100	-599	-4590
W21	112	-364597	1100	-331	-2541
W22	368	-240190	1100	-218	-1674
W23	338	-220980	1100	-201	-1546
Total	**2981**	**-4209136**		**-3975**	**-66342**

Attachment 2:
Qualitative Traffic Evaluation

Table 2.1 - Qualitative Traffic Evaluation

Category	ID	Peak Hour Trips	Note	Summary
0	3c4	729	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	Increase in traffic would not likely create new impact.
0	4	410	Sufficient capacity on adjacent roadways	
0	5h	113	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	7a	41	Sufficient capacity on adjacent roadways	
0	7e	28	Sufficient capacity on adjacent roadways	
0	7f	19	Sufficient capacity on adjacent roadways	
0	8i	40	Sufficient capacity on adjacent roadways	
0	9a	11	Sufficient capacity on adjacent roadways	
0	9d	37	Sufficient capacity on adjacent roadways	
0	18a		Sufficient capacity on adjacent roadways	
0	18b	14	Sufficient capacity on adjacent roadways	
0	21a2	73	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21a6	32	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21a15	78	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21a17	56	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21b1A	12	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21b3A	12	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i3	19	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i4	39	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i5	34	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i7	37	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i8	19	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i16	74	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21i17		Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	21j3	111	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	22	25	Sufficient capacity on adjacent roadways	
0	23	42	Sufficient capacity on adjacent roadways	
0	25	27	Sufficient capacity on adjacent roadways	
0	26	14	Sufficient capacity on adjacent roadways	
0	27	36	Sufficient capacity on adjacent roadways	
0	33	56	Sufficient capacity on adjacent roadways	
0	34	64	Sufficient capacity on adjacent roadways	
0	36	16	Sufficient capacity on adjacent roadways	
0	52b1	36	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	54a1	644	Sufficient capacity on adjacent roadways	
0	54a2	73	Sufficient capacity on adjacent roadways	
0	54b1	357	Sufficient capacity on adjacent roadways	
0	54b2	44	Sufficient capacity on adjacent roadways	
0	54d1	292	Sufficient capacity on adjacent roadways	
0	54d2	139	Sufficient capacity on adjacent roadways	
0	54e	48	Sufficient capacity on adjacent roadways	
0	54g1	55	Sufficient capacity on adjacent roadways	
0	54g2	26	Sufficient capacity on adjacent roadways	
0	54h1	125	Sufficient capacity on adjacent roadways	
0	54h2	13	Sufficient capacity on adjacent roadways	
0	54i1	229	Sufficient capacity on adjacent roadways	

0	54i2	16	Sufficient capacity on adjacent roadways	
0	16	360	Sufficient capacity on adjacent roadways (with reductions in F8)	
0	5i3	129	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	40a	68	Sufficient capacity on adjacent roadways	
0	40b	30	Sufficient capacity on adjacent roadways	
0	F7	115	Sufficient capacity on adjacent roadways (with reductions in F8)	
0	F24	130	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	W1	528	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	W2	294	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	W3	563	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	W5	173	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	W6	157	Sufficient capacity on adjacent roadways (with reductions in adjacent areas)	
0	5461	58	Sufficient capacity on adjacent roadways	
0	5983	48	Sufficient capacity on adjacent roadways	
0	5987	28	Sufficient capacity on adjacent roadways	
0	5996	34	Sufficient capacity on adjacent roadways	
0	6028	40	Sufficient capacity on adjacent roadways	
1	3h2	451	Sufficient capacity on adjacent roadways (Church east os MLK at LOS E < 151 trips from LOS F). Depends on 5g, 8e, 56e, 3h1	Increase in traffic may cause new impact. Adjacent or nearby roadway operate close to significance threshold for TIZ. Increase in traffic may cause threshold to be exceeded or may exacerbate LOS exception. Outcome may depend on development in adjacent areas.
1	5g	23	Sufficient capacity on adjacent roadways (Church east os MLK at LOS E < 151 trips from LOS F). Depends on 8e, 3h, 56e	
1	6	73	Sufficient capacity on adjacent roadways (Herndon west of Milburn at LOS F)	
1	8e	113	Sufficient capacity on adjacent roadways (Church east os MLK at LOS E < 151 trips from LOS F). Depends on 5g, 3h, 56e	
1	17b	178	Sufficient capacity on City roadways (TIZ III). May worsen LOS F on Fowler south of Kings Canyon in County.	
1	21f	170	Sufficient capacity on adjacent roadways (Veterans IC near LOSF east of SR 99)	
1	41b	78	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 53a-c, 50, 51, 41k1.	
1	41c	94	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 53a-c, 50, 51, 41k1.	
1	41d	94	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 53a-c, 50, 51, 41k1.	
1	41e	167	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 53a-c, 50, 51, 41k1.	
1	41f	302	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 53a-c, 50, 51, 41k1.	
1	41k1	420	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 41a-f, 53a-c, 50, 51.	
1	44	21	Sufficient capacity on adjacent roadways (Fresno LOS E/F south of Herndon)	
1	46	52	Sufficient capacity on adjacent roadways (Shaw east of SR 99 at LOS F)	
1	50	843	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 41a-f, 53a-c, 41k1.	
1	51	343	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 41a-f, 53a-c, 41k1.	
1	53a	65	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 41a-f, 41k1, 50, 51.	
1	53b	278	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 41a-f, 41k1, 50, 51.	
1	53c	175	Limited capacity on adjacent roadways (LOS E on Jensen (about 600 trips to LOS F) east of Peach. Depends on 41a-f, 41k1, 50, 51.	
1	54c1	292	Limited capacity on adjacent roadways (about 240 trips to LOS E) on Highland south of SR 180.	
1	54c2	32	Limited capacity on adjacent roadways (about 240 trips to LOS E) on Highland south of SR 180.	
1	56e2	2769	Sufficient capacity on adjacent roadways. Depends 56e1	
1	56e3	1153	Sufficient capacity on adjacent roadways. Depends 56e1	
1	56e4	412	Limited capacity on adjacent roadways (LOE on Jensen west of SR 41 close to LOS F)	
1	3h1	903	Sufficient capacity on adjacent roadways (Church east os MLK at LOS E < 151 trips from LOS F). Depends on 5g, 8e, 56e1-4, 3h2	
1	F11	21	Sufficient capacity on adjacent roadways (Church east os MLK at LOS E < 151 trips from LOS F). Depends on 5g, 8e, 56e1-4, 3h1-2	
1	F12	30	Sufficient capacity on adjacent roadways (Church east os MLK at LOS E < 151 trips from LOS F). Depends on 5g, 8e, 56e1-4, 3h1-2	
1	5770	51	Sufficient capacity on adjacent roadways (LOS Fon Cornelia north of Clinton)	
2	47	126	Sufficient capacity on adjacent roadways (Herndon west of Milburn at LOS F)	Increase in traffic would likely create new impact
2	56e1	42097	Insufficient capacity on adjacent roadways	
2	F1	834	LOS E on Jensen (Trip increae would result in LOS F)	
3	1	-98		Area results in less traffic or an

3	2	-11		increase of less than 10 trips.
3	3b1			Would not create new impact.
3	3c5	-172		
3	3g	-308		
3	5b1	-255		
3	5b2a	-15		
3	5b2b	-124		
3	5b2c	-47		
3	5c	-540		
3	5e1	-54		
3	5e2	-111		
3	5e3	-103		
3	5e4	-24		
3	5e5	-14		
3	5f1	-123		
3	5f2	-77		
3	5i1			
3	5i2	-216		
3	7h	-31		
3	7i1	-100		
3	7i2	-87		
3	8a	-44		
3	8j	-328		
3	8k	-77		
3	9b	-129		
3	12b	-100		
3	12c	-39		
3	12e	-30		
3	12f	-80		
3	14a	-373		
3	14b	-373		
3	15	-42		
3	17c	1		
3	21a1	-192		
3	21a3a	-39		
3	21a3b	-71		
3	21a3c	-16		
3	21a4	-31		
3	21a5	-70		
3	21a7	-83		
3	21a8	-80		
3	21a9	-555		
3	21a10	-19		
3	21a11	-179		
3	21a12	-68		
3	21a13a	4		
3	21a13b	-39		
3	21a14a	-39		
3	21a14b	-24		

3	21a16a	-62	
3	21a16b	-4	
3	21b1B	-55	
3	21b1C	-125	
3	21b3B	-9	
3	21b4	-117	
3	21c	-29	
3	21d	-47	
3	21e	-182	
3	21g1	-89	
3	21g2		
3	21g3		
3	21g4		
3	21h	-125	
3	21i2	-133	
3	21i6	-46	
3	21i9	-136	
3	21i10	-24	
3	21i11	-170	
3	21i12	-355	
3	21i13	-357	
3	21i14	-1101	
3	21i15	-67	
3	21j4	-140	
3	21j5	-130	
3	21j6	-170	
3	21k1	-143	
3	21k2	-191	
3	21k3	-35	
3	21k4	5	
3	21k5	-242	
3	24a	-124	
3	24b	-233	
3	28	-4	
3	29	-25	
3	30	-432	
3	31	-59	
3	32	-66	
3	35	3	
3	37	-96	
3	41a	-462	
3	41g1	-203	
3	41g2	-721	
3	41h	-673	
3	41i	-1238	
3	41j	-14	
3	41k2	-20	
3	42	-11	
3	43	-49	

3	45a	9		
3	45b	-22		
3	45c	0		
3	48	-16		
3	49	8		
3	52a	-156		
3	52b2	-87		
3	52c	-15		
3	52d1	-168		
3	52d2	-158		
3	52e	-153		
3	52f1	-36		
3	52f2	-27		
3	52g1	-132		
3	52g2	-60		
3	52l	-113		
3	52m	-47		
3	52n	-168		
3	55	0		
3	56b	0		
3	56c	0		
3	56d	0		
3	56f	0		
3	F8	-3099		
3	F14	-19		
3	F15	-345		
3	F17	-325		
3	F20	-238		
3	F25	-197		
3	F26	-2564		
3	W7	-89		
3	W11	-525		
3	W12	-169		
3	W14	-244		
3	W15	-459		
3	W21	-254		
3	W22	-167		
3	W23	-155		
3	4422	-7		
3	4772	-9		
3	4983	-28		
3	5171	-58		
3	5358	-121		
3	5447	-39		
3	5567	-8		
3	5995	-44		
3	5997	-1		
3	6037	-93		

Notes:
Includes evaluation of Table 1a_CEQA Impacts from Change of PLU_Worst case senario_111814.xlsx
Includes evaluation of Table 2a_CEQA Impacts from Change of PLU_Fresno Staff Changes_111314.xlsx
Includes evaluation of Table 3_Final Map changes_111914.xls (red highlighted cells only)

Attachment 3:
Residential Land Use Designation Changes

Table 3.1 : Residential Land Use Designation Changes within the City of Fresno Planning Area

Identification Number[1]	Change in Residential Acres[1,2]
5.h	18.69
7.a	10.59
7.e	13.64
7.f	19.24
7.h	18.33
7.i.2	9.15
8.a	9.0
8.i	-8.07
8.j	-11.5
8.k	8.0
9.a	-23.53
9.b	20.8
12.c	-10.3
12.e	-7.8
12.f	6.0
14.b	13.22
15	3.91
17.b	-3.64
18.a	-0.38
21.a.b	5.27
21.a.9	12.0
21.a.10	4.88
21.a.11	3.5
21.a.16.b	0.6
21.b.1.b	3.56
21.b.1.c	3.0
21.b.4	14.02
21.g.2	12.0
21.g.3	4.0

21.i.3	49.2
21.i.7	9.75
21.i.8	4.95
21.i.12	-18.84
21.i.14	17.65
21.i.16	19.55
21.j.3	15.0
21.j.4	2.9
21.j.6	3.5
26	-4.89
28	0.37
33	-1.13
34	-2.56
36	8.73
40	16..0
41.g.1	7.0
41.g.2	30.0
41.h	37.72
41.i	80.0
41.j	14.0
41.k.2	13.0
49	-2.77
52.b.1	4.27
52.b.2	5.65
52.c	0.97
52.d.1	8.0
52.d.2	10.2
52.f.1	4.25
52.f.2	1.75
52.g.1	15.74
52.g.2	3.85
52.l	7.32
52.m	3.04
52.n	10.83

54.a.1	104.07
54.a.2	51.0
54.b.1	57.68
54.b.2	30.8
54.d.1	47.3
54.d.2	97.42
54.e	33.36
54.g.1	38.90
54.g.2	17.83
54.h.1	20.1
54.h.2	9.2
52.i.l	37
54.i.2	11.5
F.14	-3.16
W.11	57.68
W.12	18.50
W.14	26.83
W.15	50.39
W.21	27.90
W.22	18.38
W.23	16.91
5983	3.56
5996	3.57
TOTAL:	**1242.40**

[1] Data obtained from Tables 1, 2, and 3 from Attachment 1 of Appendix 1.
[2] Requested change to a residential designation from a non-residential Designation is shown above as a positive number. Requested change from a residential designation to a non-residential designation is shown as a negative number.
Source: FirstCarbon Solutions, 2014

Appendix 2:
Attachments to Comment Letter Y

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit A
Gen Plan Initiation Review Draft

FRESNO

2035 General Plan

August 2012

REVIEW DRAFT

INITIATION PURPOSES ONLY

Development and Resource Management Department

City of FRESNO

2035 General Plan Team

Mayor

Ashley Swearingen

City Manager

Mark Scott

Asst. City Manager

Bruce Rudd

City Council

Blong Xiong
Andreas Borgeas
Oliver L. Baines III
Larry Westerlund
Sal Quintero
Lee Brand
Clint Olivier

Planning Commission

Jaime Holt
Serop Torossian
Rama Dawar
Andy Hansen-Smith
Luisa Medina
Rojelio Vasquez
Paul Capriolio

Long Range Planning Team

Keith Bergthold
Darrell Unruh
Franklin Spees
Arnoldo Rodriguez
Michelle Zumwalt
Trai Her
Edward Smith

City Staff

Joseph Oldham
Karana Hattersley-Drayton
Sophia Pagoulatos
Sandra Brock
Jack VanPatten
John Fox
Shannon Chaffin
Allen Smith
Mike Sanchez
Bonique Emerson
Patrick Wiemiller
Martin Querin
Scott Mozier
Steve Hogg
Brock Buche
Scott Tyler
Kevin Norgaard
Jill Gormley
John Downs
John Dugan

Consulting Team

Dyett & Bhatia (Lead Consultant)
MW Steele Group Inc.
Michael Brandman Associates
Calthorpe Associates
Fehr & Peers, Inc.
Economic and Planning Systems

General Plan Citizens Committee

The General Plan Citizens Committee provided guidance and leadership throughout the process. A special thanks to committee members:

Francine Farber, Co-Chair
Eric Payne, Co-Chair
Kris Clarke
Ryan Calvert
Austin Ewell III
Sameh El Kharbawy
Kiel Famellos-Schmidt
Paul Humphrey
Gerard Lozano
William Eric McComas
Ali Nekumanesh
Larry Raven
Michael Renberg
Mike Wells
Louise Yenovkian
Nick Yovino
Melissa White

We would also like to thank, Alec Kimmel, Charles Harris, Conrad Trembath, Drew Nitschke, Tobias Lewe, Susie Williams, Marty Sorge, Bryce Hubble, John DeLucia, DARM Development Services (aka Current Planning), Fire and Police Departments, as well as community organizations and community members for providing their insight.

Initiation Review Draft
Fresno General Plan Update

This document contains the following:

1. Introduction

- Purpose of the Initiation Review Draft
- Planning Process
- Public Participation Process
- Planning Area
- Plan Buildout

2. Land Use Element

- Land Use Classifications
- Density and Intensity
- Land Use Diagram
- General Plan Zoning Consistency

3. Circulation Element

- Street Typologies
- Circulation Map
- Street Design Standards

4. Goals and Objectives

- Goals
- Objectives

INITIATION REVIEW DRAFT

INTRODUCTION

PURPOSE OF THE INITIATION REVIEW DRAFT

This version of the Draft General Plan Update for the City of Fresno ("the City") is being called the "Initiation Review Draft." The Initiation Review Draft is not the final draft anticipated to be presented to the City Council for adoption, and will continue to be refined prior to release for public review and a final decision by the City Council. Instead, the intent of this draft is to provide information for a high-level review by the City Council to formally initiate the 2035 General Plan update process. The Initiation Review Draft has been based on the modified Alternative "A" model consistent with the direction given by the City Council

on April 19, 2012, to consider the merits of that alternative. The update process will include California Environmental Quality Act (CEQA) review of environmental impacts and project alternatives, including modified Alternative "A," commencing with the creation of a Notice of Preparation (NOP).

The City's Local Planning and Procedures Ordinance (LPPO) has very few informational requirements for formal initiation of general plan update by the City Council. However, as part of the CEQA process the NOP must contain the following minimum information: description of the project, location of the project, and probable environmental effects of the project. While this necessary information might conceivably be supplied by as little as a Land Use Diagram and Circulation Map, the Initiation Review Draft provides additional information to allow for a more in-depth, high-level review. For example, the goals and objectives of the proposed plan may not be "required" for initiation or to prepare the NOP, but will assist in informing the initiation and CEQA processes. However, a projection of future development under the proposed plan is essential for transportation and air quality analysis.

This Initiation Review Draft is anticipated to be presented to the Planning Commission for review and comment prior to consideration by the City Council. The City Council has authority to approve, approve with modifications, or deny the initiation of the General Plan update. If approved or approved as modified for the purpose of initiation, the Initiation Review Draft will provide the basis for subsequent CEQA review. The results of the subsequent CEQA review will be presented in an environmental document to accompany the "Draft General Plan for Public Review," proposed to be released sometime after March 1, 2013. Comments on the draft environmental document and the City's responses to them will be considered by decision-makers prior to any formal action to approve the General Plan Update. These additional refinements can be included in a potential "Hearing Draft General Plan," which will be the subject of public hearings prior to consideration of formal adoption by the City.

PLANNING PROCESS

The planning process for the General Plan update consisted of an initial phase of information gathering through a Map Atlas[1] and service provider correspondence, followed by an in-depth exploration of targeted issues and potential policy initiatives via a series of working papers reviewed with the General Plan Citizen's Advisory Committee (GPCC) and at public workshops. These findings, along with the GPCC's visioning process setting goals for the general plan, culminated in the alternatives phase.

The alternatives process explored four fundamentally different approaches to accommodating projected population and job growth while meeting the proposed vision for Fresno. The Alternatives Report, issued in March 2012, reviewed four options, which differed by the type, density, mix, and location of future growth. The Alternatives Report evaluated the alternative scenarios against one another in terms of their relative (1) ability to meet housing and job demand, (2) provision of parks and open space, (3) impact on transportation and mobility, and (4) adherence to the proposed goals. The Alternatives Report was reviewed by at a community workshop and at public hearings by the GPCC, Planning Commission and City Council.

[1] The Map Atlas, published in September 2011, is an existing conditions report organized as a series of maps with descriptive text.

INITIATION REVIEW DRAFT

The City Council endorsed Alternative A with modifications. Alternative A focused on rebuilding the primary corridors as a series of neighborhood and regional mixed-use centers surrounded by higher density housing, with half of future housing in infill areas and half in growth areas on the urban edge. The Council's modified A shifted more development to single family housing and with more focus on growth west and southwest of Highway 99, but maintained a strong commitment to Downtown and major corridor revitalization, complete neighborhoods, and more compact development, and called for no expansion of the Sphere of Influence (SOI) during the plan horizon of 2035. The Council elected to not expand the SOI in part to fully develop the Southeast Growth Area (SEGA), under the draft specific plan to be incorporated in Part II of this General Plan, which requires its development through sub-area master plan phases that include comprehensive public infrastructure. Portions of SEGA are anticipated to develop by 2035, with full buildout not occurring until 2050 or beyond.[2]

The preservation of the SOI boundary for the 2035 General Plan not only serves SEGA to be developed in the longer term, but is anticipated to increase the value of land in the Downtown, as shown on the General Plan Land Use Diagram insert, and existing neighborhoods, benefitting current home and property owners, and lead to more thoughtfully conceived and higher quality development in growth areas. In addition, a solid SOI boundary that is stable over the planning period allows for more effective strategic investments in and upgrades to the City's surface water treatment and distribution system and sewer system needed to serve the greater densities anticipated in the Downtown and in the corridors.

PUBLIC PARTICIPATION PROCESS

Preparation for the General Plan update began in the summer of 2010. In order for the General Plan to accurately address community needs and values, a comprehensive public process of obtaining the input of residents, businesses, and property owners as well as City officials was commenced by the City. The GPCC provided leadership throughout this process. This involved the sharing of information and ideas between elected and appointed officials, City staff, the planning consultants, and residents. The following methods were used over the course of the General Plan update to ensure the community's full participation:

- *Stakeholder Interviews*. Over 160 interviews were conducted with City officials and staff and representatives of various community stakeholders and organizations.
- *Community Workshops*. 15 public workshops held on various topics including the Map Atlas of existing conditions, Visioning and Guiding Principles, Economic Development, Urban Form, Healthy Communities, Transportation and Resource Conservation, and the Alternatives Report.
- *Neighborhood Meetings, Focus Groups and other agencies*. City staff was invited to make over 100 presentations before neighborhood associations, as well as business, educational, social, and non-profit segments of the community to discuss the General Plan Update and the Alternatives Report.

INITIATION REVIEW DRAFT

[2] The official Council minutes state "RESOLVED, Alternative A hereby selected as the Preferred Alternative for the preparation of the 2035 General Plan Update, as amended by Councilmember Brand with his 'Comparative Analysis of Alternatives A, D & A-2", and as amended by Councilmember Baines to (1) study the area near the Wastewater Treatment Plan for industrial and heavy agricultural (with buffers) and (2) study the Bus Rapid Transit (BRT) route for inclusion of a west Fresno corridor…"

- *General Plan Citizens Advisory Committee*. The GPCC served as a "sounding board" for ideas and alternatives during the update process, working with City staff and the consultant team to formulate a a recommendation to the City Council. The GPCC also heard public comment and participated with invited speakers in discussions on a range of planning topics. GPCC members also attended public workshops to facilitate dialogue and understand community concerns. The GPCC held 24 meetings throughout the process, through May 2012.
- *Planning Commission/City Council meetings*. City staff appeared at seven Planning Commission and City Council meetings for discussion items on the General Plan Update, focusing on specific issues requiring policy direction. These meetings were open to the public.
- *Other City Commissions and Committees*. Other City Commissions and Advisory Committees also met periodically to discuss issues and concerns pertaining to the General Plan Update and provide comments on documents prepared for the General Plan Update.
- *Newsletter and Survey*. The City published a newsletter in English and Spanish to introduce the planning process and provide details on means of participation. The newsletter was distributed in August 2011. The City also conducted a telephone survey on issues and priorities for the new General Plan.
- *General Plan Update Website*. A website was created for the General Plan Update process, linked to the main City website. All meeting agendas, staff reports, workshop summaries, planning documents and maps created during the update process were posted on the site and available for public review.
- *General Plan Update Mailing List*. Those interested in receiving information and notices were placed on the General Plan update email distribution.
- *Availability of Documents*. Copies of the results from GPCC, Planning Commission and City Council meetings, workshops, and presentations were made available on the General Plan Update website and at City Hall.

PLANNING AREA

The Planning Area is the geographic area for which the General Plan establishes policies about future urban growth, long-term agricultural activity, and natural resource conservation. The boundary of the Planning Area was determined in response to State law requiring each city to include in its General Plan all territory within the boundaries of the incorporated area as well as "any land outside its boundaries which in the planning agency's judgment bears relation to its planning" (California Government Code Section 65300).

The Planning Area is coterminous with the City's Sphere of Influence (SOI). The SOI is a boundary that encompasses lands that are expected to ultimately be annexed into the City, although until annexed it falls under the jurisdiction of the County of Fresno. The Fresno County Local Agency Formation Commission (LAFCO), which is an entity empowered to review and approve proposed boundary changes and annexations by incorporated municipalities, determines the SOI after giving great weight to any agreement between the City and County. The City's SOI comprises all land within the City limits as well as the county islands—unincorporated land entirely surrounded by the city—and land beyond the outer City limits on all sides (see Figure 1). The SOI encompasses 157 square miles in total, of which 44 square miles is unincorporated land.

INITIATION REVIEW DRAFT

FRESNO GENERAL PLAN UPDATE

Planning Boundaries
Draft Figure 1

Boundaries

- Sphere Of Influence
- City Limits
- North Growth Area
- Multi-Use
- San Joaquin River
- SEGA
- Clovis GP

Circulation

- 99 State Highway
- 41 State Highway
- 168 State Highway
- 180 State Highway
- Rail Lines

0 0.5 1 2 3 Miles

Source: Boundary and circulation information, City of Fresno Development And Resource Management Department, 2010; World Street Map, developed by Esri using DeLorme basemap layers, Automotive Navigation Data, USGS, UNEP-WCMC, Tele Atlas Dynamap, 2009

This page intentionally left blank.

INITIATION REVIEW DRAFT

PLAN BUILDOUT

Full development under the General Plan is referred to as "buildout." It should be noted that when buildout will actually occur is not specified in or anticipated by the General Plan, and designation of a site for a certain use does not necessarily mean that the site will be built/redeveloped with the designated use by 2035, the horizon year of the General Plan Update.

Residential Development

Table 1 tracks the existing and additional housing units expected under the General Plan buildout. As shown, approximately 171,000 units currently exist in the Planning Area. The General Plan is intended to accommodate an additional 76,000 units, through both infill development and growth area development. In total, General Plan buildout will result in approximately 247,000 housing units in the Planning Area. Around 43,500 of these new units, or 57 percent, would be located in the existing City limits, including the Downtown as defined on the Land Use Diagram inset.

TABLE 1: RESIDENTIAL DEVELOPMENT

Existing Units (2010)	*Additional Units Under General Plan Buildout*	*Total Housing Units at Buildout (2035)*
171,000	76,600	247,000

Source: City of Fresno, Dyett & Bhatia, 2012.

Table 2 lists the initial projections of new housing by type and location. Around half of the new residential units are anticipated to be in single family houses, and half in multi-family and townhome units, which could include small lot and semi-attached houses. The West Area is the portion of the Sphere of Influence that is west of Highway 99 and north of Highway 180. The Southwest Area is south of Highway 180 and west of Highway 99. The North Area is north of Copper Avenue. SEGA is made up of three subareas—the portion of the SOI east of Minnewawa Avenue and south of Jensen Avenue, the area east of Temperance Avenue between Jensen Avenue and McKinley Avenue, and the area north of McKinley Avenue and east of Locan Avenue. Downtown is defined on the Land Use Diagram inset map. Bus Rapid Transit (BRT) corridors and East-Southeast locations are located within the remainder of the Planning Area, generally the existing City limits.[3]

INITIATION REVIEW DRAFT

[3] Bus Rapid Transit (BRT) is a form of bus service that uses design and infrastructure features such as dedicated traffic lanes, pre-paid fares, raised stations, and limit stops. These features create rapid transit service with high speeds and frequency, such as usually seen with subways and light rail, at much lower costs. A first phase BRT system has been approved and funded to run along the Ventura Street/Kings Canyon Boulevard and Blackstone Avenue corridors, meeting in Downtown Fresno. This system is presently in the design stage with implementation anticipated over the next two to three years.

TABLE 2: PROJECTED SUB-REGIONAL RESIDENTIAL BUILDOUT AND DWELLING UNIT MIX[1]

Targeted Area	*Multi-Family and Townhome Units*	*Single-Family - Large Lot and Small Lot*	*Sub-Region - Total Units*
Downtown[2]	8,000	2,000	**10,000**
BRT Corridor Infill (Blackstone, Kings Canyon, Shaw)	8,000	0	**8,000**
West Area			**17,000**
West Shaw BRT Corridor (West of SR99 to Grantland)	4,000	0	
Westlake Transit Village (Grantland between Ashlan and Shields)	2,300	0	
Balance Westlake East & West Area (Garfield, Ashlan, Polk, Clinton Aves.)	2,200	8,500	
Southwest Area			**10,500**
California BRT Corridor (Thorne Ave. to Hughes Ave.)	900	0	
Veteran's Community Transit Village (California – Hughes to Marks)	1,700	0	
Balance of SW Area	2,400	5,500	
East & Southeast			**9,000**
General	3,500	2,500	
Peach-Jensen Neighborhood (Peach, Jensen, Minnewawa and North Aves.)	1,000	0	
Clovis Ave., SR 180-Belmont Ave.	2,000	0	
SEGA			**11,500**
North of McKinley	1,500	4,250	
South of Jensen	1,500	4,250	
Between McKinley & Jensen	0	0	
North Growth Area (North of Copper Ave.)	1,500	1,000	**2,500**
Approved Maps (Undeveloped)		7,500 (others converted or lapse)	**7,500**
TOTALS	**41,000**	**35,000**	**76,000**

Notes:
1. Consistent with City Council Approval of Alternative A – Modified on April 19, 2012 for 2035 GP Update.
2. Downtown reduced from 11,000 to 10,000 units based on Downtown Planning revisions

INITIATION REVIEW DRAFT

Buildout Population

The city's population of 495,000 in 2010 represents a 16 percent increase over its 2000 population of 428,000—an annual growth rate of 1.25 percent. The entire Planning Area had a 2010 population of 545,000, so around 50,000 people live in unincorporated land within the SOI. Buildout of the General Plan will accommodate a population of approximately 226,000 new residents within the Planning Area. This would result in a total population of 771,000 and an average annual growth rate of 1.24 percent. Table 3 shows the current and estimated buildout populations for the Planning Area.

TABLE 3: POPULATION

Existing Population (2010)	*Additional Population From Additional Units Under General Plan Buildout*	*Buildout Population (2035)*
545,000	226,000	771,000

Source: City of Fresno Map Atlas, 2011. Projections: Dyett & Bhatia, 2012.

Non-Residential Development

Table 4 summarizes the additional non-residential floor area expected under the General Plan buildout. The General Plan is intended to accommodate an additional 54 million square feet of non-residential space of the types listed. This new space is fairly evenly split between retail, office, and other uses (industrial, research and development, flexible space, etc.).

TABLE 4: NON-RESIDENTIAL FLOOR AREA

Type	*Additional Floor Area (in thousands of square feet) Under General Plan Buildout*
Retail	16,167,000
Office	17,535,000
Other	20,370,000
Total	**54,072,000**

Source: Dyett & Bhatia, 2012.

Buildout Employment and Jobs/Resident Balance

At buildout, the Planning Area could accommodate approximately 108,000 new jobs. These new jobs would be roughly broken down into:

- Retail = 50,000 new jobs
- Office = 32,500 new jobs
- Other = 25,500 new jobs

A city's ratio of jobs/employed residents would be 1:1 if the number of jobs in the city equaled the number of employed residents. In theory, such a balance would eliminate the need for commuting. More realistically, a balance means that in-commuting and out-commuting are matched, leading to efficient use of the transportation system, particularly during peak hours. At buildout, the General Plan would add 0.48 jobs per new resident, roughly equivalent to the current percent of the City's population in the labor force (46 percent according to the 2010 US Census).

INITIATION REVIEW DRAFT

LAND USE ELEMENT

LAND USE CLASSIFICATIONS: GENERALLY

These land uses cover the entire Planning Area, including SEGA, with the exception of the areas in the Downtown.

Residential

Residential land use provide for a wide range of neighborhoods and housing types, anywhere from larger lot single family residential (SFR) development to neighborhoods with a mix of houses and townhouse/duplexes, to high density apartment communities.

- Single-family residential development is typically arranged as stand-alone detached units, or attached as duplexes or triplexes. They may range in density from one to 12 units per acre. Garages may be accessed from the front or from alleys.
- Townhomes or row homes are typically clustered in groups of four to six units. They range from two to three stories in height and from seven to 16 units per acre. Where possible, garage access should be from the rear of the site.
- Multi-family residential buildings may be multiple stories while garage spaces should be integrated into the ground level of the development or below grade, in individually secured garages.

Residential land uses also allow for neighborhood-serving community facilities such as parks, churches, schools, family day care, libraries, community gardens and farmers markets. Residential uses are designated by density.

Low Density

This designation is intended to provide for large lot residential development. Low Density residential allows one to up to 3.5 units per acre. The resulting land use pattern is large lot residential in nature, such as rural residential, ranchettes, or estate homes.

Medium Low Density

The Medium Low Density designation is intended to provide for single family detached housing with densities of 3.5 to 6 units per acre.

Medium Density

Medium Density residential covers developments of 5 to 12 units per acre and is intended for areas with predominantly single-family residential development, but can also accommodate a mix of housing types, from small-lot starter homes, zero-lot-line developments, and duplexes, to townhouses. Much of the city's existing neighborhoods fall within this designation.

Medium High

Medium High Density residential is intended for neighborhoods with a mix of single-family residences, townhomes, garden apartments, and multi-family units intended to support a fine-grain, pedestrian scale. This land use accommodates densities from 12 to 16 units per acre overall—individual parcels may have densities outside of that range so long as a master planned neighborhood has a density that conforms.

INITIATION REVIEW DRAFT

Urban Neighborhood

Urban Neighborhood residential covers densities from 16 to 30 units per acre, which will require multi-family dwellings but still allows for a mix of housing types including single-family houses. This land use is intended to provide for a compact community that includes community facilities, walkable access to parkland and commercial services, and supports efficient, frequent transit service. Urban Neighborhood is designated for targeted areas with complementary land uses adjacent.

High Density

High Density residential is intended to accommodate attached homes, two- to four-plexes, and apartment buildings, supported by walkable access to frequent transit, retail and services, and community facilities such as parks and schools. High Density allows for 30 to 45 units per acre.

Commercial

Commercial land use designations allow a wide range of retail and service establishments intended to serve local and regional needs. Some designations allow residential mixed use, but must include a commercial component.

Main Street

Main Street commercial encourages a traditional "Main Street" character with active storefronts, outdoor seating and pedestrian-oriented design. This designation promotes primarily one to two story retail uses, with moderate office and minimal multi-family as supportive uses. It also preserves small-scale, fine-grain character in neighborhoods where single-family residential and townhomes are predominant. The maximum Floor Area Ratio (FAR)[4] is 1.0.

Community

Community commercial is intended for pedestrian-oriented commercial development that primarily serves local needs such as convenience shopping and offices. Many of the city's current commercial districts fall into this designation. Specific uses allowed include medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores and supporting uses. The maximum FAR is 1.0.

Recreation

The commercial recreation designation is intended for areas of private commercial recreation uses such as bowling alleys, family entertainment centers, and golf driving ranges. The maximum FAR is 0.5.

General

This designation is intended for a range of retail and service uses that are not appropriate in other areas because of higher volumes of vehicle traffic and potential adverse impacts on other uses. Development such as strip malls would fall into this designation. Examples of allowable uses include: building materials, storage facilities with active storefronts, equipment

[4] FAR is defined as the permitted ratio of gross floor area to site area. It is further defined in the Density and Intensity section below.

INITIATION REVIEW DRAFT

rental, wholesale businesses, and specialized retail not normally found in shopping centers. The maximum FAR is 2.0.

Highway & Auto

The Highway & Auto land use designation is intended for limited areas near the freeway to accommodate uses that depend on or are supported by freeway access but do not generate a large volume of traffic. Hotels, restaurants, and auto malls are typical land uses. The maximum FAR is 0.75.

Regional

This land use designation is intended to meet local and regional retail demand, such as large-scale retail, office, civic and entertainment uses, shopping malls, with large format or "big-box" retail, are allowed, as are supporting uses such as gas stations, and hotels. Buildings are typically larger-footprint and urban-scaled. Development and design standards will create a pedestrian orientation within centers and along major corridors, with parking generally on the side or rear of major buildings, but automobile-oriented uses also will be accommodated on identified streets and frontages. The maximum FAR is 1.0.

Employment

Office

The Office land use designation is intended for administrative, financial, business, professional, medical, and public offices. This designation is mainly intended to apply to existing office uses on smaller lots, generally located on arterial roadways, and is also considered to be compatible with existing residential neighborhoods given the smaller level of noise and traffic generation than commercial uses. Retail uses would be limited to business services and food service and convenience goods for those who work in the area. The maximum FAR is 2.0.

Business Park

The Business Park designation provides for office/business parks in campus-like setting that is well suited for large offices or multi-tenant buildings. This designation is intended to accommodate and allow for the expansion of small businesses with limited outdoor storage proximate to residential uses, thus adequate landscaping is imperative. Typical land uses include research and development, laboratories, administrative and general offices, medical offices and clinics, professional offices, prototype manufacturing, testing, repairing, packaging, and printing. No free-standing retail is permitted, except for small uses serving businesses and employees. The maximum FAR is 1.0.

Regional Business Park

The Regional Business Park land use designation is intended for large or campus-like office and technology development that includes office, research and development, manufacturing, and other large-scale, professional uses, with limited and properly screened outdoor storage. Permitted uses include incubator-research facilities prototype manufacturing, testing, repairing, packaging, and printing as well as offices and research facilities. Small-scale retail and service uses serving local employees and visitors are permitted as secondary uses. The maximum FAR is 1.0.

INITIATION REVIEW DRAFT

Light Industrial

The Light Industrial designation accommodates a diverse range of light industrial uses, including limited manufacturing and processing, research and development, fabrication, utility equipment and service yards, wholesaling, warehousing, and distribution activities. Small-scale retail and ancillary office uses are also permitted. Light Industrial areas may serve as buffers between Heavy Industrial and other land uses and otherwise are generally located in areas with good transportation access, such as along railroads and freeways. The maximum FAR is 1.5.

Heavy Industrial

The Heavy Industrial designation accommodates the broadest range of industrial uses including manufacturing, assembly, wholesaling, distribution, and storage activities that are essential to the development of a balanced economic base. Small-scale commercial services and ancillary office uses are also permitted. The maximum FAR is 1.5.

Mixed Use

Mixed-use land use designations are based on commercial uses and also require a residential component.

Corridor/Center Mixed Use

The Corridor/Center Mixed Use designation is higher intensity than Neighborhood Mixed Use, and is intended to allow for either horizontal or vertical mixed-use development in multiple story buildings along key circulation corridors in the city where height and density can be easily accommodated. Ground-floor retail and upper-floor residential or offices are the primary uses, with personal and business services and public and institutional space as supportive uses. Development will facilitate the transformation of existing transportation corridors into vibrant, highly walkable areas with broad, pedestrian-friendly sidewalks, trees, landscaping, and local-serving uses with new buildings that step down in relationship to the scale and character of adjacent neighborhoods. This designation will largely apply along arterial streets, at targeted locations between regional activity centers. Residential densities range between 16 and 30 units per acre with a maximum 40 percent residential uses and the maximum FAR is 1.5.

Regional Mixed Use

This land use designation is intended to accommodate mixed use development in urban-scale buildings and retail establishments that serve residents and businesses of the region at large. Medium-scale retail, housing, office, civic and entertainment uses, and shopping malls, with large format or "big-box" retail, are allowed, as are supporting uses such as gas stations and hotels and residential in mixed use or single use buildings. Design standards will support a pedestrian orientation within centers and along major corridors, with parking on the side or rear in general, but automobile-oriented uses also will be accommodated on identified streets and frontages. Residential densities range between 30 and 45 units per acre with a maximum 30 percent residential uses and the maximum FAR is 2.0. Additional residential density may be allowed with a Master Plan.

Neighborhood Mixed Use

The Neighborhood Mixed Use designation is similar to the Main Street and Community commercial land use designations, however it allows up to 50 percent residential uses, whereas the commercial districts do not allow residential uses. This designation provides for

INITIATION REVIEW DRAFT

mixed use districts of local-serving, pedestrian-oriented commercial development, such as convenience shopping and professional offices in two- to three-story buildings. Development is expected to include ground-floor neighborhood retails uses and upper-level housing or offices, with a mix of small lot single family houses, townhomes, and multi-family dwelling units on side streets, in a horizontal or vertical mixed-use orientation. The built form will have a scale and character that is consistent with pedestrian-orientation, to attract and promote a walk-in clientele, with small lots and frequent roadway and pedestrian connections permitting convenient access from residences to commercial space. Automobile-oriented uses are not permitted. Residential densities range between 12 and 16 units per acre and the maximum FAR is 1.5.

Open Space

These designations apply to public and private recreational sites and facilities, including neighborhood, community and regional parks, recreational centers, golf courses and other open space areas. It also applies to multi-purpose trails that serve both regional and neighborhood level needs, some of which are paved while others, in particular those found along the San Joaquin River Bluff Environs, may be unpaved. Please see Figure 4. – Multi-Purpose Trails Map below. Moreover, these designations cover open space areas that are not parks or trails, such as riparian corridors, the clear zone around Fresno-Yosemite International Airport, and the San Joaquin riverbottom which is primarily designated as open space even though it includes a limited number of existing homes.

Public Facilities

These designations apply to lands owned by public entities, including City Hall and other City buildings, county buildings, schools, the municipal airport and hospitals. They also include public facilities such as fire and police stations, City-operated recycling centers and sewage treatment.

Buffer

This designation is intended to separate urban uses from commercial agricultural uses in order to preserve long-term viable agricultural areas and intensive farming operations adjoining but outside the Planning Area, which is coterminous with the SOI established by LAFCO. The buffer will serve to prevent urban residential and related uses from developing near agricultural operations, and thereby infringing on full operation of farmland of importance. A variety of uses are compatible with the purpose of the buffer that will be defined in detail in the Development Code update. General categories include environmental, habitat, water conveyance, retention and recharge, preservation and preparation of gravel resources for beneficial uses related to permanent water resource facilities, limited agriculture and necessary supportive uses, such as agricultural processing, sans animal processing or uses that have the potential to create obnoxious noise, odor, etc., and residential uses with 20 acres of land required per residence. The one-quarter mile wide Buffer designated along the eastern Planning Area Boundary (in SEGA) may be modified and reduced to a narrower band of appropriate Buffer uses if designed as an integrated part of a sub-area master plan required for SEGA development, and if the narrower Buffer design clearly achieves the goal of the Buffer classification to separate urban uses from commercial agricultural uses in order to preserve long-term viable agricultural areas and intensive farming operations adjoining but outside the Planning Area.

INITIATION REVIEW DRAFT

LAND USE CLASSIFICATIONS: THE DOWNTOWN

These land use classifications are specific to just the Downtown portion of the Planning Area. It is anticipated the land use classifications may be further refined in community or specific plans such as the proposed Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan, which may be adopted by the City.

Central Business District (CBD)

The CBD is the cultural, civic, shopping, and transit center of Fresno and the region. This designation is applied to areas of the Downtown Core bounded by Stanislaus Street, the Union Pacific tracks, Inyo Street and the alley between Van Ness Avenue and L Street. New buildings will be block-scale, at least two stories and up to 15 stories in height and located at or near the sidewalk to promote vibrant streets of active ground floor commercial activity. Most upper stories will be expressed in a single volume to generate a consistent streetwall with upper most volumes massed for an interesting skyline. Buildings will be occupied with ground floor commercial, retail, and office activity to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will accommodate a wide variety of office, civic, lodging, housing, or additional commercial uses.

Civic Center

The Civic Center is intended for civic and office uses, including numerous public buildings containing City, County, State, and Federal uses. This designation is applied to properties currently fronting Mariposa Street and the south side of Fresno Street and the north side of Tulare Street between Van Ness and Q. New buildings will be block-scale, up to 10 stories in height and set back from the sidewalk along a continuous build-to line to maintain a formal alignment and arrangement of building frontages. Upper stories will be expressed in volumes that enhance and support the civic presence of buildings along these streets. A full range of civic and office uses, including ground floor retail, are envisioned to support active streetscapes and walking. Upper floors will have office and civic uses.

Chinatown

The Chinatown designation is applied to the areas bounded by the Union Pacific Railroad tracks, Highway 99, Stanislaus Street and Inyo Street. Its close proximity to Highway 99 and the Downtown Core create the unique opportunity to introduce buildings and uses that serve both the region and the surrounding neighborhoods. F Street is preserved and developed as Chinatown's "main street." New buildings will be block-scale, up to 3 stories in height and located at the sidewalk to activate the sidewalk with pedestrian-oriented commercial activity. Most upper stories will be expressed in single volumes to enhance the small scale of this urban neighborhood and historic main street. Ground floor uses will include commercial, retail, civic or office uses to support active streetscapes and walking. Upper floors and the space behind shop fronts will have offices, housing or additional commercial uses.

Cultural Arts

This designation is applied to the area immediately north of the Central Business District which is undergoing transformation into a thriving artist community. This designation is intended to encourage the area's transformation by encouraging mixed-use buildings comprised primarily of small-scale retail, office, industrial, and multi-family housing. New buildings will be block scale, up to five stories tall that will be located at or near the sidewalk to generate an active public realm. Most upper stories will be expressed in single volumes

INITIATION REVIEW DRAFT

with multiple volumes moderating larger buildings. Buildings will have ground floor retail uses, live-work, and uses such as art galleries on key streets to support active streetscapes and walking.

South Stadium/South Van Ness

This designation is applied to the areas immediately to south of the Central Business District, including the Monterrey and Los Angeles Street areas, and is intended for small-scale retail, office, industrial and multi-family housing. New buildings will be block-scale, with non-industrial buildings up to five stories in height located at or near the sidewalk to generate an active public realm. Secondary streets and upper floors will have residential and office uses. Industrial buildings may have larger footprints and may be up to two stories tall.

Town Center

The Town Center designation is applied to nodes at major intersections along corridors and is intended for medium-scale retail, housing, office, civic, and entertainment uses that serve several neighborhoods. New buildings will be block-scale, up to five stories in height and located at or near the sidewalk to generate focused and active, commercial activity along corridors. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Ground floor uses will include commercial, retail, and office uses to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will have office, civic, residential or additional commercial uses.

Neighborhood Center

The Neighborhood Center designation is applied to nodes at secondary intersections along corridors and is comprised of primarily small-scale neighborhood uses such as retail, office, civic, and entertainment, including housing. New buildings will be block and house-scale, up to three stories in height, completely compatible in scale with adjacent single-family houses, and located at or near the sidewalk to generate pedestrian activity. Upper stories will be expressed in volumes compatible with adjacent houses. Buildings will have ground floor commercial, retail, and office uses to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will have office, civic, residential or additional commercial uses.

Corridor General

This designation is applied to areas fronting on corridors including Belmont Avenue, East Kings Canyon Road, Blackstone Avenue, Abby Street, and North Fresno Street. It is intended for moderate intensity housing and neighborhood services, while also accommodating automobile-oriented commercial uses. New buildings will be block-scale and house-scale, up to three stories in height located at or near the sidewalk to generate more pedestrian activity. Buildings will vary in size and type, but be compatible in massing and scale with adjacent buildings. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Living rooms, dining rooms, and other formal rooms will face the street. Ground floor uses will include housing as well as commercial, retail and office uses. Upper floors will be for housing, office, or additional commercial uses.

INITIATION REVIEW DRAFT

Downtown Neighborhoods

This designation is applied to areas outside of the Downtown Core, including the Lowell neighborhood, much of the Southwest and Southeast neighborhoods, the "L" Street area and to Huntington Boulevard area east of Downtown, the Jefferson Neighborhood, areas south of Elm and B Streets in Southwest, several Southeast neighborhoods adjacent to Highway 180, and areas west of Highway 99 including the Jane Addams area. New buildings will be house-scale up to 2 stories in height and some buildings may be up to two and one-half stories. All buildings will set back from the sidewalk to provide a buffer between the sidewalk and the dwellings. Living rooms, dining rooms, and other formal rooms will face and activate the street. Other house-scale buildings are compatible in these neighborhoods when scaled and massed in relation to the predominant single-family houses. Buildings will be occupied with residential uses, limited live/work uses and home occupation activity.

Special Districts

The Special Districts designation is applied to areas that are best suited for a variety of moderate to intense industrial and manufacturing activity. These areas are comprised primarily of large and varied building sizes with substantial activity from large cargo vehicles. New buildings will be block-scale, up to three stories in height and located with a portion or all of their frontage at or near or the sidewalk. Ground floor activity will range from industrial and manufacturing uses and outdoor assembly to offices. Included in the Special Districts designation are (1) the Chandler Airport area between Kearney Boulevard, and Thorne and Whitesbridge Avenues and (2) Downtown Hospital district, including the hospital campus as well as on surrounding streets such as Fresno, Illinois, Clark, and Divisadero.

DENSITY AND INTENSITY

The General Plan calculates density on **net acreage**, defined as the land area of a lot remaining after dedication of all areas for major streets, schools, or regional trails. Infill development already served by such infrastructure may have the same gross and net density, as a result.

For residential uses, the density/intensity standards are expressed as the number of housing units per net acre. For non-residential uses, a measure known as Floor Area Ratio (FAR) is specified. In design terms, FAR is defined as the permitted ratio of gross floor area to site area. It is a measure of building bulk that controls both visual prominence and traffic generation. See the accompanying image for a graphic example of how FAR is calculated.

The City-wide density and intensity standards, established in Table 5, are intended to establish minimum and maximum densities and intensities per net acre allowed in each General Plan land use category in the Planning Area exclusive of the Downtown. Minimum and maximum densities, intensities and required land use mixes are more precisely defined within the Development Code for purposes of determining the consistency of a proposed zone district and a property development entitlement with an applicable planned land use designation. The Development Code may also provide a process and criteria to allow exceptions to be granted for qualified small projects, special situations or single users offering community benefits and otherwise meeting the overall objectives of the General Plan. Minimum lot/parcel sizes (and corresponding lot frontage minimums and other lot design requirements) will be further

INITIATION REVIEW DRAFT

defined in the Development Code for each zone district. The Development Code may also provide procedures and criteria for preparing and implementing a precise development plan for a given area to allow for limited reconfiguration of the planned land uses for a specific area while maintaining the equivalent densities, intensities and mix of uses. Finally, the General Plan land use designations may provide overlap in the defined densities, intensities and land uses described for various land uses.

.

TABLE 5: CITYWIDE STANDARDS FOR DENSITY AND DEVELOPMENT INTENSITY[1]

Land Use Classification	*Minimum to Maximum Residential Density (du/net acre)*	*Maximum Floor Area Ratio (FAR)*
Residential		
Low-Density	Min = 1 unit per 5 acres Max = 3.5 units per acre	-
Medium Low Density	Min = 3.5 units per acre Max = 6 units per acre	-
Medium Density	Min = 5 units per acre Max = 12 units per acre	-
Medium High Density	Min = 12 units per acre Max = 16 units per acre	-
Urban Neighborhood Density	Min = 16 units per acre Max = 30 units per acre	-
High Density	Min = 30 units per acre Max = 45 units per acre	-
Commercial		
Main Street		1.0
Community		1.0
Recreation		0.5
General		2.0
Highway & Auto		0.75
Regional		1.0
Employment		
Office		2.0
Business Park		1.0
Regional Business Park		1.0
Light Industrial		1.5
Heavy Industrial		1.5
Mixed Use		
Corridor/Center Mixed Use	Min = 16 units per acre Max = 30 units per acre 40% Res. / 60% Non-res.	1.5

INITIATION REVIEW DRAFT

TABLE 5: CITYWIDE STANDARDS FOR DENSITY AND DEVELOPMENT INTENSITY[1]

Land Use Classification	*Minimum to Maximum Residential Density (du/net acre)*	*Maximum Floor Area Ratio (FAR)*
Regional Mixed Use	Min = 30 units per acre Max = 45+ units per acre (higher with Master Plan) 30% Res. / 70% Non-res.	2.0
Neighborhood Mixed Use	Min = 12 units per acre Max = 16 units per acre 50% Res. / 50% Non-res.	1.5
Buffer	Max = 0.05 (1 unit per 20 acres)	-

Notes:
1. The dwelling unit standard also is a population density standard, and can be converted using a city-wide average of 3.23 persons per unit. The Hearing Draft of the General Plan Update will include a column with population density ranges. The population density standard is for general planning purposes and not intended to limit occupancy of individual units.

INITIATION REVIEW DRAFT

Table 6 provides density and intensity standards specific to the Downtown portion of the Planning Area. More specific parameters as to the design and form of development will be further defined in the Development Code specific to the Downtown portion of the Planning Area.

TABLE 6: DOWNTOWN STANDARDS FOR DENSITY AND DEVELOPMENT INTENSITY

Land Use	*Maximum Residential Density (du/net acre)*[1]	*Maximum Floor Area Ratio*
Central Business District	60 units per acre	7.5
Civic Center	-	5.0
Chinatown	45 units per acre	3.0
South Stadium / South Van Ness	60 units per acre	5.0
Town Center	45 units per acre	4.0
Neighborhood Center	30 units per acre	2.0
Corridor General	30 units per acre	2.5
Downtown Neighborhoods	16 units per acre	-
Special Districts[2]	-	2.5

Notes:
1. Additional density may be allowed for affordable housing or provision of community benefits.
2. Additional FAR may be granted for hospitals and related uses, up to 5.0 total.

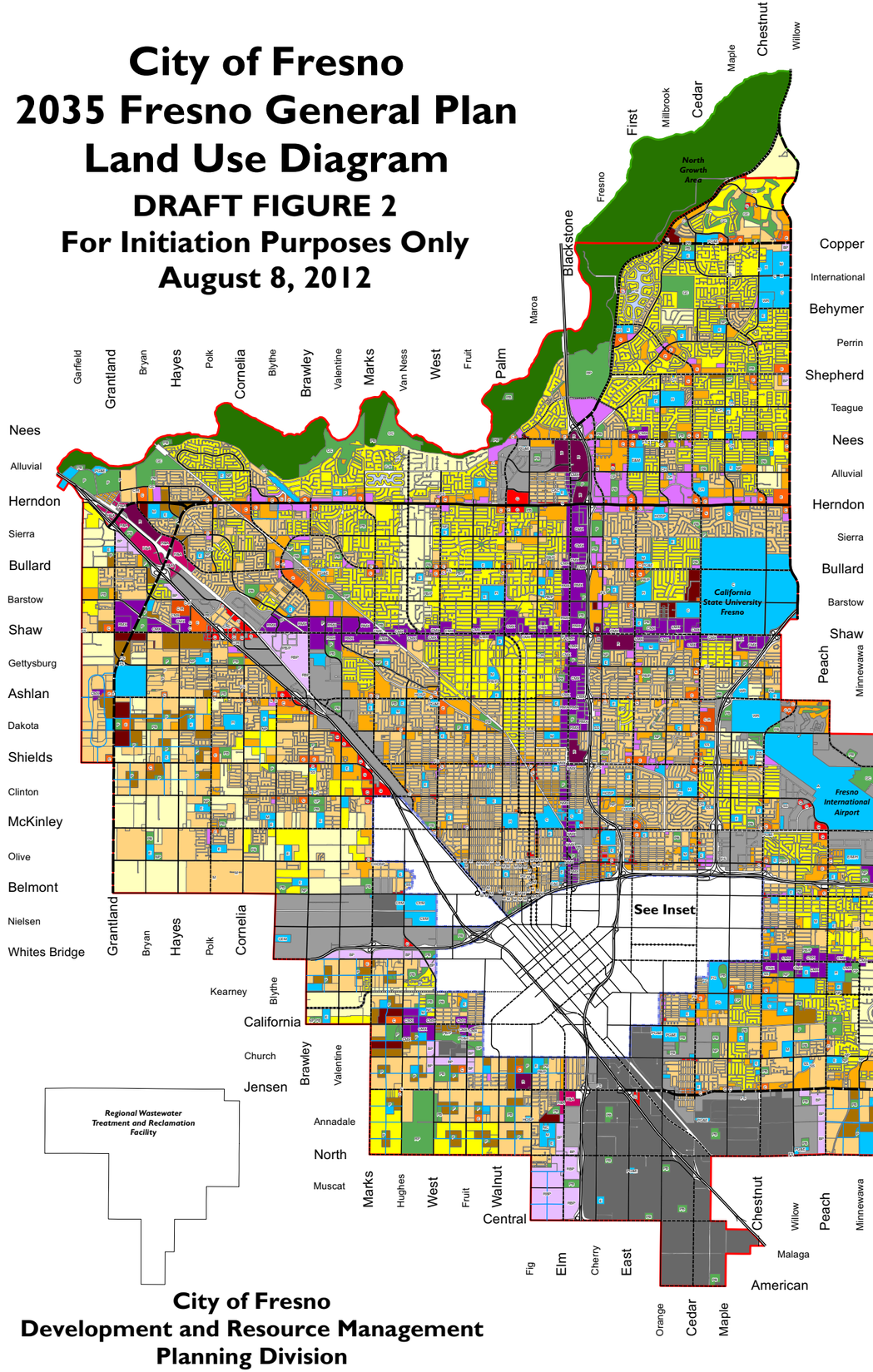
LAND USE DIAGRAM

Consistent with the Local Planning and Procedures Ordinance, the Land Use Diagram is the City's master designation of land uses for Fresno including the Sphere of Influence. The Land Use Diagram includes the Downtown area, anticipated to be further implemented through specific and community plans such as proposed the Fulton Corridor Specific Plan and Downtown Neighborhoods Community Plan, as identified in an inset. Land use descriptions in this area are generalized to facilitate implementation by providing some flexibility for detailed plans.

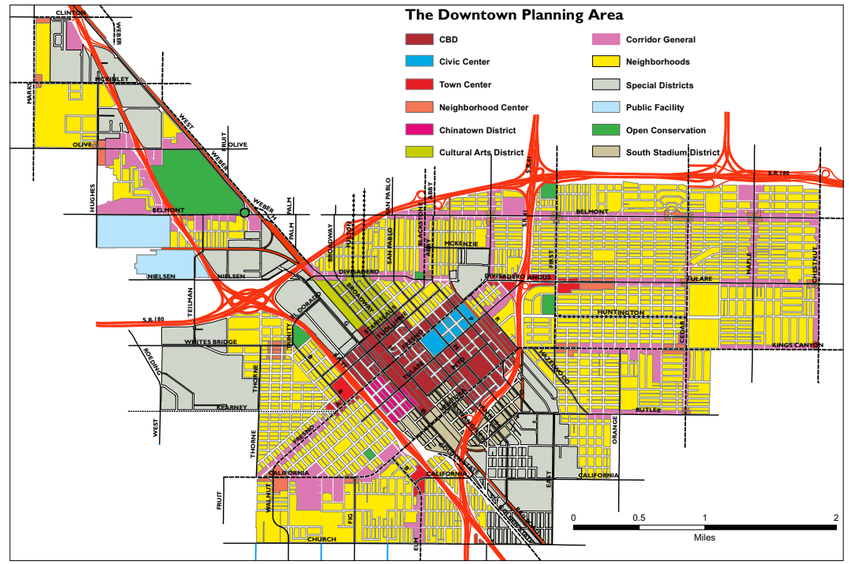
The Land Use Diagram is labeled as **Figure 2** and is provided above and in a separate fold-out map, attached to the hard copies of the Initiation Review Draft. All new parks, open space, and public facilities (such as school sites), carry dual land use designations, so that if that facility is not needed, private and public development consistent with zoning and development standards may be approved. These dual land use designations are shown on Figure 5. Dual Designations – Alternative Land Uses for Proposed Parks, Open Space, Schools, and Other Public Facilities.

INITIATION REVIEW DRAFT

City of Fresno
2035 Fresno General Plan
Land Use Diagram
DRAFT FIGURE 2
For Initiation Purposes Only
August 8, 2012



City of Fresno
Development and Resource Management
Planning Division



(Proposed downtown land use and circulation classifications are anticipated to be further refined through specific and community plans such as the proposed Fulton Corridor Specific Plan and the Downtown Neighbohoods Community Plan)

Dual land use designations for public facilities are shown on a supplemental map.

LEGEND

RESIDENTIAL
- Low Density (1-3 D.U./acre)
- Medium Low Density (3.5-6 D.U./acre)
- Medium Density (5.0-12 D.U./acre)
- Medium High Density (12-16 D.U./acre)
- Urban Neighborhood (16-30 D.U./acre)
- High Density (30-45 D.U./acre)

COMMERCIAL
- Main Street
- Community
- Recreation
- General
- Highway & Auto
- Regional

EMPLOYMENT
- Office
- Business Park
- Regional Business Park
- Light Industrial
- Heavy Industrial

MIXED USE
- Corridor/Center Mixed Use
- Regional Mixed Use
- Neighborhood Mixed Use

OPEN SPACE
- Clear Zone
- Commercial-Recreational
- Community Park
- Flood Control Project
- Golf Course
- Lake, Pond
- Multi-Use
- Neighborhood Park
- Outdoor Environmental education area
- Open Space
- Park
- Ponding Basin
- Ponding Basin (Park use)
- Regional Park

PUBLIC FACILITIES
- Public/Quasi-public Facility
- Special School
- Elementary School
- Elementary & Middle School
- Elementary, Middle & High School
- Middle School
- High School
- College
- Airport
- Cemetery
- Church
- Community Activity Center
- Convalescent Hospital
- Fairgrounds
- Fire Station
- Government Offices
- Hospital
- Medical Center
- Neighborhood Center
- PG & E Substation
- Police Dressing Station
- Water Recharge Basin
- Waste Water Treatment Facility

BUFFER
- Buffer

BOUNDARIES
- Existing Fresno Sphere of Influence
- Growth Areas
- Downtown Neighborhoods

Circulation Legend
- Freeway
- Expressway
- Scenic Expressway
- Connector
- Super Arterial
- Arterial
- Scenic Arterial
- Ramp
- Scenic Drive
- Collector
- Scenic Collector

This page intentionally left blank.

INITIATION REVIEW DRAFT

GENERAL PLAN AND ZONING CONSISTENCY

TABLE 7: GENERAL PLAN LAND USE DESIGNATIONS AND ZONE DISTRICTS

Land Use Designation	*Zone District*	
Residential		
Low Density	RE	Residential Estate
	RS-36	Single Family
	RS-20	
	RS-12	
Medium Low Density	RS-12	Single Family
	RS-9	
	RS-5	
Medium Density	RS-5	Single Family
	RS-2.5	
Medium High Density	RS-2.5	Single Family
	RM-2.5	Multi-Family
Urban Neighborhood Density	RM-1.5	Multi-Family
High Density	RM-1	Multi-Family
Commercial		
Main Street	MSC	Main Street Commercial
Community	CC	Community Commercial
Recreation	CR	Commercial Recreation
General	GC	General Commercial
Highway and Auto	HAC	Highway and Auto Commercial
Regional	RC	Regional Commercial
Employment		
Office	O	Office
Business Park	BP	Business Park
Regional Business Park	RBP	Small Business Park
Light Industrial	IL	Light Industrial
Heavy Industrial	IH	Heavy Industrial
Mixed-Use		
Corridor/Center Mixed Use	CMX	Corridor/Center Mixed Use
Regional Mixed Use	RMX	Regional Mixed Use
Neighborhood Mixed Use	NMX	Neighborhood Mixed-Use
Other		
Open Space	OS	Open Space
	PK	Park
Public Facilities	PI	Public and Institutional
Buffer	B	Buffer

Note: Specific zoned districts associated with Downtown land uses will be provided in a subsequent draft.

INITIATION REVIEW DRAFT

CIRCULATION ELEMENT

Figure 3, the Circulation Map, illustrates the planned roadway network of the General Plan. For some roadways, especially in areas that are not yet developed with urban uses, the map indicates the future and not the present character of the road. The construction of planned major streets occurs during the course of a general plan's implementation through the execution of the City's capital improvements program utilizing funds from a variety of sources. In addition, portions of major streets are constructed by private property owners and developers in accordance with applicable property development standards.

STREET TYPOLOGIES

This General Plan update establishes a refined street classification system to categorize roadways and other transportation facilities, as shown in Figure 3. Each classification reflects the character of the facility as well as its function within the context of the entire transportation system. Each classification has standards considering a facility's relation to surrounding land uses, existing right-of-way, accessibility via other roadways, and appropriate travel speeds. It prioritizes travel modes for each road, but also how to accommodate multiple travel modes.

This classification system will be used for engineering design and traffic operation standards; these classifications may be modified for the growth areas described in the Urban Form, Land Use, and Design Element (e.g., SEGA or the Westside Growth Area) based on specific master planning, if approved by the City in the development review process.

Freeway: Multiple-lane divided roadways on adopted state route alignments servicing through and crosstown traffic, with no access to abutting property and no at-grade intersections.

Expressway – Suburban: Four- to six-lane divided roadways primarily serving through and crosstown vehicle traffic, with at-grade major street intersections located at approximately one-half mile intervals and no driveways for direct motor vehicle access to abutting property.

Superarterial – Activity Center and Suburban: Four- to six-lane divided roadways with a primary purpose of moving multiple modes of travel traffic to and from major traffic generators and between community plan areas. A select number of motor vehicle access points to adjacent properties or local streets between the major street intersections may be approved by the city. Access points will typically be limited to right-turn entrance and exit vehicular movements. Special circumstances may justify a median island opening between intersections to allow left-turn movement from the superarterial street to an adjoining property or local street.

Arterial – Activity Center and Suburban: Four- to six-lane divided roadways, with somewhat limited motor vehicle access to abutting properties, and with the primary purpose of moving traffic within and between neighborhoods and to and from freeways and expressways. In addition to major street intersections, appropriately designed and spaced local street intersections may allow left-turn movements to and from the arterial streets.

Collector – Activity Center and Suburban: Two- to four-lane, typically undivided roadways, with the primary function of connecting local streets and arterials and neighborhood traffic generators and providing access to abutting properties. Local street

INITIATION REVIEW DRAFT

intersections and motor vehicle access points from abutting properties are allowed consistent with the city's engineering standards and accepted traffic engineering practices.

Quarter-mile and Connector: Two- to three-lane, typically undivided roadways planned to provide access to larger well integrated neighborhoods typically 40 to 160 acres in size and having a range of residential densities and one or more supporting uses, such neighborhood serving recreational open space, school, civic, quasi-public and shopping.

Local – Activity Center and Suburban: Two- to three-lane roadways designed to provide direct access to properties, while discouraging excessive speeds and volumes of motor vehicle travel incompatible with neighborhoods being served through the implementation of multiple well connected routes and traffic calming measures. Local street alignments are typically not designated by the General Plan, but existing local streets may be depicted for informational purposes. In specific circumstances local streets are designated where necessary to assure adequate access and implementation of complete neighborhoods with well-connected routes for motor vehicle, bicycle and pedestrian travel.

STREET DESIGN STANDARDS

The General Plan expands the roadway classification descriptions to include specific characteristics, such as pedestrian realm, on-street parking, number of vehicle lanes, bike lanes, and landscaped median, as shown in Table 8. Activity centers represent areas of greater land use intensity as well as places for walking and biking. The Suburban standards represent the city's current roadway system.

TABLE 8: ROADWAY CHARACTERISTIC MATRIX

Roadway Type	*Number of Lanes*	*Pedestrian Facilities*	*On-Street Bike Lanes*	*On-Street Parking*	*Median*
ACTIVITY CENTERS					
Superarterial	4 to 6	Sidewalks	Yes	n/a	n/a
Arterial	2 to 4	Sidewalks	Yes	Yes	Possible
Collector	2	Sidewalks	Yes	Yes	Possible
Local	2	Sidewalks	Possible	Yes	Possible
SUBURBAN					
Expressway	4 to 6	No	No	No	Yes
Superarterial	4 to 6	Possible	Yes	No	Possible
Arterial	4 to 6	Sidewalks	Yes	Possible	Typical
Collector	2 to 4	Sidewalks	Yes	Yes	Possible
Quarter-Mile & Connector	2 to 3	Sidewalks	Possible (not typical)	Yes	Possible (traffic calming)
Local	2	Sidewalks	Possible (not typical)	Yes	n/a

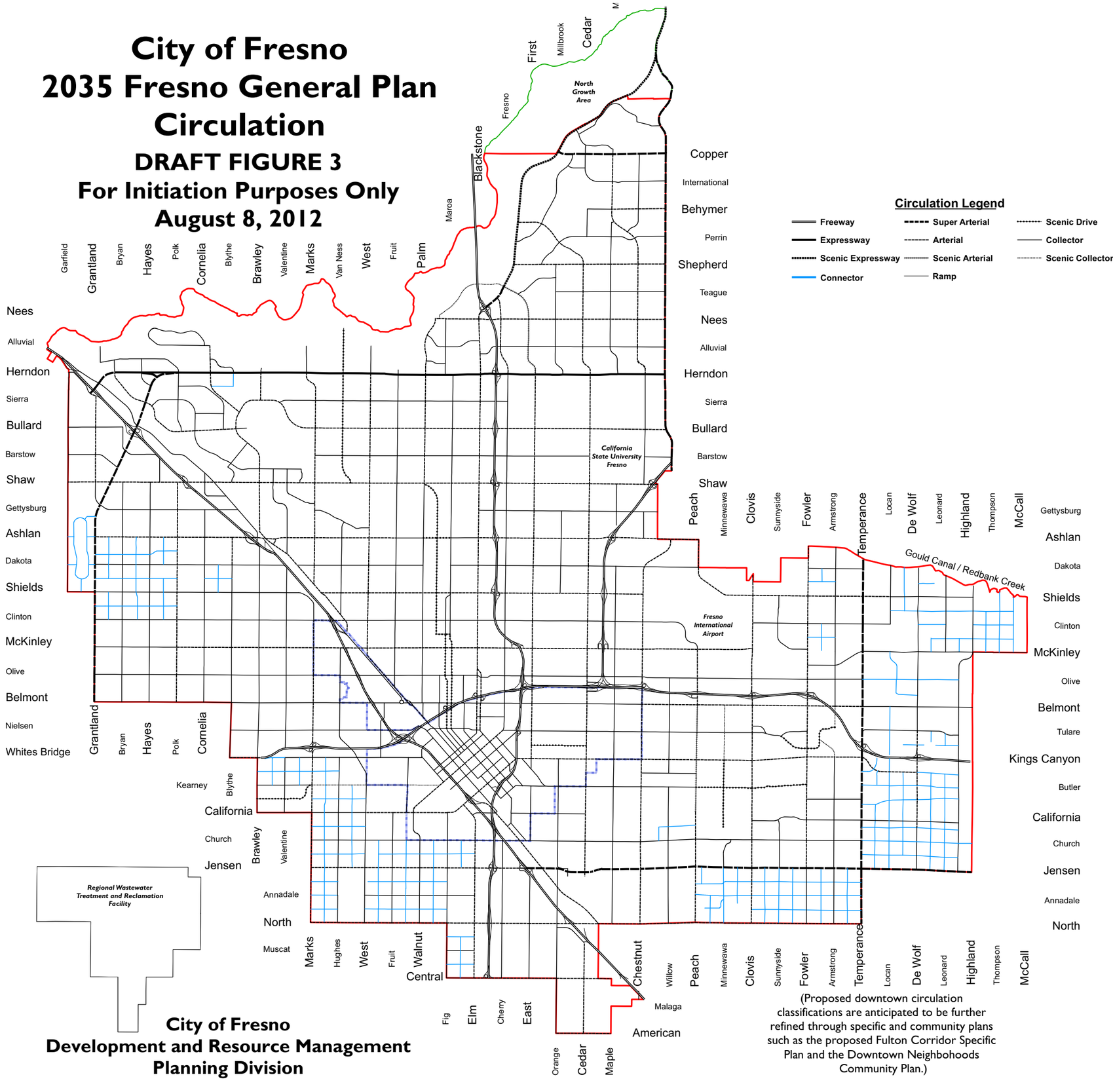
Source: Fehr & Peers, 2011

INITIATION REVIEW DRAFT

This page intentionally left blank

INITIATION REVIEW DRAFT

City of Fresno
2035 Fresno General Plan
Circulation
DRAFT FIGURE 3
For Initiation Purposes Only
August 8, 2012



Circulation Legend

Freeway	Super Arterial	Scenic Drive
Expressway	Arterial	Collector
Scenic Expressway	Scenic Arterial	Scenic Collector
Connector	Ramp	

(Proposed downtown circulation classifications are anticipated to be further refined through specific and community plans such as the proposed Fulton Corridor Specific Plan and the Downtown Neighbohoods Community Plan.)

City of Fresno
Development and Resource Management
Planning Division

This page intentionally left blank

INITIATION REVIEW DRAFT

GOALS AND OBJECTIVES

The City's Housing Element has already been approved and is not being comprehensively updated at this time as this work is scheduled to occur after adoption of the Regional Transportation Plan update and the Sustainable Communities Plan as specified under new State regulations set by SB 375. The approved Housing Element's goals and polices are incorporated by reference for the purposes of this Initiation Review Draft. However, technical amendments to the Housing Element needed for General Plan consistency may be proposed in the Hearing Draft of the General Plan as needed. If so, the Housing Element's goals, objectives, policies and programs will be included in the Hearing Draft of the General Plan, with any proposed amendments clearly indicated, so the City Council will be able to consider and act on a proposed General Plan that is complete and internally consistent. Goals and policies developed for the General Plan update are consistent with the approved and current Housing Element.

GOALS OF THE GENERAL PLAN

As explained by the OPR's General Plan Guidelines: "A goal is a general direction-setter. It is an ideal future end related to the public health, safety or general welfare. A goal is a general expression of community values and, therefore, may be abstract in nature. Consequently, a goal is generally not quantifiable or time-dependent…Goals should be expressed as ends, not actions."

The Goals for the General Plan were identified and considered by the GPCC, based on input by the public and from key stakeholders, and endorsed by the City Council and Planning Commission along with Alternative A. These Goals have since undergone minor edits for clarity, grammar, and consolidation, but are otherwise intact.

The commentary in italics following certain goals is mean to further discuss and clarify the goal to help guide the Objectives, which follow.

1. Increase opportunity, economic development, business and job creation.

   Use urban form, land use, and Development Code policies to streamline permit approval, promote local educational excellence and workforce relevance, significantly increase business development and expansion, attract and retain talented people, create jobs and sustained economic growth, strategically locate employment lands and facilities, and avoid of over-saturation of a single type of housing, retail or employment.

2. Support a successful and competitive Downtown.

   Emphasize infill development and a revitalized central core area as the primary activity center for Fresno and the region by locating substantial growth near the Downtown core and along the corridors leading to the Downtown. Use vision-based policies in a Development Code specific to the Downtown, when adopted, to ensure the creation of a unique sense of place in the central core.

3. Emphasize conservation, successful adaptation to climate and changing resource conditions, and performance effectiveness in the use of energy, water, land, buildings, natural resources, and fiscal resources required for the long-term sustainability of Fresno.

INITIATION REVIEW DRAFT

4. Emphasize achieving healthy air quality and reduced greenhouse gas emissions.
5. Support agriculture as an integral industry and sustainable food production system.

   Emphasize the economic and cultural role of Fresno as a center of agriculture and food production systems by conserving farmland through a focus on developing vacant and underutilized land within the established Sphere of Influence of the City, limiting any further urban boundary expansion, and developing urban agriculture within the city and designated growth areas.

6. Protect, preserve, and enhance natural, historic, and cultural resources.

   Emphasize the continued protection of important natural, historic and cultural resources in the future development of Fresno. This includes both designated historic structures and neighborhoods, but also "urban artifacts" and neighborhoods that create the character of Fresno.

7. Provide for a diversity of districts, neighborhoods, housing types (including affordable housing), residential densities, job opportunities, recreation, open space, and educational venues that appeal to a broad range of people throughout the City.
8. Develop "complete neighborhoods" and districts with a compact and diverse mix of residential densities, building types, and affordability which are designed to be healthy, attractive, and centered by schools, parks, public and commercial services to provide a sense of place and that meet daily needs within walking distance.

   Intentionally plan for complete neighborhoods as an outcome, and not a collection of subdivisions which do not result in complete neighborhoods.

9. Promote a city of healthy communities and improve quality of life in existing neighborhoods.

   Emphasize supporting existing neighborhoods in Fresno with safe, well maintained, and accessible streets, public utilities, education and job training, proximity to jobs, retail services, and health care, affordable housing, youth development opportunities, open space and parks, transportation options, and opportunities for home grown businesses.

10. Emphasize increased land use intensity and mixed-use development at densities supportive of greater use of transit in Fresno.

    Greater densities can be achieved through encouragement, infrastructure, and incentives for infill and revitalization along major corridors and in activity centers.

11. Emphasize and plan for all modes of travel on local and major streets in Fresno.

    Facilitate travel by walking, biking, transit, and motor vehicle with interconnected and linked neighborhoods, districts, major campuses and public facilities, shopping centers and other service centers, and regional transportation such as air, rail, bus and highways.

12. Resolve existing public infrastructure and service deficiencies, make full use of existing infrastructure, and invest in improvements to increase competitiveness and promote economic growth.

    Emphasize the fair and necessary costs of maintaining sustainable water, sewer, streets, and other public infrastructure and service systems in rates, fees, financing and public investments to implement the General Plan. Adequately address accumulated deferred maintenance, aging

INITIATION REVIEW DRAFT

infrastructure, risks to service continuity, desired standards of service to meet quality-of-life goals, and required infrastructure to support growth, economic competitiveness and business development.

13. Emphasize the City as a role model for growth management planning, regional cooperation, collaborative planning, efficient processing and permit streamlining, public-private partnerships and shared financing, sustainable urban development policies, environmental quality, and a strong economy, and work with other jurisdictions and institutions to further these values throughout the region.

    Positively influence the same attributes in other jurisdictions of the San Joaquin Valley—and thus the potential for regional sustainability—and improve the standing and credibility of the City to pursue appropriate State, LAFCO, and other regional policies that would curb sprawl and prevent new unincorporated community development which compete with and threaten the success of sustainable policies and development practices in Fresno.

14. Provide a network of well-maintained parks, open spaces, athletic facilities, and walking and biking trails connecting the city's districts and neighborhoods to attract and retain a broad range of individuals, benefit the health of residents, and provide the level of public amenities required to encourage and support development of higher density urban living and transit use.
15. Improve Fresno's visual image and enhance its form and function through urban design strategies and effective maintenance.
16. Protect and improve public health and safety.
17. Recognize, respect, and plan for Fresno's cultural, social, and ethnic diversity, and foster an informed and engaged citizenry.

    Emphasize shared community values and genuine engagement with and across different neighborhoods, communities, institutions, businesses and sectors to solve difficult problems and achieve shared goals for the success of Fresno and all its residents

OBJECTIVES

Objectives are the City's statements of how it plans to address existing and future issues and support the General Plan Goals. Every objective relates to at least one Goal and may support multiple goals.

The proposed objectives are organized by their intended General Plan Element, appearing in the order anticipated in the full General Plan Update. Objectives are labeled according to the element or section title, combined with a number that increases consecutively. In the full General Plan Update, each objective will be accompanied by one or more Implementing Policies, as done in the 2025 General Plan.

INITIATION REVIEW DRAFT

Economic Development and Fiscal Sustainability Element (ED)

ED-1 Support economic development by maintaining a strong working relationship with the business community and improving the business climate for current and future businesses.

ED-2 Support local business start-ups and encourage innovation by improving access to resources and capital and help overcome obstacles hampering economic development.

ED-3 Attract and recruit businesses and offer incentives for economic development.

ED-4 Cultivate a skilled, educated, and well-trained workforce by increasing educational attainment and the relevant job skill levels in order to appeal to local and non-local businesses.

ED-5 Achieve fiscal sustainability.

Urban Form, Land Use, and Design Element

NOTE: Objectives UF-2 through UF-11 are currently major goals of the draft Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan, and are incorporated as objectives here to ensure appropriate representation of Downtown planning efforts supported by the General Plan update. The objectives are consistent with the draft Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plans and will allow for the implementation of the updated General Plan.

Urban Form (UF)

UF-1 Emphasize the opportunity for a diversity of districts, neighborhoods, and housing types.

UF-2 Enhance the unique sense of character and identity of the different sub-areas of the Downtown neighborhoods.

UF-3 Revitalize the Downtown to be the government center and economic and cultural heart of the city and the region.

UF-4 Support and encourage arts and culture in the Downtown neighborhoods.

UF-5 Promote a greater concentration of buildings and people in the Downtown.

UF-6 Support new development in the Downtown through investment in public infrastructure.

UF-7 Promote a diverse mix of uses in the Downtown in order to create a community with a 24 hour per day life.

UF-8 Develop each of the Downtown's neighborhoods and districts, according to its unique character.

UF-9 Capitalize on the High Speed Train system to help revitalize the Downtown neighborhoods.

INITIATION REVIEW DRAFT

UF-10 Calibrate parking according to the Downtown's parking needs and make it efficient and easy to find.

UF-11 Revitalize the Fulton Mall.

UF-12 Locate roughly one-half of future residential development in infill areas—defined as being within the 2012 City limits—including-the Downtown core area and surrounding neighborhoods, mixed use centers and transit-oriented development along major transit corridors, and other non-corridor infill areas and vacant land.

UF-13 Locate roughly one-half of future residential development in the growth areas—defined as unincorporated land in the 2012 Sphere of Influence—developed within complete neighborhoods that include housing, services, and recreation; mixed-use centers; or along future Bus Rapid Transit corridors.

UF-14 Create an urban form that facilitates multi-modal connectivity.

Land Use (LU)

LU-1 Establish a comprehensive citywide land use planning strategy to meet economic development objectives, achieve efficient and equitable use of resources and infrastructure, and create an attractive living environment.

LU-2 Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residents.

LU-3 Support the successful fulfillment of plan(s) adopted for the Downtown.

LU-4 Enhance existing residential neighborhoods through regulations, code enforcement, and compatible infill development.

LU-5 Plan for a diverse housing stock that will support balanced urban growth, and make efficient use of resources and public facilities.

LU-6 Retain and enhance existing commercial areas to strengthen Fresno's economic base and site new office, retail, and lodging uses districts to serve neighborhoods and regional visitors.

LU-7 Plan and support industrial development to promote job growth.

LU-8 Provide for the development of civic and institutional land uses to meet the educational, medical, social, economic, cultural, and religious needs of the community.

LU-9 Plan land uses, design, and development intensities to supplement and support, and not compete with, the Downtown.

LU-10 Promote regional cooperation and coordination on land use and planning issues among local jurisdictions.

INITIATION REVIEW DRAFT

LU-11 Encourage coordination with adjacent jurisdictions in providing public services, infrastructure and cooperative economic development.

Design (D)

D-1 Provide and maintain an urban image that creates a "sense of place" throughout Fresno.

D-2 Enhance the visual image of all "gateway" routes entering the Fresno Planning Area.

D-3 Create unified plans for "green streets," using distinctive features reflecting Fresno's landscape heritage.

D-4 Preserve and strengthen Fresno's overall image through design review and create a safe, walkable and attractive urban environment for the current and future generations of residents.

D-5 Maintain and improve community appearance through programs that prevent and abate blighting influences.

D-6 Encourage design that celebrates and supports the cultural and ethnic diversity of Fresno.

D-7 Continue applying local urban form, land use, and design policies to specific neighborhoods and locations.

Mobility and Transportation Element (MT)

MT-1 Create and maintain a transportation system that is safe, efficient, provides access in an equitable manner, and optimizes travel by all modes.

MT-2 Make efficient use of the City's existing and proposed transportation system and strive to ensure the planning and provision of adequate resources to operate and maintain it.

MT-3 Identify, promote and preserve scenic or aesthetically unique corridors by application of appropriate policies and regulations.

MT-4 To establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.

MT-5 Establish a well-integrated network of pedestrian facilities to accommodate safe, convenient, practical and inviting travel by walking including those with physical mobility and vision impairments.

MT-6 Establish a network of multi-purpose pedestrian and bicycle paths, as well as limited access trails, to serve areas and to link residential areas to local and regional open spaces and recreation areas and urban activity centers in order to enhance Fresno's recreational amenities and alternative transportation options.

INITIATION REVIEW DRAFT

MT-7 Pursue a variety of funding sources to maximize implementation and development of the City's path and trail system.

MT-8 Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize environmental impacts.

MT-9 Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, frequent, reliable, and cost- effective.

MT-10 Establish parking standards that are strategically tuned to support neighborhoods, shopping districts and employment centers well served by a complete range of transportation choices.

MT-11 Achieve necessary capacity increasing and inter-modal connectivity enhancing improvements to the goods movement transportation system to support the growth in critical farm product and value added industries.

MT-12 Operate the City's municipal airport facilities to meet present and anticipated demands in a manner that maintains compliance with federal regulations, enhances safety to the public, minimizes the adverse effects of aircraft operations on people, and promotes the economic health of the community.

MT-13 Improve the competitiveness of domestic and international air carrier service, and air cargo operations to and from Fresno Yosemite International Airport.

Parks, Open Space, and Schools Element (POSS)

POSS-1 Provide an expanded, high quality and diversified park system, allowing for varied recreational opportunities for the entire Fresno community.

POSS-2 Ensure that adequate land, in appropriate locations, is designated and acquired for park and recreation uses in infill and growth areas.

POSS-3 Ensure that park and recreational facilities make the most efficient use of land; that they are designed and managed to provide for the entire Fresno community; and that they represent positive examples of design and energy conservation.

POSS-4 Pursue sufficient and dedicated funding for the parks acquisition, operations, and maintenance.

POSS-5 Provide for long-term preservation, enhancement, and enjoyment of plant, wildlife, and aquatic habitat.

POSS-6 Maintain and restore, where feasible, the ecological values of the San Joaquin River corridor.

POSS-7 Support the San Joaquin River Conservancy in its efforts to develop a river parkway.

INITIATION REVIEW DRAFT

POSS-8 Work cooperatively with school districts to find appropriate locations for schools to meet the needs of students and neighborhoods.

POSS-9 Work with California State University, Fresno, and other institutions of higher learning, to enhance the city's workforce, job creation, and economic development, as well as its image and desirability as a place to live.

Public Utilities and Services Element (PU)

PU-1 Provide the level of law enforcement and crime prevention services necessary to maintain a safe, secure, and stable urban living environment through a Police Department that is dedicated to providing professional, ethical, efficient and innovative service with integrity, consistency and pride.

PU-2 Ensure that the Fire Department's staffing and equipment resources are sufficient to meet all fire and emergency service level objectives and are provided in an efficient and cost effective manner.

PU-3 Enhance the level of fire protection to meet the increasing demand for services from an increasing population.

PU-4 Ensure provision of adequate trunk sewer and collector main capacities to serve existing and planned urban development, consistent with the Wastewater Master Plan.

PU-5 Preserve groundwater quality and ensure that the health and safety of the entire Fresno community is not impaired by use of private on-site disposal systems.

PU-6 Ensure the provision of adequate sewage treatment and disposal by utilizing the Fresno-Clovis Regional Wastewater Treatment and Reclamation Facility as the primary facility, when economically feasible, for all existing and new development within the metropolitan area.

PU-7 Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

PU-8 Manage and develop the City's water facilities on a strategic timeline basis that recognizes the long-life cycle of the assets and the duration of the resources, to ensure a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.

PU-9 Provide adequate solid waste facilities and services for the collection, transfer, recycling, and disposal of refuse.

Resource Conservation Element (RC)

RC-1 Make efficient use of existing public infrastructure.

RC-2 Promote land uses that conserve resources.

INITIATION REVIEW DRAFT

RC-3 Actively engage, listen to, educate, and enlist the support of the Fresno community on the need and strategies for resource conservation.

RC-4 In cooperation with other jurisdictions and agencies in the San Joaquin Valley Air Basin, take necessary actions to achieve and maintain compliance with State and federal air quality standards for criteria pollutants.

RC-5 In cooperation with other jurisdictions and agencies in the San Joaquin Valley Air Basin, take timely and necessary actions to achieve and maintain reductions in greenhouse gas emissions and all strategies that reduce the causes of climate change in order to limit and prevent the related potential detrimental effects upon public health and welfare of present and future residents of the Fresno community.

RC-6 Ensure that Fresno has a reliable, long-range source of drinkable water.

RC-7 Promote water conservation through standards, incentives and capital investments.

RC-8 Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

RC-9 Preserve agricultural land outside of the area planned for urbanization under this General Plan.

RC-10 Conserve aggregate mineral resources within the Planning Area, as identified by the Division of Mines and Geology, and allow for responsible extraction to meet Fresno's needs.

RC-11 Strive to reduce the solid waste going to landfills to zero by 2035.

Historic and Cultural Resources Element (HCR)

HCR-1 Maintain a comprehensive, citywide preservation program to identify, protect and assist in the preservation of Fresno's historic and cultural resources.

HCR-2 Identify and preserve Fresno's historic and cultural resources which reflect important cultural, social, economic and architectural features so that residents will have a foundation upon which to measure and direct physical change.

HCR-3 Promote the idea of a "New City Beautiful" ethos by linking historic preservation, public art, planning principles for complete neighborhoods with green building and technology.

HCR-4 Foster an appreciation of Fresno's history and cultural resources.

Noise and Safety Element (NS)

NS-1 Protect the citizens of the city from the harmful and annoying effects of exposure to excessive noise.

INITIATION REVIEW DRAFT

NS-2 Minimize risks of property damage and personal injury posed by geologic and seismic risks.

NS-3 Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

NS-4 Minimize the risk of loss of life, injury, serious illness, and damage to property resulting from the use, transport, treatment, and disposal of hazardous materials and hazardous wastes.

NS-5 Protect the safety, health, and welfare of persons and property on the ground and in aircraft by minimizing exposure to airport-related hazards.

NS-6 Foster an efficient and coordinated response to emergencies and natural disasters.

Healthy Communities Element (HC)

HC-1 Work with neighborhood associations of local residents, businesses, and institutions on neighborhood and community health initiatives.

HC-2 Create complete, well-structured, and healthy neighborhoods and transportation systems.

HC-3 Create healthy, safe, and affordable housing.

HC-4 Improve property maintenance.

HC-5 Promote access to healthy and affordable food.

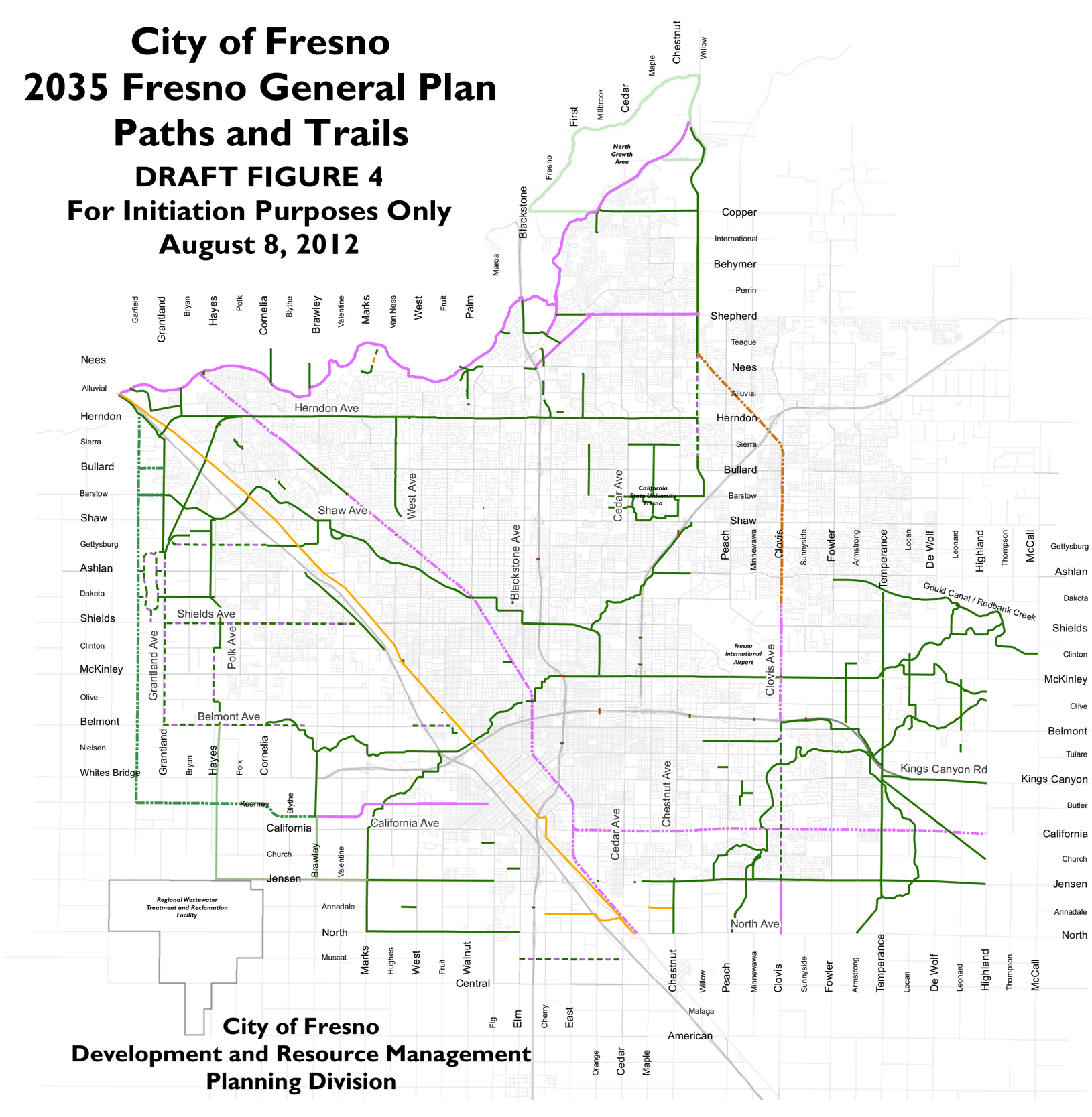
HC-6 Improve access to schools and their facilities for the community.

HC-7 Establish priorities and mechanisms for park facilities improvements linked to effectiveness and improving health.

HC-8 Support programs, leadership, and opportunities for Fresno's youth.

INITIATION REVIEW DRAFT

City of Fresno
2035 Fresno General Plan
Paths and Trails
DRAFT FIGURE 4
For Initiation Purposes Only
August 8, 2012



City of Fresno
Development and Resource Management
Planning Division

LEGEND

- Old Town Clovis Trail
- Greenbelt City/County (See note 1)
- Greenbelt Railroads (See note 2)
- Greenbelt
- Rails to Trails
- County Trail (See Note 3)
- Class I Bicycle Path
- Class I or Class II Bicycle Facility
- Class I or Class III Bicycle Facility
- High Cost Improvement

Note 1: Conceptual greenbelt alignment subject to city/county cooperative planning, adoption and implementation.

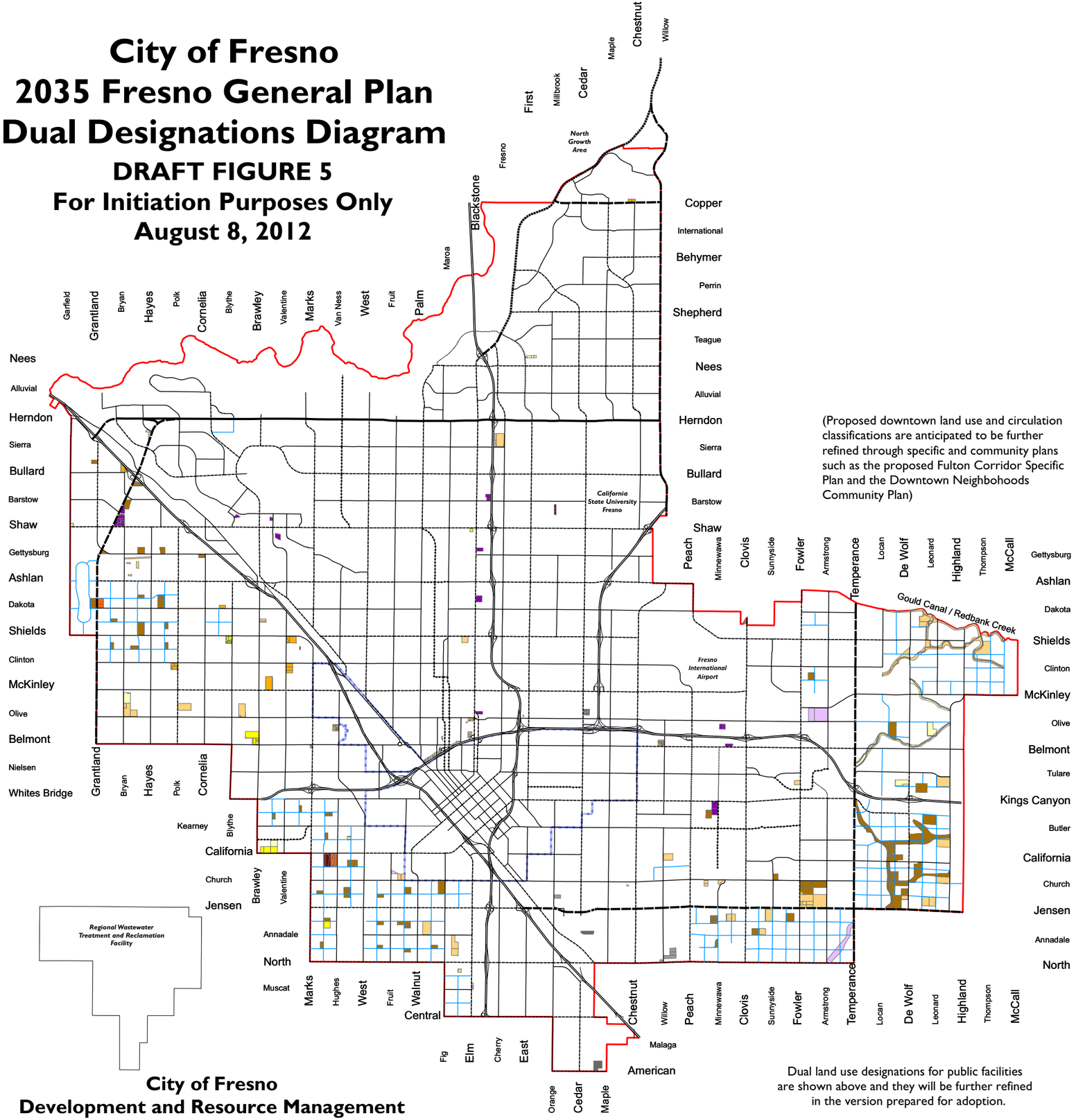
Note 2: Greenbelt required unless there is an existing railroad. Should existing railroad lines be vacated or relocated, it shall be converted to a greenbelt.

Note 3: To be determined by the County. City preferred location depicted.

Note 4: The trail on the west side of State Route 99 between Ashlan and Clinton Avenues is dependent on the design of the realignment of State Route 99 in conjunction with the California High Speed Rail Authority and Caltrans.

Note 5: This map depicts paths and trails and supersedes Figure 5.2 of the 2010 City of Fresno Bicycle, Pedestrian and Trails Master Plan. For a complete bicycle system, refer to Class II bike lane and Class III bike route designations in the 2010 City of Fresno Bicycle, Pedestrian and Trails Master Plan.

City of Fresno
2035 Fresno General Plan
Dual Designations Diagram
DRAFT FIGURE 5
For Initiation Purposes Only
August 8, 2012



(Proposed downtown land use and circulation classifications are anticipated to be further refined through specific and community plans such as the proposed Fulton Corridor Specific Plan and the Downtown Neighbohoods Community Plan)

Dual land use designations for public facilities are shown above and they will be further refined in the version prepared for adoption.

LEGEND

RESIDENTIAL
- Low Density (1-3 D.U./acre)
- Medium Low Density (3.5-6 D.U./acre)
- Medium Density (5.0-12 D.U./acre)
- Medium High Density (12-16 D.U./acre)
- Urban Neighborhood (16-30 D.U./acre)
- High Density (30-45 D.U./acre)

COMMERCIAL
- Main Street
- Community
- Recreation
- General
- Highway & Auto
- Regional

EMPLOYMENT
- Office
- Business Park
- Regional Business Park
- Light Industrial
- Heavy Industrial

MIXED USE
- Corridor/Center Mixed Use
- Regional Mixed Use
- Neighborhood Mixed Use

OPEN SPACE
- Clear Zone
- Commercial-Recreational
- Community Park
- Flood Control Project
- Golf Course
- Lake, Pond
- Multi-Use
- Neighborhood Park
- Outdoor Environmental education area
- Open Space
- Park
- Ponding Basin
- Ponding Basin (Park use)
- Regional Park

PUBLIC FACILITIES
- Public/Quasi-public Facility
- Special School
- Elementary School
- Elementary & Middle School
- Elementary, Middle & High School
- Middle School
- High School
- College
- Airport
- Cemetery
- Church
- Community Activity Center
- Convalescent Hospital
- Fairgrounds
- Fire Station
- Government Offices
- Hospital
- Medical Center
- Neighborhood Center
- PG & E Substation
- Police Dressing Station
- Water Recharge Basin
- Waste Water Treatment Facility

BUFFER
- Buffer

BOUNDARIES
- Existing Fresno Sphere of Influence
- Growth Areas
- Downtown Neighborhoods

Circulation Legend
- Freeway
- Expressway
- Scenic Expressway
- Connector
- Super Arterial
- Arterial
- Scenic Arterial
- Ramp
- Scenic Drive
- Collector
- Scenic Collector

City of Fresno
Development and Resource Management
Planning Division

Development and Resource Management Department

2600 Fresno Street
Fresno, CA 93721
(559) 621-CITY

Exhibit B
CalEnviroScreen 2.0

California Communities Environmental Health Screening Tool, Version 2.0 (CalEnviroScreen 2.0)

Guidance and Screening Tool

August 2014

Matthew Rodriquez, Secretary
California Environmental Protection Agency

George V. Alexeeff, Ph.D., Director
Office of Environmental Health Hazard Assessment

OEHHA Authors:

John Faust

Laura August

George Alexeeff

Komal Bangia

Rose Cendak

Elyse Cheung-Sutton

Lara Cushing

Vanessa Galaviz

Tamara Kadir

Julian Leichty

Carmen Milanes

Karen Randles

Andrew Slocombe

Robbie Welling

Walker Wieland

Lauren Zeise

OEHHA Editors:

Allan Hirsch

Shankar Prasad

David Siegel

CalEPA Reviewers:

Miriam Barcellona Ingenito

Arsenio Mataka

Gina Solomon

Acknowledgements:

Cumulative Impacts and Precautionary Approaches Work Group

CalEPA Boards and Departments who provided comments and data;
California Department of Public Health and the Public Health Institute

Residents and stakeholders who participated in our regional workshops;
Dr. Tara Zagofsky, facilitator, UC Davis Extension Collaboration Center

Dr. Rachel Morello-Frosch, Dr. Carolina Balaz and academic colleagues at the University of California, Berkeley

Academic expert panel who provided comments at a workshop in September 2012

Aaron M. King, who provided expertise on drinking water systems

Graduate students assisting in the project

PREFACE TO VERSION 2.0

CalEnviroscreen 2.0 is the latest iteration of the CalEnviroScreen tool. It uses the same methodology as Version 1.1 except that the two indicators for drinking water and unemployment have been added, and the tool looks at pollution burdens and vulnerabilities in census tracts rather than ZIP codes. The two new indicators incorporate potential burdens to communities posed by contaminants in drinking water and potential social stressors relating to unemployment. The use of census tracts as the geographic scale may allow for a more precise screening of pollution burdens and vulnerabilities in communities. While race and ethnicity will not be used in compiling a score using CalEnviroScreen, an analysis that provides information on the racial and ethnic composition of communities throughout the state as it relates to CalEnviroScreen scores is being released separately. This information will help us to better understand the correlation between race/ethnicity and the pollution burdens facing communities in California. CalEPA and OEHHA are committed to updating and expanding this section as new versions of the tool are released.

GUIDANCE FROM THE SECRETARY

State law defines environmental justice to mean "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." One of our top priorities over the last three years has been to integrate the principles represented by this definition into the activities of the boards, departments and office within the California Environmental Protection Agency (CalEPA or Agency). CalEPA's mission is to restore, protect and enhance the environment, and to ensure public health, environmental quality and economic vitality; environmental justice and investment in communities burdened by pollution are critical to accomplishing this mission.

As an important first step to assuring that all Californians have access to environmental justice, it is necessary to identify the areas of the state that face multiple pollution burdens so programs and funding can be targeted appropriately toward improving the environmental health and economic vitality of the most impacted communities. Despite the best efforts of government, community groups and businesses, many Californians live in the midst of multiple sources of pollution and some people and communities are more vulnerable to the effects of pollution than others. For this reason, the Agency and the Office of Environmental Health Hazard Assessment (OEHHA) developed a science-based tool for evaluating multiple pollutants and stressors in communities, called the California Communities Environmental Health Screening Tool (CalEnviroScreen). The first version of CalEnviroScreen was released in April 2013, and Version 1.1 was released in September 2013.

We are now pleased to release Version 2.0 for public review. This version of CalEnviroScreen refines the tool by incorporating the additional indicators of drinking water and unemployment rates, modifying the geographic scale by using census tracts, and enhancing the current indicators by incorporation of the most up-to-date information. These changes are intended to improve the scientific basis of the tool, and make it more useful to CalEPA and to others.

To ensure that CalEnviroScreen is properly understood and utilized, we are also providing this guidance to the Agency, its boards, departments and office, as well as to the public and stakeholders. Our experience using CalEnviroScreen over the last year informs both our new version of the tool and this updated guidance.

Finally, the release of this new draft version of CalEnviroScreen is an indicator of CalEPA and OEHHA's ongoing commitment to regularly revise the tool, using new information as it becomes available to make the tool as meaningful and as current as possible.

Background

CalEnviroScreen is primarily designed to assist the Agency in carrying out its environmental justice mission to conduct its activities in a manner that ensures the fair treatment of all Californians, including minority and low-income populations. The development of the tool was a major step in the implementation of the Agency's 2004 Environmental Justice Action Plan, which called for the development of guidance to analyze the impacts of multiple pollution sources in California communities.

CalEPA released the first draft of CalEnviroScreen for public review and comment in July 2012. This

draft built upon a 2010 report[1] that described the underlying science and a general method for identifying communities that face multiple pollution burdens. The tool identified the portions of the state that have higher pollution burdens and vulnerabilities than other areas, and therefore are most in need of assistance. In a time of limited resources, CalEnviroScreen provides meaningful insight into how decision makers can focus available time, resources and programs to improve the environmental health of Californians, particularly those most burdened by pollution. The tool uses existing environmental, health, demographic and socioeconomic data to create a screening score for communities across the state. An area with a high score would be expected to experience much higher impacts than areas with low scores.

CalEPA and OEHHA solicited comments and suggestions, and considered them in making additional changes to CalEnviroScreen 1.0. These changes were finalized in April 2013. While updating the tool to Versions 1.1 and 2.0, CalEPA and OEHHA again reviewed comments received during the 12 public workshops and in the nearly 1,000 written comments associated with the initial development of CalEnviroScreen. We also considered input from our boards and departments that were evaluating the tool for their use. This current draft incorporates many of the suggestions we have received to date.

Uses

Uses of the tool by CalEPA and its boards, departments and office include administering environmental justice grants, promoting greater compliance with environmental laws, prioritizing site-cleanup activities and identifying opportunities for sustainable economic development in heavily impacted neighborhoods. Other entities and interested parties may identify additional uses for this tool and the information it provides.

Implementation of SB 535

CalEnviroScreen will inform CalEPA's identification of disadvantaged communities pursuant to Senate Bill 535 (De León, Chapter 830, Statutes of 2012). SB 535 requires CalEPA to identify disadvantaged communities based on geographic, socioeconomic, public health and environmental hazard criteria. It also requires that the investment plan developed and submitted to the Legislature pursuant to Assembly Bill 1532 (John A. Pérez, Chapter 807, Statutes of 2012) allocate no less than 25 percent of available proceeds from the carbon auctions held under California's Global Warming Solutions Act of 2006 to projects that will benefit these disadvantaged communities. At least 10 percent of the available moneys from these auctions must be directly invested in such communities. Since CalEnviroScreen has been developed to identify areas disproportionately affected by pollution and those areas whose populations are socioeconomically disadvantaged, it is well suited for the purposes described by SB 535.

Environmental Justice Activities

CalEnviroScreen aids the administration of the Agency's Environmental Justice Small Grant Program, and guides other grant programs as well as environmental education and community programs throughout the state. The tool also helps to inform Agency boards and departments when they are budgeting scarce resources for cleanup and abatement projects. Additionally, CalEnviroScreen helps to guide boards and departments when planning their community engagement and outreach efforts. Knowing which areas of the state have higher relative environmental burdens has not only assisted efforts to increase compliance with environmental laws in disproportionately impacted areas, but also provides CalEPA and its boards, departments and office with additional insights on the potential implications of their activities and decisions.

[1] OEHHA and CalEPA (2012) *Cumulative Impacts: Building a Scientific Foundation*, Sacramento, CA. Available online at: http://www.oehha.ca.gov/ej/cipa123110.html

Local and Regional Governments

Local and regional governments, including regional air districts, water districts and planning and transit agencies, may also find uses for this tool. CalEPA will continue to work with local and regional governments to further explore the applicability of CalEnviroScreen for other uses. This includes the possibility of helping to identify and plan for sustainable development opportunities in heavily impacted neighborhoods. These areas could also be targeted for cleaning up blight and promoting development to bring in jobs and increase economic stability. As an example, the tool is being used to develop planning and financial incentives to retain jobs and create new, sustainable business enterprises in disproportionately impacted communities.

Of course, it will be important to work with organizations such as economic development corporations, workforce investment boards, local chambers of commerce and others to develop strategies to help businesses thrive in the identified areas and to attract new businesses and services to those areas. CalEnviroScreen may also assist local districts and governments with meeting their obligations under certain state funding programs.

Finally, it is important to remember that CalEnviroScreen provides a broad environmental snapshot of a given region. While the data gathered in developing the tool could be useful for decision makers when assessing existing pollution sources in an area, more precise data are often available to local governments and would be more relevant in conducting such an examination.

General Notes and Limitations

CalEnviroScreen was developed for CalEPA and its boards, departments and office. Its publication does not create any new programs, regulatory requirements or legal obligations. There is no mandate express or implied that local governments or other entities must use the tool or its underlying data. Planning, zoning and development permits are matters of local control and local governments are free to decide whether the tool's output or the information contained in the tool provides an understanding of the environmental burdens and vulnerabilities in their localities.

While CalEnviroScreen assists CalEPA and its boards, departments and office in prioritizing resources and helping promote greater compliance with environmental laws, it is important to note some of its limitations. The tool's output provides a relative ranking of communities based on a selected group of available datasets, through the use of a summary score. The CalEnviroScreen score is not an expression of health risk, and does not provide quantitative information on increases in cumulative impacts for specific sites or projects. Further, as a comparative screening tool, the results do not provide a basis for determining when differences between scores are significant in relation to public health or the environment. Accordingly, the tool is not intended to be used as a health or ecological risk assessment for a specific area or site.

Additionally, the CalEnviroScreen scoring results are not directly applicable to the cumulative impacts analysis required under the California Environmental Quality Act (CEQA). The statutory definition of "cumulative impacts" contained in CEQA is substantially different than the working definition of "cumulative impacts" used to guide the development of CalEnviroScreen. Therefore, the information provided by this tool cannot substitute for analyzing a specific project's cumulative impacts as required in a CEQA environmental review.

Moreover, CalEnviroScreen assesses environmental factors and effects on a regional or community-wide basis and cannot be used in lieu of performing an analysis of the potentially significant impacts of any specific project. Accordingly, a lead agency must determine independently whether a proposed project's impacts may be significant under CEQA based on the evidence before it, using its own discretion and judgment. The tool's results are not a substitute for this required analysis. Also, this tool considers some social, health and economic

factors that may not be relevant when doing an analysis under CEQA. Finally, as mentioned above, the tool's output should not be used as a focused risk assessment of a given community or site. It cannot predict or quantify specific health risks or effects associated with cumulative exposures identified for a given community or individual.

Conclusion

We are proud of the collaborative work of OEHHA and the input of the departments and boards in CalEPA, as well as the level of public participation and level of input we have received in the development of CalEnviroScreen. This project represents the largest public screening tool effort in the nation – both in geographic scope and level of detail. It is an achievement that could not have been realized had it not been for the tireless efforts of OEHHA and the invaluable input of all of our stakeholders. The ongoing development and evolution of CalEnviroScreen has involved many residents, community-based organizations, nongovernmental organizations, local officials, state agencies and representatives from business, industry and academia. The release of CalEnviroScreen 1.0 was just the first step. This updated version of CalEnviroScreen is a result of a continued cooperative effort. We welcome your active participation as we move forward with future versions of CalEnviroScreen and work to advance environmental justice and economic vitality in California.

Matthew Rodriquez
Secretary for Environmental Protection

August 2014

TABLE OF CONTENTS

INTRODUCTION 1
METHOD 3
THE CALENVIROSCREEN MODEL *4*
INDICATOR SELECTION AND SCORING *8*
EXAMPLE CENSUS TRACT: INDICATOR RESULTS AND CALENVIROSCREEN SCORE *14*
INDIVIDUAL INDICATORS: DESCRIPTION AND ANALYSIS 17
POLLUTION BURDEN: EXPOSURE AND ENVIRONMENTAL EFFECT INDICATORS *18*
AIR QUALITY: OZONE 19
AIR QUALITY: PM2.5 23
DIESEL PARTICULATE MATTER 29
DRINKING WATER CONTAMINANTS 34
PESTICIDE USE 41
TOXIC RELEASES FROM FACILITIES 47
TRAFFIC DENSITY 52
CLEANUP SITES 57
GROUNDWATER THREATS 64
HAZARDOUS WASTE GENERATORS AND FACILITIES 72
IMPAIRED WATER BODIES 79
SOLID WASTE SITES AND FACILITIES 83
SCORES FOR POLLUTION BURDEN 90
POPULATION CHARACTERISTICS: SENSITIVE POPULATION AND SOCIOECONOMIC FACTOR INDICATORS *92*
AGE: CHILDREN AND ELDERLY 93
ASTHMA 98
LOW BIRTH WEIGHT INFANTS 103
EDUCATIONAL ATTAINMENT 107
LINGUISTIC ISOLATION 111
POVERTY 116
UNEMPLOYMENT 120
SCORES FOR POPULATION CHARACTERISTICS 126
RESULTS 128
CALENVIROSCREEN STATEWIDE RESULTS *129*

INTRODUCTION

Californians are burdened by environmental problems and sources of pollution in ways that vary across the state. Some Californians are more vulnerable to the effects of pollution than others. CalEnviroScreen 2.0 uses a science-based method for evaluating multiple pollution sources in a community while accounting for a community's vulnerability to pollution's adverse effects. The tool can be used to identify California's most burdened and vulnerable communities. This can help inform decisions at the California Environmental Protection Agency's (CalEPA) boards and departments by identifying places most in need of assistance.

Statewide Evaluation

Using CalEnviroScreen 2.0, a statewide analysis has been conducted that identifies communities in California most burdened by pollution from multiple sources and most vulnerable to its effects, taking into account their socioeconomic characteristics and underlying health status. In doing so, CalEnviroScreen

- Produces a *relative*, rather than absolute, measure of impact.
- Provides a baseline assessment and methodology that can be expanded upon and updated periodically as important additional information becomes available.
- Demonstrates a practical and scientific methodology for evaluating multiple pollution sources and stressors that takes into account a community's vulnerability to pollution.

Factors that contribute to a community's pollution burden or vulnerability are often referred to as stressors. Community impact assessment from multiple pollution sources and stressors is complex and difficult to approach with traditional risk assessment practices. Chemical-by-chemical, source-by-source, route-by-route risk assessment approaches are not well suited to the assessment of community-scale impacts, especially for identifying the most impacted places across all of California. Although traditional risk assessment may account for the heightened sensitivities of some groups, such as children and the elderly, it has not considered other community characteristics that have been shown to affect vulnerability to pollution, such as socioeconomic factors or underlying health status.

Given the limits of traditional risk assessment, the Office of Environmental Health Hazard Assessment (OEHHA) and CalEPA developed CalEnviroScreen to conduct statewide evaluations of community impacts. It built upon the general method and a description of the underlying science published in CalEPA's and OEHHA's 2010 report, *Cumulative Impacts: Building A Scientific Foundation*. The method emerged from basic risk assessment concepts and is sufficiently expansive to incorporate multiple factors that reflect community impacts that have not been included in traditional risk assessments. The tool presents a broad picture of the burdens and vulnerabilities different areas confront from environmental pollutants. It relies on the use of indicators to measure factors that affect pollution impacts in communities.

CalEnviroScreen 2.0 contains a number of important improvements over the 1.0 and 1.1 versions that were finalized and released last year. CalEnviroScreen 2.0 analyzes communities at the census tract, rather than ZIP code level. This provides a finer scale of resolution for many parts of the state. New indicators have been included to account for drinking water quality and vulnerability due to unemployment within communities, and a number of improvements have been made to the individual indicators that characterize community stressors.

Stakeholder Involvement

Transparency and public input into government decision making and policy development are the cornerstones of environmental justice. In that spirit, the framework for the CalEnviroScreen was developed with the assistance of the Cumulative Impacts and Precautionary Approaches Work Group, consisting of representatives of business and non-governmental organizations, academia and government. CalEPA also received input on the original CalEnviroScreen 1.0 tool at a series of regional and stakeholder-specific public workshops and an academic workshop - from California communities, businesses, local governments, California tribes, community-based organizations, academia and other stakeholders. We appreciate the time and effort that the Work Group, stakeholders and general public devoted to guide the development of CalEnviroScreen.

Work in this field continues and will presents opportunities to refine CalEnviroScreen 2.0. CalEPA remains committed to an open and public process in developing future versions of the tool.

This report begins by describing the tool's methodological approach, and how indicators of pollution burden and vulnerability are selected and combined to calculate a CalEnviroScreen score for an individual census tract. The report also describes how the data for individual indicators are selected and analyzed. Data representing the indicators for the different areas of the state are presented here as statewide maps.[2] The statewide maps for the individual indicators and the CalEnviroScreen scores are available online. The report concludes by providing general results for the statewide evaluation, presented as maps showing the census tracts with the highest CalEnviroScreen scores.

[2] The community scores for individual indicators are available online at http://www.oehha.ca.gov/ej/index.html.

METHOD

THE CALENVIROSCREEN MODEL

Definition of Cumulative Impacts

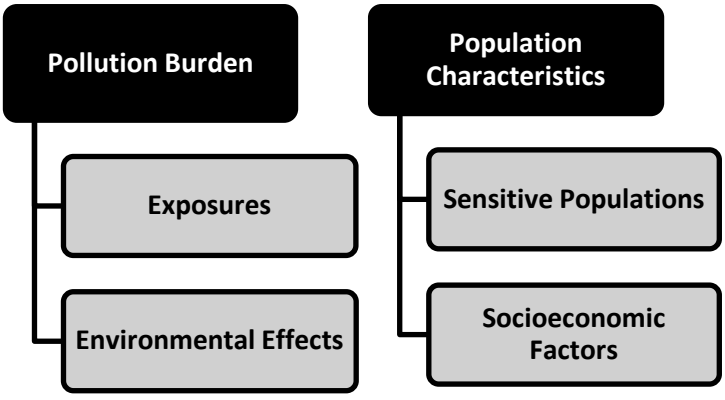
CalEPA adopted the following working definition of cumulative impacts[3] in 2005:

> *"Cumulative impacts means exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socioeconomic factors, where applicable and to the extent data are available."*

CalEnviroScreen Model

The CalEnviroScreen model is based on the CalEPA working definition in that:

- The model is place-based and provides information for the entire State of California on a geographic basis. The geographic scale selected is intended to be useful for a wide range of decisions.
- The model is made up of multiple components cited in the above definition as contributors to cumulative impacts. The model includes two components representing pollution burden – exposures and environmental effects – and two components representing population characteristics – sensitive populations (e.g., in terms of health status and age) and socioeconomic factors.



[3] This definition differs from the statutory definition of "cumulative impacts" contained in the California Environmental Quality Act (CEQA). While the term is the same, they cannot be used interchangeably. For a detailed discussion of this issue, please see the Guidance from the Secretary.

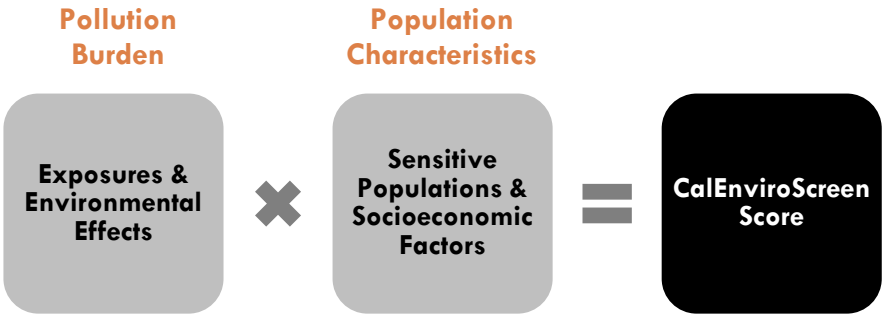
Model Characteristics

The model:

- Uses a suite of statewide indicators to characterize both pollution burden and population characteristics.
- Uses a limited set of indicators in order to keep the model simple.
- Assigns scores for each of the indicators in a given geographic area.
- Uses a scoring system to weight and sum each set of indicators within pollution burden and population characteristics components.
- Derives a CalEnviroScreen score for a given place relative to other places in the state, using the formula below.

Formula for Calculating CalEnviroScreen Score

After the components are scored, the scores are combined as follows to calculate the overall CalEnviroScreen Score:



Rationale for Formula

The mathematical formula for calculating scores uses multiplication. Scores for the pollution burden and population characteristics categories are multiplied together (rather than added, for example). Although this approach may be less intuitive than simple addition, there is scientific support for this approach to scoring.

Multiplication was selected for the following reasons:

1. *Scientific Literature*: Existing research on environmental pollutants and health risk has consistently identified socioeconomic and sensitivity factors as "effect modifiers." For example, numerous studies on the health effects of particulate air pollution have found that low socioeconomic status is associated with about a 3-fold increased risk of morbidity or mortality for a given level of particulate pollution (Samet and White, 2004). Similarly, a study of asthmatics found that their sensitivity to an air pollutant was up to 7-fold greater than non-asthmatics (Horstman *et al.*, 1986). Low-socioeconomic status African-American mothers exposed to traffic-related air pollution were twice as likely to deliver preterm babies (Ponce *et al.*, 2005). The young can be 10 times more sensitive to environmental carcinogen exposures than adults (OEHHA, 2009). Studies of increased

risk in vulnerable populations can often be described by effect modifiers that amplify the risk. This research suggests that the use of multiplication makes sense.

2. *Risk Assessment Principles*: Some people (such as children) may be 10 times more sensitive to some chemical exposures than others. Risk assessments, using principles first advanced by the National Academy of Sciences, apply numerical factors or multipliers to account for potential human sensitivity (as well as other factors such as data gaps) in deriving acceptable exposure levels (US EPA, 2012).
3. *Established Risk Scoring Systems*: Priority-rankings done by various emergency response organizations to score threats have used scoring systems with the formula: Risk = Threat × Vulnerability (Brody *et al.*, 2012). These formulas are widely used and accepted.

Maximum Scores for Combined Components

Component Group	Maximum Score*
Pollution Burden	
Exposures and Environmental Effects	10
Population Characteristics	
Sensitive Populations and Socioeconomic Factors	10
CalEnviroScreen Score	**Up to 100 (= 10 × 10)**

* Enough decimal places were retained in the calculation to eliminate ties.

Notes on Scoring System

In the CalEnviroScreen model, the Population Characteristics are a modifier of the Pollution Burden. In mathematical terms, the Pollution Burden is the multiplicand and Population Characteristics is the multiplier, with the CalEnviroScreen Score as the product. The final ordering of the communities is independent of the magnitude of the scale chosen for the Population Characteristics (without rounding scores). That is, the communities would be ordered the same in their final score if the Population Characteristics were scaled to 3, 5, or 10, for example. Here, a scale up to 10 was chosen for convenience.

Selection of Geographic Scale

CalEnviroScreen 2.0 uses the census tract scale as the unit of analysis. Census tract boundaries are available from the Census Bureau. These were updated in 2010. There are approximately 8,000 census tracts in California, representing a relatively fine scale of analysis. Census tracts are made up of multiple census blocks, which are the smallest geographic unit for which population data are available. Some census blocks have no people residing in them (unpopulated blocks).

CalEnviroScreen 2.0 Scores and Race/Ethnicity

The relationship between the calculated CalEnviroScreen score and race/ethnicity will be examined with the final CalEnviroScreen 2.0 data scheduled for release in June 2014.

References

Brody TM, Di Bianca P, Krysa J (2012). Analysis of inland crude oil spill threats, vulnerabilities, and emergency response in the midwest United States. *Risk Analysis* **32**(10):1741-9. [Available at URL: http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2012.01813.x/pdf].

Horstman D, Roger L, Kehrl H, Hazucha M (1986). Airway Sensitivity of Asthmatics To Sulfur Dioxide *Toxicol Ind Health* **2**: 289-298.

OEHHA (2009). Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures. May 2009. Available at URL: http://www.oehha.ca.gov/air/hot_spots/2009/TSDCancerPotency.pdf.

Ponce NA, Hoggatt KJ, Wilhelm M, Ritz B (2005). Preterm birth: the interaction of traffic-related air pollution with economic hardship in Los Angeles neighborhoods. *Am J Epidemiol* **162**(2):140-8.

Samet JM, White RH (2004) Urban air pollution, health, and equity. *J Epidemiol Community Health*, **58**:3-5 [Available at URL: http://jech.bmj.com/content/58/1/3.full].

US EPA (2012). Dose-Response Assessment [Available at URL: http://www.epa.gov/risk/dose-response.htm].

INDICATOR SELECTION AND SCORING

The overall CalEnviroScreen community scores are driven by indicators. Here are the steps in the process for selecting indicators and using them to produce scores.

Overview of the Process

1. Identify potential indicators for each component.
2. Find sources of data to support indicator development (see Criteria for Indicator Selection below).
3. Select and develop indicator, assigning a value for each geographic unit.
4. Assign a percentile for each indicator for each geographic unit, based on the rank-order of the value.
5. Generate maps to visualize data.
6. Derive scores for pollution burden and population characteristics components (see Indicator and Component Scoring below).
7. Derive the overall CalEnviroScreen score by combining the component scores (see below).
8. Generate maps to visualize overall results.

The selection of specific indicators requires consideration of both the type of information that will best represent statewide pollution burden and population characteristics, and the availability and quality of such information at the necessary geographic scale statewide.

Criteria for Indicator Selection

An indicator should provide a measure that is relevant to the component it represents, in the context of the 2005 CalEPA cumulative impacts definition.

Indicators should represent widespread concerns related to pollution in California.

The indicators taken together should provide a good representation of each component.

Pollution burden indicators should relate to issues that may be potentially actionable by CalEPA boards and departments.

Population characteristics indicators should represent demographic factors known to influence vulnerability to disease.

Data for the indicator should be available for the entire state at the census tract level geographical unit or translatable to the census tract level.

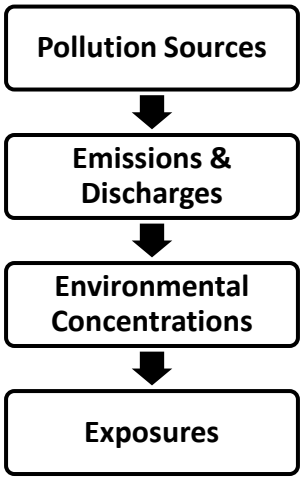
Data should be of sufficient quality, and be:

- Complete
- Accurate
- Current

Exposure Indicators

People may be exposed to a pollutant if they come in direct contact with it, by breathing contaminated air, for example.

No data are available statewide that provide direct information on exposures. Exposures generally involve movement of chemicals from a source through the environment (air, water, food, soil) to an individual or population. CalEnviroScreen uses data relating to pollution sources, releases, and environmental concentrations as indicators of potential human exposures to pollutants. Seven indicators were identified and found consistent with criteria for exposure indicator development. They are:



Ozone concentrations in air
PM2.5 concentrations in air
Diesel particulate matter emissions
Use of certain high-hazard, high-volatility pesticides
Toxic releases from facilities
Traffic density
Drinking water contaminants

Environmental Effect Indicators

Environmental effects are adverse environmental conditions caused by pollutants.

Environmental effects include environmental degradation, ecological effects and threats to the environment and communities. The introduction of physical, biological and chemical pollutants into the environment can have harmful effects on different components of the ecosystem. Effects can be immediate or delayed. The environmental effects of pollution can also affect people by limiting their ability to make use of ecosystem resources (e.g., eating fish or swimming in local rivers or bays). Also, living in an environmentally degraded community can lead to stress, which may affect human health. In addition, the mere presence of a contaminated site or high-profile facility can have tangible impacts on a community, even if actual environmental degradation cannot be documented. Such sites or facilities can contribute to perceptions of a community being undesirable or even unsafe.

Statewide data on the following topics were identified and found consistent with criteria for indicator development:

Toxic cleanup sites
Groundwater threats from leaking underground storage sites and cleanups
Hazardous waste facilities and generators

Impaired water bodies
Solid waste sites and facilities

Sensitive Population Indicators

Sensitive populations are populations with biological traits that result in increased vulnerability to pollutants.
Sensitive individuals may include those undergoing rapid physiological change, such as children, pregnant women and their fetuses, and individuals with impaired physiological conditions, such as the elderly or people with existing diseases such as heart disease or asthma. Other sensitive individuals include those with lower protective biological mechanisms due to genetic factors.

Pollutant exposure is a likely contributor to many observed adverse outcomes, and has been demonstrated for some outcomes such as asthma, low birth weight, and heart disease. People with these health conditions are also more susceptible to health impacts from pollution. With few exceptions, adverse health conditions are difficult to attribute solely to exposure to pollutants. High quality statewide data related to sensitive populations affected by toxic chemical exposures were identified and found consistent with criteria for development of these indicators:

Children and elderly
Asthma emergency department visits
Low birth-weight infants

Socioeconomic Factor Indicators

Socioeconomic factors are community characteristics that result in increased vulnerability to pollutants.
A growing body of literature provides evidence of the heightened vulnerability of people of color and lower socioeconomic status to environmental pollutants. For example, a study found that individuals with less than a high school education who were exposed to particulate pollution had a greater risk of mortality. Here, socioeconomic factors that have been associated with increased population vulnerability were selected.

Data on the following socioeconomic factors were identified and found consistent with criteria for indicator development:

Educational attainment
Linguistic isolation
Poverty
Unemployment

Indicator and Component Scoring

The indicator values for the census tracts for the entire state are ordered from highest to lowest. A percentile is calculated from the ordered values for all areas that have a score.* Thus each area's percentile rank for a specific indicator is relative to the ranks for that indicator in the rest of the places in the state.

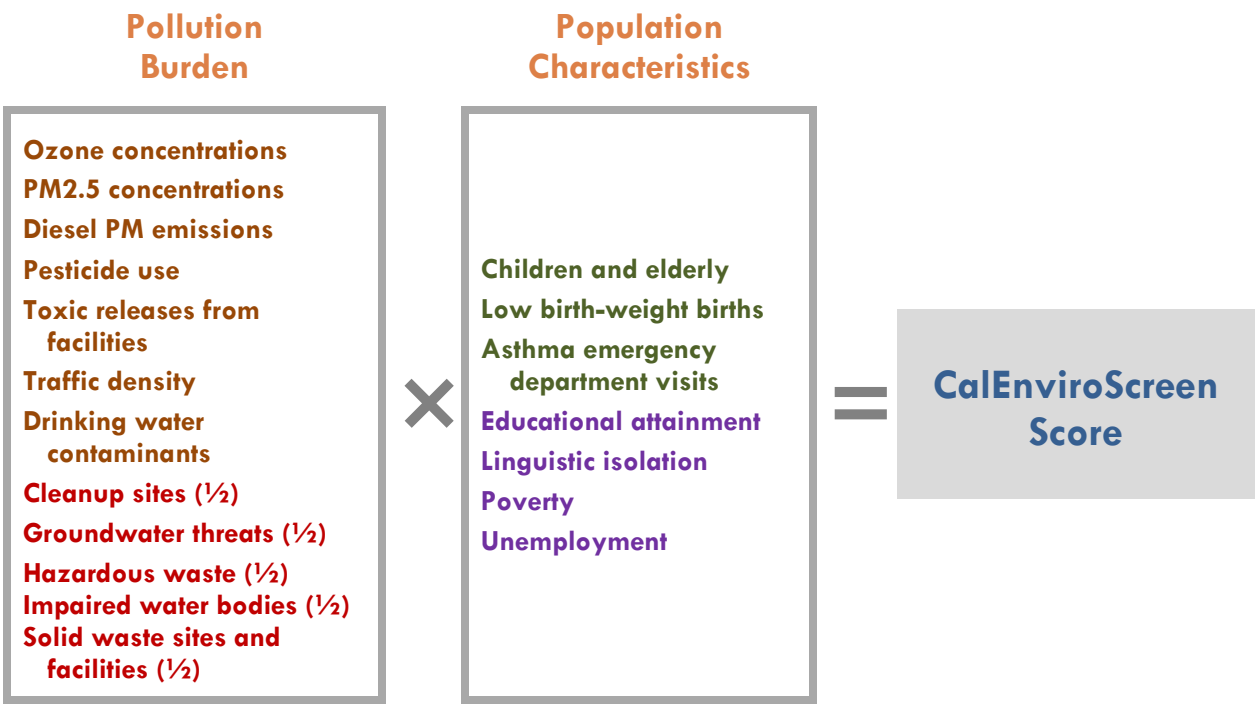
- The indicators used in this analysis have varying underlying distributions, and percentile rank calculations provide a useful way to describe data without making any potentially unwarranted assumptions about those distributions.
- A geographic area's percentile for a given indicator simply tells the percentage of areas with lower values of that indicator.
- A percentile cannot describe the magnitude of the difference between two or more areas. For example, an area ranked in the 30th percentile is not necessarily three times more impacted than an area ranked in the 10th percentile.

Indicators from Exposures and Environmental Effects components were grouped together to represent Pollution Burden. Indicators from Sensitive Populations and Socioeconomic Factors were grouped together to represent Population Characteristics (see figure below).

Scores for the Pollution Burden and Population Characteristics groups of indicators are calculated as follows:

- First, the percentiles for all the individual indicators in a group are averaged. Each indicator from the Environmental Effects component was weighted half as much as those indicators from the Exposures component. This was done because the contribution to possible pollutant burden from the Environmental Effects indicators was considered to be less than those from sources in the Exposures indicators. Thus the score for the Pollution Burden category is a weighted average, with Exposure indicators receiving twice the weight as Environmental Effects indicators.
- Second, Pollution Burden and Population Characteristics percentile averages are scaled so that they have a maximum value of 10 and a possible range of 0 to 10. Each average was divided by the maximum value observed in the state and then multiplied by 10 (see example calculation on Page 16). The scaling ensures that the pollution component and population component contribute equally to the overall CalEnviroScreen score.

* When a geographic area has no indicator value (for example, the census tract has no hazardous waste generators or facilities), it is excluded from the percentile calculation and assigned a score of zero for that indicator. When data are unavailable or missing for a geographic area (for example, the area is greater than 50 kilometers from an air monitor), it is excluded from the percentile calculation and is not assigned any score for that indicator. Thus the percentile score can be thought of as a comparison of one geographic area to other localities in the state where the hazard effect or population characteristic is present.



CalEnviroScreen Score and Maps

The overall CalEnviroScreen score is calculated from the Pollution Burden and Population Characteristics groups of indicators by multiplying the two scores. Since each group has a maximum score of 10, the maximum CalEnviroScreen Score is 100.

The geographic areas are ordered from highest to lowest, based on their overall score. A percentile for the overall score is then calculated from the ordered values. As for individual indicators, a geographic area's overall CalEnviroScreen percentile equals the percentage of all ordered CalEnviroScreen scores that fall below the score for that area.

Maps are developed showing the percentiles for all the census tracts of the state. Maps are also developed highlighting the census tracts scoring the highest.

Uncertainty and Error

There are different types of uncertainty that are likely to be introduced in the development of any screening method for evaluating pollution burden and population vulnerability in different geographic areas. Important ones are:

- The degree to which the data that are included in the model are correct.
- The degree to which the data and the indicator metric selected provide a meaningful measure of the pollution burden or population vulnerability.
- The degree to which data gaps or omissions influence the results.

Efforts were made to select datasets for inclusion that are complete, accurate and current. Nonetheless, uncertainties may arise because environmental conditions change over time, or large databases may contain errors or be incomplete, among others. Some of these uncertainties were addressed in the development of indicators. For example:

- Clearly erroneous place-based information for facilities or sites has been removed.
- Highly uncertain measurements (for example, >50 kilometers from an air monitor) have been excluded from the analysis.

Other types of uncertainty, such as those related to how well indicators measure what they are intended to represent, are more difficult to measure quantitatively. For example:

- How well data on chemical uses or emissions reflect potential contact with pollution.
- How well vulnerability of a community is characterized by demographic data.

Generally speaking, indicators are surrogates for the characteristic being modeled, so a certain amount of uncertainty is inevitable. That said, this model comprised of a suite of indicators is considered useful in identifying places burdened by multiple sources of pollution with populations that may be especially vulnerable. Places that score highly for many of the indicators are likely to be identified as impacted. Since there are tradeoffs in combining different sources of information, the results are considered most useful for identifying communities that score highly using the model. Using a limited data set, an analysis of the sensitivity of the model to changes in weighting showed it is relatively robust in identifying more impacted areas (Meehan August *et al*., 2012). Use of broad groups of areas, such as those scoring in the highest 15 and 20 percent, is expected to be the most suitable application of the CalEnviroScreen results.

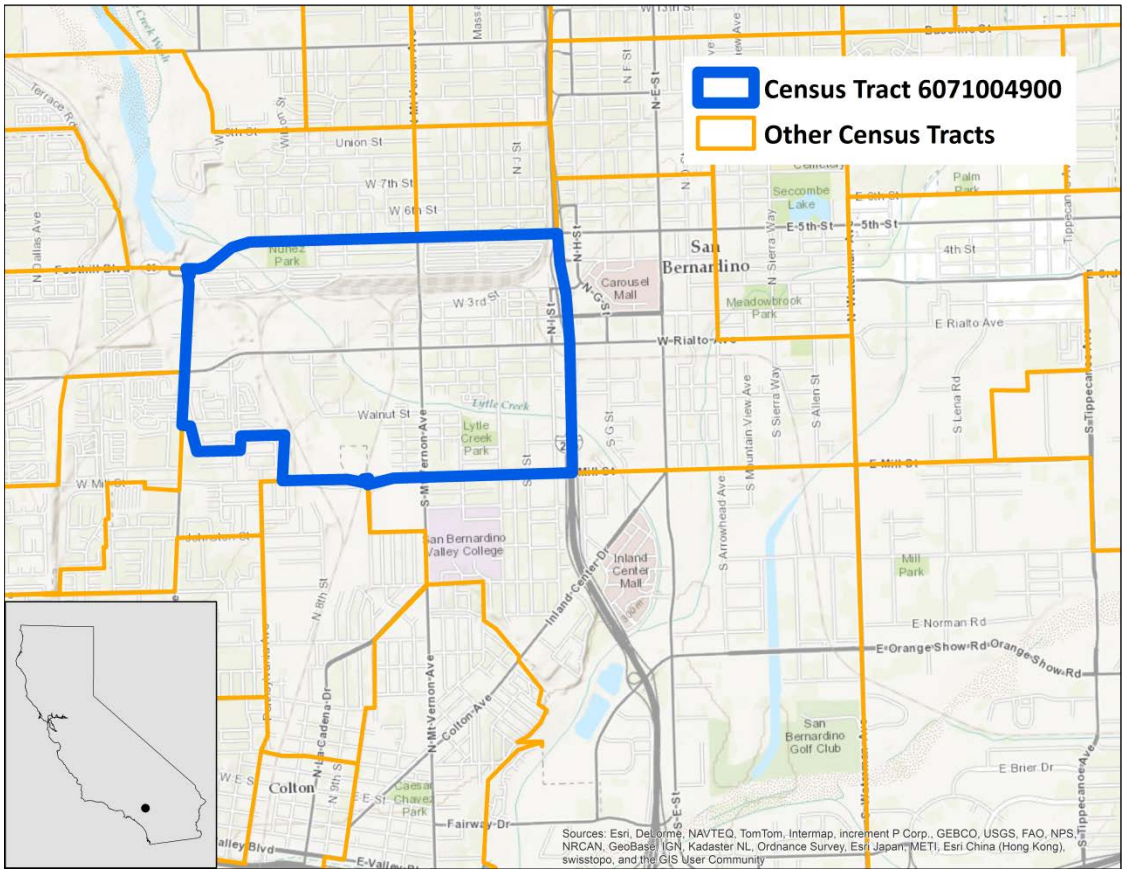
Reference

Meehan August L, Faust JB, Cushing L, Zeise L, Alexeeff, GV (2012). Methodological Considerations in Screening for Cumulative Environmental Health Impacts: Lessons Learned from a Pilot Study in California. *Int J Environ Res Public Health* ***9****(9):* 3069-3084.

EXAMPLE CENSUS TRACT: INDICATOR RESULTS AND CALENVIROSCREEN SCORE

One example census tract in San Bernardino was selected to illustrate how an overall CalEnviroScreen score is calculated using the California Communities Environmental Health Screening Tool. Shown below are:

- An area map for the census tract and surrounding tracts.
- Tables for the indicators of Pollution Burden and Population Characteristics with percentile scores for each of the indicators.
- A table showing how a CalEnviroScreen score was calculated for the example area, using CalEnviroScreen 2.0.



Exposure Indicators							
Indicator	**Ozone** (conc.)	**PM2.5** (conc.)	**DieselPM** (emissions)	**Pesticide Use** (lbs/sq. mi.)	**Toxic Releases** (RSEI toxicity-weighted releases)	**Traffic** (density)	**Drinking Water** (index)
Raw Value	0.79	12.31	23.35	0	851.4	1484.8	533.17
Percentile	98.47	74.24	71.47	0	63.31	73.41	83.86

Environmental Effects Indicators					
Indicator	**Cleanup Sites** (weighted sites)	**Groundwater Threats** (weighted sites)	**Hazardous Waste Facilities/ Generators** (weighted sites)	**Impaired Water Bodies** (number of pollutants)	**Solid Waste Sites/Facilities** (weighted sites and facilities)
Raw Value	21.3	5.75	0.73	1	0
Percentile	84.44	24.74	82.19	15.12	0

Sensitive Population Indicators			
Indicator	**Children (<10) and Elderly (>65)** (percent)	**Asthma** (rate per 10,000)	**Low Birth Weight** (percent)
Raw Value	25.9	104.45	0.05
Percentile	62.88	97.13	36.24

Socioeconomic Factor Indicators				
Indicator	**Educational Attainment** (percent)	**Linguistic Isolation** (percent)	**Poverty** (percent)	**Unemployment** (percent)
Raw Value	54	26.1	70.5	19.84
Percentile	95.05	89.35	94.39	92.90

CALCULATION OF CALENVIROSCREEN SCORE FOR TRACT 6071004900

	Pollution Burden		Population Characteristics	
	Exposures *(7 indicators)*	**Environmental Effects**[a] *(5 indicators)*	**Sensitive Populations** *(3 indicators)*	**Socioeconomic Factors** *(4 indicators)*
Indicator Percentiles	98.47 + 74.24 + 71.47 + 0.0 + 63.31 + 73.41 + 83.86	+ (0.5 × 84.44) + (0.5 × 24.74) + (0.5 × 82.19) + (0.5 × 15.12) + (0.5 × 0.0)	62.88 + 97.13 + 36.24	95.05 + 89.35 + 94.39 + 92.90
Average Percentile	568 ÷ (7+(0.5 × 5)) = 59.79		567.94 ÷ 7 = 81.13	
Scaled Component Scores (Range 0 – 10)	(59.79 ÷ 82. 49[b]) × 10 = 7.25		(81.13 ÷ 96. 22[c]) × 10= 8.43	
CalEnviroScreen Score	7.25 × 8.43 = 61.12 (61.12 is in the top 5% of CalEnviroScreen census tracts statewide)			

[a] Indicators from the Environmental Effects component were given half the weight of the indicators from the Exposures component.

[b] The tract with the highest average percentile for Pollution Burden in the state had a value of 82.49.

[c] The tract with the highest average percentile for Population Characteristics in the state had a value of 96.22.

INDIVIDUAL INDICATORS: DESCRIPTION AND ANALYSIS

POLLUTION BURDEN: EXPOSURE AND ENVIRONMENTAL EFFECT INDICATORS

AIR QUALITY: OZONE

Exposure Indicator

Ozone pollution causes numerous adverse health effects, including respiratory irritation and lung disease. The health impacts of ozone and other criteria air pollutants (particulate matter (PM), nitrogen dioxide, carbon monoxide, sulfur dioxide, and lead) have been considered in the development of health-based standards. Of the six criteria air pollutants, ozone and particle pollution pose the most widespread and significant health threats. The California Air Resources Board maintains a wide network of air monitoring stations that provides information that may be used to better understand exposures to ozone and other pollutants across the state.

Indicator

Amount of the daily maximum 8-hour ozone concentration over the California 8-hour standard (0.070 ppm), averaged over three years (2009 to 2011).

Data Source

Air Monitoring Network,
California Air Resources Board (CARB)

CARB, local air pollution control districts, tribes and federal land managers maintain a wide network of air monitoring stations in California. These stations record a variety of different measurements including concentrations of the six criteria air pollutants and meteorological data. In certain parts of the state, the density of the stations can provide high-resolution data for cities or localized areas around the monitors. However, not all cities have stations.

The information gathered from each air monitoring station audited by the CARB includes maps, geographic coordinates, photos, pollutant concentrations, and surveys.

http://www.arb.ca.gov/aqmis2/aqmis2.php
http://www.epa.gov/airquality/ozonepollution/
http://www.niehs.nih.gov/health/topics/agents/ozone/

Rationale

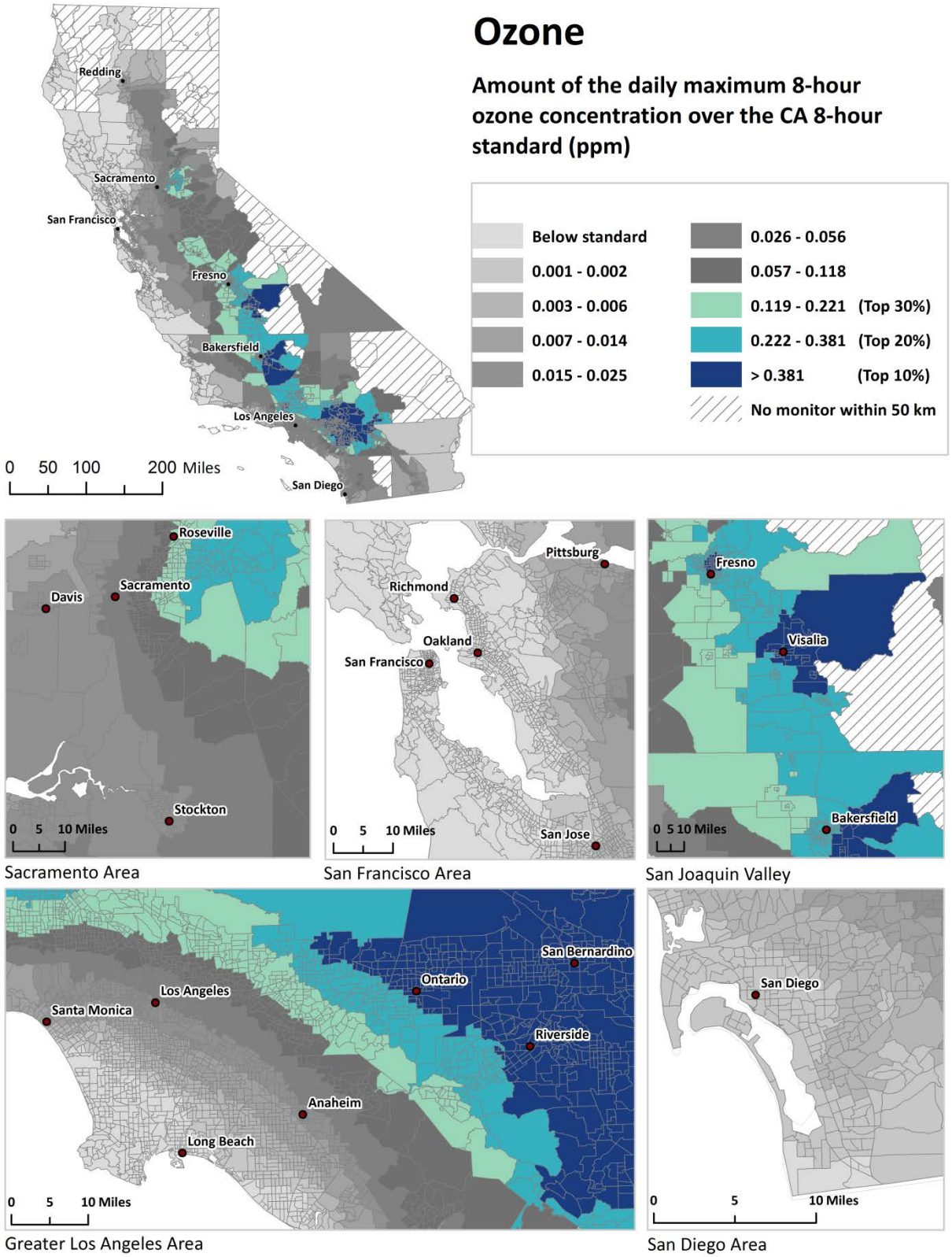
Ozone is an extremely reactive form of oxygen. In the upper atmosphere ozone provides protection against the sun's ultraviolet rays. Ozone at ground level is the primary component of smog. Ground-level ozone is formed from the reaction of oxygen-containing compounds with other air pollutants in the presence of sunlight. Ozone levels are typically at their highest in the afternoon and on hot days (NRC, 2008).

Adverse effects of ozone, including lung irritation, inflammation and exacerbation of existing chronic conditions, can be seen at even low exposures (Alexis *et al.* 2010, Fann *et al.* 2012, Zanobetti and Schwartz 2011). A long-term study in southern California found that rates of asthma hospitalization for children increased during warm season episodes of high ozone concentration (Moore *et al.* 2008). Additional studies have shown that the increased risk is higher among children under 2 years of age, young males, and African American children (Lin *et al.*, 2008, Burnett *et al.*, 2001). Increases in ambient ozone have also been

associated with higher mortality, particularly in the elderly, women and African Americans (Medina-Ramon, 2008). A study in New Mexico found an association between ozone and both cardiovascular and respiratory emergency room visits during spring and summer months when ambient ozone concentrations are highest (Rodopoulou *et al.*, 2014). Some of the relationships between CalEnviroScreen scores and race are explored in the final section of the report. Together with PM2.5, ozone is a major contributor to air pollution-related morbidity and mortality (Fann *et al.* 2012).

Method

- Daily maximum 8-hour average concentrations for all monitoring sites in California were extracted from CARB's air monitoring network database for the years 2009-2011.
- The California 8-hour standard (0.07 ppm) is subtracted from the monitoring data to arrive at the amount of the 8-hour concentration above the California standard. Only concentrations over the federal standard from 2009-2011 were used.
- For each day in the 2009-2011 time period, the 8-hour ozone concentrations over the standard were estimated at the geographic center of the census tract using a geostatistical method that incorporates the monitoring data from nearby monitors (ordinary kriging).
- The estimated daily concentrations over the standard were averaged to obtain a single value for each census tract.
- Census tracts were ordered by ozone concentration values and assigned a percentile based on the statewide distribution of values.
- Note: values at census tracts with centers more than 50 km from the nearest monitor were not estimated (signified by cross-hatch in map).


Ozone
Amount of the daily maximum 8-hour ozone concentration over the CA 8-hour standard (ppm)
Below standard
0.001 - 0.002
0.003 - 0.006
0.007 - 0.014
0.015 - 0.025
0.026 - 0.056
0.057 - 0.118
0.119 - 0.221 (Top 30%)
0.222 - 0.381 (Top 20%)
> 0.381 (Top 10%)
No monitor within 50 km
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Alexis NE, Lay JC, Hazucha M, Harris B, Hernandez ML, Bromberg PA, *et al*. (2010). Low-level ozone exposure induces airways inflammation and modifies cell surface phenotypes in healthy humans. *Inhal Toxicol* **22**(7):593-600.

Burnett RT, Smith-Doiron M, Stieb D, Raizenne ME, Brook JR, *et al*. (2001). Association between Ozone and Hospitalization for Acute Respiratory Diseases in Children Less than 2 Years of Age. *American Journal of Epidemiology* **153**(5):444-452.

Fann N, Lamson AD, Anenberg SC, Wesson K, Risley D, Hubbell BJ (2012). Estimating the National Public Health Burden Associated with Exposure to Ambient PM2.5 and Ozone. *Risk Analysis* **32**(1):81-95.

Lin S, Liu X, Le, LH, Hwang, S (2008). Chronic Exposure to Ambient Ozone and Asthma Hospital Admissions among Children. *Environ Health Perspect* **116**(12):1725-1730.

Medina-Ramón M, Schwartz J (2008). Who is more vulnerable to die from ozone air pollution? *Epidemiology* **19**(5):672-9.

Moore K, Neugebauer R, Lurmann F, Hall J, Brajer V, Alcorn S, *et al*. (2008). Ambient ozone concentrations cause increased hospitalizations for asthma in children: an 18-year study in Southern California. *Environ Health Perspect* **116**(8):1063-70.

NRC (2008). National Research Council Committee on Estimating Mortality Risk Reduction Benefits from Decreasing Tropospheric Ozone Exposure (2008). *Estimating Mortality Risk Reduction and Economic Benefits from Controlling Ozone Air Pollution*. The National Academies Press.

Rodopoulou S, Chalbot M-C, Samoli E, DuBois DW, San Filippo BD, Kavouras IG (2014). Air pollution and hospital emergency room and admissions for cardiovascular and respiratory diseases in Doña Ana County, New Mexico. *Environmental Research* **129**(0):39-46.

Zanobetti A, Schwartz J (2011). Ozone and survival in four cohorts with potentially predisposing diseases. *Am J Respir Crit Care Med* **184**(7):836-41.

AIR QUALITY: PM2.5

Exposure Indicator

Particulate matter pollution, and fine particle (PM2.5) pollution in particular, has been shown to cause numerous adverse health effects, including heart and lung disease. PM2.5 contributes to substantial mortality across California. The health impacts of PM2.5 and other criteria air pollutants (ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, and lead) have been considered in the development of health-based standards. Of the six criteria air pollutants, particle pollution and ozone pose the most widespread and significant health threats. The California Air Resources Board maintains a wide network of air monitoring stations that provides information that may be used to better understand exposures to PM2.5 and other pollutants across the state.

Indicator

Annual mean concentration of PM2.5 (average of quarterly means), over three years (2009-2011).

Data Source

Air Monitoring Network,
California Air Resources Board (CARB)

CARB, local air pollution control districts, tribes and federal land managers maintain a wide network of air monitoring stations in California. These stations record a variety of different measurements including concentrations of the six criteria air pollutants and meteorological data. The density of the stations is such that specific cities or localized areas around monitors may have high resolution. However, not all cities have stations.

The site information gathered from each air monitoring station audited by CARB includes maps, locations coordinates, photos, pollutant concentrations, and surveys.

http://www.arb.ca.gov/aqmis2/aqmis2.php
http://www.epa.gov/airquality/particlepollution/

Rationale

Particulate matter (PM) is a complex mixture of aerosolized solid and liquid particles including such substances as organic chemicals, dust, allergens and metals. These particles can come from many sources, including cars and trucks, industrial processes, wood burning, or other activities involving combustion. The composition of PM depends on the local and regional sources, time of year, location and weather. The behavior of particles and the potential for PM to cause adverse health effects is directly related to particle size. The smaller the particle size, the more deeply the particles can penetrate into the lungs. Some fine particles have also been shown to enter the bloodstream. Those most susceptible to the effects of PM exposure include children, the elderly, and persons suffering from cardiopulmonary disease, asthma, and chronic illness (US EPA, 2012a).

PM2.5 refers to particles that have a diameter of 2.5 micrometers or less. Particles in this size range can have adverse effects on the heart

and lungs, including lung irritation, exacerbation of existing respiratory disease, and cardiovascular effects. The US EPA has set a new standard for ambient PM2.5 concentration of 12 µg/m^3, down from 15 µg/m^3. According to EPA's projections, by the year 2020 only seven counties nationwide will have PM2.5 concentrations that exceed this standard. All are in California (US EPA, 2012b).

In children, researchers associated high ambient levels of PM2.5 in Southern California with adverse effects on lung development (Gauderman *et al.,* 2004). Another study in California found an association between components of PM2.5 and increased hospitalizations for several childhood respiratory diseases (Ostro *et al.,* 2009). In adults, studies have demonstrated relationships between daily mortality and PM2.5 (Ostro *et al.* 2006), increased hospital admissions for respiratory and cardiovascular diseases (Dominici *et al.* 2006), premature death after long-term exposure, and decreased lung function and pulmonary inflammation due to short term exposures (Pope, 2009). A large study in six US communities, including Los Angeles, found an association between increased PM2.5 concentration and an increased risk of stroke (Adar *et al.*, 2013). A California study of long term PM2.5 exposure in women found significant associations with biomarkers of inflammation that can indicate increased risk of cardiovascular disease (Ostro *et al.,* 2014). Exposure to PM during pregnancy has also been associated with low birth weight and premature birth (Bell *et al.* 2007; Morello-Frosch *et al.,* 2010).

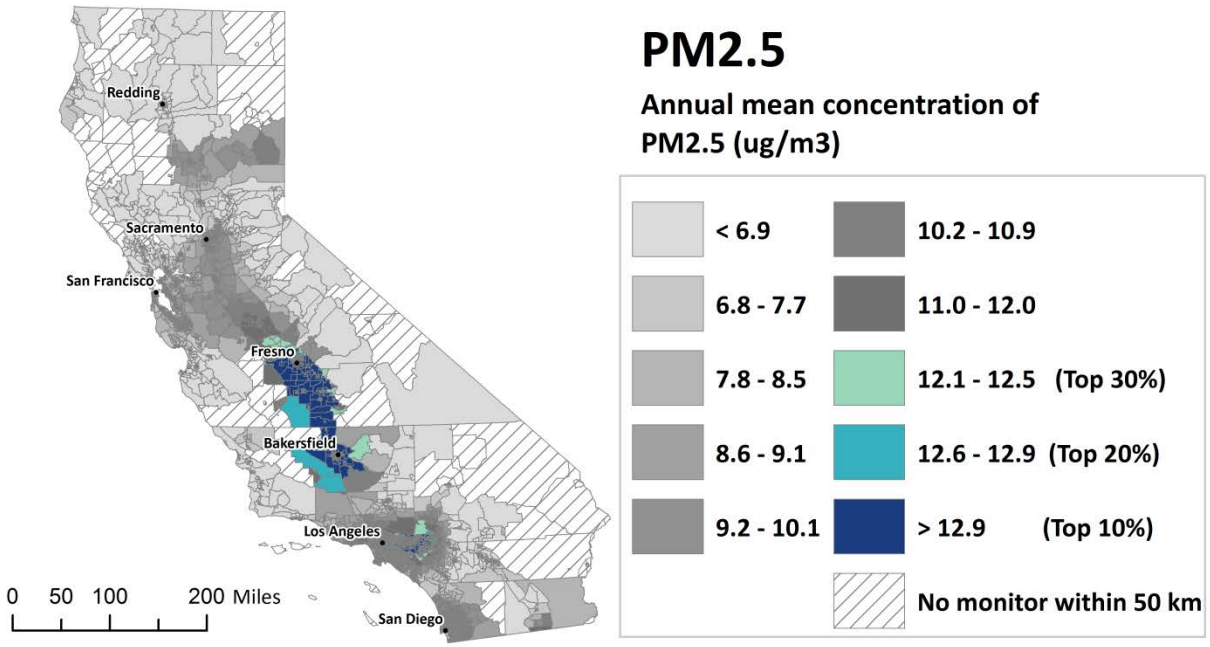
An additional source of PM2.5 in California is wildfires. Fires are not uncommon during dry seasons, particularly in Southern California and the Central Valley. Smoke particles fall almost entirely within the size range of PM2.5. Although the long term risks from exposure to smoke during a wildfire are relatively low, sensitive populations are more likely to experience severe symptoms, both acute and chronic (Lipsett *et al.* 2008). During the wildfires that spread throughout the state in June 2008, PM2.5 concentrations at a site in the northeast San Joaquin Valley were far above air quality standards and approximately ten times more toxic than normal ambient PM (Wegesser *et al.* 2009).

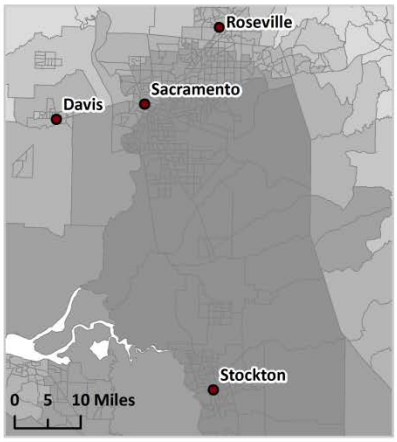
Method

- PM2.5 annual mean monitoring data for was extracted all monitoring sites in California from CARB's air monitoring network database for the years 2009-2011.
- Monitors that reported fewer than 75% of the expected number of observations, based on scheduled sampling frequency, were dropped from the analysis.
- For all measurements in the time period, the quarterly mean concentrations were estimated at the geographic center of the census tract using a geostatistical method that incorporates the monitoring data from nearby monitors (ordinary kriging).
- Annual means were then computed for each year by averaging the quarterly estimates and then averaging those over the three year

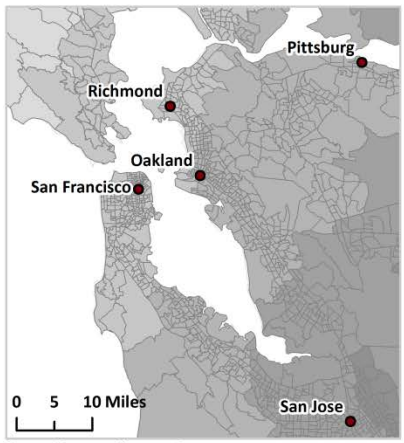
period.

- Census tracts were ordered by the PM2.5 concentration values and assigned a percentile based on the statewide distribution of values.
- Note: values at census tracts with centers more than 50 km from the nearest monitor were not estimated (signified by cross-hatch in map).

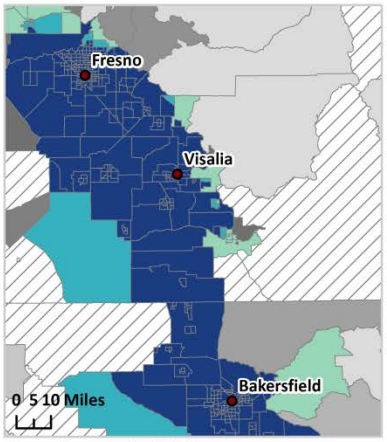




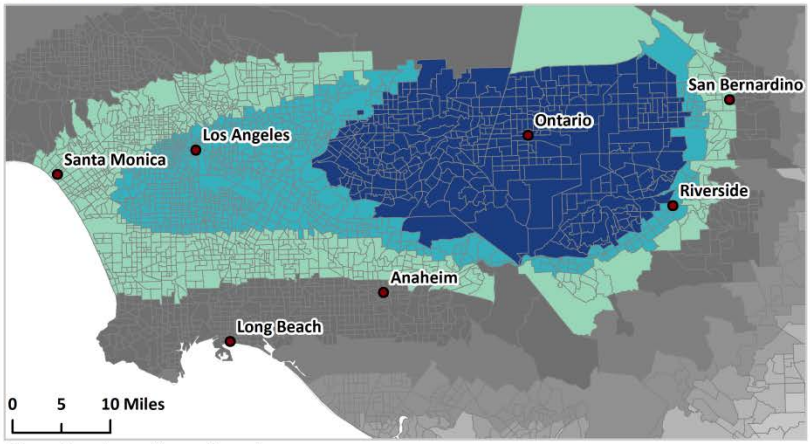
Sacramento Area



San Francisco Area



San Joaquin Valley



Greater Los Angeles Area

San Diego Area

References

Adar SD, Sheppard L, Vedal S, Polak JF, Sampson PD, Diez Roux AV, *et al.* (2013). Fine particulate air pollution and the progression of carotid intima-medial thickness: a prospective cohort study from the multi-ethnic study of atherosclerosis and air pollution. *PLoS Med* **10**(4):e1001430.

Bell ML, Ebisu K, Belanger K (2007). Ambient air pollution and low birth weight in Connecticut and Massachusetts. *Environmental Health Perspectives* **115**(7):1118.

Dominici F, Peng RD, Bell ML, Pham L, McDermott A, Zeger SL, *et al.* (2006). Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases. *JAMA: The Journal of the American Medical Association* **295**(10):1127-34.

Gauderman WJ, Avol E, Gilliland F, Vora H, Thomas D, Berhane K, *et al.* (2004). The effect of air pollution on lung development from 10 to 18 years of age. *New England Journal of Medicine* **351**(11):1057-67.

Lipsett M, Materna B, Stone SL, Therriault S, Blaisdell R, Cook J (2008). Wildfire Smoke: A Guide for Public Health Officials (pp. 53). California Department of Public Health, www.ehib.org/paper.jsp?paper_key=wildfire_smoke_2008 [accessed Feb 7, 2013].

Morello-Frosch R, Jesdale BM, Sadd JL, Pastor M (2010). Ambient air pollution exposure and full-term birth weight in California. *Environmental Health* **9**:44.

Ostro B, Broadwin R, Green S, Feng WY, Lipsett M (2006). Fine particulate air pollution and mortality in nine California counties: results from CALFINE. *Environmental health perspectives* **114**(1):29.

Ostro B, Roth L, Malig B, Marty M (2009). The effects of fine particle components on respiratory hospital admissions in children. *Environmental health perspectives* **117**(3):475.

Ostro B, Malig B, Broadwin R, Basu R, Gold EB, Bromberger JT, *et al.* (2014). Chronic PM2.5 exposure and inflammation: Determining sensitive subgroups in mid-life women. *Environ Res* **132**:168-75.

Pope III CA (2009). The expanding role of air pollution in cardiovascular disease: Does air pollution contribute to risk of deep vein thrombosis? *Circulation* **119**(24):3050-2.

US EPA. The National Ambient Air Quality Standards for Particle Pollution: Particle Pollution and Health. Washington, DC:U.S. Environmental Protection Agency (14 Dec 2012). Available: http://www.epa.gov/pm/2012/decfshealth.pdf [accessed March 12, 2013].

US EPA. Projected Fine Particle Concentrations for Counties with Monitors in 2020. Washington, DC: U.S. Environmental Protection Agency. Available: http://www.epa.gov/pm/2012/2020table.pdf [accessed March 12, 2013].

Wegesser TC, Pinkerton KE, Last JA (2009). California wildfires of 2008: coarse and fine particulate matter toxicity. *Environ Health Perspect* **117**(6):893-7.

DIESEL PARTICULATE MATTER

Exposure Indicator

Diesel particulate matter (diesel PM) occurs throughout the environment from both on-road and off-road sources. Major sources of diesel PM include trucks, buses, cars, ships and locomotive engines. Diesel PM is concentrated near ports, rail yards and freeways where many such sources exist. Exposure to diesel PM has been shown to have numerous adverse health effects including irritation to the eyes, throat and nose, cardiovascular and pulmonary disease, and lung cancer.

Indicator

Spatial distribution of gridded diesel PM emissions from on-road and non-road sources for a 2010 summer day in July (kg/day).

Data Source

California Air Resources Board (CARB)

The CARB produces grid-based emission estimates for a variety of pollutants by emissions category on a 4km by 4km statewide Cartesian grid system to support specific regulatory and research programs. Diesel PM emissions from on- and off-road sources were extracted for a July 2010 weekday from the latest grid-based emissions. This data source does not account for meteorological dispersion of emissions at the neighborhood scale, which can have local-scale and year-to-year variability, or significant local-scale spatial gradients known to exist within a few hundred meters of a high-volume roadway or other large source of diesel PM. Nevertheless it is a reasonable *regional* metric of exposure to diesel PM emissions.

http://www.arb.ca.gov/diesel

Rationale

Diesel PM is the particle phase of diesel exhaust emitted from diesel engines such as trucks, buses, cars, trains, and heavy duty equipment. This phase is composed of a mixture of compounds, including sulfates, nitrates, metals and carbon particles. The diesel particulate matter indicator is distinct from other air pollution indicators in CalEnviroScreen, PM2.5 in particular. Diesel PM includes known carcinogens, such as benzene and formaldehyde (Krivoshto *et al.*, 2008) and 50% or more of the particles are in the ultrafine range (US EPA, 2002). As particle size decreases, the particles may have increasing potential to deposit in the lung (Löndahl *et al.* 2012). The ultrafine fraction of diesel PM (aerodynamic diameter less than 0.1 µm) is of concern because researchers believe these particles penetrate deeper into the lung, can carry toxic compounds on particle surfaces, and are more biologically reactive than larger particles (Betha and Balasubramanian, 2013; Nemmar *et al.*, 2007). In urban areas, diesel PM is a major component of the particulate air pollution from traffic (McCreanor *et al.*, 2007).

Children and those with existing respiratory disease, particularly asthma, appear to be especially susceptible to the harmful effects of exposure to airborne PM from diesel exhaust, resulting in increased

asthma symptoms and attacks along with decreases in lung function (McCreanor *et al.*, 2007; Wargo, 2002).

People that live or work near heavily-traveled roadways, ports, railyards, bus yards, or trucking distribution centers may experience a high level of exposure (US EPA, 2002; Krivoshto *et al.*, 2008). People that spend a significant amount of time near heavily-traveled roadways may also experience a high level of exposure. A study of U.S. workers in the trucking industry found an increasing risk for lung cancer with increasing years on the job (Garshick *et al.*, 2008). The same trend was seen among railroad workers, who showed a 40% increased risk of lung cancer (Garshik *et al.*, 2004). Studies have found strong associations between diesel particulate exposure and exacerbation of asthma symptoms in asthmatic children who attend school in areas of heavy truck traffic (Patel *et al.* 2010, Spira-Cohen *et al.* 2011). Studies of both men and women demonstrate cardiovascular effects of diesel PM exposure, including coronary vasoconstriction and premature death from cardiovascular disease (Krivoshto *et al.*, 2008). A recent study of diesel exhaust inhalation by healthy non-smoking adults found an increase in blood pressure and other potential triggers of heart attack and stroke (Krishnan *et al.,* 2013)

Exposure to diesel PM, especially following periods of severe air pollution, can lead to increased hospital visits and admissions due to worsening asthma and emphysema-related symptoms (Krivoshto *et al.*, 2008). Diesel exposure may also lead to reduced lung function in children living in close proximity to roadways (Brunekreef *et al.*, 1997).

Method

Gridded diesel PM emissions from on-road sources were calculated as follows:

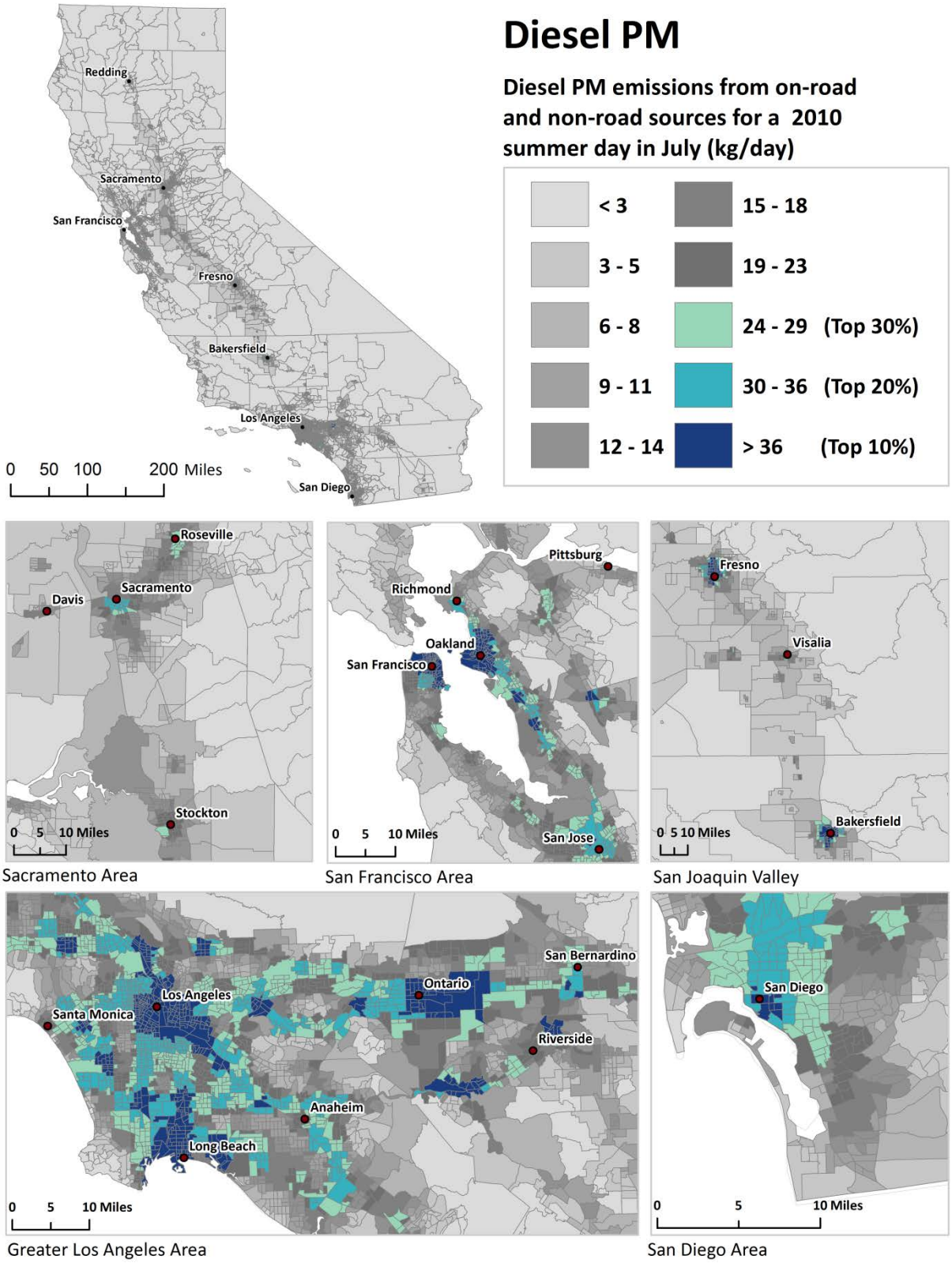
- CARB's on-road emissions model, EMFAC2013, was used to calculate 2010 county-wide estimates of diesel PM emissions for a July weekday.
  http://www.arb.ca.gov/msei/modeling.htm
- EMFAC2013 county-wide emission estimates are spatially distributed to 4km-by-4km grid cells based on the distribution of regional vehicle activity represented in local agency transportation networks and Caltrans' statewide transportation network (where local agency data are not available) using the Direct Travel Impact model (DTIM4). Transportation networks are produced from travel demand modeling conducted by local agencies and Caltrans.

Gridded diesel PM from non-road sources were calculated as follows:

- County-wide estimates of diesel PM from non-road sources for a July weekday were extracted from CARB's emissions inventory forecasting system, CEPAM.
  http://www.arb.ca.gov/app/emsinv/fcemssumcat2009.php
- County-wide emission estimates are spatially distributed to 4km-by-

4km grid cells based on a variety of gridded spatial surrogate datasets. Each category of emissions is mapped to a spatial surrogate that generally represents the expected sub-county locations of source-specific activities. The surrogates include, for example: Lakes and Coastline; Population; Housing and Employment; Industrial Employment; Irrigated Cropland; Unpaved Roads; Single-Housing Units; Forrest Land; Military Bases; Non-irrigated Pasture Land; Rail Lines; Non-Urban Land; Commercial Airports; and Ports.

Resulting gridded emission estimates from the on-road and non-road categories were summed into a single gridded dataset. Gridded diesel PM emission estimates are then allocated to census tracts in ArcMap using a weighted average where the proportion of a grid-cell intersecting a census tract is used as the weight. The resulting census tract totals are assigned a percentile based on the statewide distribution of values.


Diesel PM
Diesel PM emissions from on-road and non-road sources for a 2010 summer day in July (kg/day)
< 3
3 - 5
6 - 8
9 - 11
12 - 14
15 - 18
19 - 23
24 - 29 (Top 30%)
30 - 36 (Top 20%)
> 36 (Top 10%)
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Betha R, Balasubramanian R (2013). Emissions of particulate-bound elements from biodiesel and ultra low sulfur diesel: size distribution and risk assessment. *Chemosphere* **90**(3):1005-15.

Brunekreef B, Janssen NA, de Hartog J, Harssema H, Knape M, van Vliet P (1997). *Epidemiology* **8**(3): 298-303.

Garshick E, Laden F, Hart JE, Rosner B, Davis ME, Eisen EA, Smith TJ (2008). Lung Cancer and Vehicle Exhaust in Trucking Industry Workers. *Environmental Health Perspectives* **116**:1327–1332.

Garshick E, Laden F, Hart JE, Rosner B, Davis ME, Smith TJ, Dockery DW, Speizer FE (2004). Lung Cancer in Railroad Workers Exposed to Diesel Exhaust. *Environmental Health Perspectives* **112**:1539-1543.

Krishnan RM, Sullivan JH, Carlsten C, Wilkerson HW, Beyer RP, Bammler T, *et al*. (2013). A randomized cross-over study of inhalation of diesel exhaust, hematological indices, and endothelial markers in humans. *Part Fibre Toxicol* **10**:7.

Krivoshto IN, Richards JR, Albertson TE, Derlet RW (2008). The Toxicity of Diesel Exhaust: Implications for Primary Care. *Journal of the American Board of Family Medicine* **21**:55– 62.

Löndahl J, Swietlicki E, Rissler J, Bengtsson A, Boman C, Blomberg A, *et al*. (2012). Experimental determination of the respiratory tract deposition of diesel combustion particles in patients with chronic obstructive pulmonary disease. *Part Fibre Toxicol* **9**:30.

McCreanor J, Cullinan P, Nieuwenhuijsen MJ, Stewart-Evans J, Malliarou E, Jarup L, *et al*. (2007). Respiratory effects of exposure to diesel traffic in persons with asthma. *N Engl J Med* **357**(23):2348-58.

Nemmar A, Al-Maskari S, Ali BH, Al-Amri IS (2007). Cardiovascular and lung inflammatory effects induced by systemically administered diesel exhaust particles in rats. *Am J Physiol Lung Cell Mol Physiol* **292**(3):L664-70.

Patel MM, Chillrud SN, Deepti KC, Ross JM, Kinney PL (2012). Traffic-related air pollutants and exhaled markers of airway inflammation and oxidative stress in New York City adolescents. *Environ Res*.

Spira-Cohen A, Chen LC, Kendall M, Lall R, Thurston GD (2011). Personal exposures to traffic-related air pollution and acute respiratory health among Bronx schoolchildren with asthma. *Environ Health Perspect* **119**(4):559-65.

Wargo, J (2002). Children's Exposure to Diesel Exhaust on School Buses. *Environment and Human Health, Inc* 1-76. http://ehhi.org/reports/diesel/diesel.pdf

DRINKING WATER CONTAMINANTS

Exposure Indicator

Californians receive their drinking water from a wide variety of sources and distribution systems. In 2005, approximately 93% of Californians received their water from public water systems (USGS, 2009). According to the California Department of Public Health, approximately 98% of public water systems meet all federal and state drinking water standards (CDPH, 2011). However, drinking water quality varies with location, water source, treatment method, and the ability of the water purveyor to remove contaminants before distribution. Because water is universally consumed, drinking water contamination has the potential to result in widespread exposures. Contaminants may be introduced into drinking water sources in many ways, such as by natural occurrence, accidents, industrial releases, and agricultural runoff.

California water systems have a high rate of compliance with drinking water standards. In 2011, systems serving only between 1.4 and 2.7 percent of the state's population were in violation of one or more drinking water standards (CDPH, 2011 Annual Compliance Report). The drinking water contaminant index used in CalEnviroScreen 2.0 is not a measure of compliance with these standards. The drinking water contaminant index is a combination of contaminant data that takes into account the relative concentrations of different contaminants and whether multiple contaminants are present. The indicator does not indicate whether water is safe to drink.

Certain assumptions, data gaps and limitations within the indicator score methodology may affect the calculation of scores. For example, the indicator score is calculated using average contaminant concentrations over one compliance cycle (2005-2013). Therefore, those average concentrations may not be representative of current concentrations in treated drinking water. The indicator results do not provide a basis for determining when differences between scores are significant in relation to human health. Census tracts can encompass multiple public drinking water systems, and therefore, their scores may represent a combination of water contaminant data from several public drinking water systems and groundwater sources. As such, the drinking water contaminant score may not reflect the water that an *individual* resident of that tract is drinking. For a location within a census tract, more specific local water quality data may be available from the public water system serving that area. Public water systems are required to prepare annual Consumer Confidence Reports that provide detailed, system-specific information on water quality, health impacts and compliance with drinking water standards. These Consumer Confidence Reports provide drinking water quality information directly to the public. The U.S. Environmental Protection Agency offers guidance on finding water quality data in California: http://water.epa.gov/drink/local/ca.cfm

Indicator	*Drinking water contaminant index for selected contaminants*
Data Source	Drinking Water Systems Geographic Reporting Tool, California Environmental Health Tracking Program, California Department of Public Health (CDPH) http://www.ehib.org/page.jsp?page_key=61 Public Water System Location Data

Permitting/Inspections/Compliance/Monitoring/Enforcement (PICME) database, California Department of Public Health

Safe Drinking Water Information System, U.S. Environmental Protection Agency
http://water.epa.gov/scitech/datait/databases/drink/sdwisfed/index.cfm

Water Quality Monitoring Database, CDPH
http://www.cdph.ca.gov/certlic/drinkingwater/Pages/EDTlibrary.aspx

Domestic Well Project, Groundwater Ambient Monitoring and Assessment (GAMA) Program, State Water Resources Control Board
http://www.waterboards.ca.gov/water_issues/programs/gama/domestic_well.shtml

Priority Basin Project, GAMA Program, State Water Resources Control Board and U.S. Geological Survey
http://www.waterboards.ca.gov/water_issues/programs/gama/priority_basin_projects.shtml

Rationale

Low income and rural communities, particularly those served by small community water systems, can be disproportionately exposed to contaminants in their drinking water (VanDerslice, 2011; Balazs *et al.*, 2011).

Much of California relies on groundwater for drinking. In agricultural areas, nitrate from fertilizer application or animal waste can leach to groundwater and cause contamination of drinking water wells, although the distribution of nitrate occurrence and concentrations varies with soil type and crops planted (Lockhart *et al.,* 2013). Rural residents of the San Joaquin Valley receive water primarily from shallow domestic wells,. Elevated levels of nitrate in drinking water are associated with methemoglobinemia (blue baby syndrome), and may be associated with birth defects and miscarriages (Ruckart *et al.*, 2007). Perchlorate, a groundwater contaminant that can come from geologic, industrial and agricultural sources, is common in drier regions of the state (Fram & Belitz, 2011). Although for most people, ingested perchlorate comes primarily from food, on average, across all age groups, 20 percent comes from drinking water (Huber *et al.,* 2011). Perchlorate exposure during pregnancy appears to affect thyroid hormone levels in newborns, which can disrupt normal development (Hershman 2005, Steinmaus *et al.,* 2010). A study of bladder cancer in the U.S. found that drinking surface water was associated with an increased risk of mortality, and the authors suspected a link to low-level pesticide contamination (Colli & Kolettis, 2010).

Arsenic, a known human carcinogen, is a naturally occurring contaminant often found in groundwater in arid and semiarid regions, particularly in the San Joaquin Valley. Exposure to arsenic through drinking water is associated with elevated lung and bladder cancer rates, especially with early-life exposures (Steinmaus *et al.,* 2013). Balazs et al. (2012) found

that communities with more low socioeconomic-status residents were more likely to be exposed to arsenic in their drinking water and more likely to receive water from systems with high numbers of water quality compliance violations. In an earlier study of nitrate concentrations and socioeconomic characteristics of water consumers, they found that small community water systems serving Latinos and renters supplied drinking water with higher levels of nitrate than systems serving fewer Latinos and a higher proportion of homeowners (Balasz *et al.*, 2011).

Method

A drinking water contaminant metric was calculated for each census tract through four broad steps (detailed more fully below):

1. Drinking water system boundaries were identified based upon established boundaries or, where necessary, the boundaries were approximated.
2. Drinking water contaminant data were associated with each water system and average concentrations were calculated for each contaminant and system.
3. The systems' average water contaminant concentration was re-allocated from the system boundaries to census tracts. The census tracts were then ranked to obtain a percentile score for each contaminant and tract.
4. A census tract contaminant index was calculated as the sum of the percentiles for all contaminants.

Drinking Water System Boundaries

- Water system boundaries were downloaded from the CDPH Environmental Health Investigation Branch's Drinking Water Systems Geographic Reporting Tool.
- If the system boundaries were not available, but system source locations were available, boundaries were approximated based on their locations and the population served by the system.
- For areas without known water systems and source locations, township boundaries from the Public Land Survey System (approximately 6 miles square) were treated as the boundaries for the purpose of assigning water quality to people living in that area.

Drinking Water Contaminant Metric Calculation

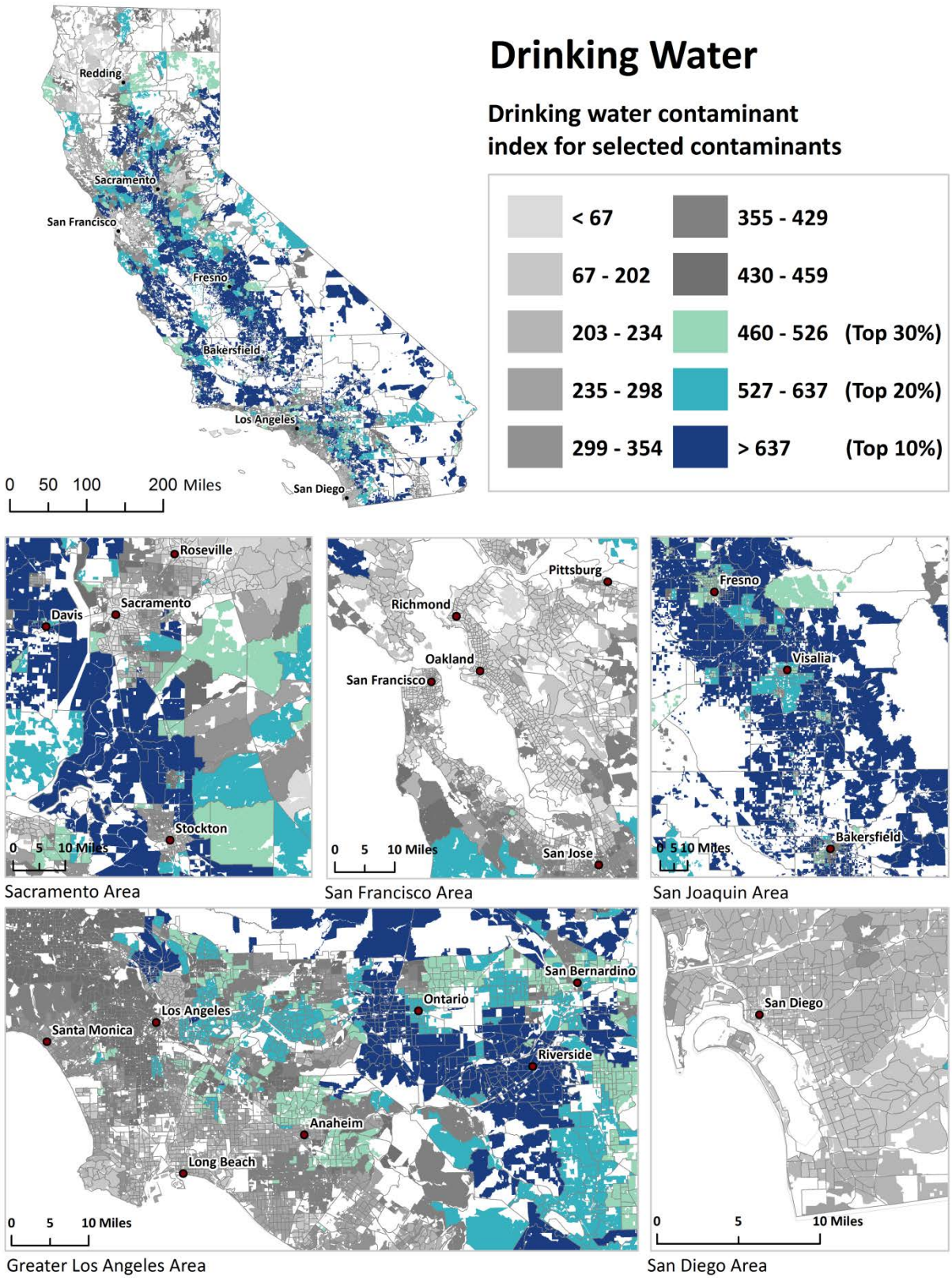
- A subset of contaminants tested in drinking water across California was selected for the analysis (see Appendix) based on frequency of testing and detection in California drinking water. Monitoring data for these chemicals were obtained from CDPH's Water Quality Monitoring database from 2005-2013, the three most recent compliance periods. Water quality data representing treated/delivered water were associated with their water system first. If no treated/delivered water quality data for a system

was available, but the system purchased water from wholesalers, the wholesaler's water quality was associated with the system. If no treated/delivered water data were reported in that time period for a given contaminant and system, water quality data from untreated or raw sources were used for that contaminant and system.

- For large water systems serving more than 100,000 people that rely on local sources of water and purchase water from wholesalers, the fraction of water that was purchased was identified from publicly available information (e.g., water quality reports). If no information was found on fraction purchased, it was assumed that half of the water was purchased (including all systems serving less than 100,000 people that purchase water from wholesalers).
- Time-weighted average concentrations of each contaminant were calculated for each year for each sample source within a system. The average yearly concentrations were then averaged to create a source concentration. Then, the source concentrations within a system were averaged to calculate one concentration value for each chemical in each system. If purchased water from wholesalers was included, the calculation was adjusted by the fraction purchased.
- Areas without system or sample source data were assigned the average groundwater quality data for sources in the township in which they were located (raw or untreated community or non-community water system data, Domestic Well Project water quality data, and Priority Basin water quality data). People in these areas were assumed to drink groundwater.
- Violations of the Maximum Contamination Level for any chemical contaminant and Total Coliform rule were also summed for each water system, serving as a basis for a "violation index."

Re-allocation from Water System Boundaries to Census Tracts

- Census *blocks* were assigned the contaminant concentration or violation index of the systems in which they fell. Partial census blocks were apportioned by area.
- Census tract concentration estimates for each contaminant were calculated as the population-weighted sum of the contaminant concentration for the census blocks (or partial blocks) within the tract. Violation index data were similarly calculated.
- The census tracts were ordered by the value of their contaminant concentrations or violation index. Percentiles were calculated.
- The overall drinking water contaminant score for a census tract is the sum of its percentiles for all contaminants and violations.



Note: This map displays only the populated portions of census tracts in California.

References

Balazs C, Morello-Frosch R, Hubbard A, Ray I (2011). Social Disparities in Nitrate Contaminated Drinking Water in California's San Joaquin Valley. *Environ Health Perspect.*

Balazs CL, Morello-Frosch R, Hubbard AE, Ray I (2012). Environmental justice implications of arsenic contamination in California's San Joaquin Valley: a cross-sectional, cluster-design examining exposure and compliance in community drinking water systems. *Environ Health* **11**:84.

CDPH (2011). California Department of Public Health. 2011 Annual Compliance Report. Available from http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Publications.aspx

Colli JL, Kolettis PN (2010). Bladder cancer incidence and mortality rates compared to ecologic factors among states in America. *International Urology and Nephrology* **42**(3):659-65.

Fram MS, Belitz K (2011). Probability of detecting perchlorate under natural conditions in deep groundwater in California and the southwestern United States. *Environ Sci Technol* **45**(4):1271-7.

Hershman JM (2005). Perchlorate and thyroid function: what are the environmental issues? *Thyroid* **15**(5):427-31.

Huber DR, Blount BC, Mage DT, Letkiewicz FJ, Kumar A, Allen RH (2011). Estimating perchlorate exposure from food and tap water based on US biomonitoring and occurrence data. *J Expo Sci Environ Epidemiol* **21**(4):395-407.

Lockhart KM, King AM, Harter T (2013). Identifying sources of groundwater nitrate contamination in a large alluvial groundwater basin with highly diversified intensive agricultural production. *J Contam Hydrol* **151**:140-54.

Parvez F, Chen Y, Yunus M, Olopade C, Segers S, Slavkovich V, *et al.* (2013). Arsenic Exposure and Impaired Lung Function. Findings from a Large Population-based Prospective Cohort Study. *American Journal of Respiratory and Critical Care Medicine* **188**(7):813-9.

Ruckart PZ, Henderson AK, Black ML, Flanders WD (2007). Are nitrate levels in groundwater stable over time? *J Expos Sci Environ Epidemiol* **18**(2):129-33.

Steinmaus C, Miller MD, Smith AH (2010). Perchlorate in drinking water during pregnancy and neonatal thyroid hormone levels in California. *J Occup Environ Med* **52**(12):1217-524.

Steinmaus CM, Ferreccio C, Romo JA, Yuan Y, Cortes S, Marshall G, et al (2013). Drinking water arsenic in northern Chile: high cancer risks 40 years after exposure cessation. *Cancer Epidemiol Biomarkers Prev* **22**(4):623-30.

USGS (2009). US Geological Survey. Estimated Use of Water in the US in 2005. Circular 1344. Available from http://pubs.usgs.gov/circ/1344/.

VanDerslice J (2011). Drinking water infrastructure and environmental disparities: evidence and methodological considerations. *Am J Public Health* **101 Suppl 1**:S109-14.

Appendix

Contaminants Evaluated

Contaminant	Public Health Goal	Maximum Contaminant Level
Arsenic	0.004 µg/l	10 µg/l
Cadmium	0.04 µg/l	5 µg/l
Chromium, Hexavalent	0.02 µg/l	10 µg/l
Dibromochloropropane (DBCP)	0.0017 µg/l	0.2 µg/l
Lead	0.2 µg/l	15 µg/l
Nitrate (NO_3)	45 mg/l	45 mg/l
Perchlorate	6 µg/l	6 µg/l
Total Trihalomethanes (THM)	---	80 µg/l
Trichloroethylene (TCE)	1.7 µg/l	5 µg/l
Uranium	0.43 pCi/l	20 pCi/l

Violation Types Evaluated

Violation Type
MCL Violation
Total Coliform Rule Violation

PESTICIDE USE

Exposure Indicator

Communities near agricultural fields, primarily farm worker communities, may be at risk for exposure to pesticides. Drift or volatilization of pesticides from agricultural fields can be a significant source of pesticide exposure. Complete statewide data on human exposures to pesticides do not exist. The most robust pesticide information available statewide are data maintained by the California Department of Pesticide Regulation showing where and when pesticides are used across the state. Pesticide use, especially use of volatile chemicals that can easily become airborne, can serve as an indicator of potential exposure. Similarly, unintended environmental damage from the use of pesticides may increase in areas with greater use.

Indicator

Total pounds of selected active pesticide ingredients (filtered for hazard and volatility) used in production-agriculture per square mile.

Data Source

Pesticide Use Reporting,
California Department of Pesticide Regulation (DPR)

In California, all agricultural pesticide use must be reported monthly to county agricultural commissioners, who report the data to DPR. California has a broad legal definition of agricultural use—production agricultural is defined as pesticides used on any plant or animal to be distributed in the channels of trade and non-production agricultural includes pesticide applications to parks and recreational lands, rights-of-ways, golf courses, and cemeteries for example. Non-agricultural control includes home, industrial, institutional, structural, vector control, and veterinary uses. Production agricultural pesticide use data are publicly available for each Meridian-Township-Range-Section (MTRS) in California and was used to create this indicator. An MTRS, or section, is roughly equivalent to one square mile. Data are available statewide except for some areas that are exempt from reporting, such as some military and tribal lands.

Non-production agricultural and non-agricultural pesticide use data is only available at the county scale and was not included in the indicator due to the large geographic scale.

http://www.DPR.ca.gov/docs/pur/purmain.htm

Rationale

To determine whether pesticide exposure may be occurring as a result of agricultural use, DPR established a pesticide air monitoring network for agricultural areas where there is high use of pesticides likely to concentrate in air. Preliminary results for the first year of monitoring show that more than half of pesticides sampled were detected, although none were above the health screening levels (CDPR, 2012). Pesticide air monitoring is not available statewide.

High use of pesticides, however, has been correlated with exposure and with acute pesticide-related illness, and there is evidence of association with chronic disease outcomes. Pregnant, low income Latinas residing in an agricultural area of California had pesticide metabolite levels in

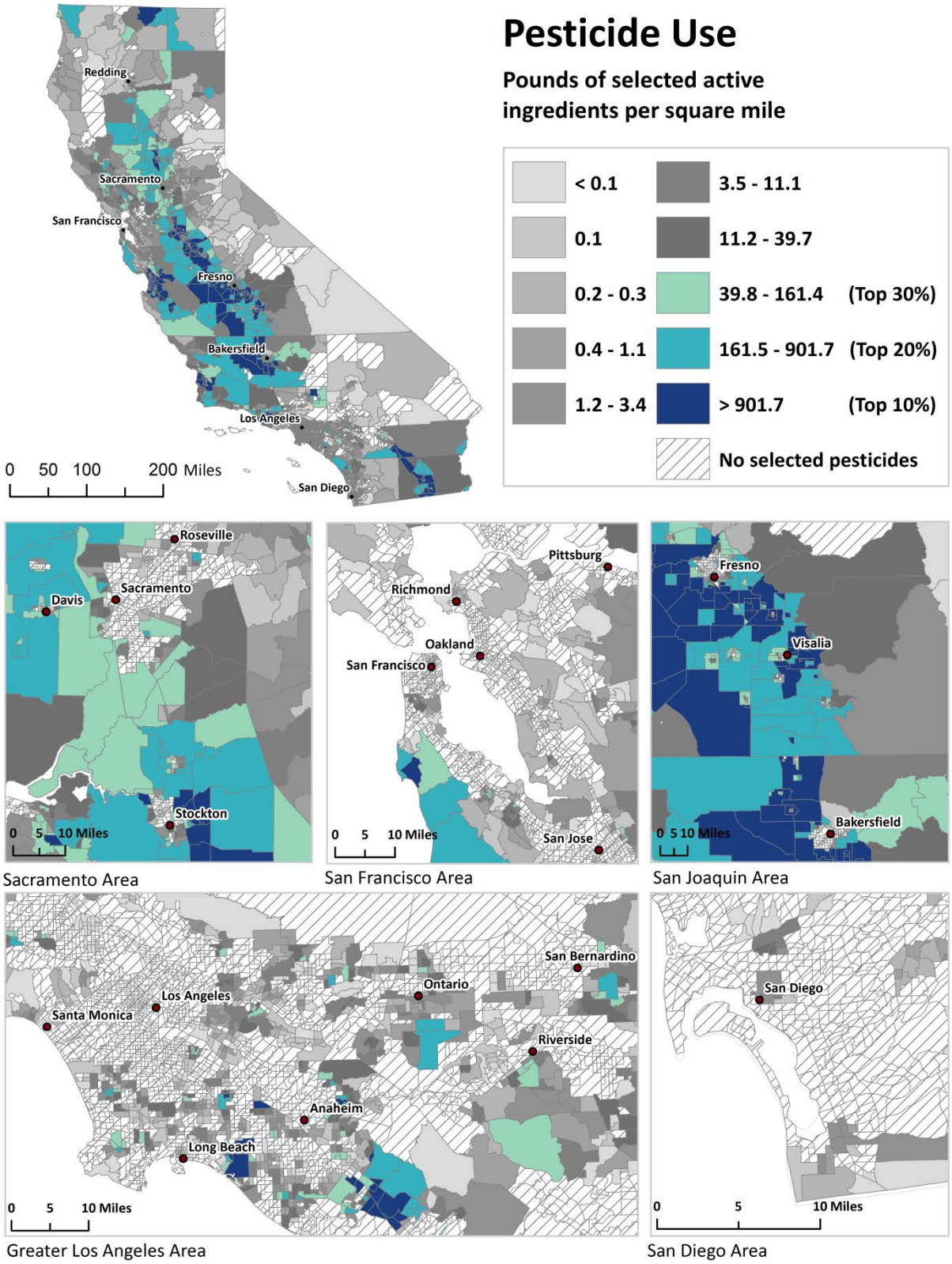
their urine up to 2.5 times higher than a representative sample of U.S. women (Bradman *et al.*, 2005). Some research indicates that proximity to agricultural fields is correlated with measured concentrations in homes (Bradman *et al.*, 2007; Harnly *et al.*, 2009). A recent study in California comparing farmworker homes to homes of low income urban residents found indoor concentrations of an agricultural pesticide only in homes of farmworkers (Quiros-Alcala *et al.,* 2011). Another study, based on data from the California Pesticide Use Report database, found that nearby agricultural pesticide use was significantly associated with pesticide concentrations in carpet dust (Gunier *et al.*, 2011).

A large cohort study of male pesticide applicators found a significant association between the use of four specific insecticides and aggressive prostate cancer (Koutros *et al.*, 2012). Prenatal exposure to the organophosphate chlorpyrifos has been associated with abnormalities in brain structure in children (Rauh *et al.*, 2012). An examination of national pesticide illness data concluded that agricultural workers and residents near agriculture had the highest rates of pesticide poisoning from drift incidents. Soil fumigation accounted for most of the cases (Lee *et al.*, 2011). DPR has also documented numerous pesticide drift incidents that have led to illness in California (O'Malley *et al.*, 2005). Because of their physical and chemical characteristics, fumigants and other volatile pesticides are most likely to be involved in pesticide drift incidents and illnesses. However, any pesticide that is applied by air or sprayed during windy conditions can drift over neighboring communities (Coronado *et al.*, 2011; Lee *et al.*, 2011).

Method

Specific pesticides included in the measure of pesticide use were narrowed from the list of all registered pesticides in use in California to focus on a subset of 69 chemicals that are filtered for hazard and volatility. Volatility is indicative of higher likelihood of drift and exposure (See Appendix).

- Production agricultural pesticide use records were obtained for the entire state for the years 2009, 2010, and 2011.
- Production pesticide use (total pounds of selected active ingredient) for MTRS records were matched to census tracts using a match file created in the GIS software ArcMap.
- Production pesticide use for each census tract was divided by each census tract's area.


Pesticide Use
Pounds of selected active ingredients per square mile
< 0.1
0.1
0.2 - 0.3
0.4 - 1.1
1.2 - 3.4
3.5 - 11.1
11.2 - 39.7
39.8 - 161.4 (Top 30%)
161.5 - 901.7 (Top 20%)
> 901.7 (Top 10%)
No selected pesticides
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Area
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

Appendix

Pesticide Use – Filter for Hazard and Volatility

Specific pesticides included in the measure of pesticide use were identified from the list of all registered pesticides through consideration of both hazard and likelihood of exposure.

The more hazardous pesticides were identified using a list generated under the Birth Defect Prevention Act of 1984 (SB 950) and the Proposition 65 list (Safe Drinking Water and Toxic Enforcement Act of 1986). As part of a review process of active ingredients under the SB 950 program, pesticides are classified as "High", "Moderate", or "Low" priority for potential adverse health effects using studies of sufficient quality to characterize risk. The prioritization of each pesticide is a subjective process based upon the nature of potential adverse effects, the number of potential adverse effects, the number of species affected, the no observable effect level (NOEL), potential human exposure, use patterns, quantity used, and US EPA evaluations and actions, among others. Proposition 65 requires the state to maintain a list of chemicals that cause cancer or reproductive toxicity. For the purpose of developing an exposure indicator, pesticides that were prioritized as "Low," not prioritized under SB 950, or not on the Proposition 65 list were removed from the analysis.

The analysis was further limited to pesticides of high or moderate volatility. Higher volatility was considered to increase the likelihood of exposures. A list of pesticide volatilities was obtained from DPR. Pesticides not appearing on this list were researched for chemical properties in the open literature. Pesticides with volatility less than 10^{-6} mm Hg were removed from the indicator analysis.

The filtering of pesticides for both hazard and volatility resulted in a list of 69 pesticides that were included in the analysis here. The pesticides that are included in the indicator calculation are identified below.

- *1,3-Dichloropropene*
- *2,2-Dibromo-3-nitrilopropionamide (DBNPA)*
- *2,2-dichlorovinyl dimethyl phosphate (DDVP, Dichlorvos)*
- *Acephate*
- *Acrolein*
- *Aldicarb*
- *Azinphos-methyl (Guthion)*
- *Bromoxynil heptanoate*
- *Bromoxynil octanoate*
- *Buprofezin*
- *Carbaryl (Sevin)*
- *Carbofuran*
- *Chloropicrin*
- *Chlorothalonil*
- *Chlorpyrifos*
- *Chlorthal-dimethyl (DCPA, Dacthal)*
- *Clomazone*
- *Cycloate (Ro-Neet)*
- *Cyprodinil*
- *Dazomet*
- *Diazinon*
- *Dichloran*
- *Dimethoate*
- *Dimethyl disulfide (Paladin)*
- *Endosulfan**
- *Ethalfluralin*
- *Ethoprop*
- *Fenamiphos*
- *Fenpropathrin*
- *Fenthion*
- *Fludioxonil*
- *Flumioxazin*
- *Fosthiazate*
- *Hydrogen cyanamide*
- *Imazalil*
- *Linuron*
- *Malathion*
- *Metalaxyl*
- *Metam-sodium*
- *Methamidophos (Monitor)*
- *Methidathion*
- *Methomyl*
- *Methyl bromide*
- *Methyl isothiocyanate*
- *Methyl parathion*
- *Metrafenone*
- *Molinate*
- *Myclobutanil*
- *Naled*
- *Oxydemeton-methyl*
- *Pentachloronitrobenzene (PCNB)*
- *Phosphine*
- *Metam-potassium*
- *Propetamphos*
- *Propoxur (Baygon)*
- *Propylene oxide*
- *Pyrimethanil*
- *S,S,S-Tributyl phoshorotrithioate (DEF)*
- *S-Ethyl dipropylthiocarbamate (EPTC)*
- *Sodium cyanide*
- *Sodium tetrathiocarbonate*
- *Sulfur dioxide*
- *Sulfuryl fluoride*
- *Thiram*
- *Triclopyr, butoxyethyl ester (TBEE)*
- *Triclopyr, triethylamine salt (TEA)*
- *Triflumizole*
- *Trifluralin*
- *Ziram*

** Added based on its designation as a Toxic Air Contaminant (AB 1807 Program).*

References

Bradman A, Eskenazi B, Barr DB, Bravo R, Castorina R, Chevrier J, *et al.* (2005). Organophosphate urinary metabolite levels during pregnancy and after delivery in women living in an agricultural community. *Environ Health Perspect* **113**(12):1802-7.

Bradman A, Whitaker D, Quiros L, Castorina R, Claus Henn B, Nishioka M, *et al.* (2007). Pesticides and their metabolites in the homes and urine of farmworker children living in the Salinas Valley, CA. *J Expo Sci Environ Epidemiol* **17**(4):331-49.

CDPR (2012). California Department of Pesticide Regulation. Air Monitoring Network Results for 2011. Volume 1. [Available at URL: http://www.cdpr.ca.gov/docs/emon/airinit/amn_draft_vol1.pdf].

Coronado GD, Holte S, Vigoren E, Griffith WC, Barr DB, Faustman E, Thompson B (2011). Organophosphate pesticide exposure and

residential proximity to nearby fields: evidence for the drift pathway. *J Occup Environ Med* **53**(8):884-91.

Gunier RB, Ward MH, Airola M, Bell EM, Colt J, Nishioka M, *et al.* (2011). Determinants of agricultural pesticide concentrations in carpet dust. *Environmental health perspectives* **119**(7):970.

Harnly ME, Bradman A, Nishioka M, McKone TE, Smith D, McLaughlin R, *et al.* (2009). Pesticides in dust from homes in an agricultural area. *Environ Sci Technol* **43**(23):8767-74.

Koutros S, Beane Freeman LE, Lubin JH, Heltshe SL, Andreotti G, Barry KH, *et al.* (2013). Risk of total and aggressive prostate cancer and pesticide use in the Agricultural Health Study. *Am J Epidemiol* **177**(1):59-74.

Lee SJ, Mehler L, Beckman J, Diebolt-Brown B, Prado J, Lackovic M, *et al.* (2011). Acute Pesticide Illnesses Associated with Off-Target Pesticide Drift from Agricultural Applications: 11 States, 1998–2006. *Environmental health perspectives* **119**(8):1162.

O'Malley M, Barry T, Ibarra M, Verder-Carlos M, Mehler L (2005). Illnesses related to shank application of metam-sodium, Arvin, California, July 2002. *Journal of Agromedicine* **10**(4):27-42.

Quiros-Alcala L, Bradman A, Nishioka M, Harnly ME, Hubbard A, McKone TE, *et al.* (2011). Pesticides in house dust from urban and farmworker households in California: an observational measurement study. *Environ Health* **10**:19.

Rauh VA, Perera FP, Horton MK, Whyatt RM, Bansal R, Hao X, *et al.* (2012). Brain anomalies in children exposed prenatally to a common organophosphate pesticide. *Proc Natl Acad Sci U S A* **109**(20):7871-6.

TOXIC RELEASES FROM FACILITIES

Exposure Indicator

There is widespread concern regarding exposures to chemicals that are released from industrial facilities. Statewide information directly measuring exposures to toxic releases has not been identified. However, some data on the *release* of pollutants into the environment is available and may provide some relevant evidence for potential subsequent exposures. The U.S. Environmental Protection Agency (US EPA) maintains a toxic substance inventory of on-site releases to air, water, and land and underground injection of any classified chemical, as well as quantities transferred off-site. The data are reported by each facility. US EPA has a computer-based screening tool called Risk Screening Environmental Indicators (RSEI) that analyzes these releases and models potential toxic exposures.

Indicator

Toxicity-weighted concentrations of modeled chemical releases to air from facility emissions and off-site incineration.

Data Source

Risk Screening Environmental Indicators (RSEI)
U.S. Environmental Protection Agency (US EPA)
Toxic Release Inventory (TRI)

The TRI program was created by the federal Emergency Planning and Community Right-to-Know Act (EPCRA) and Pollution Prevention Act. The program maintains a database of emissions and other releases for certain toxic chemicals. The database is updated annually and includes:

- Chemicals identified in EPCRA Section 313 (593 individually listed chemicals and 30 chemical categories including three categories containing 62 chemicals); and
- Persistent, Bioaccumulative and Toxic (PBT) Chemicals (16 specific chemicals and 4 chemical classes).

Facilities are required to report if they have 10 or more full-time employees, operate within a set of industrial sectors outlined by TRI, and manufacture more than 25,000 pounds or otherwise use more than 10,000 pounds of any listed chemical during the calendar year. Lower reporting thresholds apply for PBT chemicals (10 or 100 pounds) and dioxin-like chemicals (0.1 gram).

RSEI is a computer-based screening tool that analyzes factors related to toxic releases that may result in chronic human health risks. RSEI analyzes these factors and calculates a numeric score. To give the score meaning, it must be ranked against other RSEI scores. RSEI combines TRI release data with toxicity estimates and models the dispersion of chemicals in air by incorporating physicochemical properties, weather and geography. US EPA gives each chemical release and potential exposure pathway is given a toxic weight. The toxicity weights are drawn from various programs of the US EPA, CalEPA, and the Agency for Toxic Substances and Disease Registry and consider both cancer and non-cancer endpoints. The resulting measure of exposure is additive across

chemicals.

For all air releases, an EPA plume model is used to estimate long-term pollutant concentrations downwind of a stack or area source. The air releases resulting from incineration of waste after transfers to off-site facilities are modeled in the same manner. RSEI assigns the toxicity weighted concentrations to an 810 m by 810 m grid cell system. The total concentration based hazard scores for the entire grid cell system are available from US EPA as RSEI Geographic Microdata.

http://www.epa.gov/opptintr/rsei/pubs/rsei_methodology_v2.3.1.pdf
http://www.epa.gov/opptintr/rsei/pubs/rsei_users_manual_v2.3.1.pdf
http://www.epa.gov/tri/index.htm
http://www.epa.gov/oppt/rsei/pubs/technical_appendix_a_toxicity_v2.3.1.pdf

Rationale

The Toxics Release Inventory (TRI) provides public information on emissions and releases into the environment from a variety of facilities across the state. TRI data do not, however, provide information on the extent of public exposure to these chemicals. That said, US EPA has stated that "[d]isposal or other releases of chemicals into the environment occur through a range of practices that could ultimately affect human exposure to the toxic chemicals." (US EPA, 2010). A study of pollution in the printed wiring board industry found that among states with high TRI emissions in 2006, RSEI risk scores for California were by far the highest. According to the study, California combines high toxic emissions with a high risk score, based on location, composition of emissions and population exposure modeling (Lam *et al.*, 2011).

Air monitoring data at hundreds of locations across the United States have identified over a dozen hazardous air pollutants at concentrations that exceed California cancer or non-cancer benchmarks (McCarthy *et al.*, 2009). Many of the locations that these authors found to have elevated levels are near major industrial sources, and many of the chemicals monitored are the same as those that are emitted from these facilities. In California, a study that modeled concentrations of air toxic chemicals found significant levels of risk (Morello-Frosch *et al.*, 2000). Although this study found that mobile sources accounted for a major portion of the risk, the authors pointed out that for some communities, local industrial sources were a major contributor.

In addition to routine chemical releases, some communities located near TRI facilities are at risk from exposure to accidental chemical releases. A study of self-reported accident rates at U.S. chemical facilities over a five year period reported that 1,205 facilities (7.8% of facilities in the database) had at least one accident during the reporting period, and an additional 355 facilities (2.3%) had multiple accidents during the reporting period (Kleindorfer *et al.*, 2003). Associated with these events were a total of 1,987 injuries and 32 deaths among workers, and 167 injuries among nonemployees, including emergency responders. There were 215 total hospitalizations and 6,057 individuals given other medical treatments. Over 200,000 community residents were involved in

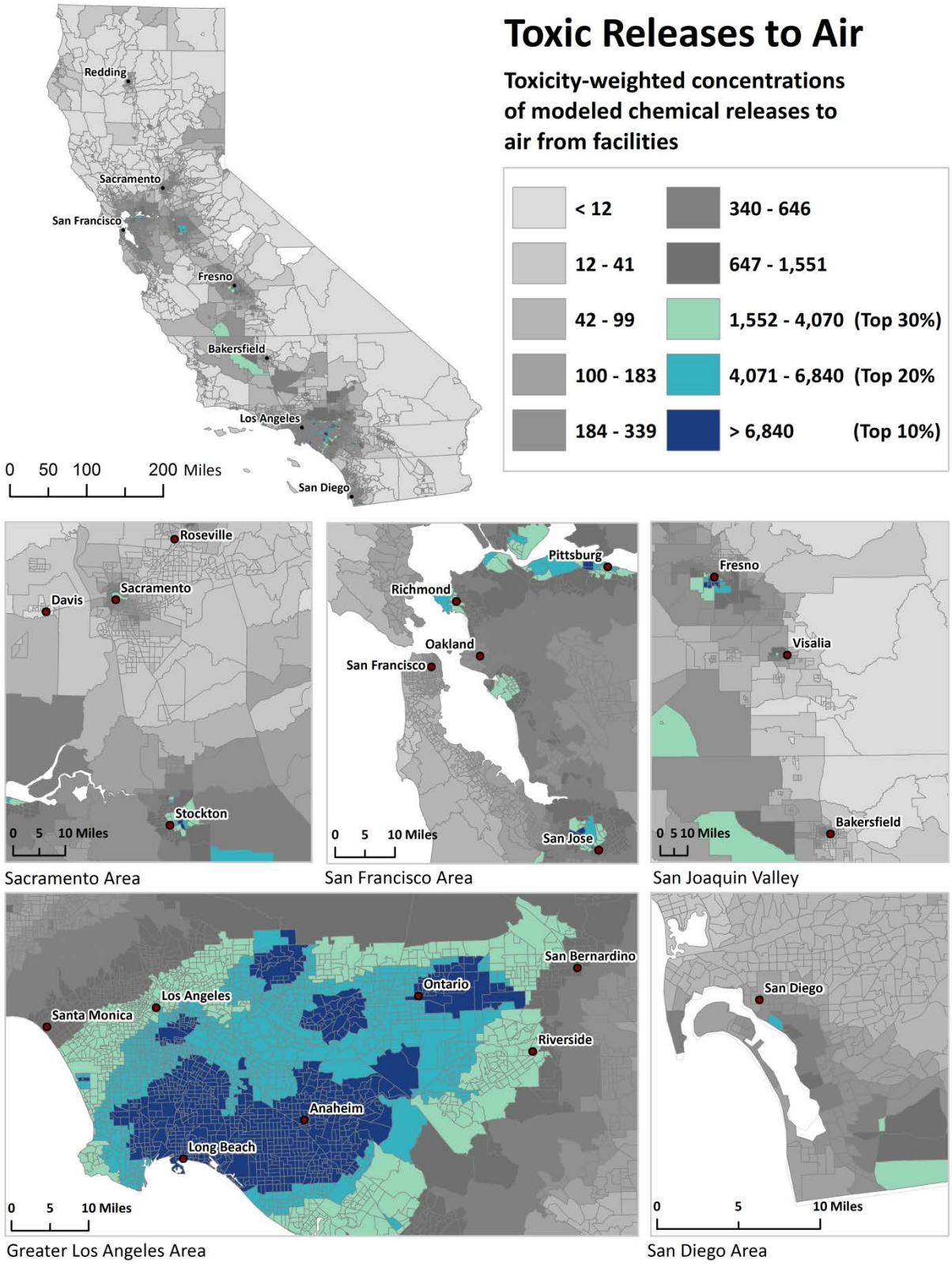
evacuations and shelter-in-place incidents over that five year period.

Several studies have examined the potential for health effects from living near TRI facilities. For example, a case-control study reported an increase in risk for diagnosis of brain cancer in children of mothers living within a mile of a TRI facility that released carcinogens (Choi *et al.*, 2006). In another study, TRI air and water concentrations were associated with an increase in infant, but not fetal, mortality rates (Agarwal *et al.*, 2010). A study that compared county-level TRI releases and health data found that increased chemical releases to air were significantly associated with higher total mortality as well as mortality from cardiovascular disease (Hendryx *et al.,* 2014).

Multiple studies have observed greater emissions in low-income and disadvantaged areas (Szasz and Meuser, 1997). Additionally, race and ethnicity have been correlated with the presence of toxic release facilities. People of color in studied regions of southern California were found to have a greater likelihood of living in areas with higher toxic releases (Morello-Frosch *et al.*, 2002; Sadd *et al.*, 1999).

Method

- Geometric Microdata for all 2010 TRI air releases modeled by RSEI was obtained. (Releases to land and water were not included.)
- Toxicity-weighted concentrations in air for the RSEI grid were converted to 2010 census blocks using an area-based conversion method.
- Census tract-level estimates were made by taking a land-area weighted average of the block-level values for each tract. Land area information was obtained from a 2010 Census Tiger Line block shapefile.
- Census tracts were sorted based on the toxicity-weighted concentration estimate and assigned a percentile based on their position in the distribution.


Toxic Releases to Air
Toxicity-weighted concentrations of modeled chemical releases to air from facilities
< 12
12 - 41
42 - 99
100 - 183
184 - 339
340 - 646
647 - 1,551
1,552 - 4,070 (Top 30%)
4,071 - 6,840 (Top 20%
> 6,840 (Top 10%)
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Agarwal N, Banternghansa C, Bui L (2010). Toxic exposure in America: Estimating fetal and infant health outcomes from 14 years of TRI reporting. *Journal of Health Economics* **29**(4):557-74.

Choi HS, Shim YK, Kaye WE, Ryan PB (2006). Potential residential exposure to toxics release inventory chemicals during pregnancy and childhood brain cancer. *Environmental Health Perspectives* **114**(7):1113.

Hendryx M, Luo J, Chen BC (2014). Total and cardiovascular mortality rates in relation to discharges from toxics release inventory sites in the United States. *Environ Res* **133c**:36-41.

Kleindorfer PR, Belke JC, Elliott MR, Lee K, Lowe RA, Feldman HI (2003). Accident epidemiology and the U.S. chemical industry: accident history and worst-case data from RMP*Info. *Risk Anal* **23**(5):865-81.

Lam CW, Lim SR, Schoenung JM (2011). Environmental and risk screening for prioritizing pollution prevention opportunities in the U.S. printed wiring board manufacturing industry. *J Hazard Mater* **189**(1-2):315-22.

McCarthy MC, O'Brien TE, et al (2009). Characterization of the Chronic Risk and Hazard of Hazardous Air Pollutants in the United States Using Ambient Monitoring Data. *Environ Health Perspect* **117**(5): 790–796.

Morello-Frosch R, Pastor MJ, Porras C, Sadd J (2002). Environmental justice and regional inequality in southern California: implications for future research. *Environmental Health Perspectives* **110**(Suppl 2): 149-154.

Morello-Frosch RA, Woodruff TJ, Axelrad DA, Caldwell JC (2002). Air toxics and health risks in California: the public health implications of outdoor concentrations. *Risk Anal* **20**(2):273-91.

Sadd JL, Pastor MJ, Boer JT, Snyder LD (1999). "Every breath you take...": the demographics of toxic air releases in Southern California. *Economic Development Quarterly* **13**(2):107-23.

Szasz A, Meuser M (1997). Environmental inequalities: literature review and proposals for new directions in research and theory. *Current Sociology* **45**(3):99-120.

US EPA (2010). 2010 Toxics Release Inventory National Analysis Overview. 35 pp. http://www.epa.gov/tri/NationalAnalysis/archive/2010_National_Analysis_Overview_Document.pdf

TRAFFIC DENSITY

Exposure Indicator

While California has the strictest auto emissions standards in the U.S., the state is also known for its freeways and heavy traffic. Traffic is a significant source of air pollution, particularly in urban areas, where more than 50% of particulate emissions come from traffic. Exhaust from vehicles contains a large number of toxic chemicals, including nitrogen oxides, carbon monoxide, and benzene. Traffic exhaust also plays a role in the formation of photochemical smog. Health effects of concern from these pollutants include heart and lung disease, cancer, and increased mortality.

Indicator

Traffic density – Sum of traffic volumes adjusted by road segment length (vehicle-kilometers per hour) divided by total road length (kilometers) within 150 meters of the census tract boundary.

Data Source

Traffic Volume Linkage Tool,
California Environmental Health Tracking Program (CEHTP)
Environmental Health Investigations Branch,
California Department of Public Health

Data on the amount of traffic traveling on major roadways statewide are available. Traffic data are compiled under the California Department of Transportation's (Caltrans) Highway Performance Monitoring System (HPMS) every four years. The data consist of traffic volumes along various pre-defined segments of roadways across the state. Locally maintained roads are not included in the data.

A Traffic Volume Linkage Tool developed under CEHTP uses the annual average daily traffic volumes from the 2004 HPMS data to calculate traffic-related metrics within a circular buffer of any geographic coordinate in California.

For this analysis, CEHTP used the 2004 HPMS data and the Traffic Volume Linkage Tool to calculate traffic density within a 150 meter buffer of the census tract boundary. Traffic density was calculated as the sum of all road length-adjusted traffic volumes per hour divided by the total road length (from HPMS) in and within 150 meters of each census tract.

The most recent year for which data are available for use by this tool is 2004.

http://www.cehtp.org/p/tools_traffic

Rationale

Traffic density is used to represent the number of mobile sources in a specified area, resulting in human exposures to chemicals that are released into the air by vehicle exhaust, as well as other effects related to large concentrations of motor vehicles. Major roadways have been associated with a variety of effects on communities, including noise, vibration, injuries, and local land use changes such as increased numbers of gas stations. For example, motorists often detour through residential

streets near major roads in order to avoid congestion or traffic controls, a phenomenon known as "rat-running"; this phenomenon can increase risk of injuries among pedestrians or bicyclists in these communities. Vehicle speed is directly associated with risk of pedestrian fatality, and speeds along major roadways tend to be higher than normal speeds on residential streets.

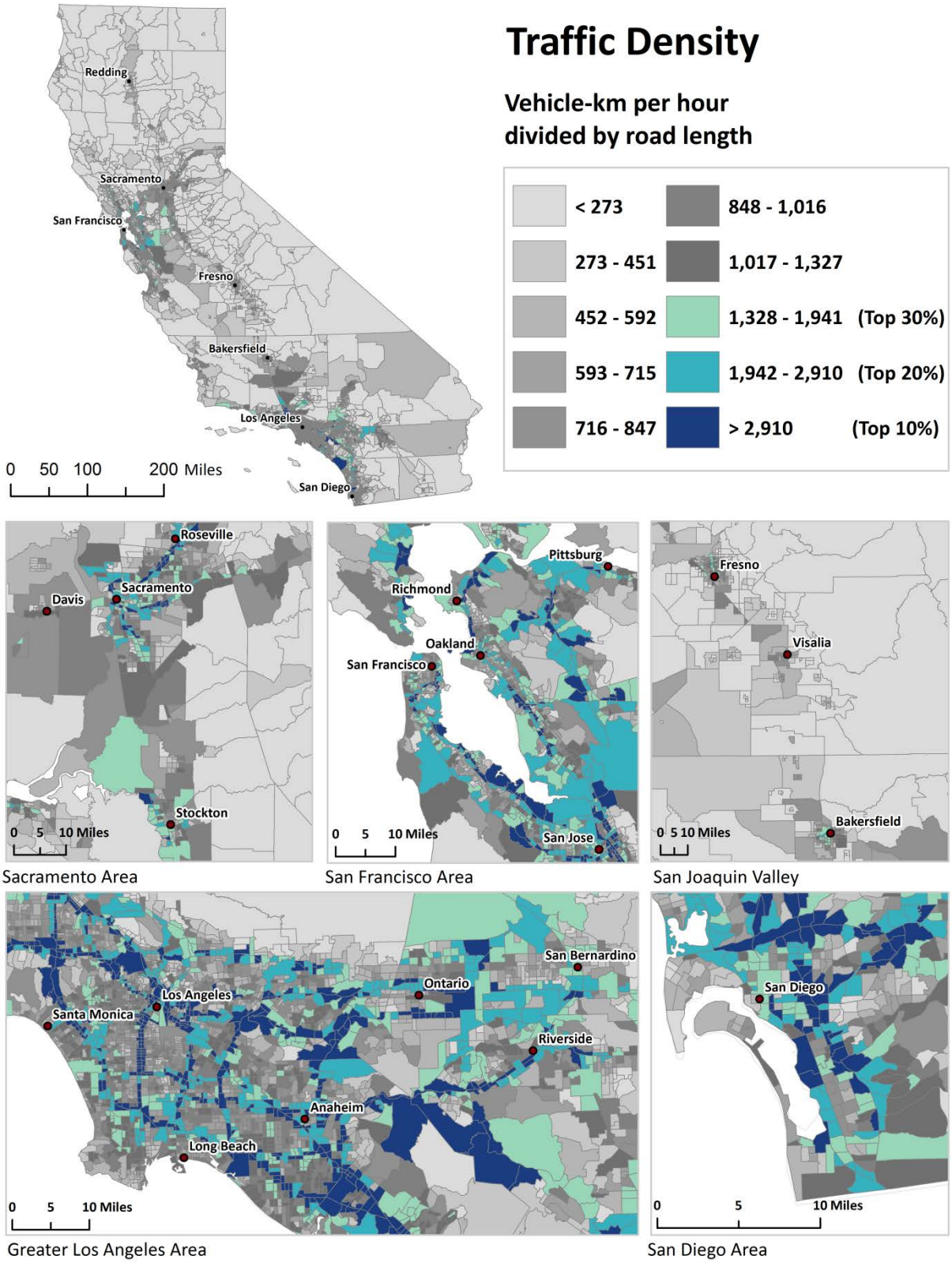
Studies have shown that non-white and low income people make up the majority of residents in high-traffic areas (Gunier *et al.* 2003; Tian *et al.*, 2013) and that schools that are located near busy roads are more likely to be in poor neighborhoods than those farther away (Green *et al.* 2004). A U.S. Centers for Disease Control and Prevention study based on the 2010 Census found that Latinos, non-whites, foreign born and people who speak a language other than English at home were most likely to live within 150 meters of a major highway (Boehmer *et al.*, 2013). In addition, children who live or attend schools near busy roads are more likely to suffer from asthma and bronchitis than children in areas with lower traffic density. This relationship has been seen in both developed (Patel *et al., 2011;* Schultz *et al.* 2012) and developing countries (Baumann *et al.*, 2011).

Exposure to air pollutants from vehicle emissions has been linked to adverse birth outcomes, such as low birth weight and preterm birth (Ghosh *et al.*, 2012; Ritz *et al.* 2007). A recent study of children in Los Angeles found that those with the highest prenatal exposure to traffic-related pollution were up to 15% more likely to be diagnosed with autism than children of mothers in the lowest quartile of exposure (Becerra *et al.*, 2013). The Atherosclerosis in Communities study, a cohort study with over 15,000 participants, found that traffic density and distance to roadways were associated with reduced lung function in adult women (Kan *et al.*, 2007). Road density and traffic volume were associated with adult male mortality from cardiovascular disease in an urban area in Brazil (Habermann and Gouveia, 2012). Motor vehicle exhaust is also a major source of polycyclic aromatic hydrocarbons (PAH), which can damage DNA and may cause cancer (IARC, 2010).

Method

- A 150 meter buffer was placed around each of the census tracts in California. A buffer was chosen to account for roadways near census tract boundaries. The selected buffer distance of 150 meters, or about 500 feet, is taken from the California Air Resources Board Air Quality and Land Use Handbook recommendations, which states that most particulate air pollution from traffic drops off after approximately 500 feet (CARB, 2005).
- The buffered boundaries were put into the Traffic Volume Linkage Tool.
- Traffic density was calculated using two metrics from the tool: 1) the sum of all length-adjusted traffic volumes within the buffered census tract (vehicle-km/hr), then divided by 2) the sum of the length of all road segments within the buffered census tract (km).

- Due to differences in the length of road segments within Highway Performance Monitoring (HPMS), a length-adjusted traffic volumes metric was selected. This metric multiplies traffic volumes by length of the road segment in HPMS.
- Traffic density is calculated as traffic volumes (adjusted by road segment lengths) divided by the total road length within the 150 meter buffer of each census tract (vehicles-km/hr/km).
- Census tracts were sorted by traffic density and assigned percentiles based on the distribution.


Traffic Density
Vehicle-km per hour
divided by road length
< 273
273 - 451
452 - 592
593 - 715
716 - 847
848 - 1,016
1,017 - 1,327
1,328 - 1,941 (Top 30%)
1,942 - 2,910 (Top 20%)
> 2,910 (Top 10%)
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Air Quality and Land Use Handbook: A Community Health Perspective, California Air Resources Board (CARB): Sacramento, CA, USA, 2005. Available online: http://www.arb.ca.gov/ch/handbook.pdf (accessed on December 20, 2012).

Baumann LM, Robinson CL, Combe JM, Gomez A, Romero K, Gilman RH, *et al*. (2011). Effects of distance from a heavily transited avenue on asthma and atopy in a periurban shantytown in Lima, Peru. *J Allergy Clin Immunol* **127**(4):875-82.

Becerra TA, Wilhelm M, Olsen J, Cockburn M, Ritz B (2013). Ambient air pollution and autism in Los Angeles County, California. *Environ Health Perspect* **121**(3):380-6.

Boehmer TK, Foster SL, Henry JR, Woghiren-Akinnifesi EL, Yip FY (2013). Residential proximity to major highways - United States, 2010. *MMWR Surveill Summ* **62 Suppl 3**:46-50.

Ghosh JKC, Wilhelm M, Su J, Goldberg D, Cockburn M, Jerrett M, *et al*. (2012). Assessing the Influence of Traffic-related Air Pollution on Risk of Term Low Birth Weight on the Basis of Land-Use-based Regression Models and Measures of Air Toxics. *American Journal of Epidemiology* **175**(12):1262-74.

Green, R. S., S. Smorodinsky, *et al*. (2004). Proximity of California public schools to busy roads. *Environ Health Perspect* **112**(1): 61-66.

Gunier, R. B., A. Hertz, *et al*. (2003). Traffic density in California: socioeconomic and ethnic differences among potentially exposed children. *J Expo Anal Environ Epidemiol* **13**(3): 240-246.

Habermann M, Gouveia N (2012). Motor vehicle traffic and cardiovascular mortality in male adults. *Rev Saude Publica* **46**(1):26-33.

IARC. Some non-heterocyclic polycyclic aromatic hydrocarbons and some related exposures. (2010). *IARC Monogr Eval Carcinog Risks Hum* **92**:1-853.

Kan H, Heiss G, Rose KM, Whitsel E, Lurmann F, London SJ (2007). Traffic Exposure and lung function in adults: the Atherosclerosis Risk in Communities study. *Thorax* **62**:873-79.

Ritz, B., M. Wilhelm, *et al*. (2007). Ambient air pollution and preterm birth in the environment and pregnancy outcomes study at the University of California, Los Angeles. *Am J Epidemiol* **166**(9): 1045-52.

Schultz, E. S., O. Gruzieva, *et al*. (2012). Traffic-Related Air Pollution and Lung Function In Children At 8 Years Of Age - A Birth Cohort Study. *Am J Respir Crit Care Med*. 186(10).

Tian N, Xue J, Barzyk TM (2013). Evaluating socioeconomic and racial differences in traffic-related metrics in the United States using a GIS approach. *J Expo Sci Environ Epidemiol* **23**(2):215-22.

CLEANUP SITES

Environmental Effects Indicator

Sites undergoing cleanup actions by governmental authorities or by property owners have suffered environmental degradation due to the presence of hazardous substances. Of primary concern is the potential for people to come into contact with these substances. Some of these "brownfield" sites are also underutilized due to cleanup costs or concerns about liability. The most complete set of information available related to cleanup sites and brownfields in California is maintained by the Department of Toxic Substances Control.

Indicator

Sum of weighted sites within each census tract.

Since the nature and the magnitude of the threat and burden posed by hazardous substances vary among the different types of sites as well as the site status, the indicator takes both into account. Weights were also adjusted based on proximity to populated census blocks.

Data Source

EnviroStor Cleanup Sites Database,
Department of Toxic Substances Control (DTSC)

US Environmental Protection Agency, Region 9
Region 9 NPL Sites (Superfund Sites) Polygons

EnviroStor is a public database that provides access to information maintained by DTSC on site cleanup. The database contains information on numerous types of cleanup sites, including Federal Superfund, State Response, Corrective Action, School Cleanup, Voluntary Cleanup, Tiered Permit, Evaluation, Historical, and Military Evaluation sites. The database contains information related to the status of the site such as required cleanup actions, involvement/land use restriction, or "no involvement."

US EPA maintains and distributes the dataset for National Priorities List (NPL) Superfund sites nationwide. The data come in polygon format and generally represent the parcel boundaries of the sites or the estimated extent of contamination.

http://www.envirostor.dtsc.ca.gov/public/
https://edg.epa.gov/clipship/

Rationale

Contaminated sites can pose a variety of risks to nearby residents. Hazardous substances can move off-site and impact surrounding communities through volatilization, groundwater plume migration, or windblown dust. Studies have found levels of organochlorine pesticides in blood (Gaffney *et al.* 2005) and toxic metals in house dust (Zota *et al.* 2011) that were correlated with residents' proximity to contaminated sites.

A study of pregnant women living near Superfund sites in New York state found an increased risk of having a low birth weight male child (Baibergenova *et al.* 2003). A later study in New York City found an association between prevalence of liver disease and the number of Superfund sites per 100 square miles (Ala *et al.* 2007). A demographic

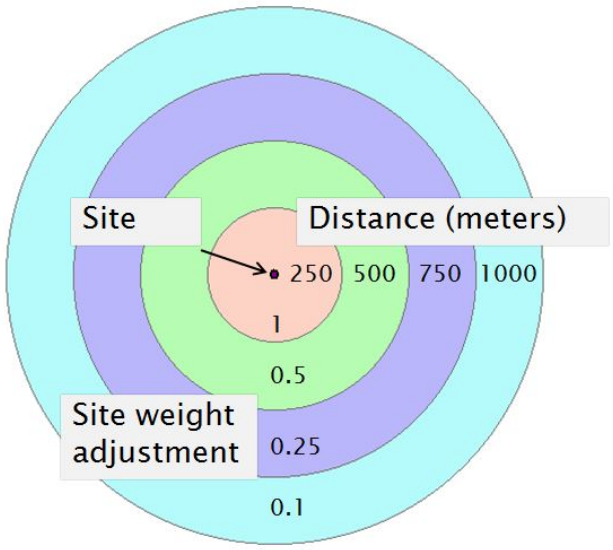
study of socioeconomic factors in communities in Florida found that census tracts with Superfund sites had significantly higher proportions of African Americans, Latinos and people employed in "blue collar" occupations than census tracts that did not contain a Superfund site (Kearney and Kiros, 2009). Some of the relationships between CalEnviroScreen scores and race have been added to the final section of this report.

It generally takes many years for a site to be certified as clean, and cleanup work is often delayed due to cost, litigation, concerns about liability or detection of previously unrecognized contaminants. Contaminated sites also have the potential to degrade nearby wildlife habitats, resulting in potential ecological impacts as well as threats to human health.

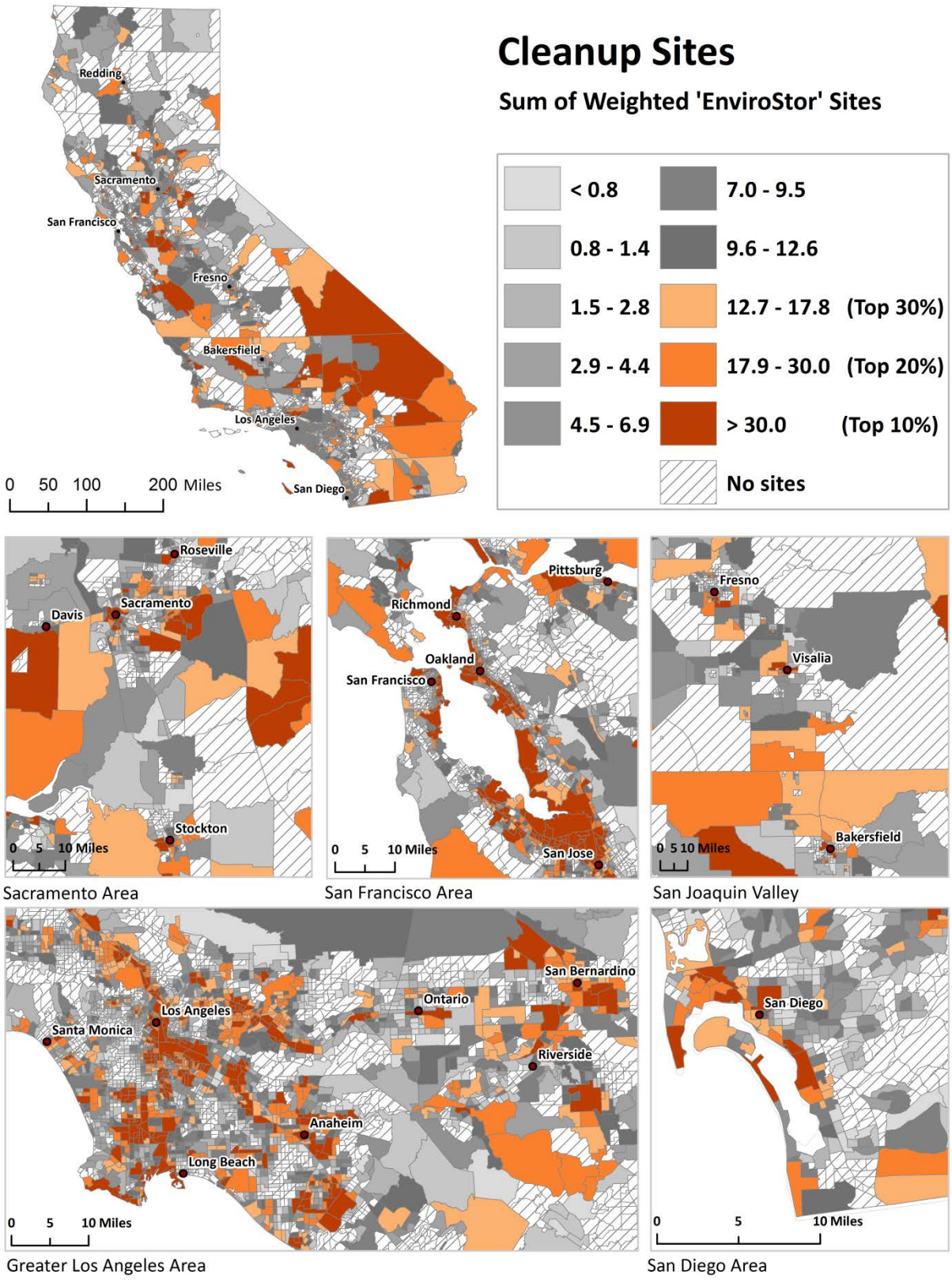
Method

- Data on cleanup site type, status, and location (coordinate or address) for the entire state were downloaded from the EnviroStor (http://www.envirostor.dtsc.ca.gov/public/data_download.asp) Cleanup Sites database.
- Sites with a valid latitude and longitude were mapped and sites with address only were geocoded in ArcMap. Sites without a valid latitude and longitude or unrecognizable address were excluded from the analysis.
- US EPA Region 9 National Priority List (NPL) polygon shapefile boundary data were downloaded from the Environmental Dataset Gateway.
- Polygon boundaries of California NPL sites were identified. Sites were assigned a score of 10 or 12 (as a federal Superfund site).
- EnviroStor sites with a NPL polygon representation were used instead of points.
- Several types of sites and statuses were excluded from the analysis because they indicate neither the presence of hazardous waste nor potential environmental risk (See Appendix).
- Each remaining site was scored on a weighted scale of 0 to 12 in consideration of both the site type and status (See Appendix). Higher weights were applied to Superfund, State Response sites, and cleanups compared to evaluations, for example. Similarly, higher weights were applied to sites that are undergoing active remediation and oversight by DTSC, relative to those with little or no state involvement.
- The weights for all sites were adjusted based on the distance they fell from populated census blocks. Sites further than 1000m from any populated census block were excluded from the analysis.
- Site weights were adjusted by multiplying the weight by 1 for sites less than 250m, 0.5 for sites 250-500m, 0.25 for sites 500-750m, and 0.1 for sites 750-1000m from the nearest populated census

blocks within a given tract.



- Each census tract was scored based on the sum of the adjusted weights (in ArcMap).
- Summed census tract scores were ordered and assigned percentiles.


Cleanup Sites
Sum of Weighted 'EnviroStor' Sites
< 0.8
0.8 - 1.4
1.5 - 2.8
2.9 - 4.4
4.5 - 6.9
7.0 - 9.5
9.6 - 12.6
12.7 - 17.8 (Top 30%)
17.9 - 30.0 (Top 20%)
> 30.0 (Top 10%)
No sites
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Ala A, Stanca CM, Bu-Ghanim M, Ahmado I, Branch AD, Schiano TD, *et al*. (2006). Increased prevalence of primary biliary cirrhosis near Superfund toxic waste sites. *Hepatology* **43**(3):525-31.

Baibergenova A, Kudyakov R, Zdeb M, Carpenter DO (2003). Low birth weight and residential proximity to PCB-contaminated waste sites. *Environ Health Perspect* **111**(10):1352-7.

Gaffney SH, Curriero FC, Strickland PT, Glass GE, Helzlsouer KJ, Breysse PN (2005). Influence of geographic location in modeling blood pesticide levels in a community surrounding a U.S. Environmental protection agency superfund site. *Environ Health Perspect* **113**(12):1712-6.

Kearney G, Kiros GE (2009). A spatial evaluation of socio demographics surrounding National Priorities List sites in Florida using a distance-based approach. *Int J Health Geogr* **8**:33.

U.S. Environmental Protection Agency, Region 9. San Francisco, CA. Region 9 NPL Sites (Superfund Sites) Polygons. https://edg.epa.gov/data/Public/R9/R9_Stakeholder_Outreach/NPL_Polygons.gdb.zip. Accessed 21 January 2014.

Zota AR, Schaider LA, Ettinger AS, Wright RO, Shine JP, Spengler JD (2011). Metal sources and exposures in the homes of young children living near a mining-impacted Superfund site. *J Expo Sci Environ Epidemiol* **21**(5):495-505.

Appendix

Weighting Matrix for Cleanup Sites

Cleanup Sites from the EnviroStor Cleanup Sites database were weighted on a scale of 0 to 12 in consideration of both the site type and status. The table below shows the weights applied for each site type and status.

Site and status types excluded from the analysis:
School Investigation and *Border Zone/Hazardous Waste Evaluation* site types were not included in the analysis. Sites with the following statuses were also not included in the analysis: *Agreement – Work Completed*, *Referrals*, *Hazardous Waste Disposal Land Use,* and *De-listed*. Sites with statuses of *Certified, Completed,* and *No Further Action* were assigned a weight of zero and were effectively not included in the analysis. These sites and status types were excluded because they are not indicative of hazardous waste or potential environmental risk.

For a given census tract, the weighted scores of all facilities in the area were summed. Definitions used in the table are defined below.

Site Type	Status		
	Low • Certified • Completed • No Further Action	**Medium** • Inactive-Needs Eval. • Inactive • Certified Operation & Maintenance – Land Use Restrictions • Certified Operation & Maintenance	**High** • Active • Backlog • Inactive- Action Required
Low • Evaluation • Historical • Military Evaluation	0	4	6
Medium • Corrective Action • School Cleanup • Voluntary Cleanup • Tiered Permit	1	7	9
High • State Response • Superfund	2	10	12

Definitions*

- *Active*: Identifies that an investigation and/or remediation is currently in progress and that DTSC is actively involved, either in a lead or support capacity.
- *Certified Operation and Maintenance (O&M)*: Identifies sites that have certified cleanups in place but require ongoing O&M activities.
- *Certified*: Identifies completed sites with previously confirmed releases that are subsequently certified by DTSC as having been remediated satisfactorily under DTSC oversight.
- *Corrective Action*: Identifies sites undergoing "corrective action," defined as investigation and cleanup activities at hazardous waste facilities (either Resource Conservation and Recovery Act (RCRA) or State-only) that either were eligible for a permit or received a permit. These facilities treat, store, dispose and/or transfer hazardous waste.
- *Evaluation*: Identifies suspected, but unconfirmed, contaminated sites that need or have gone through a limited investigation and assessment process.
- *Inactive – Action Required*: Identifies non-active sites where, through a Preliminary Endangerment Assessment (PEA) or other evaluation, DTSC has determined that a removal or remedial action or further extensive investigation is required.
- *Inactive - Needs Evaluation*: Identifies inactive sites where DTSC has determined a Preliminary Endangerment Assessment or other evaluation is required.

- *No Further Action*: Identifies completed sites where DTSC determined after investigation, generally a PEA (an initial assessment), that the property does not pose a problem to public health or the environment.
- *School Cleanup*: Identifies proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination at which remedial action occurred.
- *State Response*: Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.
- *Superfund*: Identifies sites where the US EPA proposed, listed, or delisted a site on the National Priorities List (NPL).
- *Tiered CA Permit Sites*: These facilities manage waste not regulated under RCRA, but regulated as a hazardous waste by the State of California. These facilities include but are not limited to recyclers, oil transfer stations, and precious metals recyclers.
- *Voluntary Cleanup*: Identifies sites with either confirmed or unconfirmed releases, and the project proponents have requested that DTSC oversee evaluation, investigation, and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

* EnviroStor Glossary of Terms (http://www.envirostor.dtsc.ca.gov/public/EnviroStor%20Glossary.pdf)

Number of Cleanup Sites in CalEnviroScreen 2.0: Approximately 5,600

Site Type	% of Sites
Military Evaluation	20%
Voluntary Cleanup	18%
Tiered Permit	16%
State Response	15%
Evaluation	9%
Corrective Action	8%
Historical	6%
School Cleanup	6%
National Priorities List (NPL) (with boundaries)	2%
Federal Superfund (boundaries unavailable)	1%

GROUNDWATER THREATS

Environmental Effects Indicator

Many activities can pose threats to groundwater quality. These include the storage and disposal of hazardous materials on land and in underground storage tanks at various types of commercial, industrial, and military sites. Thousands of storage tanks in California have leaked petroleum or other hazardous substances, degrading soil and groundwater. Storage tanks are of particular concern when they can affect drinking water supplies. Storage tank sites can expose people to contaminated soil and volatile contaminants in air. In addition, the land surrounding these sites may be taken out of service due to perceived cleanup costs or concerns about liability. The most complete set of information related to sites that may impact groundwater and require cleanup is maintained by the State Water Resources Control Board.

Indicator

Sum of weighted scores for sites within each census tract.

The nature and the magnitude of the threat and burden posed by sites maintained in GeoTracker vary significantly by site type (e.g., leaking underground storage tank or cleanup site) and status (e.g., Completed Case Closed or Active Clean up). The indicator takes into account information about the type of site, its status, and its proximity to populated census blocks.

Data Source

GeoTracker Database,
State Water Resources Control Board (SWRCB)

GeoTracker is a public web site that allows the SWRCB, regional water quality control boards and local agencies to oversee and track projects at cleanup sites that can impact groundwater. The GeoTracker database contains information on locations and water quality of wells that could be contaminated, as well as potential sources of groundwater contamination. These include leaking underground storage tanks (LUSTs), leaking military underground storage tanks (USTs) cleanup and land disposal sites, and cleanup sites, industrial sites, airports, dairies, dry cleaners, and publicly-owned sewage treatment plants. For each site, there is additional information on the status of cleanup activities. Groundwater quality data are extracted from monitoring and records maintained by SWRCB, the Department of Water Resources, Department of Public Health, Department of Pesticide Regulation, U.S. Geological Survey and Lawrence Livermore National Laboratory. The database is constantly updated and sites are never deleted from the database, where they may ultimately be designated 'clean closed.'

A separate GeoTracker database contains information on the location of underground storage tanks (not leaking), which was not used.

http://geotracker.waterboards.ca.gov/

Rationale

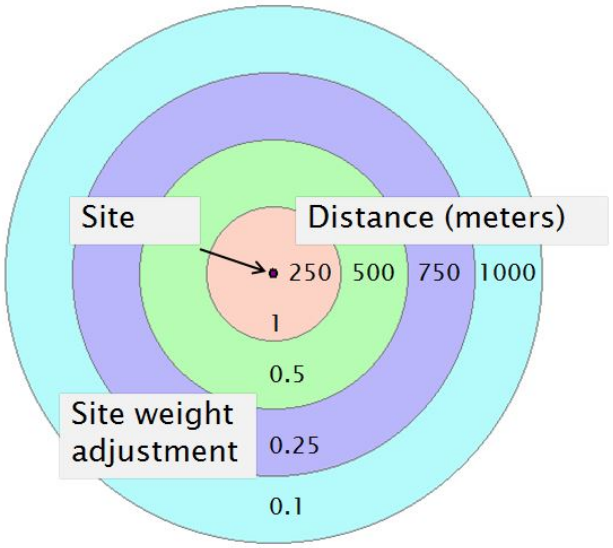
Common groundwater pollutants found at LUST and cleanup sites in California include gasoline and diesel fuels, chlorinated solvents and other volatile organic compounds (VOCs) such as benzene, toluene, and

methyl tert-butyl ether (MTBE); heavy metals such as lead, chromium and arsenic; polycyclic aromatic hydrocarbons (PAHs); persistent organic pollutants like polychlorinated biphenyls (PCBs); DDT and other insecticides; and perchlorate (SWRCB, 2012; DPR, 2011; US EPA, 2002). An assessment of benzene exposure from a fuel leak concluded that soil and groundwater contamination could put nearby residents at risk and could have caused adverse health effects (Santos *et al.,* 2013). Dioxins and dioxin-like substances have been detected in groundwater in areas where treated wastewater has been used for irrigation (Mahjoub *et al.*, 2011) and near wood treatment facilities (Karouna-Renier *et al.*, 2007). The occurrence of storage tanks, leaking or not, provides a good indication of potential concentrated sources of some of the more prevalent compounds in groundwater. For example, the detection frequency of VOCs found in gasoline is associated with the number of UST or LUST sites within one kilometer of a well (Squillace and Moran, 2007). The occurrence of chlorinated solvents in groundwater is also associated with the presence of cleanup sites (Moran *et al.*, 2007). Some of these cancer-causing compounds have in turn been detected in drinking water supplies in California (Williams *et al.*, 2002). People who live near shallow groundwater plumes containing VOCs may also be exposed via the intrusion of vapors from soil into indoor air (Picone *et al.*, 2012; Yao *et al.*, 2013).

Method

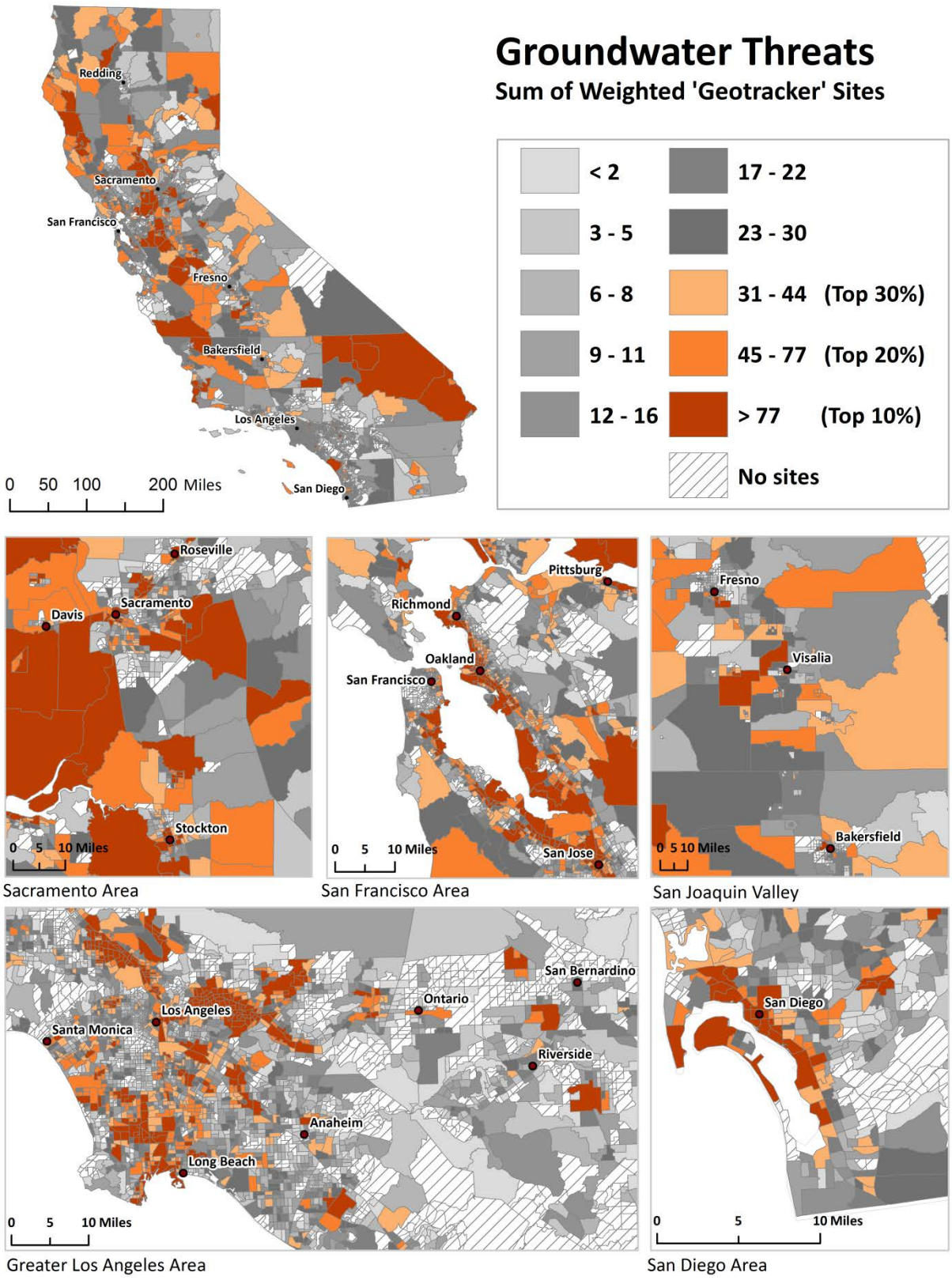
- Data on cleanup site type, status, and location (coordinate or address) for the entire state were downloaded from GeoTracker (http://geotracker.waterboards.ca.gov/data_download.asp; GeoTracker Cleanup Sites).
- Sites with a valid latitude and longitude were mapped and sites with address only were geocoded in ArcMap. Sites without a valid latitude and longitude or unrecognizable address were excluded from the analysis.
- Certain types of sites and statuses were excluded from the analysis because they are not indicative of a hazard or a potential environmental risk (see Appendix). Each remaining site was scored on a weighted scale of 1 to 15 in consideration of both the site type and status. (See Appendix.)
- The weights for all sites, except LUST Cleanup Program and military UST sites, were adjusted based on the distance they fell from populated census blocks. Sites further than 1000m from any populated census block were excluded from the analysis. LUST Cleanup Program and military UST sites were not adjusted, but if these sites fell further than 250m from populated census blocks, they were excluded.
- Site weights were adjusted by multiplying the weight by 1 for sites less than 250m, 0.5 for sites 250-500m, 0.25 for sites 500-750m, and 0.1 for sites 750-1000m from the nearest populated census blocks within a given tract. Sites outside of a census tract, but less

than 1000m from one of that tract's populated blocks were similarly adjusted based on the distance to the nearest block from that tract (See image below).



.

- Each census tract was scored based on the sum of the adjusted weights for sites it contains or is near (in ArcMap).
- Census tracts were ordered based on their summed scores and were assigned percentiles.


Groundwater Threats
Sum of Weighted 'Geotracker' Sites
< 2
3 - 5
6 - 8
9 - 11
12 - 16
17 - 22
23 - 30
31 - 44 (Top 30%)
45 - 77 (Top 20%)
> 77 (Top 10%)
No sites
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Karouna-Renier NK, Rao KR, Lanza JJ, Davis DA, Wilson PA (2007). Serum profiles of PCDDs and PCDFs, in individuals near the Escambia Wood Treating Company Superfund site in Pensacola, FL. *Chemosphere* **69**(8):1312-9.

Mahjoub O, Escande A, Rosain D, Casellas C, Gomez E, Fenet H (2011). Estrogen-like and dioxin-like organic contaminants in reclaimed wastewater: transfer to irrigated soil and groundwater. *Water Sci Technol* **63**(8):1657-62.

Moran MJ, Zogorski JS, Squillace PJ (2007). Chlorinated solvents in groundwater of the United States. *Environ Sci Technol* **41**(1): 74-81.

Picone S, Valstar J, van Gaans P, Grotenhuis T, Rijnaarts H (2012). Sensitivity analysis on parameters and processes affecting vapor intrusion risk. *Environ Toxicol Chem* **31**(5):1042-52.

Santos Mdos A, Tavora BE, Koide S, Caldas ED (2013). Human risk assessment of benzene after a gasoline station fuel leak. *Rev Saude Publica* **47**(2):335-44.

Squillace PJ, Moran MJ (2007). Factors associated with sources, transport, and fate of volatile organic compounds and their mixtures in aquifers of the United States. *Environ Sci Technol* **41**(7):2123-30.

Williams P, Benton L, Warmerdam J, Sheehan P (2002). Comparative risk analysis of six volatile organic compounds in California drinking water. *Environ Sci Technol* **36**(22): 4721-28.

Yao Y, Shen R, Pennell KG, Suuberg EM (2013). Examination of the Influence of Environmental Factors on Contaminant Vapor Concentration Attenuation Factors Using the US EPA's Vapor Intrusion Database. *Environ Sci Technol* **47**(2):906-13.

Appendix

Weighting Matrix for Groundwater Threats

Groundwater threats from the GeoTracker database were weighted on a scale of 1 to 15 in consideration of both the site type and status. The following table shows the weights applied for each site type and status.

Sites with a status type of *Completed – Case Closed* and *Open-Referred* were excluded from the analysis because they are completed or were referred and tracked by another agency.

For a given census tract, the weighted scores of all facilities in the area were summed after adjusting for proximity to populated census blocks.

Site Type	Status	Weight
Land Disposal Sites [Military Privatized Site*]	Open – Remediation	10
	Open - Assessment & Interim Remedial Action	10
	Open - Site Assessment	6
	Open	3
	Open – Operating	3
	Open - Verification Monitoring	3
	Open - Closed / Monitoring	2
	Open – Inactive	2
	Open - Eligible for Closure	Exclude
	Open – Proposed	Exclude
LUST Sites [Military UST Site*]	Open – Remediation	3
	Open - Assessment & Interim Remedial Action	3
	Open - Site Assessment	2
	Open - Verification Monitoring	2
	Open – Inactive	1
	Open - Eligible for Closure	Exclude
Cleanup Program Sites [Military Cleanup Site*]	Open - Assessment & Interim Remedial Action	15
	Open – Remediation	15
	Open - Site Assessment	10
	Open - Reopen Case	10
	Open - Verification Monitoring	6
	Open – Inactive	3
	Open - Eligible for Closure	Exclude

*Military sites have unique site types, but receive the same weights as their Land Disposal, Cleanup, and LUST site types of the same status.

Site Type Definitions*:

- *Cleanup Program Site* (Site Cleanup Program): In general, Site Cleanup Program sites are areas where a release of pollutants has occurred that is not addressed in the other core regulatory programs (e.g., permitted facilities, USTs). The funding for the Program is primarily cost reimbursement from responsible parties.
- *Land Disposal Site:* The Land Disposal program regulates water quality aspects of discharges to land for disposal, treatment, or storage of waste at waste management facilities and units such as landfills, waste piles and land treatment units under California

Code of Regulations, Title 27. A land disposal unit is an area of land, or a portion of a waste management facility, at which waste is discharged.

- *Military Cleanup Site:* Military Cleanup Program sites are areas where a release of pollutants from an active or closed military facility has occurred. The military fully funds for the Program oversight.
- *Military Privatized Site:* These sites are within the Site Cleanup Program. They are unique because these sites have been transferred by the military into non-military ownership with or without further cleanup necessary.
- *Military Underground Storage Tanks (UST):* Military UST Program sites are areas where a release of pollutants from an underground storage tank has occurred at a military or former military installation. The military fully funds for the Program oversight costs.

Status Definitions for Land Disposal Sites*:

- *Open - Operating:* A land disposal site that is accepting waste. These sites have been issued waste discharge requirements by the appropriate Regional Water Quality Control Board.
- *Open - Proposed:* A land disposal site that is in the process of undergoing the permit process from several agencies. These sites have not been issued waste discharge requirements by the appropriate Regional Water Quality Control Board, and are not accepting waste.
- *Open – Closing/with Monitoring:* A land disposal site that is no longer accepting waste and is undergoing all operations necessary to prepare the site for post-closure maintenances in accordance with an approved plan for closure.
- *Open – Closed/with Monitoring:* A land disposal site that has ceased accepting waste and was closed in accordance with applicable statutes, regulations, and local ordinances in effect at time of closure. Land disposal site in post closure maintenance period as waste could have an adverse effect on the quality of the waters of the state. Site has waste discharge requirements.
- *Open – Inactive:* A land disposal site that has ceased accepting waste but has not been formally closed or is still within the post closure monitoring period. Site does not pose a significant threat to water quality and does not have groundwater monitoring. Site may or may not have waste discharge requirements.
- *Completed – Case Closed/No Monitoring:* A land disposal site that ceased accepting waste and was closed in accordance with applicable statutes, regulations, and local ordinances in effect at time of closure. The land disposal site was monitored for at least 30 years and Water Board staff has determined that wastes no longer pose a threat to water quality. Site does not have waste discharge requirements.

Status Definitions for Other Site Types*:

- *Completed – Case Closed*: A closure letter or other formal closure decision document has been issued for the site.
- *Open – Assessment & Interim Remedial Action*: An "interim" remedial action is occurring at the site AND additional activities such as site characterization, investigation, risk evaluation, and/or site conceptual model development are occurring.
- *Open – Inactive*: No regulatory oversight activities are being conducted by the Lead Agency.

- *Open – Remediation*: An approved remedy or remedies has/have been selected for the impacted media at the site and the responsible party (RP) is implementing one or more remedy under an approved cleanup plan for the site. This includes any ongoing remedy that is either passive or active, or uses a combination of technologies. For example, a site implementing only a long term groundwater monitoring program, or a "monitored natural attenuation" (MNA) remedy without any active groundwater treatment as part of the remedy, is considered an open case under remediation until site closure is completed.
- *Open – Site Assessment*: Site characterization, investigation, risk evaluation, and/or site conceptual model development are occurring at the site. Examples of site assessment activities include, but are not limited to, the following: 1) identification of the contaminants and the investigation of their potential impacts; 2) determination of the threats/impacts to water quality; 3) evaluation of the risk to humans and ecology; 4) delineation of the nature and extent of contamination; 5) delineation of the contaminant plume(s); and 6) development of the Site Conceptual Model.
- *Open – Verification Monitoring* (use only for UST, Chapter 16 regulated cases): Remediation phases are essentially complete and a monitoring/sampling program is occurring to confirm successful completion of cleanup at the Site. (e.g. No "active" remediation is considered necessary or no additional "active" remediation is anticipated as needed. Active remediation system(s) has/have been shut-off and the potential for a rebound in contaminant concentrations is under evaluation).
- *Open – Reopen Case* (available selection only for previously closed cases): This is not a case status. This field should be selected to record the date that the case was reopened for further investigation and/or remediation. A case status should immediately be selected from the list of case status choices after recording this date.
- *Open – Eligible for Closure*: Corrective action at the Site has been determined to be completed and any remaining petroleum constituents from the release are considered to be low threat to Human Health, Safety, and the Environment. The case in GeoTracker is going through the process of being closed.

* *Available through Geotracker website: http://geotracker.waterboards.ca.gov/.*

Number of Groundwater Threat Sites in CalEnviroScreen 2.0: Approximately 14,000

Facility Type	% of Total
Cleanup Program Site	42%
LUST Site	30%
Military Cleanup Site	15%
Land Disposal Site	8%
Military UST Site	4%
Military Privatized Site	<1%

HAZARDOUS WASTE GENERATORS AND FACILITIES

Environmental Effects Indicator

Most hazardous waste must be transported from hazardous waste generators to permitted recycling, treatment, storage, or disposal facilities (TSDF) by registered hazardous waste transporters. Most shipments must be accompanied by a hazardous waste manifest. There are widespread concerns for both human health and the environment from sites that serve for the processing or disposal of hazardous waste. Many newer facilities are designed to prevent the contamination of air, water, and soil with hazardous materials, but even newer facilities may negatively affect perceptions of surrounding areas in ways that have economic, social and health impacts. The Department of Toxic Substances Control maintains data on permitted facilities that are involved in the treatment, storage, or disposal of hazardous waste as well as information on hazardous waste generators.

Indicator

Sum of weighted permitted hazardous waste facilities and hazardous waste generators within each census tract.

Data Source

EnviroStor Hazardous Waste Facilities Database and
Hazardous Waste Tracking System,
Department of Toxic Substances Control (DTSC)

EnviroStor is a public web site that provides access to detailed information on hazardous waste permitted facilities. Information included in the database includes the facility name and address, geographic location, facility type and status.

DTSC also maintains information on the manifests created for the transport of hazardous waste from generators in its Hazardous Waste Tracking System. Manifests include the generators' name and identification number, the transporter, the designated recipient and description of the type and quantity of waste classified by a coding system. Data are currently available for 2009.

http://www.envirostor.dtsc.ca.gov/public/data_download.asp
http://hwts.dtsc.ca.gov/

Rationale

Hazardous waste by definition that is potentially dangerous or harmful to human health or the environment. US EPA and DTSC both have standards for determining when waste materials must be managed as hazardous waste. Hazardous waste can be liquids, solids, or contained gases. It can include manufacturing by-products, and discarded used or unused materials such as cleaning fluids (solvents) or pesticides. Used oil and contaminated soil generated from a site clean-up can be hazardous wastes (DTSC, Defining Hazardous Waste). In 1995, 97% of toxic chemicals released nationwide came from small generators and facilities (McGlinn, 2000). Generators of hazardous waste may treat waste onsite or send it elsewhere for disposal.

The potential health effects that come from living near hazardous waste

disposal sites have been examined in a number of studies (Vrijheid, 2000). While there is sometimes limited assessment of exposures that occur in nearby populations, there are studies that have found health effects, including diabetes and cardiovascular disease, associated with living in proximity to hazardous waste sites (Kouznetsova *et al.*, 2007; Sergeev and Carpenter, 2005).

Location of hazardous waste sites in communities has long been an environmental justice concern in California. For example, a recent study of 82 hazardous waste treatment, storage, and disposal facilities in Los Angeles County found that the communities most affected by the facilities are composed of working-class and ethnic minority populations living near industrial areas (Aliyu et al, 2011). A 1997 study correlated race/ethnicity with the location of hazardous waste treatment, storage and disposal facilities for both African-American and Latino populations (Boer *et al.*, 1997).

Electronic waste is defined as universal waste rather than hazardous waste by California law, and is subject to different rules for handling and transportation. However, some components of electronic devices contain hazardous materials, and facilities that collect or recycle electronic waste are potential sources of exposure to toxic chemicals (DTSC, 2010; CalRecycle, 2012).

Method

Permitted hazardous waste facilities:

- Permitted facility data were obtained from the DTSC website.
- Facilities were scored on a weighted scale in consideration of the type and permit status for the facility (See Appendix).
- Site locations were mapped or geocoded (in ArcMap).

Hazardous waste generators:

- Generator data were obtained from DTSC from the Hazardous Waste Tracking System for 2010 to 2012.
- Only large quantity generators (producing over 1,000 kg of waste per month[4] for at least one of the three years) and generators producing RCRA waste[5] were included.
- Facilities were scored on a weighted scale in consideration of the volume of waste generated (see Appendix).
- Site locations were mapped or geocoded (in ArcMap).

Proximity Adjustment:

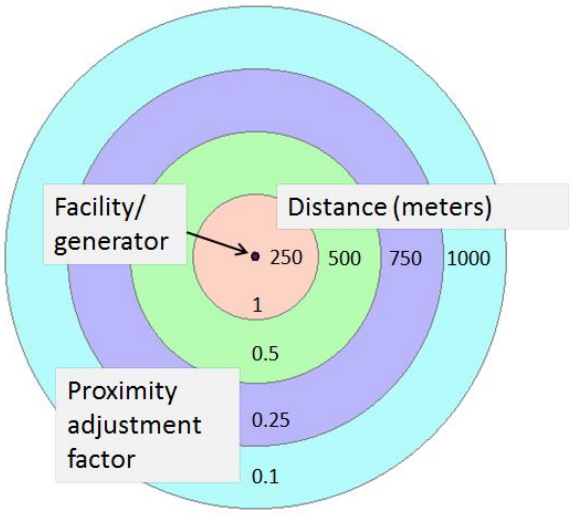
- The weights for facilities (permitted and generators) were adjusted based on the distance they fell from populated census blocks. All

[4] Corresponds to over 13.1 tons per year

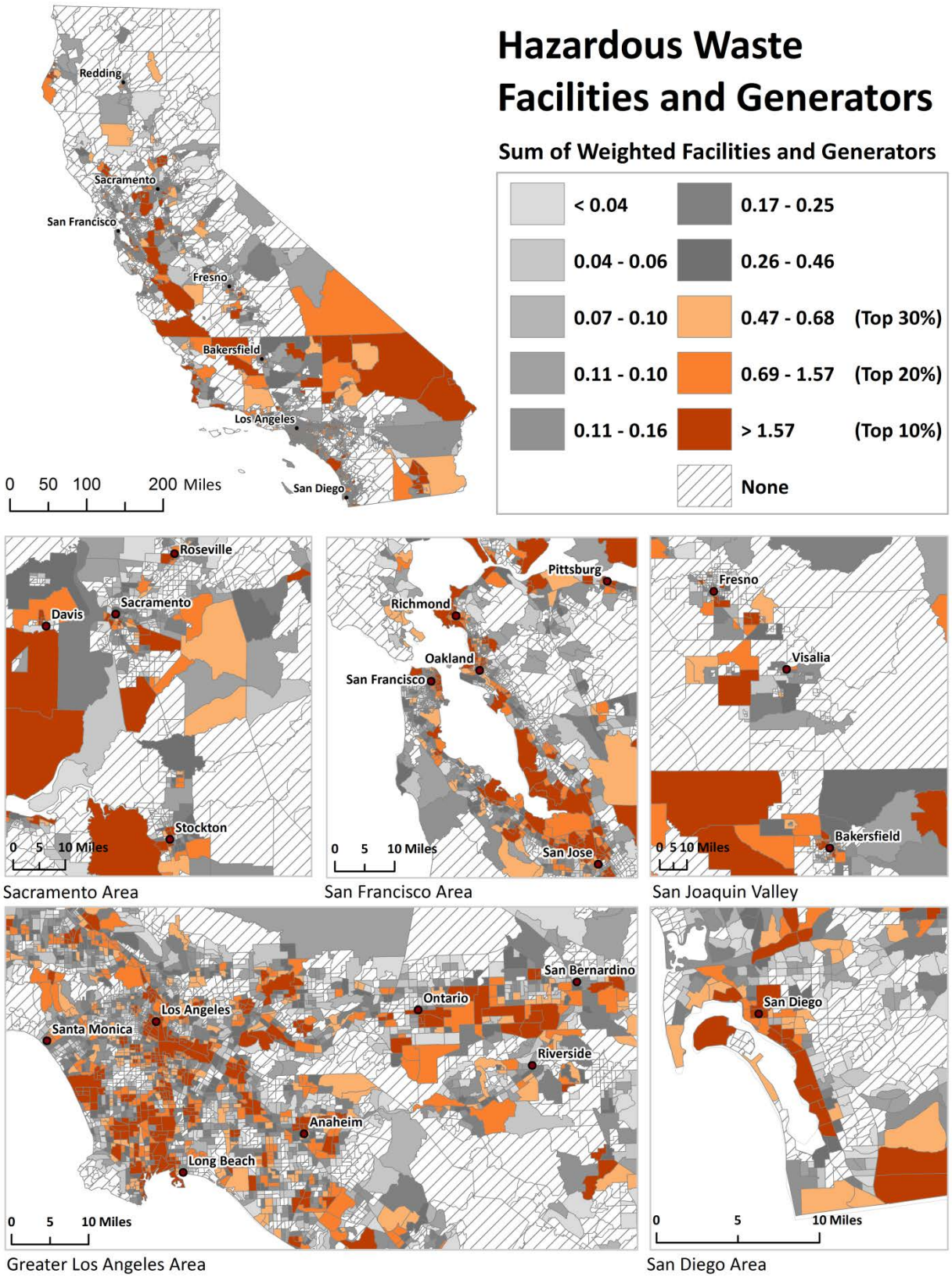
[5] RCRA: Resource Conservation and Recovery Act governs the federal management of hazardous wastes; (List of RCRA waste: http://www.epa.gov/osw/inforesources/data/br91/na_apb-p.pdf)

facilities further than 1,000m from any populated census block were excluded from the analysis.

- Site weights were adjusted by multiplying the weight by 1 for facilities less than 250m, 0.5 for sites 250-500m, 0.25 for sites 500-750m, and 0.1 for sites 750-1000m from the nearest populated census blocks within a given tract. Facilities outside of a census tract, but less than 1000m from one of that tract's populated blocks were similarly adjusted based on the distance to the nearest block from that tract (See image below).



- Each census tracts was scored based on the sum of the adjusted weights for sites it contains or is near (in ArcMap).
- Census tracts were ordered based on their summed scores and were assigned percentiles.


Hazardous Waste Facilities and Generators
Sum of Weighted Facilities and Generators
< 0.04
0.04 - 0.06
0.07 - 0.10
0.11 - 0.10
0.11 - 0.16
0.17 - 0.25
0.26 - 0.46
0.47 - 0.68 (Top 30%)
0.69 - 1.57 (Top 20%)
> 1.57 (Top 10%)
None
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Aliyu AA, Kasim R, Martin D (2011). Siting of hazardous waste dump facilities and their correlation with status of surrounding residential neighbourhoods in Los Angeles County. *Property Management*. **29** (1): 87-102.

Boer JT, Pastor MJ, Sadd JL, Snyder LD (1997). Is there environmental racism? The demographics of hazardous waste in Los Angeles County. *Social Science Quarterly* **78**(4):793-810.

CalRecycle. "What is E-Waste?". Last updated October 26, 2012. http://www.calrecycle.ca.gov/Electronics/WhatisEwaste/. Accessed February 14, 2013.

DTSC. "Electronic Hazardous Waste (E-Waste)" 2010. http://www.dtsc.ca.gov/hazardouswaste/ewaste/. Accessed February 14, 2013.

DTSC. "Defining Hazardous Waste" 2012 http://www.dtsc.ca.gov/HazardousWaste/upload/HWMP_DefiningHW111.pdf. Accessed February 14,2013

Kouznetsova M, Huang X, Ma J, Lessner L, Carpenter DO (2007). Increased rate of hospitalization for diabetes and residential proximity of hazardous waste sites. *Environ Health Perspect* **115**(1):75-9.

McGlinn L (2000). Spatial patterns of hazardous waste generation and management in the United States. *The Professional Geographer* **52**(1):11-22.

Sergeev AV, Carpenter DO (2005). Hospitalization rates for coronary heart disease in relation to residence near areas contaminated with persistent organic pollutants and other pollutants. *Environ Health Perspect* **113**(6):756-61.

Vrijheid M (2000). Health effects of residence near hazardous waste landfill sites: a review of epidemiologic literature. *Environmental health perspectives* **108**(Suppl 1):101.

Appendix

Weighting Matrix for Permitted Hazardous Waste Facilities and Hazardous Waste Generators

Permitted Hazardous Waste Facilities from DTSC's permitted facilities database were weighted on a scale of 1 to 15 in consideration of the facility activity, permit type and permit status. The score for any given Permitted Hazardous Waste Facility represents the sum of its Facility Activity, Permit Type and Permit Status. Hazardous waste generators were weighted on a scale of 0.1 to 2 based on the yearly amount of waste generated.

The following tables show the weights applied to the facilities and generators. Greater concerns were identified for permitted hazardous waste facilities that handle much of the hazardous waste generated from the ~30,000 generators in California. Only large quantity generators (> 1,000 kg per month or >13.1 tons per year) that produce RCRA waste were included due to the large number of hazardous waste generators producing small amounts of less hazardous types of waste. In 2010 to 2012 this represents about 4,500 generators. Higher weights were given to generators that produced larger volumes of waste. For all census tract codes, the weighted and proximity adjusted scores of all facilities and generators in the area were summed.

Permitted Hazardous Waste Facilities

	Weight	Activity or Status
Facility Activity (base weight)	**10**	Landfill
	7	Treatment
	4	Storage
	2	Post-closure
Permit Type *(additional weight)*	**1**	Large facilities
	1	Non-RCRA facilities
	2	RCRA facilities
Permit Status *(additional weight)*	**0**	Permit current
	1	Permit expired, less than 5 years
	2	Permit expired, 5 years but less than 10
	3	Permit expired, 10 or more years
	3	No permit, interim status

Hazardous Waste Generators

Generator Type	Weight	Quantity of Waste
Large Quantity Hazardous Waste Generators (> 13.1 tons per year)	**0.1**	< 100 tons/yr
	0.5	100 – 1,000 tons/yr
	2	>1,000 tons/yr

Number of Hazardous Waste Generators and Permitted Facilities in CalEnviroScreen 2.0: Approximately 4,400

Facility Type	% of Total
Large hazardous waste generator with RCRA waste	97%
Permitted hazardous waste storage facility	3%*

**Permitted storage facilities are weighted much higher than generators.*

IMPAIRED WATER BODIES

Environmental Effects Indicator

Contamination of California streams, rivers, and lakes by pollutants can compromise the use of the water body for drinking, swimming, fishing, aquatic life protection, and other beneficial uses. When this occurs, such bodies are considered "impaired." Information on impairments to these water bodies can help determine the extent of environmental degradation within an area.

Indicator

Summed number of pollutants across all water bodies designated as impaired within the area.

Data Source

303(d) List of Impaired Water Bodies,
State Water Resources Control Board (SWRCB)

The SWRCB provides information relevant to the condition of California surface waters. Such information is required by the Federal Clean Water Act. Every two years, State and Regional Water Boards assess the quality of California surface waters. Lakes, streams and rivers that do meet water quality standards, or are not expected to meet water quality standards, are listed as impaired under Section 303(d) of the Clean Water Act.

http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/TMDLs/303dlist.shtml

Rationale

Rivers, lakes, estuaries and marine waters in California are important for many different uses. Water bodies used for recreation may also be important to the quality of life of nearby residents if subsistence fishing is critical to their livelihood (CalEPA, 2002). Water bodies also support abundant flora and fauna. Changes in aquatic environments can affect biological diversity and overall health of ecosystems. Aquatic species important to local economies may be impaired if the habitats where they seek food and reproduce are changed. Marine wildlife like fish and shellfish that are exposed to toxic substances may potentially expose local consumers to toxic substances as well (CalEPA, 2002). Excessive hardness, unpleasant odor or taste, turbidity, color, weeds, and trash in the waters are types of pollutants affecting water aesthetics (CalEPA, 2002), which in turn can affect nearby communities.

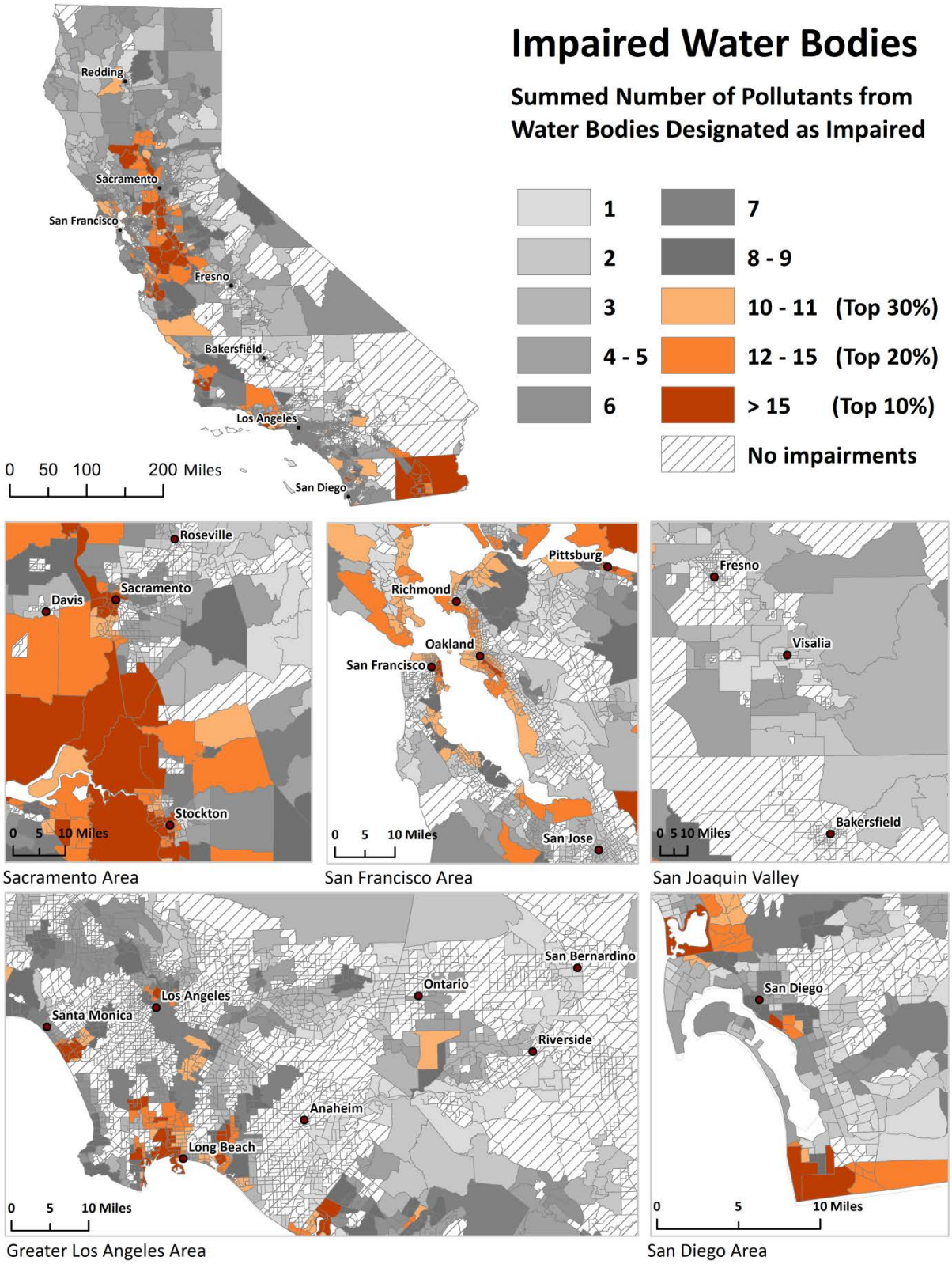
Communities of color, low-income communities, and tribes generally depend on the fish, aquatic plants, and wildlife provided by nearby surface waters to a greater extent than the general population (NEJAC, 2002). Some communities that rely on resources provided by nearby surface waters have populations of lower socioeconomic status than the general population. For example, certain fishing communities along California's northern coast have lower educational attainment and median income than California as a whole (Pomeroy *et al.*, 2010). Low-income communities in California that rely on fishing and waterfront businesses have been affected by a recent decline in the fishing

community (California State Lands Commission, 2011). Lower per capita income has been associated with increased levels of certain surface water pollutants, as have a higher percentage of minorities and people of color (Farzin and Grogan, 2012). In addition, a study in the Sacramento-San Joaquin Delta found that fish consumption for certain subsistence fishers was higher than rates used for planning and regulation of polluted waters, and that mercury consumption from fish was significantly above US EPA advisory levels (Shilling *et al.,* 2010).

Two studies, one in England and one in San Antonio, Texas, found that people who lived near water bodies with significant impairments were more likely to believe that the water bodies were safe, and therefore to visit them more often, than people who lived further away (Georgiou *et al.,* 2000; Brody *et al.,* 2004).

Method

- Data on water body type, water body ID, and pollutant type were downloaded in Excel format, and GIS data showing the visual representation of all water bodies were downloaded from the SWRCB website. http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml)
- All water bodies were identified in all census tracts in the GIS software ArcMap.
- The number of pollutants listed in streams or rivers that fell within 1 kilometer (km) or 2 km of a census tract's populated blocks were counted. The 2 km buffer distance was applied to major rivers (>100 km in length, plus the Los Angeles River and Imperial Valley canals and drainage ways). The 1 km buffer distance was applied to all smaller streams/rivers.
- The number of pollutants listed in lakes, bays, estuaries or shoreline that fell within 1 km or 2 km of a census tract's populated blocks were counted. The 2 km buffer distance was applied to major lakes or bays greater than 25 square kilometers in size, plus all the Sacramento/San Joaquin River Delta waterways. The 1 km buffer distance was applied for all other lakes/bays.
- The two pollutant counts were summed for every census tract.
- Each census tract was scored based on the sum of the number of individual pollutants found within and/or bordering it. For example, if two stream sections within a census tract were both listed for the same pollutant, the pollutant was only counted once.
- Census tracts were ordered based on their summed scores and were assigned percentiles.


Impaired Water Bodies
Summed Number of Pollutants from Water Bodies Designated as Impaired
1
2
3
4 - 5
6
7
8 - 9
10 - 11 (Top 30%)
12 - 15 (Top 20%)
> 15 (Top 10%)
No impairments
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Brody SD, Highfield W, Alston L (2004). Does location matter? Measuring environmental perceptions of creeks in two San Antonio watersheds. *Environment and Behavior* **36**(2):229-50.

CalEPA, Agency CR (2002). Environmental Protection Indicators for California. In OEHHA (Ed.) (2002 ed., pp. 303). Sacramento: CalEPA. Available at URL: http://oehha.ca.gov/multimedia/epic/Epicreport.html.

California State Lands Commission (2012). Central Coastal California Seismic Imaging Project. Final Environmental Impact Report. Vol. 2. Section III. Chapter 7.

Farzin YH and Grogan KA (2012). Socioeconomic factors and water quality in California. Environmental Economics and Policy Studies. Published Online: 08 June 2012. Available at URL: http://www.feem.it/userfiles/attach/2011781234534NDL2011-051.pdf.

Georgiou S, Bateman I, Cole M, Hadley D (2000). *Contingent ranking and valuation of river water quality improvements: Testing for scope sensitivity, ordering and distance decay effects*ed.: Centre for Social and Economic Research on the Global Environment.

NEJAC (2002). National Environmental Justice Advisory Council. Fish Consumption and Environmental Justice. A Report developed from the National Environmental Justice Advisory Council Meeting of December 3-6, 2001. Available at URL: http://www.epa.gov/environmentaljustice/resources/publications/nejac/fish-consump-report_1102.pdf

Pomeroy C, Thomson CJ, Stevens MM (2010). California's North Coast Fishing Communities Historical Perspective and Recent Trends. Scripps Institution of Oceanography.SLC (2012). Available at URL: http://www-csgc.ucsd.edu/BOOKSTORE/documents/FullRept.pdf

Shilling F, White A, Lippert L, Lubell M (2010). Contaminated fish consumption in California's Central Valley Delta. *Environ Res* **110**(4):334-44.

SOLID WASTE SITES AND FACILITIES

Environmental Effects Indicator

Many newer solid waste landfills are designed to prevent the contamination of air, water, and soil with hazardous materials. However, older sites that are out of compliance with current standards or illegal solid waste sites may degrade environmental conditions in the surrounding area and pose a risk of exposure. Other types of facilities, such as composting, treatment and recycling facilities, may raise concerns about odors, vermin, and increased truck traffic. While data that describe environmental effects from the siting and operation of all types of solid waste facilities are not currently available, the California Department of Resources Recycling and Recovery (CalRecycle) maintains data on facilities that operate within the state, as well as sites that are abandoned, no longer in operation, or illegal.

Indicator

Sum of weighted solid waste sites and facilities.

Data Source

Solid Waste Information System (SWIS) and
Closed, Illegal, and Abandoned (CIA) Disposal Sites Program,
California Department of Resources Recycling and Recovery, CalRecycle

SWIS is a database which tracks solid waste facilities, operations, and disposal sites throughout California. Solid waste sites found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites.

The CIA Disposal Sites Program is a subset of the SWIS database, and includes closed landfills and disposal sites that have not met minimum state standards for closure as well as illegal and abandoned sites. Sites within CIA have been prioritized to assist local enforcement agencies investigate the sites and enforce state standards.

http://calrecycle.ca.gov/SWFacilities/Directory/
http://www.calrecycle.ca.gov/SWFacilities/CIA/

Rationale

Solid waste sites can have multiple impacts on a community. Waste gases like methane and carbon dioxide can be released into the air from disposal sites for decades, even after site closure (US EPA, 2011; Ofungwu and Eget, 2005). Fires, although rare, can pose a health risk from exposure to smoke and ash (CalRecycle, 2010a; US Fire Administration, 2002). Odors and the known presence of solid waste may impair a community's perceived desirability and affect the health and quality of life of nearby residents (Heaney *et al.*, 2011).

Although all active solid waste sites are regulated, CalRecycle has recorded a number of old closed disposal sites and landfills that are monitored less frequently. Former abandoned disposal sites present potential for human or animal exposure to uncovered waste or burn ash. Such sites are of concern to State and local enforcement agencies

(CalRecycle, 2010b).

Many of the studies that address the potential toxicity of solid waste site emissions look at the biological effects of landfill leachate on selected species of animals and plants in the laboratory. New ecological test methods have demonstrated that exposure to landfill soil containing a mixture of hazardous chemicals can cause genetic changes that are associated with adverse effects on the reproductive system (Roelofs *et al.*, 2012). In addition, an epidemiologic study of human births near landfills in Wales found an increase in the rate of birth defects after the opening or expansion of sites (Palmer *et al.*, 2005). A study conducted after an accidental fire at a municipal landfill in Greece found unacceptably high levels of dioxins in food products, primarily meat, milk and olives, from an area near the landfill (Vassiliadou *et al.*, 2009).

Method:

Closed, Illegal, and Abandoned (CIA) sites:

- CIA data were obtained from CalRecycle for all priorities. (Only high priority CIA sites data are available online.)
- Unconfirmed and non-solid waste sites were removed from the analysis.
- Each remaining site was scored on a weighted scale in consideration of CalRecycle's prioritization categories (see table in Appendix).
- Site locations were mapped or geocoded (in ArcMap).

Active Solid Waste Information (SWIS) sites:

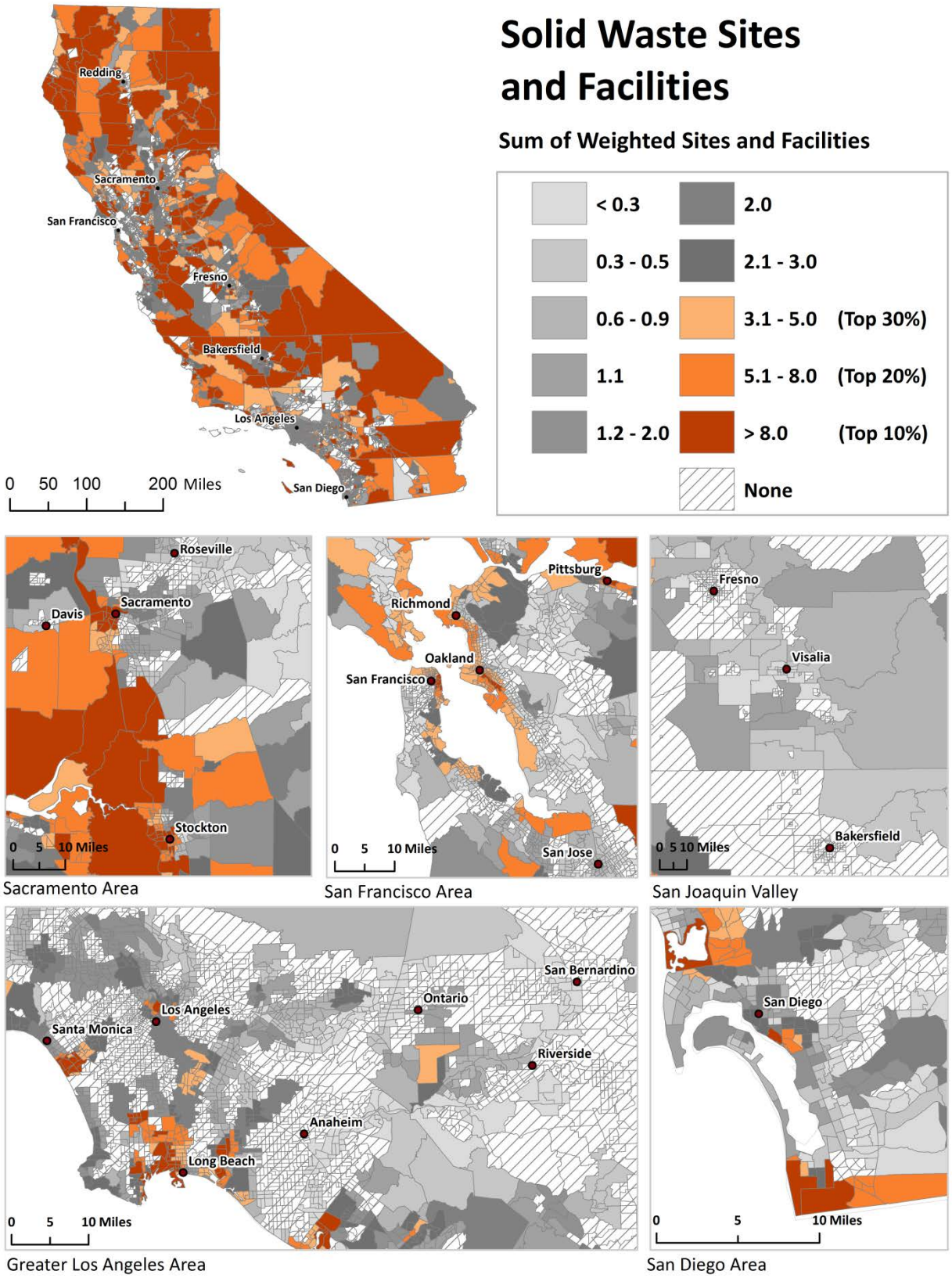
- SWIS data were obtained from the CalRecycle website.
- CIA records were filtered from the database because SWIS contains an inventory of both active and CIA sites.
- Of the remaining sites, Clean Closed, Absorbed, Inactive and Planned sites were not included.
- Each remaining site was scored on a weighted scale in consideration of the category type of solid waste operation (see table in Appendix).
- Site locations were mapped or geocoded (in ArcMap).
- To account for the relatively large land area of certain solid waste landfills that process greater than 3000 tons per day, the area of these sites from the SWIS database was used to create a circular perimeter approximation around its mapped location.

All sites:

- The weights for all sites, including the approximated large landfill perimeters, were adjusted based on the distance they fell from populated census blocks. Sites further than 1000m from any populated census block were excluded from the analysis.
- Site weights were adjusted by multiplying the weight by 1 for sites

less than 250m, 0.5 for sites 250-500m, 0.25 for sites 500-750m, and 0.1 for sites 750-1000m from the nearest populated census blocks within a given tract. Sites outside of a census tract, but less than 1000m from one of that tract's populated blocks were similarly adjusted based on the distance to the nearest block from that tract.

- Each census tract was scored based on the sum of the adjusted weights for sites it contains or is near.
- Census tracts were ordered based on their summed scores and were assigned percentiles.


Solid Waste Sites and Facilities
Sum of Weighted Sites and Facilities
< 0.3
0.3 - 0.5
0.6 - 0.9
1.1
1.2 - 2.0
2.0
2.1 - 3.0
3.1 - 5.0 (Top 30%)
5.1 - 8.0 (Top 20%)
> 8.0 (Top 10%)
None
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

CalRecycle. "Fire at Solid Waste Facilities". Last updated September 3, 2010. http://www.calrecycle.ca.gov/SWFacilities/Fires/. Accessed April 26, 2012.

CalRecycle. "Former Landfill and Disposal Site Investigations". Last updated October 6, 2010. http://www.calrecycle.ca.gov/Publications/Documents/Facilities%5C2010008.pdf. Accessed March 12, 2013.

Heaney CD, Wing S, Campbell RL, Caldwell D, Hopkins B, Richardson D, *et al*. (2011). Relation between malodor, ambient hydrogen sulfide, and health in a community bordering a landfill. *Environ Res* **111**(6):847-52.

Ofungwu J, Eget S (2006). Brownfields and health risks--air dispersion modeling and health risk assessment at landfill redevelopment sites. *Integr Environ Assess Manag* **2**(3):253-61.

Palmer SR, Dunstan FD, Fielder H, Fone DL, Higgs G, Senior ML (2005). Risk of congenital anomalies after the opening of landfill sites. *Environ Health Perspect* **113**(10):1362-5.

Roelofs D, de Boer M, Agamennone V, Bouchier P, Legler J, van Straalen N (2012). Functional environmental genomics of a municipal landfill soil. *Front Genet* **3**:85.

US EPA (2011). "General Information on the Link Between Solid Waste Management and Greenhouse Gas Emissions". Last updated April 14, 2011. http://www.epa.gov/climatechange/wycd/waste/generalinfo.html. Accessed April 26, 2012.

US Fire Administration (2002). "Landfill Fires: Their Magnitude, Characteristics, and Mitigation". Prepared by TriDataCorporation: Arlington, Virginia; 2002. http://www.usfa.fema.gov/downloads/pdf/publications/fa-225.pdf. Accessed April 26, 2012.

Vassiliadou I, Papadopoulos A, Costopoulou D, Vasiliadou S, Christoforou S, Leondiadis L (2009). Dioxin contamination after an accidental fire in the municipal landfill of Tagarades, Thessaloniki, Greece. *Chemosphere* **74**(7):879-84.

Appendix

Weighting Matrix for Solid Waste Sites and Facilities

Solid Waste Sites and Facilities from the Solid Waste Information System were weighted on a scale of 1 to a maximum of 13 in consideration of both the site type and violation history. The following table shows the weights applied to the facilities and sites. The score for any given Solid Waste Site or Facility represents the sum of its 'Site or Facility Type' and 'Violations'. For all census tracts, the weighted scores of all facilities in the area were summed after adjusting for proximity to populated census blocks.

Category	Criteria	Site or Facility Type	Violations (any in previous 12 months) [1]
Closed, Illegal, or Abandoned Site [1]	Priority Code [2]	**6** (Priority Code A) **4** (Priority Code B) **2** (Priority Code C) **1** (Priority Code D)	NA
Solid Waste Landfill or Construction, Demolition and Inert (CDI) Debris Waste Disposal (active) [3]	Tonnage	**8** (> 10,000 tpd) **7** (> 3,000 to < 10,000 tpd) **6** (> 1,000 to < 3,000 tpd) **5** (> 100 to < 1,000 tpd) **4** (< 100 tpd)	**3** (gas) **1** (each for litter, dust, noise, vectors, and site security)
Solid Waste Disposal Site (closed, closing, inactive) [4]	Tonnage	**1** (All)	**3** (gas) **1** (each for litter, vector, site security)
Inert Debris: Engineered Fill	Regulatory Tier [5]	**2** (Notification)	**1** (each for dust, noise, vectors, site security)
Inert Debris: Type A Disposal	Regulatory Tier [5]	**3** (Permitted)	**1** (each for dust, noise, vectors, site security)
Composting	Regulatory Tier [5]	**4** (Permitted) **3** (Permitted: Chipping & Grinding, 200 to ≤500 tpd) **2** (Notification)	**1** (each for vector, odor, litter, hazard, nuisance, noise, dust, site security) **1** (fire)
Transfer/Processing	Regulatory Tier [5]	**5** (Permitted: large vol.) **3** (Permitted: medium vol.; direct transfer) **2** (Notification)	**1** (each for dust, litter, vector/bird/animal, fire, site security)
Waste Tire	Regulatory Tier [5]	**4** (Major) **2** (Minor)	**2** (each for storage, fire) **1** (each for vectors, site security)

[1] Violations: Recurring requirements ensures only facilities that exhibit a pattern and practice of non-compliance receive a higher impact score and reduces point-in-time fluctuations. Explosive gas violations have a greater potential environmental impact than dust, noise, and vectors (from SWIS and the Waste Tire Management System).

[2] CIA Sites weighted per established CIA Site Priority Code scoring methodology (A through D; additional information available at http://www.calrecycle.ca.gov/SWFacilities/CIA/forms/prioritize.htm).

[3] Active landfills (other than Contaminated Soil Disposal Sites and Nonhazardous Ash Disposal/Monofill Facilities) are all in the Full Permit tier, so permitted tonnage (from SWIS) is used to scale impact score.

[4] Solid Waste Disposal Site (closed) means the site was closed pursuant to state closure standards that became operative in 1989. Closed sites associated with the CIA Site database were closed prior to 1989 in accordance with standards applicable at the time of closure.

[5] Regulatory Tier used to weight the site or facility. Placement within a regulatory tier accounts for the type of waste and amount of waste processed per day or onsite at any one time. See SWIS for compost and transfer/processing; Waste Tire Management System (WTMS) for waste tire sites.

Number of Solid Waste Sites and Facilities in CalEnviroScreen 2.0: Approximately 2,800

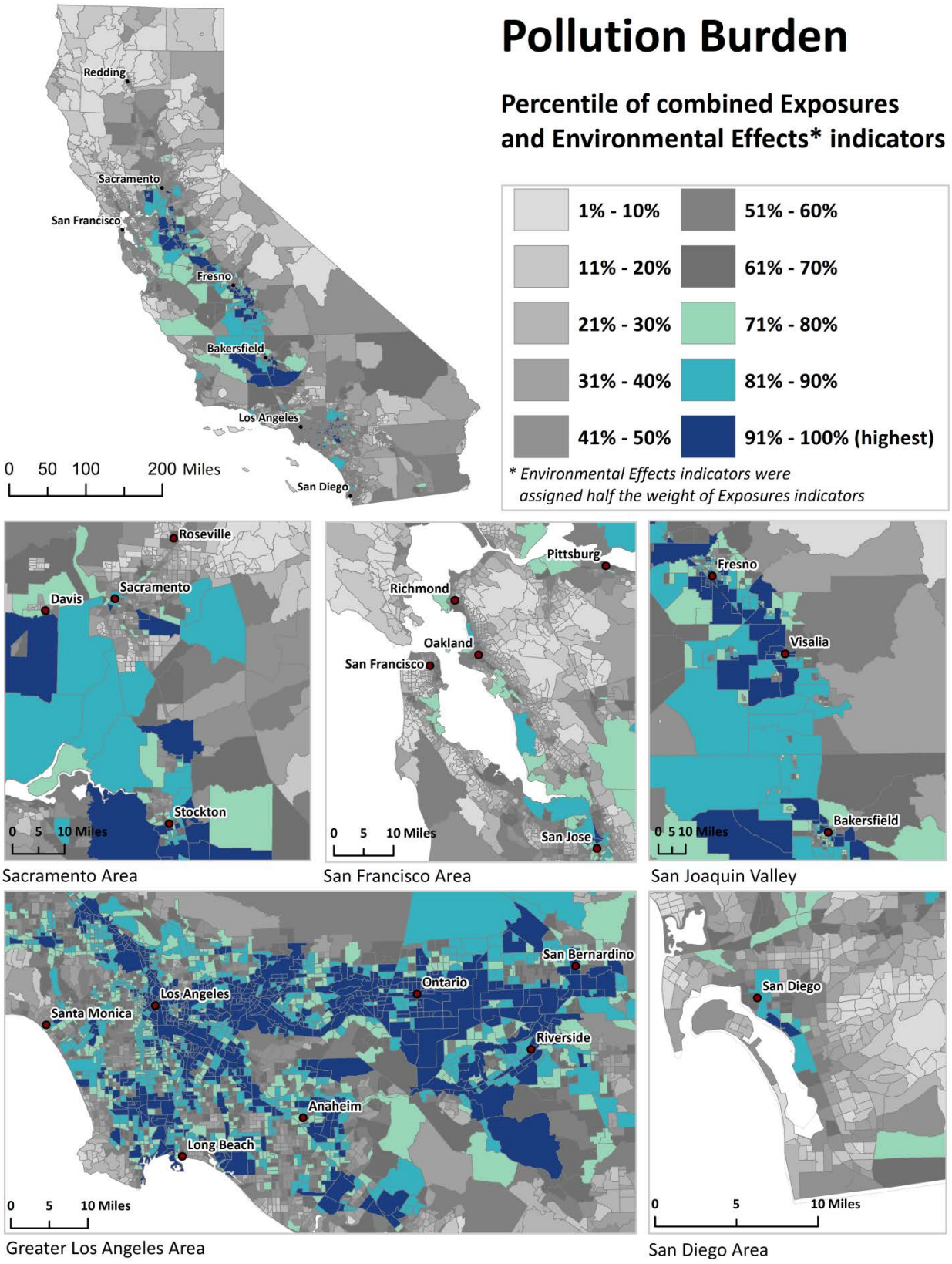
Facility Type	% of Total
Disposal (closed)	50%
Transfer/Processing (open)	24%
Composting	13%
Disposal (active)	11%
Waste Tire	2%
Transfer/Processing (closed)	<1%

SCORES FOR POLLUTION BURDEN (RANGE OF POSSIBLE SCORES: 0.1 TO 10)

Pollution Burden scores for each census tract are derived from the average percentiles of the six Exposures indicators (ozone and PM2.5 concentrations, diesel PM emissions, pesticide use, toxic releases from facilities, and traffic density) and the five Environmental Effects indicators (cleanup sites, impaired water bodies, groundwater threats, hazardous waste facilities and generators, and solid waste sites and facilities).

Indicators from the Environmental Effects component were given half the weight of the indicators from the Exposures component. The calculated average pollution buden score (average of the indicators) was divided by 10 and rounded to one decimal place for a Pollution Burden score ranging from 0.1 -10.

Note: The map on the following page shows pollution scores divided into deciles.


Pollution Burden
Percentile of combined Exposures and Environmental Effects* indicators
1% - 10%
11% - 20%
21% - 30%
31% - 40%
41% - 50%
51% - 60%
61% - 70%
71% - 80%
81% - 90%
91% - 100% (highest)
* Environmental Effects indicators were assigned half the weight of Exposures indicators
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

POPULATION CHARACTERISTICS: SENSITIVE POPULATION AND SOCIOECONOMIC FACTOR INDICATORS

AGE: CHILDREN AND ELDERLY

Sensitive Populations Indicator

Children can be especially sensitive to the adverse effects of pollutants for many reasons. Children are often more susceptible to the health effects of air pollution because their immune systems and organs are still immature. Irritation or inflammation caused by air pollution is more likely to obstruct their narrow airways. Children, especially toddlers and young children, may have higher background exposures to multiple contaminants from contact with the ground, from breathing through their mouths, and from spending a significant amount of time outdoors. Further, exposure to toxic contaminants in air or other sources during infancy or childhood could affect the development of the respiratory, nervous, endocrine and immune systems, and could increase the risk of cancer later in life.

Elderly populations can also be more vulnerable to adverse health effects from exposures to pollutants than younger adults. This population is more likely to have health conditions that may worsen responses, such as weakened immune system and existing cardiovascular and respiratory disease. A history of exposure to pollutants, or interactions with medications, may influence responses.

Indicator

Percent of population under age 10 or over age 65.

Data Source

U.S. Census Bureau

As part of the 2010 decennial census, the U.S. Census Bureau questionnaire asked all census respondents for the age and date of birth of all members of the household. Datasets describing the number of individuals in different age categories are available for California at different geographic scales. The data are made available using the American FactFinder website.

http://factfinder2.census.gov/

Rationale

Sensitivity of Children

Biological differences account for children's enhanced susceptibility to environmental pollutants. Children have smaller airways, a higher oxygen demand, and lower body weight than adults. Studies have demonstrated that children under the age of two have the highest exposure to lead in soil and household dust because of hand-to-mouth behavior. Even low levels of lead in a child's blood can result in intellectual delays, attention deficit-hyperactivity disorder and behavior problems. Childhood lead poisoning is associated with poverty, recent immigrant status and lack of private health insurance (Bellinger 2004; Howarth 2012; Wright *et al.* 2008, Canfield *et al.* 2003).

Children may spend 70% of their time outdoors, where they are exposed to contaminants in outdoor air. Air pollution can contribute to asthma, aggravated by children's high breathing rates and increased particle deposition in their small airways. Because children have low

body weights and high oxygen demands, they can also ingest higher amounts of chemicals than adults in relation to their size (OEHHA, 2001).

Children have proportionately greater skin surface area than adults, allowing body heat to be lost more readily and requiring a higher rate of metabolism to maintain body temperature and fuel growth and development. The resulting higher oxygen and food requirements can lead to higher exposures to environmental contaminants in air and food (Cohen Hubal *et al.*, 2000). In addition, the skin of children, especially newborns, is softer than the skin of adults and therefore can be more readily penetrated by chemicals. Infants may have higher exposures to fat-soluble chemicals once the layer of fat underlying the skin develops at approximately 2-3 months of age, continuing through the toddler period (OEHHA, 2001). The percentage of body fat generally decreases with age (Cohen Hubal *et al.*, 2000). Once environmental chemicals have been absorbed, the infant's immature renal system is unable to eliminate them as effectively as older children and adults (Sly and Flack, 2008).

Sensitivity of the Elderly

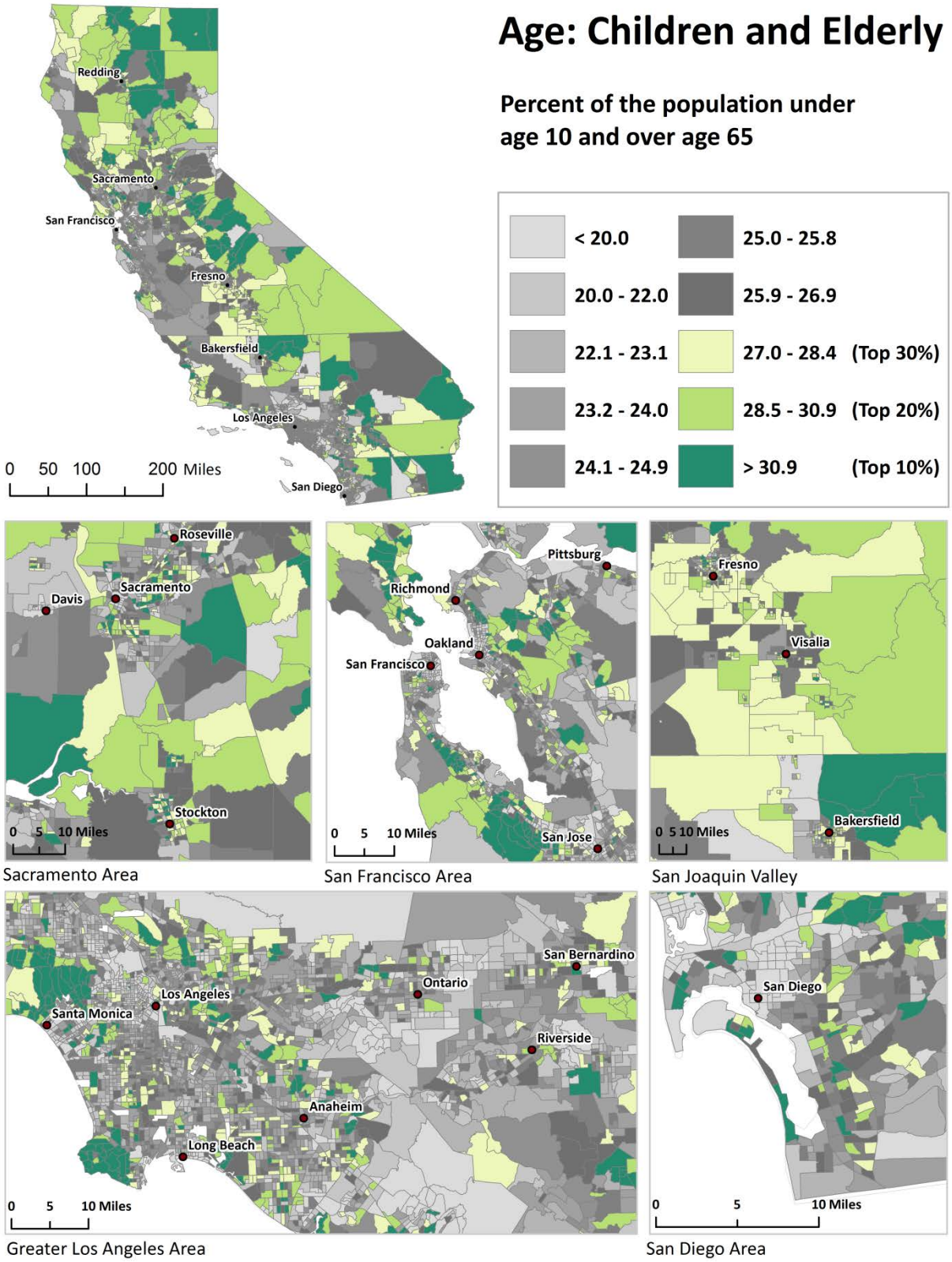
The mechanisms of absorption, distribution, metabolism, and excretion change with age. There is a reduction in lean body mass, certain blood proteins, and total body water as we get older. In comparison to younger adult populations, there is more variation in elderly individuals' capacity to metabolize substances. Reduced metabolic rates result in decreases in blood flow, prolonging the process of chemical elimination. In addition, renal function can be reduced by 50% in the elderly (Pedersen, 1997). Heart disease, which is found in the majority of elderly populations, increases susceptibility to the effects of exposure to particulate matter and can decrease heart rate and oxygen saturation (Adler, 2003).

Researchers in Korea in the 1990s noted that an increase in air pollution resulted in an increased risk for stroke in adults over the age of 65 (Hong *et al.*, 2002). Increased prevalence of stroke has also been associated with higher concentrations of carbon monoxide, sulfur dioxide, ozone, and nitrogen oxide (Adler, 2003). A study involving senior citizens in Denver found an increased hospitalization rate for heart attacks, atherosclerosis, and pulmonary heart disease on days with high air pollution levels. A review of studies of pollution exposure in older adults concluded that the elderly are more susceptible to health effects from air pollution than younger adults or the general population (Shumake *et al.*, 2013). Sulfur dioxide and carbon monoxide exposure have also been linked to longer hospital stays for cardiac dysrhythmias and congestive heart failure, respectively (Koken *et al.*, 2003).

Contaminants in drinking water, such as arsenic, may also pose a threat to the elderly. Arsenic accumulates in cardiovascular tissue and can trigger inflammation of the arteries, increasing the risk of atherosclerosis and vascular disease (Adler, 2003).

Method

- A dataset containing the number of people in different age groups by census tracts was downloaded for the State.
- The total percentage of individuals less than 10 years of age was calculated by summing the percentage of people less than 5 years of age and the percentage of people aged 5 to 9 years of age.
- The percentage of children and elderly in each census tract was calculated by summing the total percentage of individuals less than 10 years of age and the total percentage of individuals greater than 65 years of age in each census tract. Census tracts were ordered by this percentage. A percentile score for each census tract was determined by its place in the distribution of all census tracts.


Age: Children and Elderly
Percent of the population under age 10 and over age 65
< 20.0
20.0 - 22.0
22.1 - 23.1
23.2 - 24.0
24.1 - 24.9
25.0 - 25.8
25.9 - 26.9
27.0 - 28.4 (Top 30%)
28.5 - 30.9 (Top 20%)
> 30.9 (Top 10%)
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Adler, T (2003). Aging Research: The Future Face of Environmental Health. *Environmental Health Perspectives, 111,* 14.

Bellinger DC (2004). Lead. *Pediatrics* **113**(4 Suppl):1016-22.

Canfield RL, Henderson CR, Jr., Cory-Slechta DA, Cox C, Jusko TA, Lanphear BP (2003). Intellectual impairment in children with blood lead concentrations below 10 microg per deciliter. *N Engl J Med* **348**(16):1517-26.

Cohen Hubal EA, Sheldon LS, Burke JM, McCurdy, TR, Berry, MR, Rigas, ML, Zartarian, VG, *et al.* (2000). Children's exposure assessment: a review of factors influencing Children's exposure, and the data available to characterize and assess that exposure. *Environmental Health Perspectives,* **108**(6):475-86.

Hong Y-C, Lee JT, Kim H, and Kwon H-J (2002). Air Pollution: A New Risk Factor in Ischemic Stroke Mortality. *Stroke* **33**(9):2165.

Howarth D (2012). Lead exposure–implications for general practice. *Aust Fam Physician* **41**(5):311-5.

Koken P JM, Piver WT, Ye F, Elixhauser A, Olsen LM, and Portier CJ (2003). Temperature, Air Pollution, and Hospitalization for Cardiovascular Diseases among Elderly People in Denver. *Environmental Health Perspectives* **111**(10):1312-1317.

Office of Environmental Health Hazard Assessment (OEHHHA). (2001, October). Prioritization of toxic air contaminants under the Children's Environmental Health Protection Act. Available from URL: http://oehha.ca.gov/air/toxic_contaminants/pdf_zip/SB25%20TAC%20prioritization.pdf

Pedersen T (1997). The Unique Sensitivity of the Elderly. UCD ExtoxNet FAQ. Available from URL: http://extoxnet.orst.edu/faqs/senspop/elder.htm

Shumake KL, Sacks JD, Lee JS, Johns DO (2013). Susceptibility of older adults to health effects induced by ambient air pollutants regulated by the European Union and the United States. *Aging Clin Exp Res* **25**(1):3-8.

Sly PD and Flack F (2008). Susceptibility of Children to Environmental Pollutants. *Annals of the New York Academy of Sciences* **1140**(1):163-183.

Wright JP, Dietrich KN, Ris MD, Hornung RW, Wessel SD, Lanphear BP, *et al.* (2008). Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Med* **5**(5):e101.

ASTHMA

Sensitive Populations Indicator

Asthma is a chronic lung disease characterized by episodic breathlessness, wheezing, coughing, and chest tightness. While the causes of asthma are poorly understood, it is well established that exposure to traffic and outdoor air pollutants, including particulate matter, ozone, and diesel exhaust, can trigger asthma attacks. Nearly three million Californians currently have asthma and about five million have had it at some point in their lives. Children, the elderly and low-income Californians suffer disproportionately from asthma (California Health Interview Survey, 2009). Although well-controlled asthma can be managed as a chronic disease, asthma can be a life-threatening condition, and emergency department visits for asthma are a very serious outcome, both for patients and for the medical system.

Indicator

Spatially modeled, age-adjusted rate of emergency department (ED) visits for asthma per 10,000 (averaged over 2007-2009).

Data Source

California Office of Statewide Health Planning and Development (OSHPD)
California Environmental Health Tracking Program (CEHTP)
Environmental Health Investigations Branch,
California Department of Public Health

Since 2005, hospitals licensed by the state of California to provide emergency medical services are required to report all emergency department (ED) visits to OSHPD. Federally-owned facilities, including Veterans Administration and Public Health Services hospitals are not required to report. The ED dataset includes information on the principal diagnosis, which can be used to identify which patients visited the ED because of asthma.

ED utilization does not capture the full burden of asthma in a community because not everyone with asthma requires emergency care, especially if they receive preventive care, avoid asthma triggers and undertake disease maintenance. However, there is limited state-wide monitoring of other indicators, such as planned and unplanned doctor's visits, that might provide a better indication of overall disease burden. Some ED visits result in hospitalization, and OSPHD collects data on hospitalization due to asthma in addition to emergency department visits. ED visits are thought to provide a better comparative measure of asthma burden than hospitalizations and deaths because the data capture a larger portion of the overall burden and include less severe occurrences.

CEHTP used OSHPD's data to calculate age-adjusted rates of asthma ED visits for California ZIP codes. These estimates make use of ZIP-code level population estimates from a private vendor (Esri) and the U.S. 2000 Standard Population to derive age-adjusted rates. Age-adjustment takes the age distribution of a population into account and allows for meaningful comparisons between ZIP codes with different age

structures. ZIP code estimates are assigned to 2010 census blocks using areal apportionment. Population-weighted census block estimates are then combined to arrive at a census tract estimate.

http://www.oshpd.ca.gov/HID/Products/EmerDeptData/
http://www.cehtp.org/p/asthma

Rationale

Asthma increases an individual's sensitivity to pollutants. Air pollutants, including particulate matter, ozone, nitrogen dioxide, and diesel exhaust, can trigger symptoms among asthmatics (Meng *et al.*, 2011). Children living near major roadways and traffic corridors in California have been shown to suffer disproportionate rates of asthma (Kim *et al.*, 2004). Particulate matter from diesel engines has been implicated as a cause of new-onset asthma (Pandya *et al*, 2002). A study of low income children who developed asthma found that there was an increase in asthma diagnosis following increases in ambient air pollution (Wendt *et al.*, 2014). Exposure to certain pesticides can also trigger wheezing, coughing, and chest tightness (Hernández *et al.*, 2011).

Asthma can increase susceptibility to respiratory diseases such as pneumonia and influenza (Kloepfer *et al.*, 2012). For example, one study found that when ambient particulate pollution levels are high, persons with asthma have twice the risk of being hospitalized for pneumonia compared to persons without asthma (Zanobetti *et al.*, 2000).

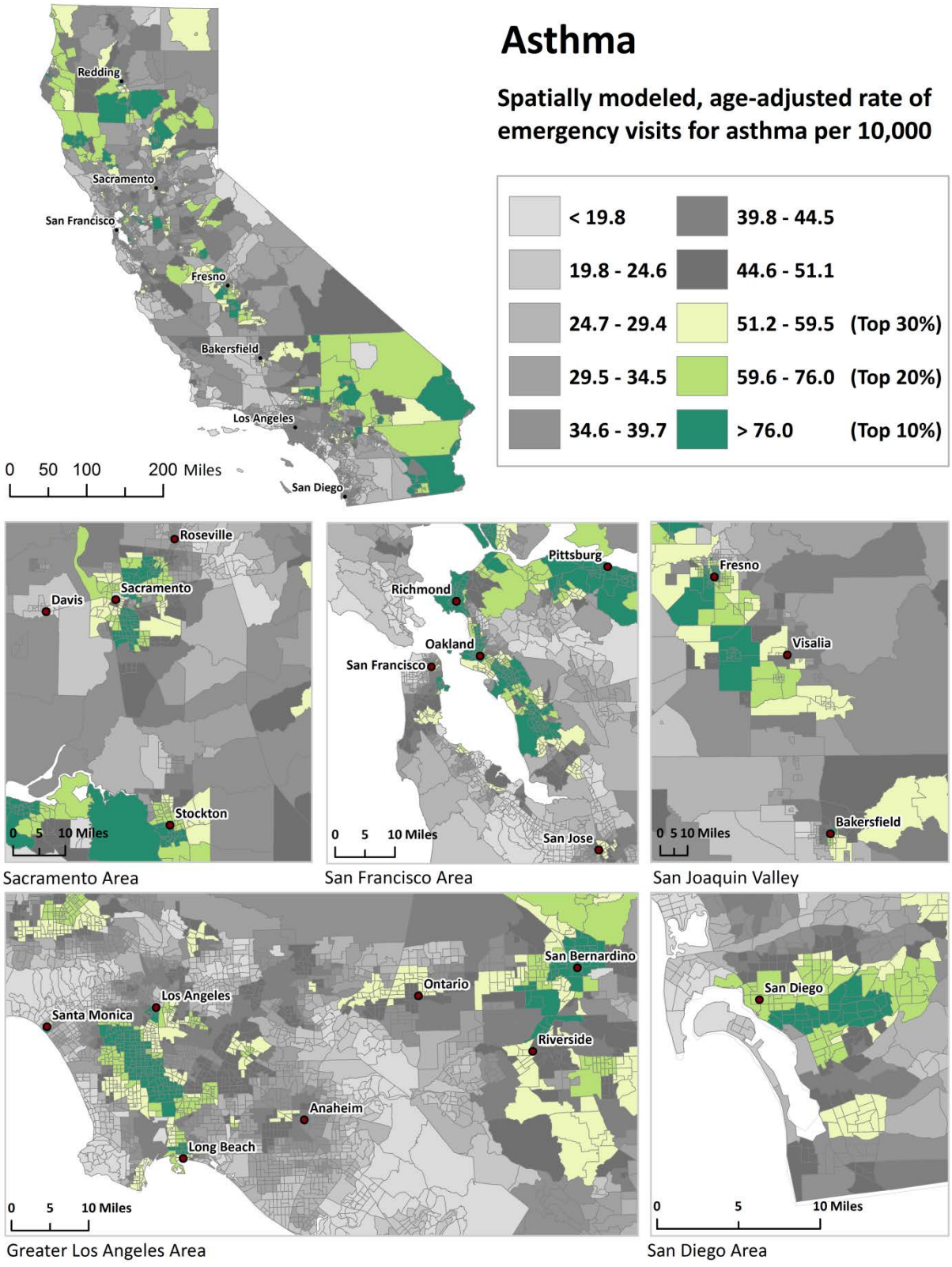
Asthma rates are a good indicator of population sensitivity to environmental stressors because asthma is both caused by and worsened by pollutants (CDPH, 2010). The severity of symptoms and the likelihood of needing hospital care decrease with access to regular medical care and asthma medication (Delfino *et al.*, 1998; Grineski *et al.*, 2010). Asthma-related emergency department visits provide a conservative estimate of total asthma cases because not all cases require emergency care. However, using those cases requiring emergency care as an indicator also captures some aspects of access to care and can be seen as a marker of both environmental and social stressors. Potential biases in using emergency department visits as an indicator of sensitivity include the possibility that lower socioeconomic status or more isolated rural populations may not have access to nearby health care facilities. Conversely, populations without health insurance may turn to emergency departments for care.

Method

- An age-adjusted rate of asthma emergency department (ED) visits was calculated for each ZIP code by CEHTP using data obtained from OSHPD. ZIP code rates were then reapportioned to census tract rates (see below).
- CEHTP obtained records for ED visits occurring during 2007-2009 from OSHPD's Emergency Department and Ambulatory Surgery files if the patient was listed as residing in California and principle diagnostic ICD-9-CM code began with the digits 493 (asthma).
- Population data used for the age-adjustment were obtained from

Esri and rates reported are standardized to the 2000 U.S. population using five-year age groupings (0-4, 5-9, etc.). The rates are per 10,000 residents per year.

- The age-adjusted rates of asthma ED visits per 10,000 residents by ZIP code were then spatially modeled to provide estimates for ZIP codes with fewer than 12 ED visits and to incorporate information about local and statewide averages into the calculations.
- A Bayesian modeling technique was used to calculate the spatially modeled rates (Mollié, 1996).
- ZIP codes without a spatially modeled rate are census ZIP codes that did not correspond to Esri ZIP codes used in the age-adjustment.
- Census blocks were assigned the average rate of the ZIP code they intersected using areal apportionment. Census tract rates were then estimated by the population-weighted average of the rates of the census blocks that it contains.
- Census tracts were ordered by the spatially modeled apportioned rate and were assigned percentiles based on the distribution across all census tracts.


Asthma
Spatially modeled, age-adjusted rate of emergency visits for asthma per 10,000
< 19.8
19.8 - 24.6
24.7 - 29.4
29.5 - 34.5
34.6 - 39.7
39.8 - 44.5
44.6 - 51.1
51.2 - 59.5 (Top 30%)
59.6 - 76.0 (Top 20%)
> 76.0 (Top 10%)
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

California Health Interview Survey, (2009). Accessed November 2012 at http://www.chis.ucla.edu/main/default.asp

CDPH. "Asthma and the Environment." http://www.ehib.org/page.jsp?page_key=27. Last edited 9/29/2010, accessed 2/15/2013.

Delfino RJ, Zeiger RS, Seltzer JM, Street DH (1998). Symptoms in pediatric asthmatics and air pollution: differences in effects by symptom severity, anti-inflammatory medication use and particulate averaging time. *Environ Health Perspect* **106**(11):751-61.

Grineski SE, Staniswalis JG, Peng Y, Atkinson-Palombo C (2010). Children's asthma hospitalizations and relative risk due to nitrogen dioxide (NO_2): Effect modification by race, ethnicity, and insurance status. *Environmental Research* **110**(2):178-88.

Hernández AF, Parrón T, Alarcón R (2011). Pesticides and asthma. *Current Opinion in Allergy and Clinical Immunology* **11**(2):90.

Kim JJ, Smorodinsky S, Lipsett M, Singer BC, Hodgson AT, Ostro B (2004). Traffic-related Air Pollution near Busy Roads The East Bay Children's Respiratory Health Study. *American Journal of Respiratory and Critical Care Medicine* **170**(5):520-6.

Kloepfer KM, Olenec JP, Lee WM, Liu G, Vrtis RF, Roberg KA, *et al.* (2012). Increased H1N1 infection rate in children with asthma. *Am J Respir Crit Care Med* **185**(12):1275-9.

Mollié A (1996). Bayesian mapping of disease. In: *Markov Chain Monte Carlo in Practice*. Gilks WR, Richardson S, Spiegelhalter DJ, eds. Chapman & Hall: London, pp. 359–379.

Meng Y, Wilhelm M, Ritz B, Balmes J, Lombardi C, Bueno A, *et al.* (2011). Is disparity in asthma among Californians due to higher pollution exposures, greater vulnerability, or both? In CAR Board (Ed.). Sacramento: CARB.

Pandya RJ, Solomon G, Kinner A, Balmes JR (2002). Diesel exhaust and asthma: hypotheses and molecular mechanisms of action. *Environ Health Perspect* **110**(Suppl 1):103.

Wendt JK, Symanski E, Stock TH, Chan W, Du XL (2014). Association of short-term increases in ambient air pollution and timing of initial asthma diagnosis among Medicaid-enrolled children in a metropolitan area. *Environmental Research* **131**(0):50-8.

Zanobetti A, Schwartz J, Gold D (2000). Are there sensitive subgroups for the effects of airborne particles? *Environ Health Perspect* **108**(9):841-5.

LOW BIRTH WEIGHT INFANTS

Sensitive Populations Indicator

Infants born weighing less than 2,500 grams (about 5.5 pounds) are classified as low birth weight (LBW), a condition that is associated with increased risk of later health problems as well as infant mortality. Most LBW infants are small because they were born early. Infants born at full term (after 37 complete weeks of pregnancy) can also be LBW if their growth was restricted during pregnancy. Nutritional status, lack of prenatal care, stress, and maternal smoking are known risk factors for LBW. Studies also suggest links with environmental exposures to lead, air pollution, toxic air contaminants, traffic pollution, pesticides, and polychlorinated biphenyls (PCBs). These children are at risk for chronic health conditions that may make them more sensitive to environmental exposures after birth.

Indicator

Percent low birth weight, spatially modeled (averaged over 2006-2009).

Data Source

California Department of Public Health (CDPH)

The Health Information and Research Section of CDPH is responsible for the stewardship and distribution of birth records in the state. Medical data related to a birth, as well as demographic information related to the infant, mother, and father is collected from birth certificates. Personal identifiers are not released publicly to protect confidentiality.

Information about the geographic location of births was used by OEHHA in compliance with the State of California Committee for the Protection of Human Subjects. The data was analyzed by the California Environmental Health Tracking Program (CEHTP) of CDPH's Environmental Health Investigation Branch.

http://www.cdph.ca.gov/data/dataresources/requests/Pages/BirthandFetalDeathFiles.aspx

Rationale

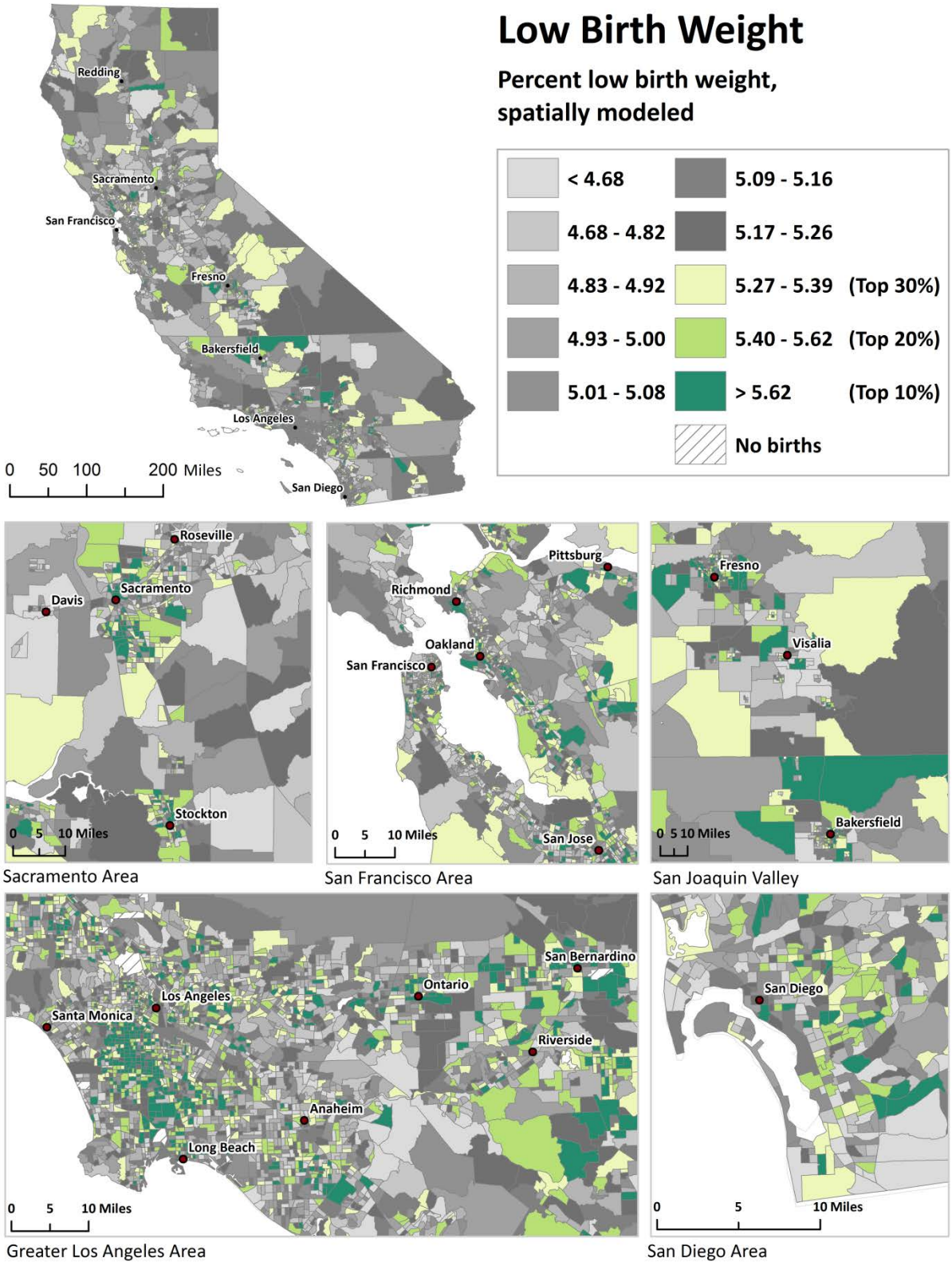
LBW is considered a key marker of overall population health. Being born low weight puts individuals at higher risk of health conditions that can subsequently make them more sensitive to environmental exposures. For example, children born low weight are at increased risk of developing asthma (Nepomnyaschy and Reichman, 2006). Asthma symptoms, in turn, are worsened by exposure to air pollution. LBW can also put one at increased risk of coronary heart disease and type 2 diabetes (Barker *et al.*, 2002). These conditions can predispose one to mortality associated with particulate air pollution or excessive heat (Bateson and Schwartz, 2004; Basu and Samet, 2002). There is also evidence that children born early have lowered cognitive development and more behavioral problems compared to children born at term (Butta *et al.*, 2002), putting them at disadvantage for subsequent opportunities for good health.

Risk of LBW is increased by certain environmental exposures and social factors and can therefore be considered a marker of the combined impact of environmental and social stressors. For example, exposures to fine particulate matter, heavy traffic and to toxic air contaminants such as benzene, xylene, and toluene have been linked to LBW in California (Ghosh *et al*., 2012, Basu *et al.,* 2014). Low weight births are more common among African-American women than they are among Hispanic and non-Hispanic white women, even among those with comparable socioeconomic status, prenatal care, and behavioral risk factors (Lu and Halfon, 2003).

Living in close proximity to freeways has been associated with an increased risk for LBW term infants (Laurent *et al*., 2013). Latina women exposed to pesticides in California in low-income farmworker communities were found to be at risk for LBW infants that were small for gestational age, with smaller than average head circumference, an indicator of brain development (Harley *et al*., 2011).

Method

- The crude low birth weight (LBW) rate was calculated from California birth records as the percent of live, singleton births during the 2006-2009 period weighing less than 2,500 grams.
- Multiple births (non-singletons) and births with an improbable combination of gestational age and birth weight were excluded (Alexander, 1996). Out-of-state births, and births with no known residential address (including P.O. boxes) were also excluded. These exclusions lead to a lower statewide LBW rate than that reported by other organizations who do not apply this criterion.
- Births were geocoded based on the mother's residential address at the time of birth by CEHTP. A small number (less than 1%) of addresses could not be geocoded and were excluded.
- Estimates derived from places with few births are considered unreliable because they often produce extreme values much higher or lower than expected and can vary greatly from year to year. For this reason, spatially-smoothed rather than crude rates were used as the indicator. An Empirical Bayes method was used to spatially smooth the observed crude rates that were based on small counts (Anselin *et al*., 2006a). Empirical Bayes smoothing uses the total number of births in an area as a measure of the confidence that can be placed in an observed LBW rate. LBW estimates for areas with few births (in which we have low confidence) are moved toward the state-wide average, while estimates for areas with many births (in which we have high confidence) are changed very little. The smoothing was performed using GeoDa software version 1.4.6 (Arizona State University, Anselin *et al*., 2006b).
- Each census tract was assigned a percentile based on its relative ranking of spatially modeled LBW compared to all other tracts.



References Alexander R, *et al.* (1996). A United States national reference for fetal

growth. *Obstetrics & Gynecology* **87**(2): 163-168.

Anselin, Luc, Nancy Lozano & Julia Koschinsky (2006a). Rate Transformation and Smoothing. Spatial Analysis Laboratory, University of Illinois, Urbana-Champaign, 85 pages. Accessed March 2014 at http://geodacenter.asu.edu/pdf/smoothing_06.pdf

Anselin, Luc, Ibnu Syabri & Youngihn Kho (2006b). GeoDA: an introduction to spatial data analysis. *Geographical Analysis* **38**: 5-22.

Barker DJ, Eriksson JG, Forsen T, Osmond C (2002). Fetal origins of adult disease: strength of effects and biological basis. *Int J Epidemiol* **31**(6):1235-9.

Basu R, Samet JM (2002). Relation between elevated ambient temperature and mortality: a review of the epidemiologic evidence. *Epidemiol Rev* **24**(2):190-202.

Basu R, Harris M, Sie L, Malig B, Broadwin R, Green R (2014). Effects of fine particulate matter and its constituents on low birth weight among full-term infants in California. *Environ Res* **128**:42-51.

Bateson TF, Schwartz J (2004). Who is sensitive to the effects of particulate air pollution on mortality? A case-crossover analysis of effect modifiers. *Epidemiology* **15**(2):143-9.

Bhutta AT, Cleves MA, Casey PH, Cradock MM, Anand KJ (2002). Cognitive and behavioral outcomes of school-aged children who were born preterm: a meta-analysis. *JAMA* **288**(6):728-37.

Ghosh JKC, Wilhelm M, Su J, Goldberg D, Cockburn M, Jerrett M*, et al.* (2012). Assessing the Influence of Traffic-related Air Pollution on Risk of Term Low Birth Weight on the Basis of Land-Use-based Regression Models and Measures of Air Toxics. *American Journal of Epidemiology* **175**(12):1262-74.

Harley KG, Huen K, Schall RA, Holland NT, Bradman A, Barr DB*, et al.* (2011). Association of organophosphate pesticide exposure and paraoxonase with birth outcome in Mexican-American women. *PloS one* **6**(8):e23923.

Laurent O, Wu J, Li L, Chung J, Bartell S (2013). Investigating the association between birth weight and complementary air pollution metrics: a cohort study. *Environ Health* **12**(1):18.

Lu MC, Halfon N (2003). Racial and ethnic disparities in birth outcomes: a life-course perspective. *Matern Child Health J* **7**(1):13-30.

Nepomnyaschy L, Reichman NE (2006). Low birthweight and asthma among young urban children. *Am J Public Health* **96**(9):1604-10.

EDUCATIONAL ATTAINMENT

Socioeconomic Factors Indicator

Educational attainment is an important element of socioeconomic status and a social determinant of health. Numerous studies suggest education can have a protective effect from exposure to environmental pollutants that damage health. Information on educational attainment is collected annually in the U.S. Census Bureau's American Community Survey (ACS). In contrast to the decennial census, the ACS surveys a small sample of the U.S. population to estimate more detailed economic and social information for the country's population.

Indicator

Percent of the population over age 25 with less than a high school education (5-year estimate, 2008-2012).

Data Source

American Community Survey
U.S. Census Bureau

The American Community Survey (ACS) is an ongoing survey of the U.S. population conducted by the U.S. Census Bureau and has replaced the long form of the decennial census. Unlike the decennial census, which attempts to survey the entire population and collects a limited amount of information, the ACS releases results annually based on a sub-sample of the population and includes more detailed information on socioeconomic factors such as educational attainment. Multiple years of data are pooled together to provide more reliable estimates for geographic areas with small population sizes. The most recent results available at the census tract scale are the 5-year estimates for 2008-2012. The data are made available using the American FactFinder website.

http://www.census.gov/acs/www/
http://factfinder2.census.gov/

Rationale

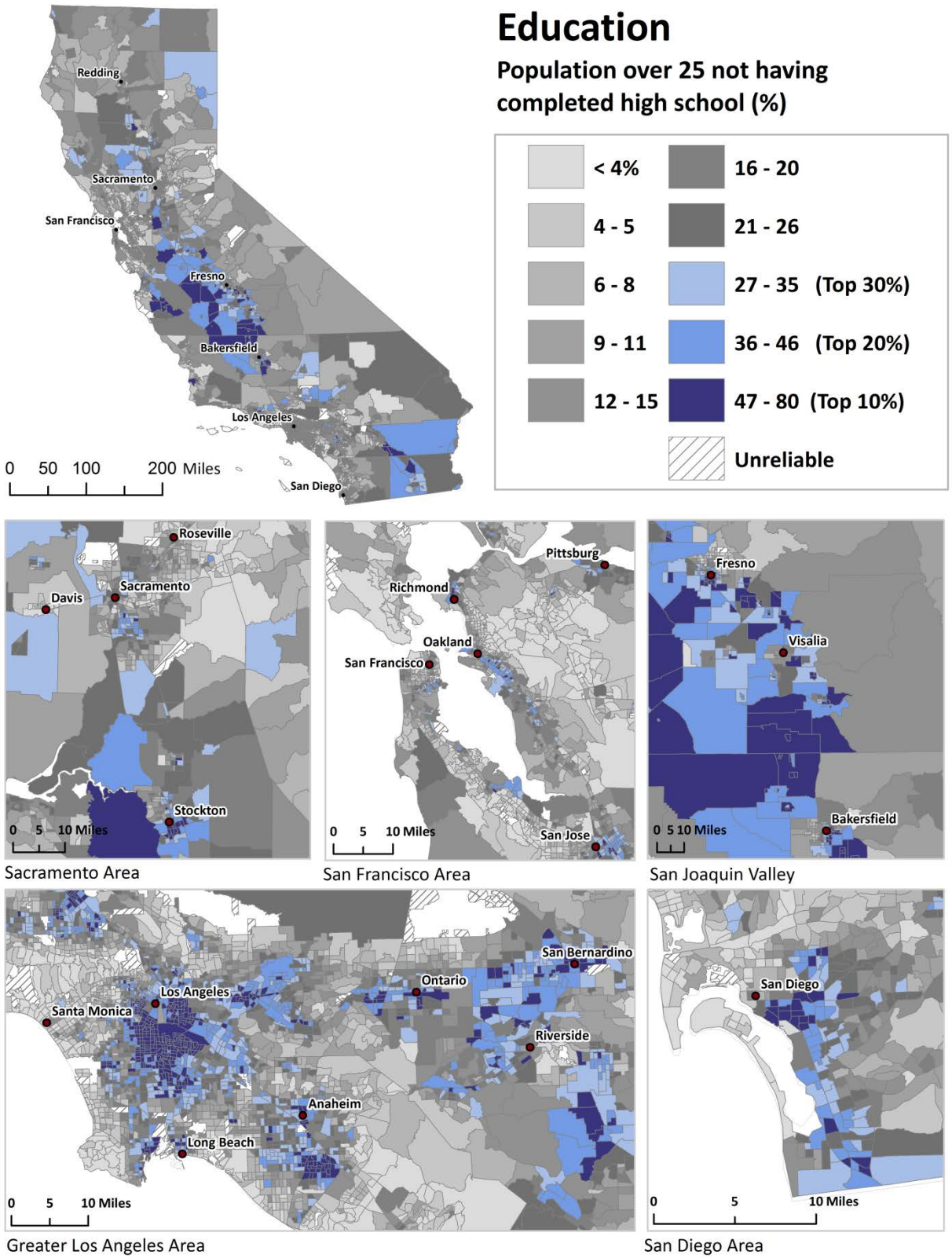
Educational attainment is an important independent predictor of health (Cutler and Lleras-Muney, 2006). As a component of socioeconomic status, education is often inversely related to the degree of exposure to indoor and outdoor pollution. Several studies have associated educational attainment with susceptibility to the health impacts of environmental pollutants. For example, individuals without a high school education appear to be at higher risk of mortality associated with particulate air pollution than those with a high school education (Krewski *et al.*, 2000). There is also evidence that the effects of air and traffic-related pollution on respiratory illness, including childhood asthma, are more severe in communities with lower levels of education (Cakmak *et al.*, 2006; Shankardass *et al.*, 2009; Neidell, 2004).

The ways in which lower educational attainment can decrease health status are not completely understood, but may include economic hardship, stress, fewer occupational opportunities, lack of social support, and reduced access to health-protective resources such as medical care, prevention and wellness initiatives, and nutritious food. In a study of pregnant women in Amsterdam, smoking and exposure to environmental

tobacco smoke were more common among women with less education. These women also were at significantly increased risk of preterm birth, low birth weight and small for gestational age infants (van den Berg *et al.*, 2012). A review of studies tying social stressors with the effects of chemical exposures on health found that level of education was related to mortality and incidence of asthma and respiratory diseases from exposure to particulate air pollution and sulfur dioxide (Lewis *et al.*, 2011). A study of older adults, aged 70 to 79, found that those with less than a high school education had significantly shorter leukocyte telomere length, a genetic marker linked to stress, than those with more education (Adler *et al.*, 2013)

Method

- From the 2008-2012 American Community Survey estimates, a dataset containing the percentage of the population over age 25 with a high school education or higher was downloaded by census tracts for the state of California.
- This percentage was subtracted from 100 to obtain the proportion of the population with less than a high school education.
- Unlike the U.S. Census, ACS estimates come from a sample of the population and may be unreliable if they are based on a small sample or population size. The standard error (SE) and relative standard error (RSE) were used to evaluate the reliability of each estimate.
- The SE was calculated for each census tract by dividing the margin of error (MOE) reported in the ACS by 1.645, a statistical value associated with a 90 percent confidence interval. The MOE is the difference between an estimate and its upper or lower confidence bound. All ACS-published margins of error are based on a 90 percent confidence level.
- The RSE is calculated by dividing a tract's SE by its estimate of educational attainment, and taking the absolute value of the result.
- Census tract estimates that met either of the following criteria were considered reliable and included in the analysis:
  1. RSE less than 50 (meaning the SE was less than half of the estimate) OR
  2. SE was less than the mean SE of all California census tract estimates for education.
- Census tracts that met the inclusion criteria were ordered by the percentage of the population over age 25 with less than a high school education and percentiles were assigned to each based on the distribution across all census tracts.


Education
Population over 25 not having completed high school (%)
< 4%
4 - 5
6 - 8
9 - 11
12 - 15
16 - 20
21 - 26
27 - 35 (Top 30%)
36 - 46 (Top 20%)
47 - 80 (Top 10%)
Unreliable
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Adler N, Pantell MS, O'Donovan A, Blackburn E, Cawthon R, Koster A, *et al*. (2013). Educational attainment and late life telomere length in the Health, Aging and Body Composition Study. *Brain Behav Immun* **27**(1):15-21.

American Community Survey Office (2012). American Community Survey Multiyear Accuracy of the Data (3-Year 2010-2012 and 5-Year 2008-2012). Accessed March 2014 at https://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2012.pdf.

Cakmak S, Dales RE, Judek S (2006). Respiratory health effects of air pollution gases: modification by education and income. *Archives of Environmental & Occupational Health* **61**(1):5-10.

Cutler DM, Lleras-Muney A (2006). Education and Health: Evaluating Theories and Evidence. *National Bureau of Economic Research Working Paper Series* **No. 12352**.

Krewski D, Burnett RT, Goldberg MS, Hoover K, Siemiatycki J, Jerrett M, *et al*. (2000). Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of particulate air pollution and mortality. *Cambridge, MA: Health Effects Institute*.

Lewis AS, Sax SN, Wason SC, Campleman SL (2011). Non-chemical stressors and cumulative risk assessment: an overview of current initiatives and potential air pollutant interactions. *Int J Environ Res Public Health* **8**(6):2020-73.

Neidell MJ (2004). Air pollution, health, and socio-economic status: the effect of outdoor air quality on childhood asthma. *Journal of Health Economics* **23**(6):1209-36.

Shankardass K, McConnell R, Jerrett M, Milam J, Richardson J, Berhane K (2009). Parental stress increases the effect of traffic-related air pollution on childhood asthma incidence. *Proc Natl Acad Sci U S A* **106**(30):12406-11.

van den Berg G, van Eijsden M, Vrijkotte TG, Gemke RJ (2012). Educational inequalities in perinatal outcomes: the mediating effect of smoking and environmental tobacco exposure. *PLoS One* **7**(5):e37002.

LINGUISTIC ISOLATION

Socioeconomic Factors Indicator

According to the most recent U.S. Census Bureau's 2008-2012 American Community Survey (ACS), nearly 43% of Californians speak a language at home other than English, about 20% of the state's population speaks English "not well" or "not at all," and 10% of all households in California are linguistically isolated. The U.S. Census Bureau uses the term "linguistic isolation" to measure households where all members 14 years of age or above have at least some difficulty speaking English. A high degree of linguistic isolation among members of a community raises concerns about access to health information and public services, and effective engagement with regulatory processes. Information on language use is collected annually in the ACS. In contrast to the decennial census, the ACS surveys a small sample of the U.S. population to estimate more detailed economic and social information for the country's population.

Indicator

Percentage of households in which no one age 14 and over speaks English "very well" or speaks English only.

Data Source

American Community Survey
U.S. Census Bureau

The American Community Survey (ACS) is an ongoing survey of the U.S. population conducted by the U.S. Census Bureau and has replaced the long form of the decennial census. Unlike the decennial census, which attempts to survey the entire population and collects a limited amount of information, the ACS releases results annually based on a sub-sample of the population and includes more detailed information on socioeconomic factors such as linguistic isolation. Multiple years of data are pooled together to provide more reliable estimates for geographic areas with small population sizes. The most recent results available at the census tract scale are the 5-year estimates for 2008-2012. The data are made available using the American FactFinder website.

http://www.census.gov/acs/www/
http://factfinder2.census.gov/

Rationale

From 1990 to 2000 the number of households in the U.S. defined as "linguistically isolated" rose by almost 50% (Shin and Bruno, 2003). While the percentage of immigrant households in California that are linguistically isolated is comparable to the national percentage, according to the 2009 American Community Survey (Hill, 2011), California has a higher proportion of immigrants than any other state and the immigrant population has increased by 400% since 1970 (Johnson, 2011). The inability to speak English well can affect an individual's communication with service providers and his or her ability to perform daily activities. People with limited English are less likely to have regular medical care and are more likely to report difficulty getting medical information or advice than English speakers. Communication is essential for many steps in the process of obtaining health care, and limited English speakers may delay care because they

lack important information about symptoms and available services (Shi *et al*. 2009). Non-English speakers are also less likely to receive mental health services when needed, and because in California non-English speakers are concentrated in minority ethnic communities, limited English proficiency may contribute to further ethnic and racial disparities in health status and disability (Sentell *et al*. 2007). Linguistic isolation is also an indicator of a community's ability to participate in decision-making processes and the ability to navigate the political system.

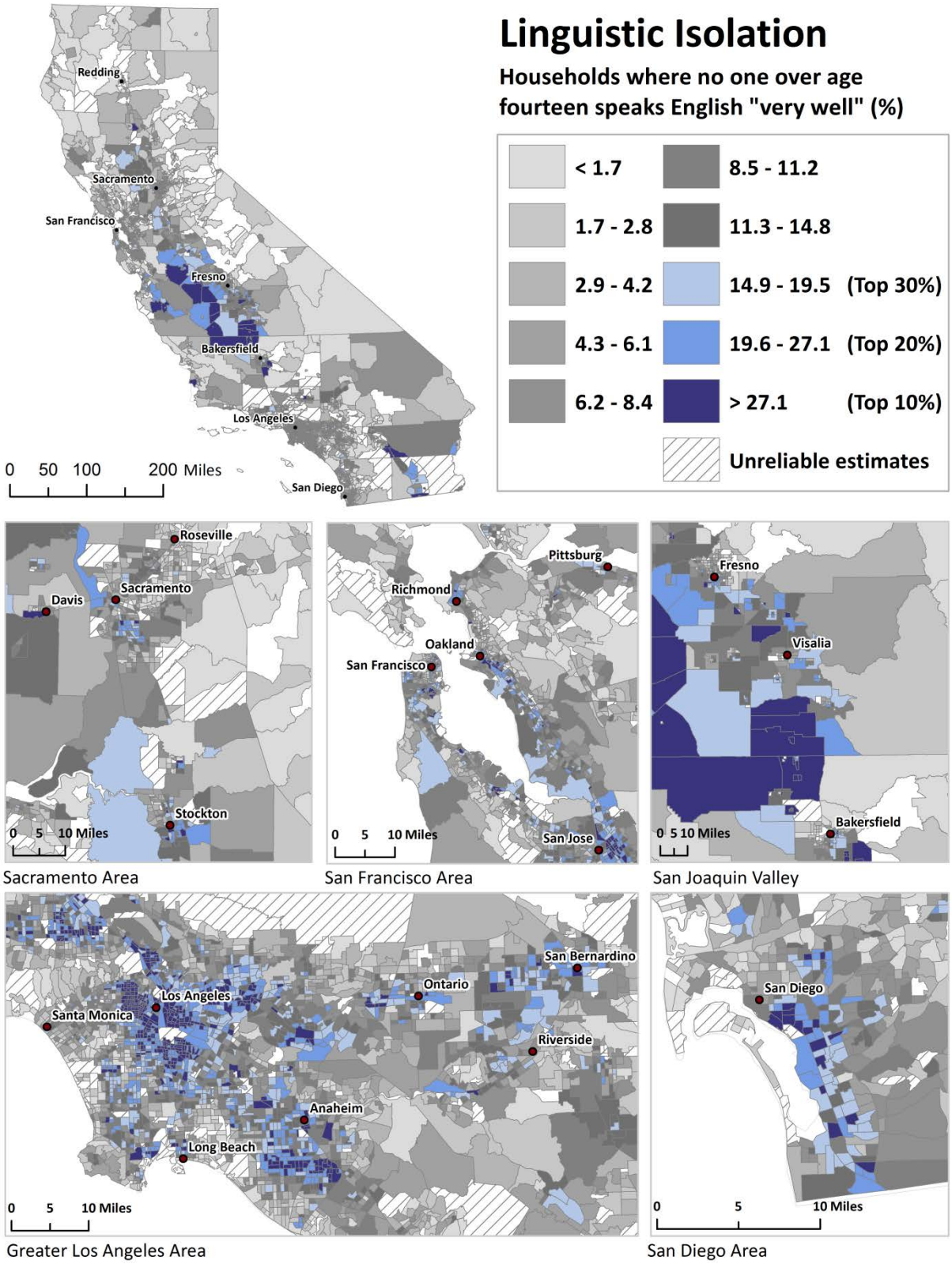
Lack of proficiency in English often results in racial discrimination, and both language difficulties and discrimination are associated with stress, low socioeconomic status and reduced quality of life (Gee and Ponce, 2010). Linguistic isolation hampers the ability of the public health sector to reduce racial and ethnic disparities because non-English-speaking individuals participate in public health surveillance studies at very low rates, even when there is translation available (Link *et al*., 2006).

In the event of an emergency, such as an accidental chemical release or a spill, households that are linguistically isolated may not receive timely information on evacuation or shelter-in-place orders, and may therefore experience health risks that those who speak English can more easily avoid. Additionally, linguistic isolation was independently related to both proximity to a Toxic Release Inventory (TRI) facility and cancer risks by the National-Scale Air Toxics Assessment (NATA) in an analysis of the San Francisco Bay Area, suggesting that linguistically isolated communities may bear a greater share of health risks from air pollution hazards (Pastor *et al*,. 2010).

Method

- From the 2008-2012 American Community Survey, a dataset containing the average percent of household in which no one age 14 and over speaks English "very well" or speaks English only was downloaded by census tracts for the state of California. This variable is referred to as "linguistic isolation" and measures households where no one speaks English well.
- Unlike the U.S. Census, ACS estimates come from a sample of the population and may be unreliable if they are based on a small sample or population size. The standard error (SE) and relative standard error (RSE) were used to evaluate the reliability of each estimate.
- The SE was calculated for each census tract by dividing the margin of error (MOE) reported in the ACS by 1.645, a statistical value associated with a 90 percent confidence interval. The MOE is the difference between an estimate and its upper or lower confidence bound. All ACS-published margins of error are based on a 90 percent confidence level.
- The RSE is calculated by dividing a tract's SE by its estimate of the percent of linguistically isolated households, and taking the absolute value of the result.

- Census tract estimates that met either of the following criteria were considered reliable and included in the analysis:
    1. RSE less than 50 (meaning the SE was less than half of the estimate) OR
    2. SE was less than the mean SE of all California census tract estimates for linguistic isolation.
- Census tracts that met the inclusion criteria were ordered by the percent linguistically isolated and percentiles were assigned to each based on the distribution across all tracts.


Linguistic Isolation
Households where no one over age fourteen speaks English "very well" (%)
< 1.7
1.7 - 2.8
2.9 - 4.2
4.3 - 6.1
6.2 - 8.4
8.5 - 11.2
11.3 - 14.8
14.9 - 19.5 (Top 30%)
19.6 - 27.1 (Top 20%)
> 27.1 (Top 10%)
Unreliable estimates
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

American Community Survey Office (2013). American Community Survey Multiyear Accuracy of the Data (3-Year 2010-2012 and 5-Year 2008-2012). Accessed March 2014 at https://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2012.pdf.

Gee GC, Ponce N (2010). Associations between racial discrimination, limited English proficiency, and health-related quality of life among 6 Asian ethnic groups in California. *Am J Public Health* **100**(5):888-95.

Hill, Laura (2011). English Proficiency of Immigrants. Fact Sheet. Public Policy Institute of California, March 2011. 2 pp. Accessed 1/30/2013. http://www.ppic.org/content/pubs/jtf/JTF_EnglishProficiencyJTF.pdf

Johnson, Hans (2011). Immigrants in California. Fact Sheet. Public Policy Institute of California, April 2011. 2 pp. Accessed 1/30/2013. http://www.ppic.org/content/pubs/jtf/JTF_ImmigrantsJTF.pdf

Link MW, Mokdad AH, Stackhouse HF, Flowers NT (2006). Race, ethnicity, and linguistic isolation as determinants of participation in public health surveillance surveys. *Prev Chronic Dis* **3**(1):A09.

Pastor M, Morello-Frosch R, Sadd J (2010). *Air pollution and environmental justice: integrating indicators of cumulative impact and socio-economic vulnerability into regulatory decision-making*: California Environmental Protection Agency, Air Resources Board, Research Division.

Sentell T, Shumway M, Snowden L (2007). Access to mental health treatment by English language proficiency and race/ethnicity. *J Gen Intern Med* **22 Suppl 2**:289-93.

Shi L, Lebrun LA, Tsai J (2009). The influence of English proficiency on access to care. *Ethn Health* **14**(6):625-42.

Shin HB, Bruno R (2003). Language Use and English-Speaking Ability: 2000. In US Dept of Commerce (Ed.) (pp. 1-11). Washington, DC: U.S. Census Bureau.

POVERTY

Socioeconomic Factors Indicator

Poverty is an important social determinant of health. Numerous studies have suggested that impoverished populations are more likely than wealthier populations to experience adverse health outcomes when exposed to environmental pollution. Information on poverty is collected annually in the U.S. Census Bureau's American Community Survey (ACS). In contrast to the decennial census, the ACS surveys a small sample of the U.S. population to estimate more detailed economic and social information for the country's population.

Indicator

Percent of the population living below two times the federal poverty level (5-year estimate, 2008-2012).

Data Source

American Community Survey
U.S. Census Bureau

The American Community Survey (ACS) is an ongoing survey of the U.S. population conducted by the U.S. Census Bureau and has replaced the long form of the decennial census. Unlike the decennial census, which attempts to survey the entire population and collects a limited amount of information, the ACS releases results annually based on a sub-sample of the population and includes more detailed information on socioeconomic factors such as poverty. Multiple years of data are pooled together to provide more reliable estimates for geographic areas with small population sizes. The most recent results available at the census tract scale are the 5-year estimates for 2008-2012. The data are made available using the American FactFinder website.

The Census Bureau uses income thresholds that are dependent on family size to determine a person's poverty status during the previous year. For example, if a family of four with two children has a total income less than $21,938 during 2010, everyone in that family is considered to live below the federal poverty line. A threshold of twice the federal poverty level was used in this analysis because the federal poverty thresholds have not changed since the 1980s despite increases in the cost of living, and because California's cost of living is higher than many other parts of the country.

http://www.census.gov/acs/www/
http://factfinder2.census.gov/

Rationale

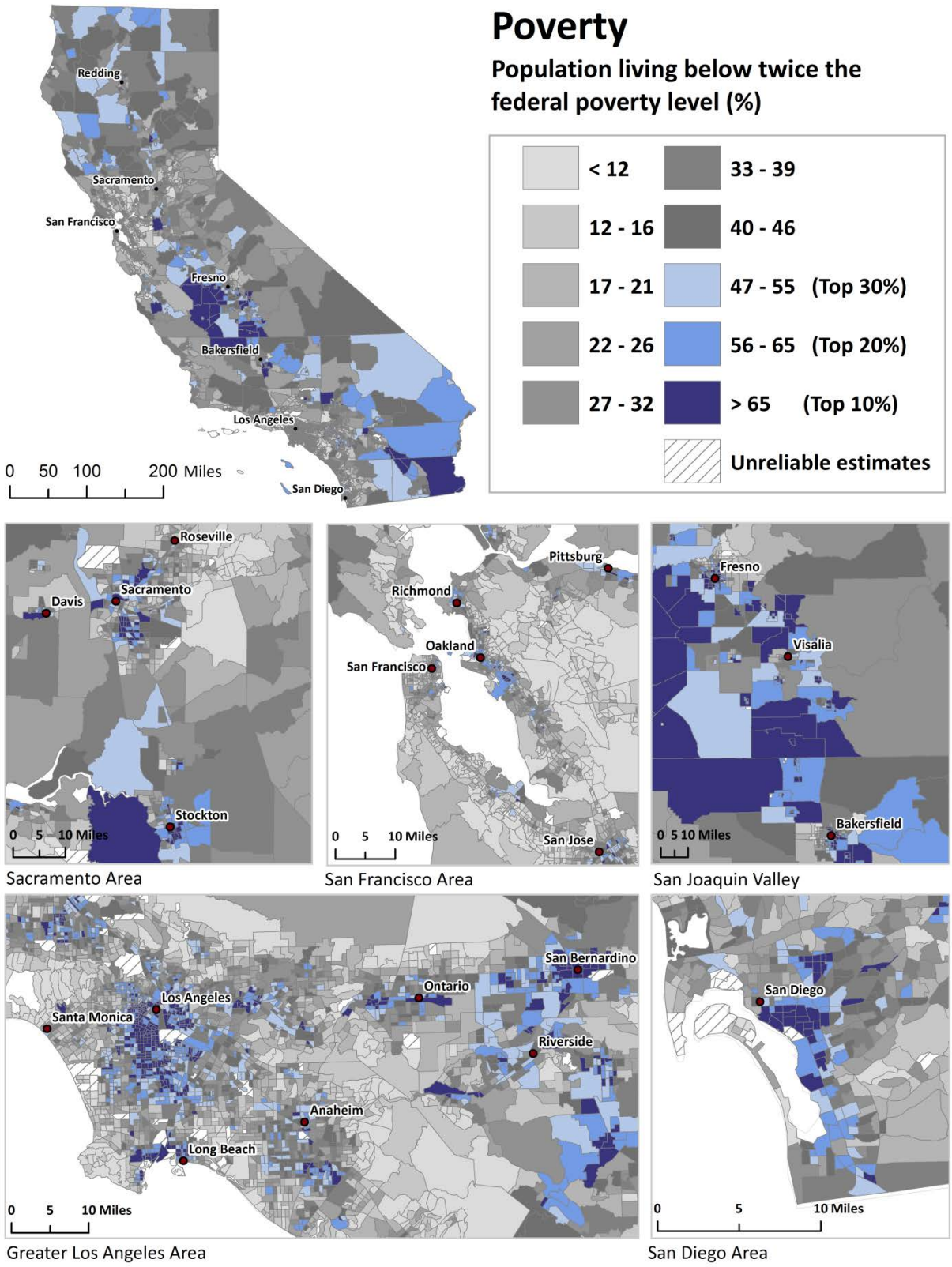
Wealth influences health because it helps determine one's living conditions, nutrition, occupation, and access to health care and other health-promoting resources. For example, studies have shown a stronger effect of air pollution on mortality (Forastiere *et al.*, 2007) and childhood asthma (Lin *et al.*, 2004, Meng *et al.*, 2011) among low income communities. A multi-city study in Canada found that the effect of nitrogen dioxide on respiratory hospitalizations was increased among lower income households compared to those with higher incomes (Cakmak *et al.*, 2006). Other studies have found that neighborhood-level

income modifies the relationship between particulate air pollution and preterm birth (Yi *et al.,* 2010) as well as traffic and low birth weight (Zeka *et al.,* 2008), with mothers living in low income neighborhoods having higher risk of both outcomes.

One way by which poverty may lead to greater susceptibility is from the effects of chronic stress on the body (Wright *et al.*, 1999; Brunner and Marmot, 2006). Differential underlying burdens of pre-existing illness and co-exposure to multiple pollutants are other possible factors (O'Neill *et al.,* 2003).

Method

- From the 2008-2012 American Community Survey, a dataset containing the number of individuals below 200 percent of the federal poverty level was downloaded by census tracts for the state of California.
- The number of individuals below the poverty level was divided by the total population for whom poverty status was determined to obtain a percent.
- Unlike the U.S. Census, ACS estimates come from a sample of the population and may be unreliable if they are based on a small sample or population size. The standard error (SE) and relative standard error (RSE) were used to evaluate the reliability of each estimate.
- The SE was calculated for each census tract using the formula for approximating the SE of proportions provided by the ACS (American Community Survey Office, 2013, pg. 13, equation 4). When this approximation could not be used, the formula for approximating the SE of ratios (equation 3) was used instead.
- The RSE is calculated by dividing a tract's SE by its estimate of the percentage of the population living below twice the federal poverty level, and taking the absolute value of the result.
- Census tract estimates that met either of the following criteria were considered reliable and included in the analysis:
    1. RSE less than 50 (meaning the SE was less than half of the estimate) OR
    2. SE was less than the mean SE of all California census tract estimates for poverty.
- Census tracts that met the inclusion criteria were ordered by the percentage of the population below twice the federal poverty level. A percentile score for a census tract was determined by its place in the distribution of all census tracts.


Poverty
Population living below twice the federal poverty level (%)
< 12
12 - 16
17 - 21
22 - 26
27 - 32
33 - 39
40 - 46
47 - 55 (Top 30%)
56 - 65 (Top 20%)
> 65 (Top 10%)
Unreliable estimates
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

American Community Survey Office (2013). American Community Survey Multiyear Accuracy of the Data (3-Year 2010-2012 and 5-Year 2008-2012). Accessed March 2014 at https://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2012.pdf.

Brunner E and Marmot M (2006). Social organization, stress and health. In: *Social Determinants of Health* (2nd edition). Marmot M and Wildinson RG, eds. Oxford, UK: Oxford University Press, p. 7-30.

Cakmak S, Dales RE, Judek S (2006). Respiratory health effects of air pollution gases: modification by education and income. *Archives of Environmental & Occupational Health* **61**(1):5-10.

Forastiere F, Stafoggia M, Tasco C, Picciotto S, Agabiti N, Cesaroni G, *et al*. (2007). Socioeconomic status, particulate air pollution, and daily mortality: differential exposure or differential susceptibility. *American Journal of Industrial Medicine* **50**(3):208-16.

Lin M, Chen Y, Villeneuve PJ, Burnett RT, Lemyre L, Hertzman C, *et al*. (2004). Gaseous air pollutants and asthma hospitalization of children with low household income in Vancouver, British Columbia, Canada. *American Journal of Epidemiology* **159**(3):294-303.

Meng Y, Wilhelm M, Ritz B, Balmes J, Lombardi C, Bueno A, *et al*. (2011). Is disparity in asthma among Californians due to higher pollution exposures, greater vulnerability, or both? In CAR Board (Ed.). Sacramento: CARB.

O'Neill MS, Jerrett M, Kawachi I, Levy JI, Cohen AJ, Gouveia N, *et al*. (2003). Health, wealth, and air pollution: advancing theory and methods. *Environmental Health Perspectives* **111**(16):1861.

Wright RJ, Rodriguez M, Cohen S (1998). Review of psychosocial stress and asthma: an integrated biopsychosocial approach. *Thorax* **53**(12):1066-74.

Yi O, Kim H, Ha E (2010). Does area level socioeconomic status modify the effects of PM10 on preterm delivery? *Environmental Research* **110**(1):55-61.

Zeka A, Melly SJ, Schwartz J (2008). The effects of socioeconomic status and indices of physical environment on reduced birth weight and preterm births in Eastern Massachusetts. *Environ Health* **7**:60.

UNEMPLOYMENT

Socioeconomic Factors Indicator

Because low socioeconomic status often goes hand-in-hand with high unemployment, the rate of unemployment is a factor commonly used in describing disadvantaged communities. On an individual level, unemployment is a source of stress, which is implicated in poor health reported by residents of such communities. Lack of employment and resulting low income often oblige people to live in neighborhoods with higher levels of pollution and environmental degradation.

Indicator

Percent of the population over the age of 16 that is unemployed and eligible for the labor force. Excludes retirees, students, homemakers, institutionalized persons except prisoners, those not looking for work, and military personnel on active duty (5-year estimate, 2008-2012).

Data Source

American Community Survey
U.S. Census Bureau

The American Community Survey (ACS) is an ongoing survey of the U.S. population conducted by the U.S. Census Bureau. Unlike the decennial census, which attempts to survey the entire population and collects a limited amount of information, the ACS releases results annually based on a sub-sample of the population and includes more detailed information on socioeconomic factors such as unemployment. Multiple years of data are pooled together to provide more reliable estimates for geographic areas with small population sizes. The most recent results available at the census tract level are the 5-year estimates for 2008-2012. The data are available on the American FactFinder website.

http://www.census.gov/acs/www/
http://factfinder2.census.gov/

Rationale

There is evidence that an individual's health is at least partly determined by neighborhood and regional factors. Unemployment is frequently used as a surrogate for neighborhood deprivation, which is associated with pollution exposure as well as poor health (Voigtlander *et al.*, 2010). Studies of neighborhood socioeconomic factors have found stress to be a major factor in reported poor health among residents of disadvantaged communities, and both financial and emotional stress are direct results of unemployment (Turner, 1995).

The unemployed tend to have higher annual illness rates, lack health insurance and access to health care, and have an increased risk of death compared to those who are employed. In addition, poor health also affects a person's ability to obtain and retain employment (Athar *et al.* 2013). Unemployment, along with low income and low educational attainment, has been associated with increased incidence of irritable bowel syndrome (Farzaneh *et al.*, 2013), childhood asthma (Hafkamp-de Groen *et al.*, 2013), poor mental health (Kan, 2013), and decreased quality of life among cervical cancer survivors (Yoo *et al.*, 2013). A study of 4301 men and women in 3 cities in Germany found that men living in

high-unemployment neighborhoods were at higher risk of emergent coronary artery disease than men living in areas of low unemployment (Dragano *et al.,* 2009). In a study of unemployment and mortality, the authors found that job loss was associated with an increased hazard of death compared to that of employed individuals, equivalent to aging 10 years (Tapia Granados *et al.*, 2014). Unemployment has been shown to be associated with the biological effects of stress. Stress resulting from early-life experiences and current domestic stress are linked with shorter leukocyte telomere length (LTL). Among men, long-term unemployment (more than 500 days during three years) in early adulthood was associated with having shorter LTL, compared to being continuously employed (Ala-Mursula *et al.,* 2013). Stress, in turn, may lead to poor health, increased susceptibility to toxic effects of pollution, and reduced capacity to cope and recover from adverse effect of environmental exposures (Defur *et al.*, 2007).

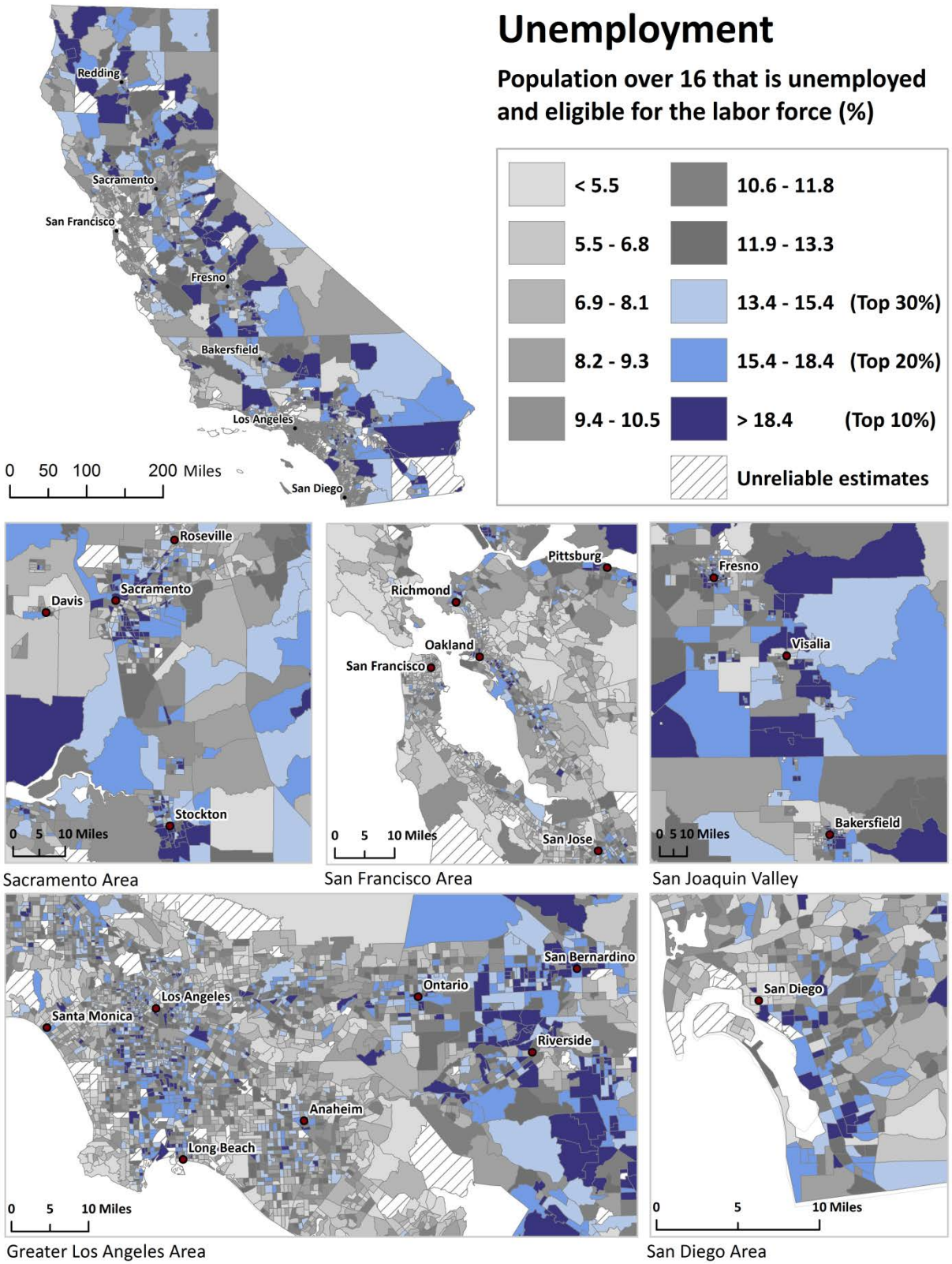
Premji *et al.* (2007) studied the relationship between pollutant emissions and socioeconomic variables in 27 Canadian communities and found that pollution levels were positively associated with the unemployment rate. In a study of statewide unemployment levels as well as trucking industry data in New Jersey, Davis *et al.* (2010) found that high unemployment was associated with high coefficient of haze, a measure of diesel particulate pollution.

Method

- From the 2008-2012 American Community Survey, a dataset containing the unemployment rate was downloaded by census tracts for the state of California.
- The Census Bureau calculates an unemployment rate by dividing the 'Population Unemployed in the Civilian Labor Force' by 'Population in the Civilian Labor Force' and then converting to a percentage.
- Unlike the U.S. Census, ACS estimates come from a sample of the population and may be unreliable if they are based on a small sample or population size. The standard error (SE) and relative standard error (RSE) were used to evaluate the reliability of each estimate.
- The SE was calculated for each census tract using the formula for approximating the SE of proportions provided by the ACS (American Community Survey Office, 2013, pg. 13, equation 4). When this approximation could not be used, the formula for approximating the SE of ratios (equation 3) was used instead.
- The RSE is calculated by dividing a tract's SE by its estimate of unemployment rate, and taking the absolute value of the result.
- Census tract estimates that met either of the following criteria were considered reliable and included in the analysis:
    1. RSE less than 50 (meaning the SE was less than half of the estimate) OR

2. SE was less than the mean SE of all California census tract estimates for unemployment rate.

- Census tracts that met the inclusion criteria were ordered by unemployment rate. A percentile score for a census tract was determined by its place in the distribution of all census tracts.


Unemployment
Population over 16 that is unemployed and eligible for the labor force (%)
< 5.5
5.5 - 6.8
6.9 - 8.1
8.2 - 9.3
9.4 - 10.5
10.6 - 11.8
11.9 - 13.3
13.4 - 15.4 (Top 30%)
15.4 - 18.4 (Top 20%)
> 18.4 (Top 10%)
Unreliable estimates
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Sacramento
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

References

Ala-Mursula L, Buxton JL, Ek E, Koiranen M, Taanila A, Blakemore AI, *et al.* (2013). Long-term unemployment is associated with short telomeres in 31-year-old men: an observational study in the northern Finland birth cohort 1966. *PLoS One* **8**(11):e80094.

American Community Survey Office (2013). American Community Survey Multiyear Accuracy of the Data (3-Year 2010-2012 and 5-Year 2008-2012). Accessed March 2014 at https://www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearACSAccuracyofData2012.pdf.

Athar HM, Chang MH, Hahn RA, Walker E, Yoon P (2013). Unemployment - United States, 2006 and 2010. *MMWR Surveill Summ* **62** Suppl 3:27-32.

Davis ME, Laden F, Hart JE, Garshick E, Smith TJ (2010). Economic activity and trends in ambient air pollution. *Environ Health Perspect* **118**(5):614-9.

Defur PL, Evans GW, Cohen Hubal EA, Kyle AD, Morello-Frosch RA (2007) Vulnerability as a function of individual and group resources in cumulative risk assessment. *Environ Health Perspect* **115**(5): 817-824.

Dragano N, Hoffmann B, Stang A, Moebus S, Verde PE, Weyers S, *et al.* (2009). Subclinical coronary atherosclerosis and neighbourhood deprivation in an urban region. *Eur J Epidemiol* **24**(1):25-35.

Farzaneh N, Ghobaklou M, Moghimi-Dehkordi B, Naderi N, Fadai F (2013). Effects of demographic factors, body mass index, alcohol drinking and smoking habits on irritable bowel syndrome: a case control study. *Ann Med Health Sci Res* **3**(3):391-6.

Hafkamp-de Groen E, Sonnenschein-van der Voort AM, Mackenbach JP, Duijts L, Jaddoe VW, Moll HA, *et al.* (2013). Socioeconomic and sociodemographic factors associated with asthma related outcomes in early childhood: the Generation R Study. *PLoS One* **8**(11):e78266.

Kan M (2013). Being out of work and health among younger Japanese men: a panel data analysis. *Ind Health* **51**(5):514-23.

Premji S, Bertrand F, Smargiassi A, Daniel M (2007). Socio-economic correlates of municipal-level pollution emissions on Montreal Island. *Can J Public Health* **98**(2):138-42.

Tapia Granados JA, House JS, Ionides EL, Burgard S, Schoeni RS (2014). Individual Joblessness, Contextual Unemployment, and Mortality Risk. *Am J Epidemiol.*

Turner JB (1995). Economic Context and the Health Effects of Unemployment. *Journal of Health and Social Behavior* **36**(3):213-29.

Voigtlander S, Berger U, Razum O (2010). The impact of regional and neighbourhood deprivation on physical health in Germany: a multilevel study. *BMC Public Health* **10**:403.

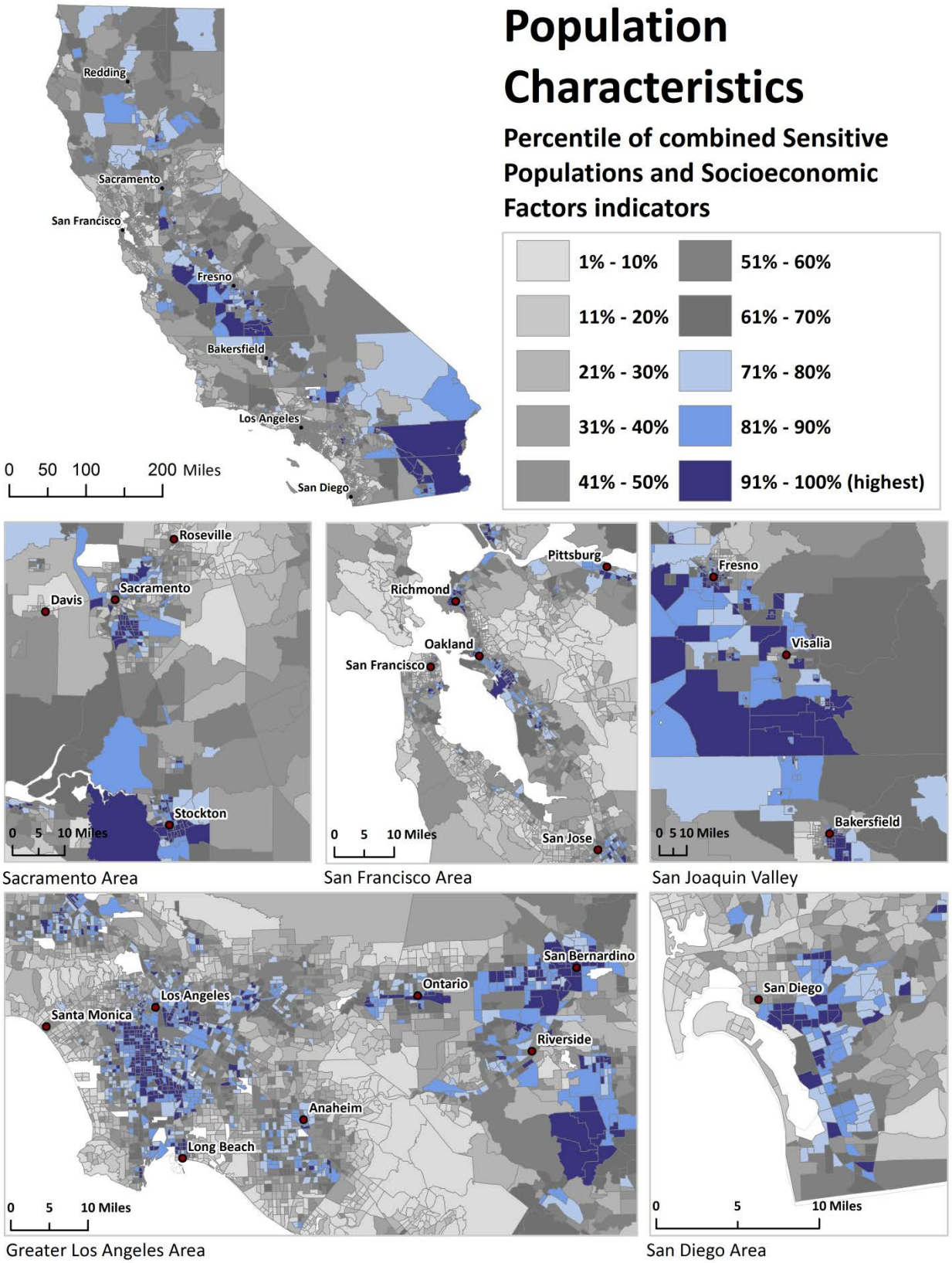
Yoo SH, Yun YH, Park S, Kim YA, Park SY, Bae DS, *et al.* (2013). The

correlates of unemployment and its association with quality of life in cervical cancer survivors. *J Gynecol Oncol* **24**(4):367-75.

SCORES FOR POPULATION CHARACTERISTICS (RANGE OF POSSIBLE SCORES: 0.1 TO 10)

Population Characteristics scores for each census tract are derived from the average percentiles for the three Sensitive Populations indicators (children/elderly, low birth weight, and asthma) and the three Socioeconomic Factors indicators (educational attainment, linguistic isolation, and poverty). The calculated average percentile divided by 10 for a Population Characteristic score ranging from 0.1 -10.

Note: The map on the following page shows population characteristic scores divided into deciles.


Population Characteristics
Percentile of combined Sensitive Populations and Socioeconomic Factors indicators
1% - 10%
11% - 20%
21% - 30%
31% - 40%
41% - 50%
51% - 60%
61% - 70%
71% - 80%
81% - 90%
91% - 100% (highest)
Redding
Sacramento
San Francisco
Fresno
Bakersfield
Los Angeles
San Diego
0 50 100 200 Miles
Roseville
Davis
Stockton
0 5 10 Miles
Sacramento Area
Pittsburg
Richmond
Oakland
San Francisco
San Jose
0 5 10 Miles
San Francisco Area
Fresno
Visalia
Bakersfield
0 5 10 Miles
San Joaquin Valley
San Bernardino
Ontario
Los Angeles
Santa Monica
Riverside
Anaheim
Long Beach
0 5 10 Miles
Greater Los Angeles Area
San Diego
0 5 10 Miles
San Diego Area

RESULTS

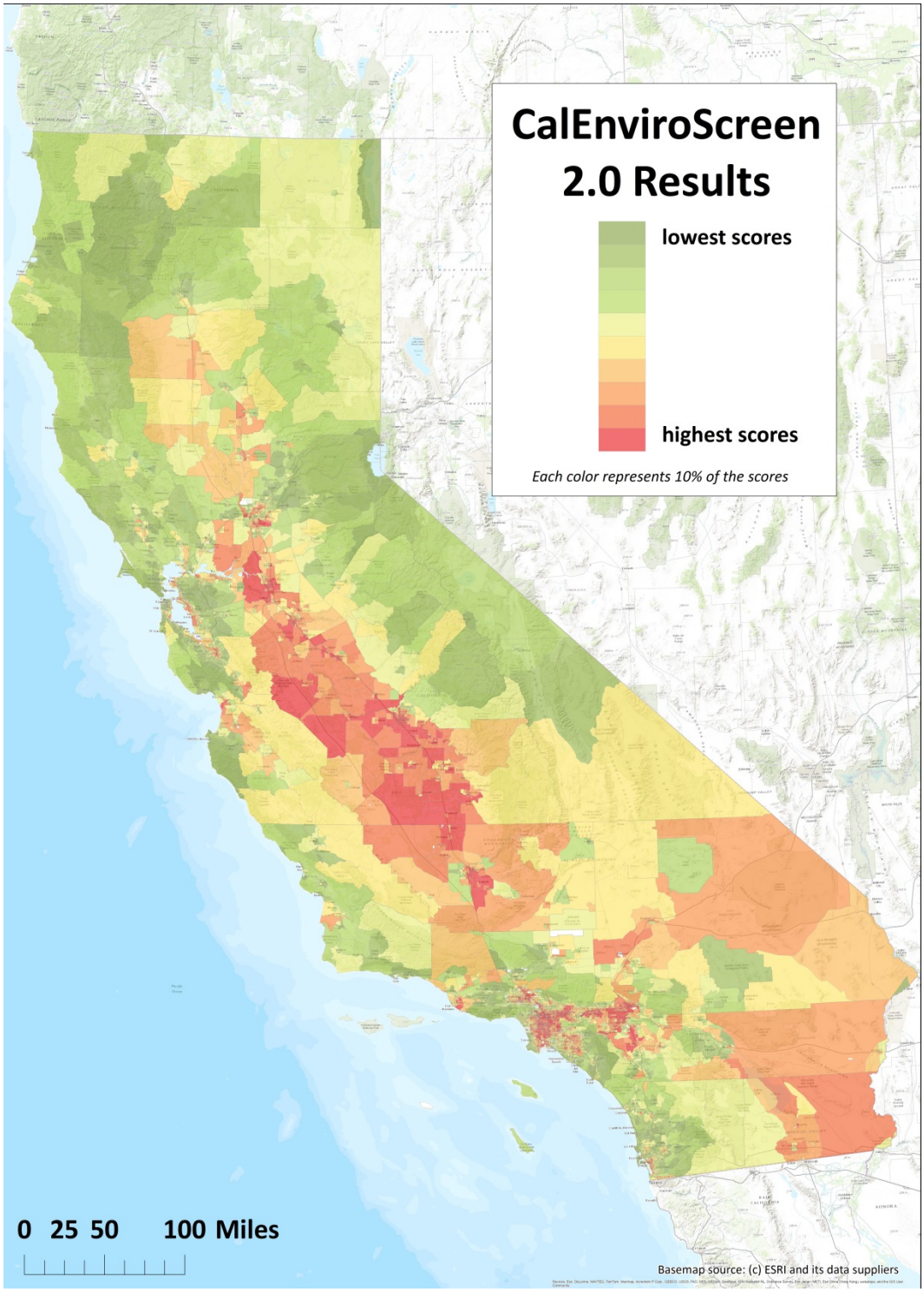
CALENVIROSCREEN STATEWIDE RESULTS

The maps on the following pages depict the relative scoring of California's census tracts using the CalEnviroScreen methodology described in this report. Census tracts with darker red colors have the higher CalEnviroScreen scores and therefore have relatively high pollution burdens and population sensitivities. Census tracts with lighter green colors have lower scores, and correspondingly lower pollution burdens and sensitivities.

The maps of specific regions of the state (Los Angeles, San Francisco, San Diego, San Joaquin Valley, Sacramento and the Coachella and Imperial Region) are "close-ups" of the statewide map and are intended to provide greater clarity on the relative scoring of census tracts in those regions. Colors on these maps reflect the relative statewide scoring of individual census tracts.

Numerical scores for each census tract, as well as the individual indicator scores for each census tract, may be found online at OEHHA's web site at (http://www.oehha.ca.gov/ej/ces2). The information is available both in a Microsoft Excel spreadsheet format and as an online mapping application.

CALENVIROSCREEN STATEWIDE RESULTS

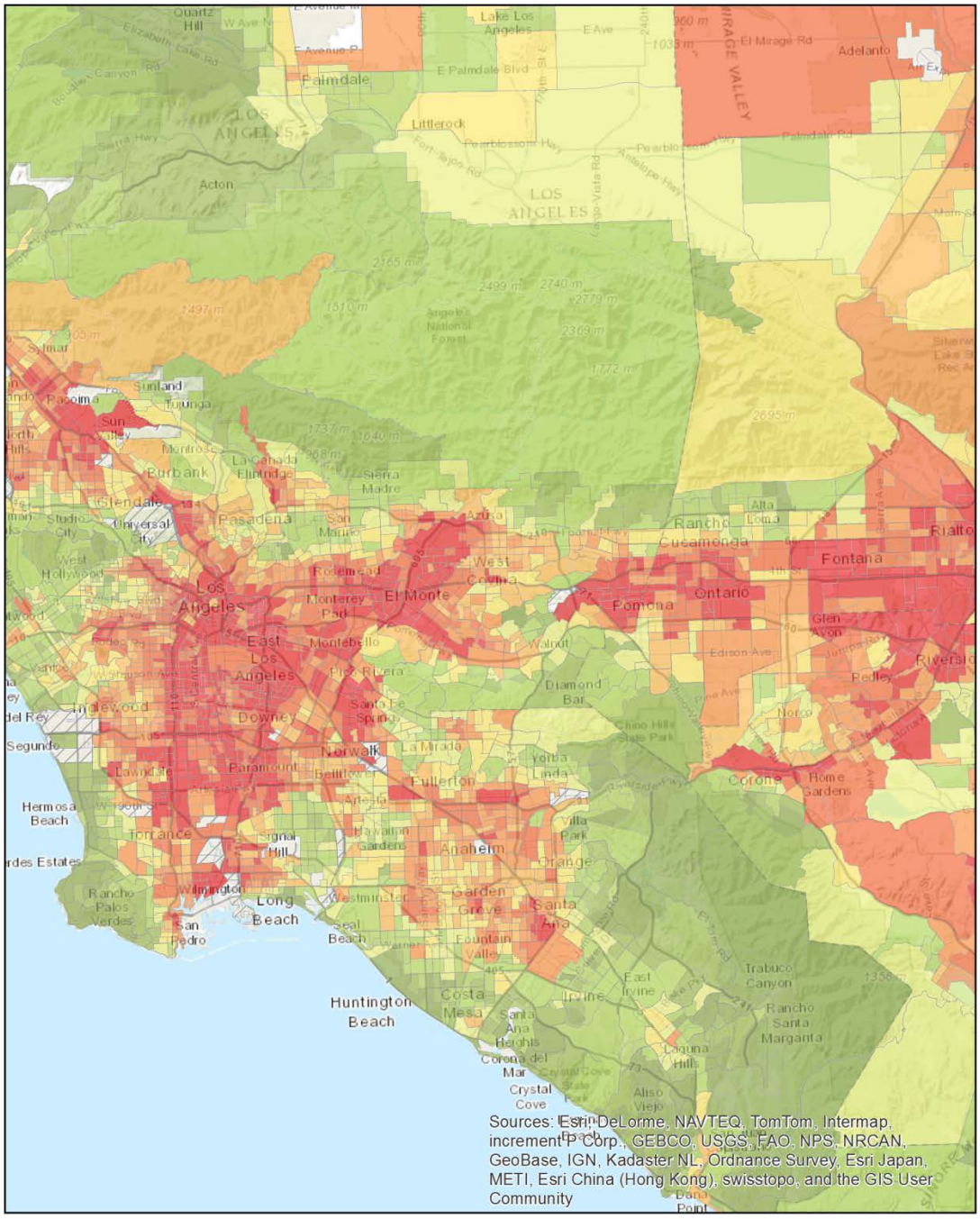


CalEnviroScreen 2.0 Results

Top 20% pollution, low population

lowest scores — highest scores

Each color represents 10% of the scores



Los Angeles Area

0 5 10 20 Miles

Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

San Francisco Area

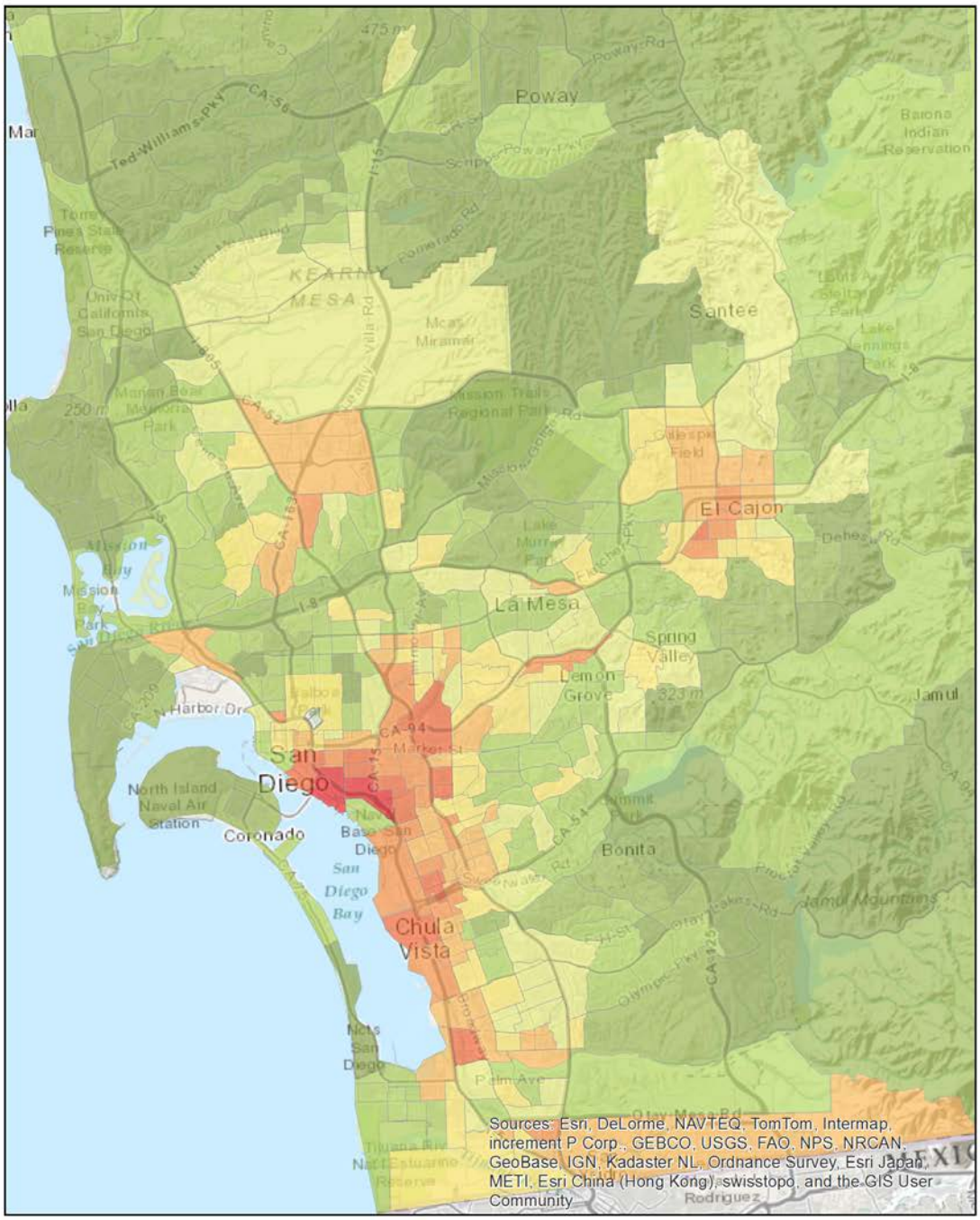
Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

Top 20% pollution, low population

lowest scores — highest scores

Each color represents 10% of the scores

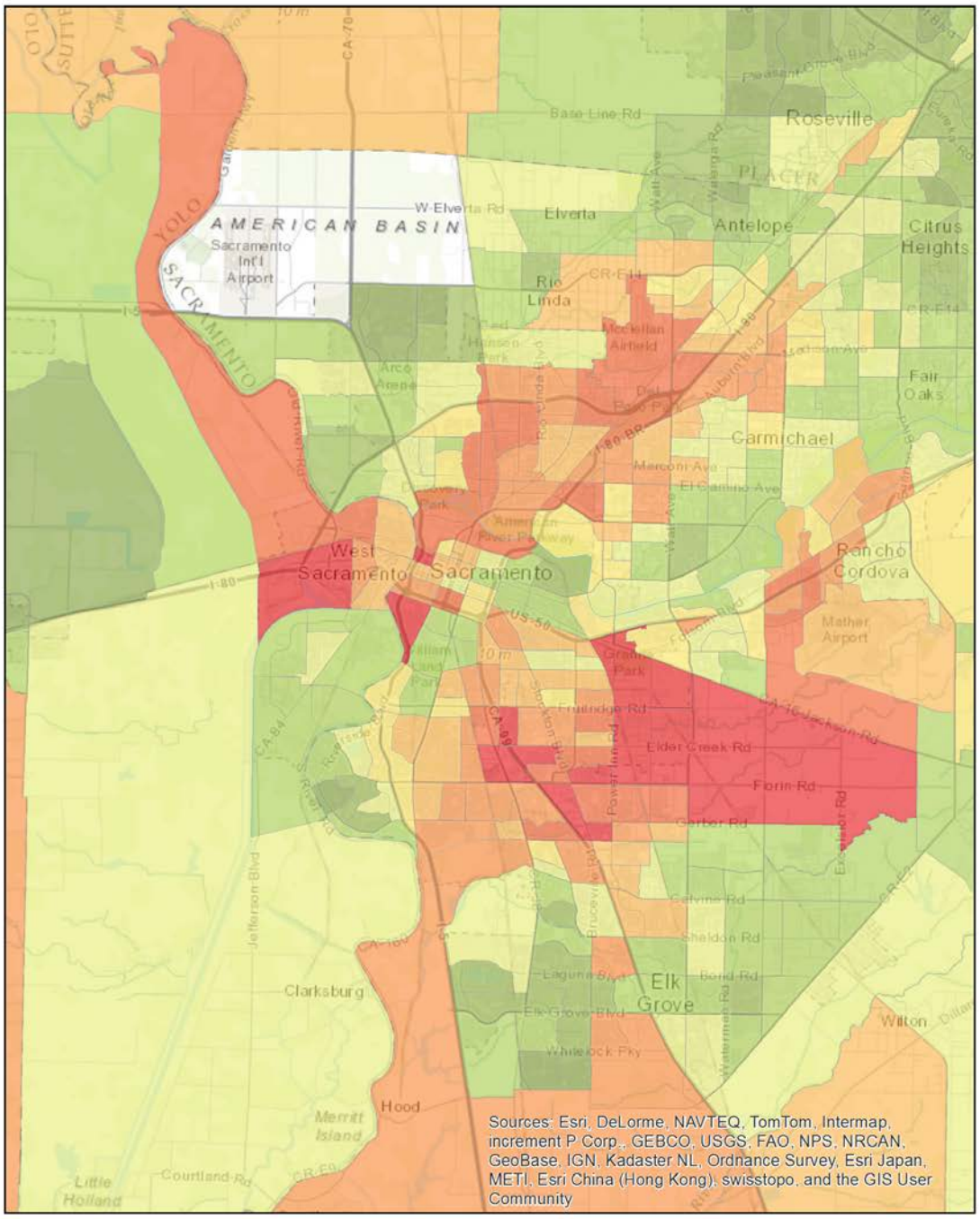


San Diego Area

0 2.5 5 10 Miles

Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

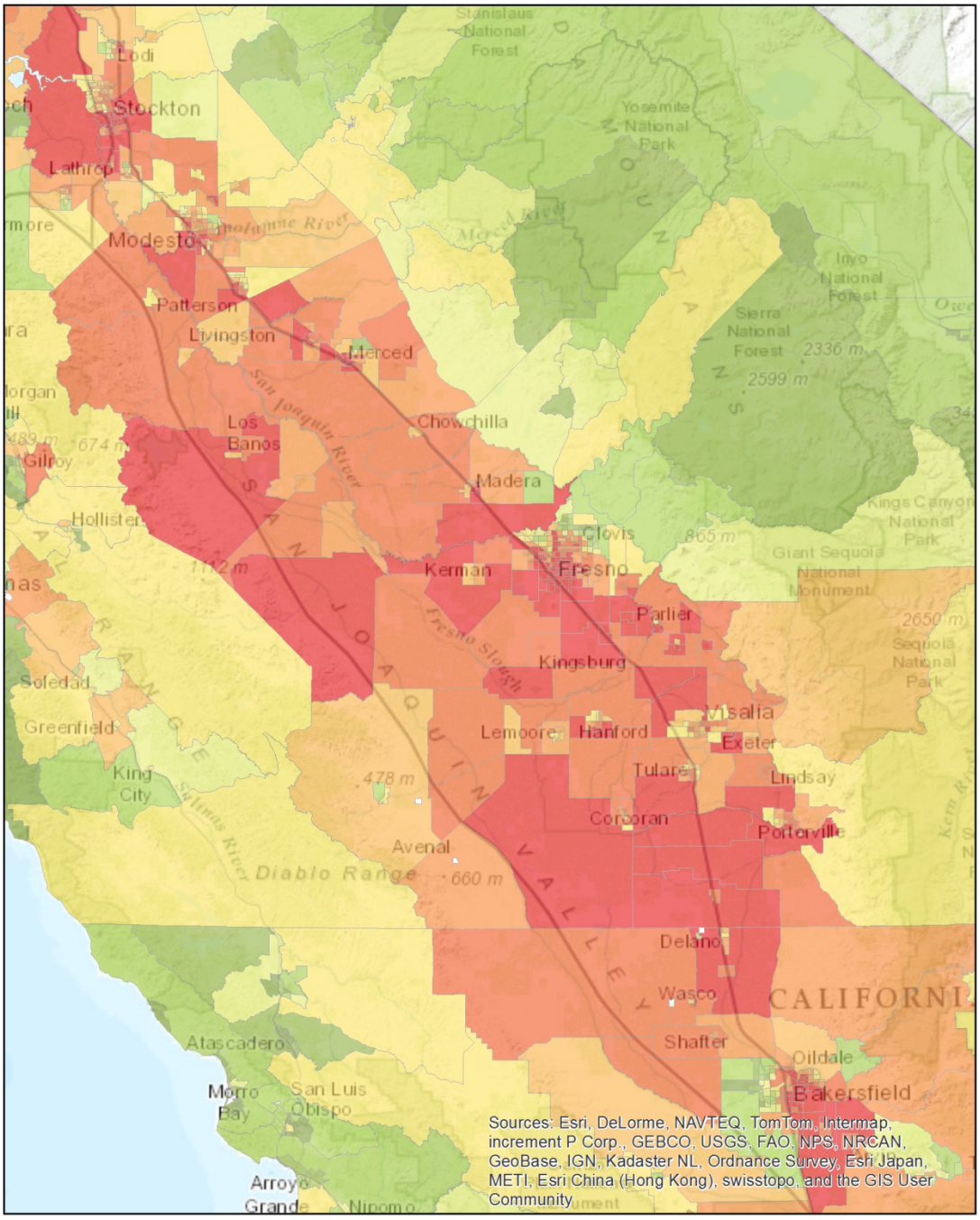


Sacramento Area

0 2.5 5 10 Miles

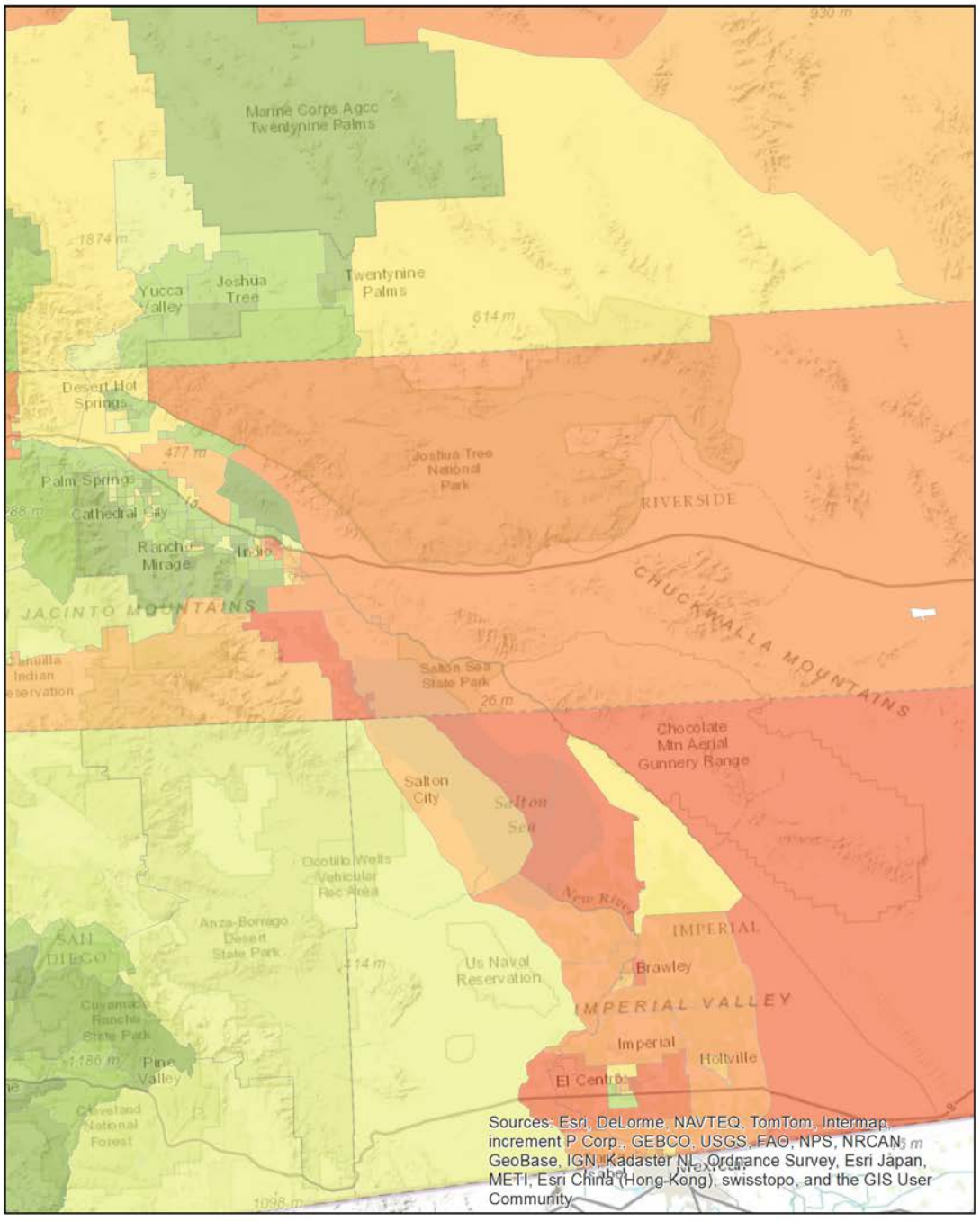
Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results



Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results



Basemap source: (c) ESRI and its data suppliers

Exhibit C
Fresno Bee Cal Enviro Screen

FresnoBee.com

Previous Story
Next Story

Health hazard: West Fresno the riskiest place to live in California

By Mark Grossi

The Fresno BeeMarch 16, 2013

Facebook Twitter Google Plus Reddit E-mail Print

From the Hyde Park mound in West Fresno, you can see the city landscape quickly go from residential to industrial park. You can smell it, too.

Across the street, there is an animal rendering plant, a poultry facility, a meat distributor and a PG&E substation. The Hyde Park mound itself is a converted garbage landfill.

But there is more: high asthma rates, widespread poverty and low birth weights that scientists link to dirty air, chemical exposures and a host of other problems.

RELATED: Read other stories in Mark Grossi's Toxic Land series

The California Environmental Protection Agency takes it a step further. EPA says people in West Fresno live with higher health risks than anyone in California -- higher than any part of Los Angeles, Oakland or any place else you can name.

Life expectancy in West Fresno is more than 20 years lower than in northeast Fresno, according to a 2012 study done by a team of researchers including the Central Valley Health Policy Institute at Fresno State.

West Fresno and many parts of the Valley soon will be known as the riskiest places in California to live. Financial help appears to be headed this way, but there is controversy surrounding it.

The state EPA is expected to designate the most environmentally burdened areas in the next few weeks. West Fresno is at the top of the list, and several other Valley ZIP codes are not far behind. **(Update: On Tuesday, April 23, the state released the CalEnviroScreen mapping tool.)**

The state EPA's draft documents show the Valley has nine of the 12 worst places in California, including four in Fresno County and three in Stockton. The map of California's worst 10% shows mostly Valley ZIP codes. **(Update: The final state list released Tuesday shows the Valley has eight of the 12 worst places in California.)**

The state's designations will be part of a program called California Communities Environmental Health Screening Tool, or CalEnviroScreen.

RELATED STORIES: Toxic Land in the Valley

Businesses and industries worry that the science is vague and might be misused by government agencies. State leaders say the tool is not intended to replace project analysis, laws or planning.

The tool will fulfill part of the 2006 state greenhouse gas law, Senate Bill 535, by identifying such high-risk places, known as disadvantaged communities.

Funds will be raised from auctions of greenhouse gas allowances for California companies. Disadvantaged communities will be favored to get that money to address their problems.

Disadvantaged community is a good description of West Fresno. Mary Curry of the activist group Concerned Citizens of West Fresno says it has been this way for decades.

"We ask for help," she said. "Nobody has been listening."

The San Joaquin Valley has nine of the 12 most environmentally burdened places in California, including four in Fresno County and three in Stockton.

The map of California's worst 5% shows many Valley ZIP codes. The state's designations will be part of a program called California Communities Environmental Health Screening Tool, or CalEnviroScreen.

Source: California Environmental Protection Agency

But state EPA is paying attention. And it's no surprise the state recognizes the multiple layers of risks in West Fresno and the Valley above other places in the state, says Jonathan London of the University of California at Davis.

He worked on a 2011 study about Valley pollution and health risks, including West Fresno and the Kings County community of Kettleman City, which is just a few miles from a hazardous waste landfill.

London said, "People with low income and people of color are disproportionately located in those places with high concentrations of factors that can lead to poor health conditions."

Place your bets

If you live in West Fresno, will you really die younger? Will you actually get asthma, cancer, heart disease or other serious health problems?

The science is not intended to make such individual predictions, says John Capitman, executive director of the Central Valley Health Policy Institute at Fresno State. It is not a health assessment, which goes into far more depth and history of a patient.

"I'm looking at the big shape of the iceberg," he said, "not little pieces of it."

Scientists say they are looking at risk -- the odds that something may happen. The risks are higher in places such as West Fresno and Kettleman City, but lower in the Woodward Park area of Fresno.

In his 2012 "Place Matters" study, Capitman said he calculated mortality rates in each Valley ZIP code. He also included such details as income, ethnicity, education and pollution exposure.

But what if some aspect of lifestyle, such as diet, could account for the early mortality?

Capitman said it would be hard to make that case. The repeating patterns in the places with the highest early mortality suggest something more than lifestyle problems.

"We saw communities of color, immigrants, low income, high exposure to air pollution, clusters along Highway 99, asthma," he said. "So are they all eating the wrong things? I don't think so."

Life expectancy in West Fresno's ZIP code is 69 years old or less, according to Capitman's study. Life expectancy in the more affluent Woodward Park ZIP code is up to 90 years old.

In the state's CalEnviroScreen document, the contrasts between the two are just as striking. The pollution burden in West Fresno is rated more than three times higher.

The populations are near the same size -- 41,087 in West Fresno and 45,191 in Woodward Park, state EPA shows. But there are vast differences in education, birth weights, poverty, ethnicity and asthma rates.

One dramatic example of the differences: pesticide applications. Located in an urban-farming transition area, West Fresno ranks in the 90th percentile for such chemicals statewide. Amid rows of suburban homes around northeast Fresno, the Woodward Park ZIP code ranks in the 23rd percentile.

There are objections and doubts about the way the state is presenting this information, especially about pesticides.

The California Farm Bureau Federation last month wrote a letter to the state EPA, saying the screening tool makes it look as though pesticide use equates to 100% exposure.

"These pesticides have the strictest application and use regulations (buffer zones, worker safety clothing requirements, restricted entry intervals, etc.) of any pesticide applications nationwide," wrote Cynthia Cory, the Farm Bureau group's director of environmental affairs.

But the tool is intended only as a screening device, said John Faust, of the state EPA's Office of Environmental Health Hazard Assessment. The EPA is not assessing blame or indicating the level of exposure, he said.

The agency does not have complete information on exposures to such chemicals, Faust said. But the screening is important because it shows where people might be vulnerable to such chemicals.

"We're finding out where people use chemicals as a way to get at the question of where exposures are taking place," said Faust.

West Fresno's fight

Mary Curry says everyone in West Fresno knows someone in the community with asthma. She has it. The CalEnviroScreen draft document shows West Fresno's emergency room visits for asthma rank in the 98th percentile -- among the highest in the state.

Curry says the Concerned Citizens of West Fresno will fight for health, adding that the animal rendering plant is at the top of the list.

But is the rendering plant part of the risk?

The plant on West Belgravia Avenue, owned by Texas-based Darling International Inc., has operated nearly 60 years. The company has spent millions of dollars in the last decade upgrading its operation.

The plant is not among the four companies identified in the U.S. Environmental Protection Agency's Toxics Release Program for the 93706 ZIP code.

One company on the list is Cargill Meat Solutions Corp. on South Fig Avenue. Its chemical releases are basically ammonia, according to federal EPA.

But Curry says the stench of the Darling rendering plant makes life miserable for people. Ask any West Fresnan who has asthma, she says.

"The wind knows no boundaries," she said.

Curry says it's just one more layer of stress on an overburdened West Fresno where the battle for health seems endless.

The 81-year-old Curry is no stranger to public battles. In 1985, she was the first African-American woman elected to the Fresno Unified School District board before being recalled in 1990 during her second term.

She and the Concerned Citizens of West Fresno sued the city of Fresno last year over the rendering plant.

The group says the owners should apply for a conditional-use permit to process the 850,000 pounds of animal carcasses and animal parts into such products as poultry feed and tallow. A hearing is scheduled May

21 in Fresno County Superior Court.

West Fresno and the rendering plant are not high political agendas around Fresno, says the Rev. Chris Breedlove, pastor of College Community Congregational Church. He says Fresnans need to help their neighbor.

Breedlove last year wrote a Fresno Bee Valley Voices opinion about the rendering plant. He says he has heard people say: Why don't they just move from West Fresno?

"Many people don't have that luxury," Breedlove said. "That's where they are stuck."

Resources

Rating California environmental quality by ZIP code (Excel spreadsheet)

Read more about the state program CalEnviroScreen

Study: "Place Matters for Health in the San Joaquin Valley"

Study: "Land of Risk, Land of Opportunity"

To print the document, click the "Original Document" link to open the original PDF. At this time it is not possible to print the document with annotations.

The reporter can be reached at (559) 441-6316, mgrossi@fresnobee.com or @markgrossi on Twitter. Read his Earth Log blog at news.fresnobeehive.com/earth-log.

Facebook Twitter Google Plus Reddit E-mail Print

Join The Conversation

The Fresno Bee is pleased to provide this opportunity to share information, experiences and observations

about what's in the news. Some of the comments may be reprinted elsewhere in the site or in the newspaper. We encourage lively, open debate on the issues of the day, and ask that you refrain from profanity, hate speech, personal comments and remarks that are off point. Thank you for taking the time to offer your thoughts.

Commenting FAQs | Terms of Service

Today's Circulars

MUSICIAN'S FRIEND
VALID UNTIL OCT 26

DELL
VALID UNTIL NOV 03

DOLLAR GENERAL
3 DAYS LEFT

SPORTS AUTHORITY
3 DAYS LEFT

View All Circulars

Email Newsletters >
Manage newsletter subscriptions
Tablets >
Apps and services for tablet devices
Mobile >
Apps and services for your mobile phone
Social Media >
Get updates via Facebook and Twitter
e-Edition >
Your daily paper delivered to your computer
Home Delivery >
Manage your home delivery account
Digital Subscriptions >
Manage your online subscriptions

careerbuilder cars.com HomeFinder.com dealsaver FIND&SAVE

© 2014 www.fresnobee.com and wire service sources. All Rights Reserved. http://www.fresnobee.com

Appendix 3:
Attachments to Comment Letter JJ

THIS PAGE INTENTIONALLY LEFT BLANK

Exhibit A
MRO DMEIR Traffic Comment Ltr - 9-10-14

MRO ENGINEERS

660 Auburn Folsom Rd.

Suite 201B

Auburn, California

95603

PHONE (916) 783-3838

FAX (916) 783-5003

September 10, 2014

Ms. Carmen Borg
Shute, Mihaly & Weinberger LLP
396 Hayes Street
San Francisco, California 94102

Subject: Review of "Transportation and Traffic" Analysis –
Draft Master Environmental Impact Report
General Plan and Development Code Update
City of Fresno, Fresno County, California

Dear Ms. Borg:

As requested, MRO Engineers, Inc., has completed a review of the "Transportation and Traffic" section of the Draft Master Environmental Impact Report (DMEIR) prepared with respect to the proposed General Plan and Development Code Update for the City of Fresno, California. That document was prepared by First Carbon Solutions and published on July 22, 2014. The DMEIR incorporates a traffic and transportation impact analysis prepared by Fehr & Peers (F&P).

This letter report documents the results of our detailed review of the DMEIR "Transportation and Traffic" analysis.

1. ***Deficient Travel Demand Forecasting Model*** – According to page 5.14-27 of the DMEIR:

> *"A modified version of the Fresno COG countywide travel demand forecasting (TDF) model was used to forecast future traffic volume for the City of Fresno General Plan Update. The modifications were specific to the City of Fresno to ensure that the model accurately estimated traffic volumes used in the analysis process . . . Appendix H-5 includes documentation of the transportation modeling and analysis steps including a summary of the model validation."*

Although DMEIR Appendix H-5 contains maps illustrating the boundaries of the model's traffic analysis zones (TAZ) and detailed information concerning the land use inputs for Existing, Existing Plus Project, and Cumulative Conditions, there is no other "documentation of the transportation modeling and analysis steps." As noted, however, there is a summary of the model validation, which is presented in a table entitled, "Fresno COG Traffic Model GIS Validation Results: PM Peak Hour Two-Way Total Traffic Volumes." For ease of reference, that table is presented here as Attachment A.

According to the *Travel Model Validation and Reasonableness Checking Manual – Second Edition* (Federal Highway Administration and Cambridge Systematics, Inc., September 24, 2010, p. 1-4), validation is defined as follows:

> *"Validation is the application of the calibrated models and comparison of the results against observed data."*

Specifically, the "base year" model is run and the traffic volume estimates generated by the model are compared to existing traffic volume data on a link-by-link basis. The question is, how well does the model replicate existing traffic volumes? The theory is that if the model can

accurately predict existing volumes (based on existing land use data and transportation system information), then it will accurately predict future traffic volumes (based on future land use and transportation system projections).

The results of the model validation process are summarized at the bottom of the table presented in Attachment A. Three parameters were used to determine whether the modified Fresno COG countywide model provides valid traffic estimates:

- The percent of road segments "within target deviation,"
- The Percent Root Mean Square Error, and
- The Correlation Coefficient.

For each of those three metrics, a target was established, and the model-generated traffic volume estimates were compared to those targets, with the following results:

- The percent of road segments "within target deviation" was 60 percent, whereas the goal was to exceed 75 percent,
- The "Percent Root Mean Square Error" was 46 percent, while the goal was to be less than 40 percent, and
- The "Correlation Coefficient" was 0.88, which just missed the goal of exceeding 0.88.

Each of these three parameters is discussed below.

Target Deviation

The "target deviations" employed in the model validation process are listed in the table presented in Attachment A; they range from 0.20 to 0.60. These values were derived from a curve presented in the Caltrans *Travel Forecasting* Guidelines (November 1992).

As noted above, the goal of the model validation process was for 75 percent of the links to fall within the allowable deviation. In other words, it was considered acceptable for 25 percent of the links to fall outside that allowable value. In fact, only 60 percent of the links met this target, meaning that a full 40 percent failed to do so. In this case, 199 of the 495 tested links had traffic forecasts that were either excessively high or low, compared to the actual traffic counts.

Of those 199 deficient traffic forecasts, 120 (60 percent) were lower than the corresponding traffic count. Moreover, of the 495 total roadway links, the traffic forecasts at 281 (57 percent) were lower than the actual count. The links at which traffic was underestimated are highlighted in yellow in Attachment A.

Percent Root Mean Square Error

Percent root mean square error, according to the FHWA *Travel Model Validation and Reasonableness Checking Manual* is a:

> *". . . measure of accuracy of the traffic assignment measuring the average error between the observed and modeled traffic volumes on links with traffic counts."*

The modified Fresno COG model validation had a goal for this parameter of less than 40 percent. The actual model validation result was 46 percent, which failed to meet the established goal. Thus, the model validation process determined that the modified Fresno COG model is not sufficiently accurate, which reinforces the results described above with respect to the target deviation.

Correlation Coefficient

Correlation coefficient is a measure of the degree of straight-line or linear association between two variables. A value of 1.00 would indicate a perfect relationship between the two variables. That is, as one variable increases, the other variable increases in a linear fashion. In this case, although the validation results indicate that the model again fell short of the established standard, the shortfall is minimal.

Conclusion

The model validation results for the modified Fresno COG countywide travel demand forecasting model clearly indicate that the model fails to provide accurate forecasts of future traffic – it can't even "predict" existing volumes. As described above, it tends to underestimate traffic. In fact, a number of the roadway links listed in the validation results table had literally no traffic assigned to them.

The use of this deficient tool to estimate study area traffic volumes has substantial ramifications for the environmental analysis. In addition to the likelihood that the underestimated traffic will result in failure to identify significant traffic impacts, it is probable that the air quality, noise, and greenhouse gas analyses are compromised by the defective traffic forecasts.

Clearly, more effort needs to be devoted to the model refinement process, with the goal of creating a travel demand forecasting model that actually provides credible forecasts of travel demand; the modified Fresno COG model used in the DMEIR traffic analysis is woefully inadequate in this regard. Once the model has been improved to the point that it is capable of replicating existing traffic volumes and generating meaningful future traffic projections, the DMEIR traffic analysis needs to be revised and the document needs to be recirculated for further public review.

2. ***Level of Service Calculation Methodology*** – The DMEIR traffic analysis focused on determination of level of service (LOS) for major roadway segments throughout the city. The specific process is described on DMEIR p. 5.14-4:

> *"The LOS was determined by comparing traffic volumes for selected roadway segments with peak hour LOS capacity thresholds. These thresholds are shown in Table 5.14-2 and were calculated based on the methodology contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000). The HCM methodology is the prevailing measurement standard used throughout the United States."*

Several points are in order with respect to the above statement from the DMEIR.

First, we note that the LOS analysis was based on the year 2000 version of the *Highway Capacity Manual*. This violates the requirement established in the *City of Fresno Traffic*

Impact Study Report Guidelines (City of Fresno, Department of Public Works, Updated February 2, 2009, p. 3), which requires that the:

> *"Most current edition of the Highway Capacity Manual by Transportation Research Board, and MUTCD shall be used."*

The current (year 2010) version of the *Highway Capacity Manual* (HCM 2010) was released on April 11, 2011. It follows previous editions completed in 1965, 1985, 1997, and 2000.

Although it is unclear exactly when the DMEIR traffic analysis was initiated, p. 5.14-4 of the document says that the traffic counts used in the analysis represent year 2012 conditions. Thus, the DMEIR traffic study was initiated at least a year after the current (2010) version of the *Highway Capacity Manual* became widely available. Despite this, the traffic analysis was performed using procedures documented in the superseded (year 2000) version of the *Highway Capacity Manual*, which violates standard City of Fresno procedures.

The second point concerns the DMEIR statement regarding the status of the HCM methodology as the prevailing standard for level of service analysis. This statement (which is true) implies that the HCM method was used in the DMEIR analysis (which is not true).

The DMEIR analysis is a simple volume/capacity (V/C) ratio evaluation. In this case, the volumes represent either the existing (year 2012) traffic volumes or the pertinent traffic forecasts generated by the deficient modified Fresno COG model. Only the estimated capacity thresholds were ostensibly based on HCM methodologies. DMEIR Table 5.14-2 (pages 5.14-7 and 5.14-8) presents a highly detailed set of LOS thresholds for various roadway types. Unfortunately, no information is provided that would illuminate the question of exactly how these thresholds were derived. (For ease of reference, DMEIR Table 5.14-2 is presented here as Attachment B.)

For example, DMEIR Table 5.14-2 provides thresholds for each level of service (LOS A through LOS F) for various numbers of lanes for a variety of roadway types, including freeways. Chapter 11 of the *Highway Capacity Manual* (2010) describes the HCM 2010 analysis procedures for "Basic Freeway Segments." According to that chapter, freeway level of service is defined by density (i.e., the number of passenger cars per mile per lane); neither traffic volume nor volume/capacity ratio is a measure of freeway level of service.

Moreover, under the HCM 2010 methodology, calculation of level of service on a freeway segment requires substantial data input, including the following:

- Free-flow speed (miles/hour),
- Number of mainline freeway lanes,
- Lane width (feet),
- Right-hand lateral clearance (feet),
- Total ramp density (i.e., ramps/mile),
- Terrain (level, rolling, or mountainous or specific grade information),
- Heavy-vehicle (i.e., truck) percentage,

- Peak-hour factor (which describes the uniformity of traffic flow within the peak hour), and
- Driver population (e.g., commuters who are familiar with the route or tourists who are not).

Although we have used freeways as an example to illustrate our point, similar considerations apply to all of the roadway types represented in DMEIR Table 5.14-2.

No information is provided in the DMEIR with regard to the specific input parameters that were used in developing the theoretical thresholds applied in the LOS analysis, whether for freeways or any of the other roadway types presented. Consequently, it is impossible to judge whether the analysis is credible and, moreover, whether the LOS results are valid.

Moreover, we assume (based on the nature of the information presented in DMEIR Table 5.14-2) that the same input assumptions were applied across the entire study area. This ignores the obvious fact that different roadways, or even different sections of a given road, vary somewhat. Lane widths, shoulder widths, truck percentages, and a wide variety of parameters could easily change as one travels down a particular roadway. The generic approach employed in the DMEIR analysis fails to account for these key differences, which raises serious questions as to the validity of the analysis results.

We also note that DMEIR Table 5.14-2 has "holes" where no capacity threshold value has been provided. For example, for "super arterial" roads, values are only shown for LOS D and E; no thresholds are presented for LOS A, B, or C. A footnote to the table might be an attempt to explain this. It says, "LOS is not achievable because of type of facility." Referring again to super arterials, this suggests that it is impossible for a driver to experience LOS A, B, or C. How can this be? If that driver happens to be traveling on one of Fresno's super arterials at a time when traffic is particularly light, will he not experience LOS A, which the DMEIR (p. 5.14-4) defines as:

> *". . . free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver."*

According to DMEIR Table 5.14-2, the best this driver can expect is LOS D, which is defined as:

> *". . . high-density, but stable flow. Users experience severe restrictions in speed and freedom to maneuver, with poor levels of comfort and convenience."*

This simply defies common sense and, more importantly, raises questions as to the technical and philosophical approach to the analysis of roadway level of service. As presented, the LOS analysis for certain roadway types lacks credibility.

The failure to use the latest version of the *Highway Capacity Manual* represents a violation of City of Fresno procedures. To ensure the accuracy of the DMEIR traffic analysis, as well as consistency with City procedures and policies, the level of service calculations must be performed using the current, year 2010 version of the *Highway Capacity Manual*. Also, the specific inputs used to develop LOS thresholds must be revealed and adjusted, as necessary, to reflect the specific link-by-link characteristics of the study area roadways. After the LOS calculations are corrected, the DMEIR will need to be recirculated for further public review.

3. ***Obsolete Traffic Volume Data*** – According to the DMEIR (page 5.14-4):

> *"Traffic counts used for this analysis represent year 2012 conditions."*

Referring to the *City of Fresno Traffic Impact Study Report Guidelines* (p. 7):

> *"Available existing counts can be used if they are less than twelve (12) months old and the counts have not be* [sic] *significantly changed due to more recent development in the vicinity.*

The traffic counts used in the DMEIR are now two years old, which violates the City's standard, as well as accepted practice within the traffic engineering profession. Page 19 of the 2006 Institute of Transportation Engineers (ITE) document, *Transportation Impact Analyses for Site Development*, specifically states that ". . . traffic volume data should generally be no older than 1 year."

Because the traffic volumes represent the most critical input parameter in the level of service calculation process, any inaccuracies in those values directly affect the validity of the level of service results. In short, to the extent that the existing peak-hour traffic volumes are inaccurate, the corresponding level of service results reported in the DMEIR are invalid, and a misleading representation of the environmental setting and plan-related impacts will be provided. Although the document does not specifically say so, it is also likely that the future year traffic volumes were developed based, in part, on the existing traffic volumes. Thus, any shortcomings in the existing conditions data will adversely affect the validity of the future year information, as well.

Updated traffic data must be obtained and all analysis scenarios must be revised using the current traffic volume information. The modified transportation and traffic impact analysis should then be incorporated into a revised DMEIR, which must be recirculated for further public review.

4. ***Failure to Consider the Operational Effects of Truck Traffic*** – The proposed General Plan calls for substantial additional industrial land use, particularly in the south and west Fresno areas. Consequently, the road system in those areas will be called upon to accommodate substantial truck traffic.

As described above, it is impossible to determine what assumption has been incorporated into the analysis with regard to the heavy-vehicle percentage on the study area road system. Moreover, we would point out that the use of a blanket heavy-vehicle percentage for all study area roadways would be inappropriate, as it would fail to account for the relatively high truck percentages that can reasonably be anticipated in south and west Fresno and any other areas where substantial industrial development is proposed.

To ensure that the traffic impact analysis fully accounts for truck traffic, the analysis of each roadway link should incorporate a realistic "heavy vehicle percentage" and an appropriate "passenger-car equivalent" (PCE) factor. These factors can be used to derive adjusted traffic volumes that accurately account for the truck component of the pertinent traffic volume.

The traffic impact analysis incorporated into a recent draft environmental impact report prepared for the City of Irwindale in southern California used the following PCE values

(Reference: Urban Crossroads, *Athens-Irwindale Materials Recovery Facility and Transfer Station Traffic Impact Analysis*, February 27, 2014.):

- Light trucks: PCE = 1.5,
- Medium-duty trucks: PCE = 2.7, and
- Heavy-duty trucks: PCE = 3.7.

Thus, according to the assumptions employed in that analysis, one truck is equivalent to between 1.5 and 3.7 passenger cars, depending upon the specific type of truck. These factors reflect not only the size of the vehicles, but also their operating characteristics, particularly with regard to slower acceleration, longer braking distances, and the need for greater separation between vehicles.

The failure to incorporate appropriate factors reflecting the presence of a substantial number of trucks in the prevailing traffic stream results in unrealistic, overly-optimistic level of service results. The roadway segment level of service analyses must be revised to reflect the existing and anticipated composition of traffic in the study area.

5. ***Failure to Consider the Safety Effects of Truck Traffic*** – As described above, the proposed General Plan proposes substantial additional industrial land use in south and west Fresno, where residential neighborhoods are also common. Consequently, implementation of the proposed plan will add a considerable volume of heavy trucks to the road system in those areas. Despite this, the "Transportation and Traffic" section of the DMEIR includes no discussion or analysis of auto-truck conflicts and the potential safety issues associated with mixing automobile traffic with a considerable amount of heavy-vehicle traffic. This is a substantial deficiency in the DMEIR, given the extent of nearby residential land uses.

6. ***Deficient Safety Analysis*** – DMEIR p. 5.14-15 provides a one-paragraph section labeled "Traffic Safety." That section briefly describes a small number of locations in Fresno having the highest number of vehicular collisions since 2009. This information, which is presented graphically on Exhibit 5.14-5 in Appendix H-12, is based on data presented in the Statewide Integrated Traffic Records System (SWITRS).

   Unfortunately, this information is virtually meaningless, as the number of collisions alone fails to account for the total volume of traffic at any given location. For example, consider two hypothetical locations, both of which were found to have 100 collisions per year. Location A carries 10,000 vehicles per day, while Location B has 100,000 vehicles per day. Based on the analysis presented in the DMEIR, these two locations are equally problematical, despite the fact that one carries ten times more traffic than the other.

   This is, of course, not accurate and is, further, misleading. This example illustrates that it is not simply the number of collisions that matters; it's the rate at which the collisions occur that accurately tells the story. A valid traffic safety analysis will include the development and comparison of accident rates, in terms of collisions per million-vehicle-miles for key roadway segments. The DMEIR, though, provides no such assessment and, therefore, it is impossible to determine whether the accident data indicates an existing safety problem. In addition, the DMEIR contains no evaluation with respect to the potential impacts of implementation of the proposed General plan on traffic safety within the City of Fresno. The DMEIR must be revised

to include a detailed analysis of plan-related safety impacts and to identify needed mitigation measures.

7. ***Failure to Consider Pedestrian and Bicycle System Impacts*** – As noted above, the level of service on the study area road system was derived (DMEIR, p. 5.14-4):

> *". . . based on the methodology contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000)."*

The DMEIR goes on to say:

> *"It should be noted that this traditional methodology used to analyze the roadway system does not consider the potential impact on walking, bicycling, and transit."*

The analyst appears to be unfamiliar with the current, year 2010 edition of the *Highway Capacity Manual*, which might explain why the roadway LOS values were inappropriately derived using the superseded year 2000 version of that document. In fact, the very first paragraph of the "Foreword" in the current HCM document (p. V1-i) states that:

> *"It is the first* Highway Capacity Manual *to provide an integrated multimodal approach to the analysis and evaluation of urban streets from the points of view of automobile drivers, transit passengers, bicyclists, and pedestrians. This is the first manual to take into account the effects of cars on bicyclists and pedestrians."*

Recognizing the integrated nature of the transportation system, the HCM does not include separate chapters for non-automobile travel modes. Instead, the document states (HCM 2010, p. 1-4.):

> *"Where applicable, pedestrian and bicycle material has been integrated throughout the Volume 3* [Interrupted Flow] *chapters, along with the public transit material specific to multimodal analyses."*

Detailed analysis procedures for the pedestrian, bicycle, and transit modes are presented in HCM 2010 Chapters 16 (Urban Street Facilities) and 17 (Urban Street Segments).

Given the focus of the proposed Fresno General Plan Update on accommodating all travel modes, it is difficult to understand how the non-automobile modes could be so thoroughly dismissed in the DMEIR. The DMEIR acknowledges this modified City perspective with the following statement (DMEIR, p. 5.14-42):

> *"The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS . . . is not desirable since it fails to acknowledge other users of the circulation system and other community values."*

Moreover, the specific policies and objectives in the proposed General Plan related to pedestrian, bicycle, and transit facilities are detailed on pages 5.14-85 through 5.14-88 in the DMEIR.

Impact TRANS-6 concerns the potential impacts of the proposed General Plan on these "alternative" travel modes. It is addressed beginning on p. 5.14-85 of the DMEIR. As stated there:

> *"The project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities."*

Although the next several pages of the DMEIR list the policies and objectives that relate to the non-automobile travel modes, no quantitative analysis or qualitative statement is provided to address the potential impacts of the proposed General Plan with regard to the "performance or safety of such facilities." Consequently, there is simply no basis for the DMEIR' s finding of a less-than-significant impact.

The DMEIR ignores factors that could lead to significant operational and safety-related impacts throughout the City as the plan is implemented. At the very minimum, transit users will suffer from the extensive travel delays imposed by a roadway system where LOS E and F are prevalent. Moreover, pedestrians and bicyclists are likely to be exposed to unsafe conditions, as frustrated motorists become impatient and make poor decisions leading to red light running, failure to yield to pedestrians in crosswalks, or using road shoulders and bike lanes as added travel or turn lanes.

Given the importance of non-automotive travel within the proposed plan, it is essential that the DMEIR include a meaningful analysis of the plan's impacts on those alternative modes. Such an analysis is absent from the current document. Upon completion of the analysis, the DMEIR must be revised and recirculated for further public review.

8. ***Vehicle Miles Traveled Calculation*** – DMEIR Table 5.14-3 presents estimates of vehicle miles traveled (VMT) for the three analysis scenarios addressed in the traffic study: Existing Conditions, Existing Plus General Plan Buildout, and Cumulative Plus General Plan Buildout.

   Addition of General Plan Buildout to existing conditions is projected to increase the daily VMT by almost 8,950,000 vehicle-miles, an increase of 95 percent. Under cumulative conditions, total VMT is projected to increase by over 111 percent (i.e., 10,487,655 vehicle-miles) compared to existing conditions.

   Unfortunately, these values were derived through a "black box" process using the modified Fresno COG Countywide Travel Demand Forecasting Model, and no detail is provided to assist the reader in understanding the factors that were key in developing these estimates or, more importantly, to judge whether the estimates are credible. Because the VMT values are key inputs to the air quality and greenhouse gas analyses, it is important to ensure the validity of these values. (Of course, as described earlier, the ability of the Fresno COG model to provide meaningful estimates of future travel (including future VMT estimates) is highly questionable.)

   We note that California in September 2013 enacted Senate Bill 743 (SB 743), which will eventually eliminate level of service as a determinant of significant effects in documents prepared under the California Environmental Quality Act (CEQA), such as the DMEIR. In other words, vehicular delay will no longer be considered an environmental impact under CEQA. Instead, VMT will be the primary measure of transportation impacts. Although

debatable, this is ostensibly intended to better reflect the multi-modal nature of the transportation system, particularly with regard to pedestrians, bicyclists, and transit users.

Although no local or statewide thresholds have been established with regard to what constitutes a significant impact concerning increases in vehicle miles traveled, it is disappointing that the DMEIR would dismiss a 111 percent increase in VMT as insignificant.

9. ***At-Grade Railroad Crossing Safety*** – As described on DMEIR pages 5.14-17 and 5.14-18, Fresno is served by two railroad corridors. The Burlington Northern Santa Fe (BNSF) corridor runs through "the middle of downtown" and the Union Pacific (UP) corridor runs parallel to State Route 99 (SR 99). Moreover, ". . . about 50 freight trains pass through the two rail corridors daily as they travel through Downtown."

   Each of these rail lines has numerous at-grade crossings of local streets and, further, each of those locations represents a potentially hazardous condition. As traffic increases in Fresno in accordance with the General Plan Update land use plan, the likelihood of conflicts between automobiles and trains will also increase. Despite this, the DMEIR fails to address safety-related issues associated with at-grade rail crossings. This is a substantial deficiency that must be corrected.

10. ***Emergency Access*** – Impact TRANS-5 (DMEIR, p. 5.14-83) addresses whether the proposed plan would result in inadequate emergency access, and concludes that the General Plan Update would have a less-than-significant impact. This conclusion was based largely on a review of the proposed General Plan policies and objectives that might "provide adequate emergency access." We note that the potential role of certain of these policies in providing adequate emergency access is questionable. For example, it is unclear how Policy LU-1-g has any effect on emergency access: "Maintain the City's current SOI boundaries without additional expansion . . ." Since the SOI boundary is nothing more than a line on a map, we fail to see any effect whatsoever with respect to emergency access.

    The DMEIR discussion of the emergency access issue includes the following statement:

    > *"Implementation of the City of Fresno General Plan Update would increase the amount of vehicle traffic, which would require the improvement and expansion of the City of Fresno's roadway system . . . to accommodate forecasts* [sic] *travel demand as well as maintaining acceptable traffic operations (LOS) in the City (see Impact TRANS-1). An enhanced roadway network that accommodates forecasted travel demand would also provide adequate emergency access."*

    There are several problems with this statement. First, while it is certainly true that implementation of the proposed plan will increase the amount of vehicle traffic (as noted earlier, the plan will more than double daily vehicle miles traveled), there is no certainty regarding the "improvement and expansion of the City of Fresno's roadway system." Road construction is dependent upon the availability of funding (among other factors) and it is not certain whether adequate funding will be available in coming years to keep up with needs.

    Second, it is also true that, "[a]n enhanced roadway network that accommodates forecasted travel demand would also provide adequate emergency access." Unfortunately, as demonstrated in the DMEIR, the City's road system will not, in many cases, accommodate the forecasted traffic demand. For example, the level of service standard for the entire Downtown

Planning Area (designated as Traffic Impact Zone I or TIZ-I) is LOS F. Similarly, roadway segments within TIZ-II ("areas of the City currently built-up and wanting to encourage infill development") and TIZ-III ("areas near or outside the City limits but within the SOI") that the DMEIR has identified as operating at LOS F are "grandfathered in" and will be allowed to continue to operate at LOS F.

By definition, roads that are projected to operate at LOS F will not accommodate forecasted traffic demand. Referring to the level of service definitions provided on DMEIR p. 5.14-4:

> *"LOS F is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion."*

Clearly, such roads will not provide adequate emergency access. The simple fact is that roads that are at LOS F will be clogged with traffic, which will impede the ability of emergency vehicles to respond to calls. A recent (September 2 and 3, 2014) feature on the NBC *Nightly News* addressed the issue of delays in emergency response due to traffic congestion. According to that report, research has indicated a ten percent increase in deaths for every minute of delay in emergency response time. Further, a 2012 study in Utah found an eight percent increase in fatalities within the 24-hour period following a delayed emergency response.

Traffic delays caused by planned congestion associated with the proposed General Plan Update will, very simply, result in additional fatalities among the citizens of Fresno, particularly in the areas of the City where LOS F will be allowed by General Plan policies. This is a significant impact, which was ignored in the DMEIR.

CONCLUSION

Our review of the "Transportation and Traffic" section of the Draft Master Environmental Impact Report for the proposed City of Fresno General Plan Update revealed several issues that affect the validity of the conclusions presented in that document. These issues should be addressed prior to City of Fresno approval of the proposed plan and the associated environmental documentation.

Among other considerations, we find it ironic that the City of Fresno has developed a General Plan Update that:

- Explicitly encourages and addresses the needs of non-automobile travel through an extensive set of policies and objectives, while
- Performing absolutely no analysis to determine whether the proposed plan will have adverse operational or safety impacts on pedestrians, bicyclists, and transit users, and
- Determines that implementation of the proposed General Plan Update will have no significant traffic impacts, even though roads throughout the City will operate at LOS E and F, while also
- Determining that VMT in the City will more than double as a result of plan implementation, but still

- Maintaining that the proposed plan will have no significant transportation impacts requiring mitigation.

As described above, the DMEIR "Transportation and Traffic" analysis has substantial deficiencies and, further, has failed to identify a number of significant impacts,

We hope this information is useful. If you have questions concerning any of the items presented here or would like to discuss them further, please feel free to contact us at (916) 783-3838.

Sincerely,

MRO ENGINEERS, INC.

Neal K. Liddicoat, P.E.
Traffic Engineering Manager

MRO ENGINEERS

ATTACHMENT A

Fresno COG Traffic Model GIS Validation Results:
PM Peak Two-Way Total Traffic Volumes

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
1	A	N/O	STANISLAUS	5186	5190	05186-05190	160	183	0.87	0.60	Yes	-23	529
2	ABBY	S/O	180	4404	2040	04404-02040	983	290	3.39	0.60	No	693	480,249
3	ABBY	N/O	DIVISADERO	2093	2092	02093-02092	1,055	371	2.84	0.60	No	684	467,856
4	ABBY	S/O	OLIVE	2087	2086	02087-02086	908	854	1.06	0.60	Yes	54	2,916
5	AIRWAYS	W/O	CLOVIS	2540	8220	02540-08220	1,338	1,135	1.18	0.35	Yes	203	41,209
6	ALLUVIAL	E/O	CEDAR	3093	3105	03093-03105	483	912	0.53	0.60	Yes	-429	184,041
7	ALLUVIAL	E/O	CHESTNUT	3100	3110	03100-03110	130	1,013	0.13	0.37	No	-883	779,689
8	ALLUVIAL	E/O	INGRAM	6540	6542	06540-06542	739	840	0.88	0.60	Yes	-101	10,201
9	ALLUVIAL	E/O	MAPLE	3096	3108	03096-03108	350	1,020	0.34	0.37	No	-670	448,900
10	ALLUVIAL	E/O	MARKS	3165	5047	03165-05047	97	162	0.60	0.60	Yes	-65	4,225
11	ALLUVIAL	W/O	MILBURN	5784	5791	05784-05791	790	436	1.81	0.60	No	354	125,316
12	ALLUVIAL	E/O	VAN NESS	3166	5048	03166-05048	8	104	0.08	0.60	No	-96	9,216
13	ALLUVIAL	E/O	WEST	3168	5049	03168-05049	1	53	0.02	0.60	No	-52	2,704
14	ANNADALE	E/O	CEDAR	8434	9236	08434-09236	0	66	0.00	0.60	No	-66	4,356
15	ANNADALE	W/O	ELM	2134	2779	02134-02779	307	206	1.49	0.60	Yes	101	10,201
16	ANNADALE	W/O	MARTIN LUTHER KING JR	2914	2934	02914-02934	17	19	0.89	0.60	Yes	-2	4
17	ANNADALE	W/O	WALNUT	2934	3036	02934-03036	0	9	0.00	0.60	No	-9	81
18	ARMSTRONG	N/O	BELMONT	3559	12146	03559-12146	294	239	1.23	0.60	Yes	55	3,025
19	ARMSTRONG	N/O	BUTLER	5627	6684	05627-06684	16	118	0.14	0.60	No	-102	10,404
20	ARMSTRONG	S/O	CHURCH	6685	12142	06685-12142	11	121	0.09	0.60	No	-110	12,100
21	ARMSTRONG	S/O	DAKOTA	5021	8378	05021-08378	118	360	0.33	0.60	No	-242	58,564
22	ARMSTRONG	S/O	KINGS CANYON	3560	6684	03560-06684	15	252	0.06	0.60	No	-237	56,169
23	ASHLAN	W/O	41	3128	4336	03128-04336	2,411	2,210	1.09	0.27	Yes	201	40,401
24	ASHLAN	E/O	BLACKSTONE	2077	3128	02077-03128	1,911	2,312	0.83	0.27	Yes	-401	160,801
25	ASHLAN	W/O	BRYAN	3330	5072	03330-05072	138	155	0.89	0.60	Yes	-17	289
26	ASHLAN	E/O	CEDAR	2450	2451	02450-02451	2,522	2,091	1.21	0.28	Yes	431	185,761
27	ASHLAN	E/O	CHESTNUT	5034	6812	05034-06812	1,425	1,863	0.76	0.29	Yes	-438	191,844
28	ASHLAN	E/O	DEL MAR	2077	2444	02077-02444	1,171	1,598	0.73	0.31	Yes	-427	182,329
29	ASHLAN	E/O	FRESNO	2445	2446	02445-02446	1,850	1,805	1.02	0.29	Yes	45	2,025
30	ASHLAN	W/O	FRUIT	2440	5428	02440-05428	1,611	1,375	1.17	0.32	Yes	236	55,696
31	ASHLAN	W/O	HAYES	3330	5072	03330-05072	138	208	0.66	0.60	Yes	-70	4,900
32	ASHLAN	E/O	MILLBROOK	2449	5007	02449-05007	1,960	1,931	1.02	0.28	Yes	29	841
33	ASHLAN	W/O	SANTA FE	2440	5428	02440-05428	1,611	1,359	1.19	0.32	Yes	252	63,504
34	ASHLAN	E/O	WEBER	3119	5084	03119-05084	3,093	3,111	0.99	0.25	Yes	-18	324
35	ASHLAN	W/O	WEST	2438	5431	02438-05431	1,801	1,495	1.20	0.31	Yes	306	93,636
36	ASHLAN	W/O	WINERY	5034	6288	05034-06288	1,425	2,657	0.54	0.26	No	-1,232	1,517,824
37	AUDUBON	E/O	BLACKSTONE	3173	3174	03173-03174	729	1,465	0.50	0.31	No	-736	541,696
38	AUDUBON	N/O	COLE	3175	3176	03175-03176	772	1,028	0.75	0.37	Yes	-256	65,536
39	AUDUBON	W/O	DEL MAR	2060	12117	02060-12117	434	1,237	0.35	0.33	No	-803	644,809
40	AUDUBON	W/O	FRIANT	3173	5584	03173-05584	575	1,519	0.38	0.31	No	-944	891,136
41	AUDUBON	N/O	LEXINGTON	3272	3274	03272-03274	499	1,244	0.40	0.33	No	-745	555,025
42	AUDUBON	N/O	NEES	3272	6560	03272-06560	437	1,126	0.39	0.35	No	-689	474,721
43	B	N/O	STANISLAUS	3493	4438	03493-04438	214	213	1.00	0.60	Yes	1	1
44	B	N/O	TUOLUMNE	2180	3493	02180-03493	94	180	0.52	0.60	Yes	-86	7,396
45	BARSTOW	E/O	BLACKSTONE	2072	2347	02072-02347	1,660	1,542	1.08	0.31	Yes	118	13,924
46	BARSTOW	E/O	BRAWLEY	2337	3562	02337-03562	33	354	0.09	0.60	No	-321	103,041
47	BARSTOW	E/O	CEDAR	2354	12314	02354-12314	1,569	1,073	1.46	0.36	No	496	246,016
48	BARSTOW	W/O	CEDAR	2354	5442	02354-05442	1,451	987	1.47	0.60	Yes	464	215,296
49	BARSTOW	E/O	FRUIT	2342	2343	02342-02343	358	1,009	0.35	0.37	No	-651	423,801
50	BARSTOW	E/O	GRANTLAND	3295	6744	03295-06744	32	79	0.41	0.60	Yes	-47	2,209
51	BARSTOW	E/O	PALM	2311	2344	02311-02344	684	903	0.76	0.60	Yes	-219	47,961
52	BARSTOW	E/O	THORNE	2344	3195	02344-03195	358	1,084	0.33	0.36	No	-726	527,076
53	BARSTOW	W/O	VALENTINE	3562	3563	03562-03563	30	133	0.23	0.60	No	-103	10,609
54	BARSTOW	E/O	WEST	2341	3194	02341-03194	156	770	0.20	0.60	No	-614	376,996
55	BEHYMER	E/O	CHANCE	5513	5517	05513-05517	16	427	0.04	0.60	No	-411	168,921
56	BEHYMER	E/O	MAPLE	5513	6648	05513-06648	474	332	1.43	0.60	Yes	142	20,164
57	BEHYMER	W/O	MAPLE	5513	5517	05513-05517	16	378	0.04	0.60	No	-362	131,044
58	BELMONT	W/O	99	4368	4369	04368-04369	428	420	1.02	0.60	Yes	8	64
59	BELMONT	E/O	ABBY	2090	2728	02090-02728	809	573	1.41	0.60	Yes	236	55,696
60	BELMONT	W/O	BLACKSTONE	4402	4403	04402-04403	530	168	3.15	0.60	No	362	131,044
61	BELMONT	E/O	CEDAR	2737	2738	02737-02738	1,167	1,070	1.09	0.36	Yes	97	9,409
62	BELMONT	W/O	CHESTNUT	2741	2742	02741-02742	698	884	0.79	0.60	Yes	-186	34,596
63	BELMONT	W/O	CLOVIS	2746	2747	02746-02747	289	534	0.54	0.60	Yes	-245	60,025
64	BELMONT	E/O	FIRST	2733	2734	02733-02734	762	1,388	0.55	0.32	No	-626	391,876
65	BELMONT	W/O	FRESNO	2729	2730	02729-02730	771	659	1.17	0.60	Yes	112	12,544
66	BELMONT	W/O	FULTON	4382	5178	04382-05178	1,031	878	1.17	0.60	Yes	153	23,409
67	BELMONT	W/O	H	2723	6650	02723-06650	651	634	1.03	0.60	Yes	17	289
68	BELMONT	W/O	MAPLE	2739	2740	02739-02740	923	1,160	0.80	0.34	Yes	-237	56,169
69	BELMONT	W/O	MARKS	3363	3473	03363-03473	179	409	0.44	0.60	Yes	-230	52,900
70	BELMONT	W/O	PEACH	2745	5505	02745-05505	442	904	0.49	0.60	Yes	-462	213,444
71	BLACKSTONE	N/O	ALLUVIAL	6539	9180	06539-09180	2,657	2,821	0.94	0.26	Yes	-164	26,896
72	BLACKSTONE	N/O	BREMER	5438	4400	05438-04400	802	685	1.17	0.60	Yes	117	13,689
73	BLACKSTONE	N/O	BULLARD	2071	2130	02071-02130	2,566	1,259	2.04	0.33	No	1,307	1,708,249
74	BLACKSTONE	N/O	CLINTON	2082	3253	02082-03253	1,789	1,177	1.52	0.34	No	612	374,544
75	BLACKSTONE	S/O	DAKOTA	2078	2079	02078-02079	1,632	835	1.95	0.60	No	797	635,209
76	BLACKSTONE	N/O	DIVISADERO	4413	4412	04413-04412	479	421	1.14	0.60	Yes	58	3,364
77	BLACKSTONE	N/O	GETTYSBURG	2075	2076	02075-02076	1,953	1,098	1.78	0.36	No	855	731,025
78	BLACKSTONE	S/O	HERNDON	2068	3223	02068-03223	2,225	968	2.30	0.60	No	1,257	1,580,049
79	BLACKSTONE	S/O	OLIVE	2086	4361	02086-04361	491	637	0.77	0.60	Yes	-146	21,316
80	BLACKSTONE	N/O	SHAW	2073	2074	02073-02074	1,942	1,241	1.56	0.33	No	701	491,401

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
81	BLACKSTONE	N/O	SHIELDS	2079	2080	02079-02080	1,877	835	2.25	0.60	No	1,042	1,085,764
82	BLACKSTONE	N/O	SIERRA	2069	3223	02069-03223	2,285	605	3.78	0.60	No	1,680	2,822,400
83	BRAWLEY	N/O	BARSTOW	2337	5487	02337-05487	1,249	1,798	0.69	0.30	No	-549	301,401
84	BRAWLEY	S/O	CALIFORNIA	5136	8062	05136-08062	104	106	0.98	0.60	Yes	-2	4
85	BRAWLEY	N/O	CLINTON	2562	3429	02562-03429	213	860	0.25	0.60	No	-647	418,609
86	BRAWLEY	N/O	DAKOTA	3339	3340	03339-03340	579	537	1.08	0.60	Yes	42	1,764
87	BRAWLEY	N/O	GETTYSBURG	3118	3585	03118-03585	1,290	1,218	1.06	0.33	Yes	72	5,184
88	BRAWLEY	S/O	HERNDON	3281	5107	03281-05107	1,280	793	1.61	0.60	No	487	237,169
89	BRAWLEY	N/O	NIELSEN	5120	5440	05120-05440	152	384	0.40	0.60	No	-232	53,824
90	BRAWLEY	N/O	SHAW	2374	3571	02374-03571	1,436	3,053	0.47	0.25	No	-1,617	2,614,689
91	BRAWLEY	N/O	WEBER	3118	3585	03118-03585	1,290	608	2.12	0.60	No	682	465,124
92	BROADWAY	N/O	41	6145	6187	06145-06187	436	522	0.84	0.60	Yes	-86	7,396
93	BROADWAY	N/O	DIVISADERO	4385	5400	04385-05400	186	87	2.14	0.60	No	99	9,801
94	BROADWAY	N/O	FRESNO	9226	9227	09226-09227	297	202	1.47	0.60	Yes	95	9,025
95	BROADWAY	S/O	VENTURA	4457	5222	04457-05222	25	238	0.11	0.60	No	-213	45,369
96	BRYAN	S/O	ASHLAN	3326	5632	03326-05632	162	62	2.61	0.60	No	100	10,000
97	BULLARD	E/O	41	3675	4327	03675-04327	2,646	2,601	1.02	0.26	Yes	45	2,025
98	BULLARD	W/O	BLACKSTONE	2071	3126	02071-03126	2,177	1,983	1.10	0.28	Yes	194	37,636
99	BULLARD	E/O	CARNEGIE	5806	5808	05806-05808	292	808	0.36	0.60	No	-516	266,256
100	BULLARD	E/O	CEDAR	2316	5001	02316-05001	1,850	2,114	0.88	0.27	Yes	-264	69,696
101	BULLARD	W/O	CEDAR	2313	2314	02313-02314	2,006	2,055	0.98	0.28	Yes	-49	2,401
102	BULLARD	W/O	CHESTNUT	2316	5001	02316-05001	1,850	2,029	0.91	0.28	Yes	-179	32,041
103	BULLARD	W/O	FIRST	2309	3245	02309-03245	2,044	2,467	0.83	0.26	Yes	-423	178,929
104	BULLARD	W/O	FRESNO	3675	4327	03675-04327	2,646	2,563	1.03	0.26	Yes	83	6,889
105	BULLARD	E/O	GRANTLAND	2294	6740	02294-06740	14	104	0.13	0.60	No	-90	8,100
106	BULLARD	W/O	JEANNE	3291	5052	03291-05052	34	91	0.37	0.60	No	-57	3,249
107	BULLARD	W/O	MAPLE	2316	5001	02316-05001	1,850	1,900	0.97	0.28	Yes	-50	2,500
108	BULLARD	E/O	MAROA	2306	3126	02306-03126	2,350	2,328	1.01	0.27	Yes	22	484
109	BULLARD	W/O	MILLBROOK	2312	3244	02312-03244	2,084	2,514	0.83	0.26	Yes	-430	184,900
110	BULLARD	W/O	PALM	2303	3201	02303-03201	2,230	1,869	1.19	0.29	Yes	361	130,321
111	BULLARD	E/O	VALENTINE	6062	12301	06062-12301	40	358	0.11	0.60	No	-318	101,124
112	BULLARD	E/O	WEST	2301	3193	02301-03193	1,940	1,668	1.16	0.30	Yes	272	73,984
113	BUTLER	E/O	ARMSTRONG	2850	5627	02850-05627	24	16	1.50	0.60	Yes	8	64
114	BUTLER	E/O	CHESTNUT	2842	2843	02842-02843	661	684	0.97	0.60	Yes	-23	529
115	BUTLER	W/O	CLOVIS	2846	2847	02846-02847	157	410	0.38	0.60	No	-253	64,009
116	CALAVERAS	E/O	N	3008	6084	03008-06084	213	148	1.44	0.60	Yes	65	4,225
117	CALIFORNIA	E/O	BRAWLEY	3068	3113	03068-03113	15	95	0.16	0.60	No	-80	6,400
118	CALIFORNIA	W/O	CEDAR	2879	3505	02879-03505	148	88	1.68	0.60	No	60	3,600
119	CALIFORNIA	E/O	CHERRY	5405	6188	05405-06188	11	59	0.19	0.60	No	-48	2,304
120	CALIFORNIA	E/O	MARKS	2863	2966	02863-02966	94	154	0.61	0.60	Yes	-60	3,600
121	CALIFORNIA	E/O	ORANGE	2878	3505	02878-03505	203	127	1.60	0.60	Yes	76	5,776
122	CALIFORNIA	W/O	TUPMAN	2872	6089	02872-06089	409	455	0.90	0.60	Yes	-46	2,116
123	CALIFORNIA	W/O	WALNUT	3586	6750	03586-06750	185	304	0.61	0.60	Yes	-119	14,161
124	CALIFORNIA	E/O	WEST	2865	2866	02865-02866	58	496	0.12	0.60	No	-438	191,844
125	CECELIA	N/O	BULLARD	2929	5411	02929-05411	1,388	468	2.97	0.60	No	920	846,400
126	CEDAR	N/O	BULLDOG	2354	3129	02354-03129	1,693	2,100	0.81	0.27	Yes	-407	165,649
127	CEDAR	S/O	CALIFORNIA	2879	3146	02879-03146	528	605	0.87	0.60	Yes	-77	5,929
128	CEDAR	N/O	CENTRAL	2962	12353	02962-12353	98	126	0.78	0.60	Yes	-28	784
129	CEDAR	S/O	CENTRAL	5169	8106	05169-08106	105	129	0.81	0.60	Yes	-24	576
130	CEDAR	N/O	CHURCH	2897	3146	02897-03146	461	714	0.65	0.60	Yes	-253	64,009
131	CEDAR	N/O	CLINTON	2557	2586	02557-02586	1,315	941	1.40	0.60	Yes	374	139,876
132	CEDAR	N/O	COPPER	3053	12318	03053-12318	283	80	3.54	0.60	No	203	41,209
133	CEDAR	S/O	DAKOTA	2491	2508	02491-02508	938	1,450	0.65	0.31	No	-512	262,144
134	CEDAR	S/O	HERNDON	2252	2283	02252-02283	1,962	1,686	1.16	0.30	Yes	276	76,176
135	CEDAR	N/O	JENSEN	3150	4614	03150-04614	401	417	0.96	0.60	Yes	-16	256
136	CEDAR	S/O	MCKINLEY	2634	2651	02634-02651	1,684	1,611	1.05	0.30	Yes	73	5,329
137	CEDAR	N/O	NEES	2230	3112	02230-03112	879	1,839	0.48	0.29	No	-960	921,600
138	CEDAR	N/O	NORTH	2952	5296	02952-05296	225	387	0.58	0.60	Yes	-162	26,244
139	CEDAR	S/O	PARKWAY	2962	3693	02962-03693	114	148	0.77	0.60	Yes	-34	1,156
140	CEDAR	S/O	SHAW	2140	2399	02140-02399	1,836	1,401	1.31	0.31	No	435	189,225
141	CEDAR	S/O	SHEPHERD	2222	3067	02222-03067	422	1,716	0.25	0.30	No	-1,294	1,674,436
142	CEDAR	N/O	TEAGUE	3067	3161	03067-03161	630	1,685	0.37	0.30	No	-1,055	1,113,025
143	CEDAR	N/O	TULARE	2767	2787	02767-02787	761	1,322	0.58	0.32	No	-561	314,721
144	CEDAR	N/O	VENTURA	2189	2813	02189-02813	893	1,390	0.64	0.32	No	-497	247,009
145	CENTRAL	W/O	MAPLE	5176	6202	05176-06202	89	136	0.65	0.60	Yes	-47	2,209
146	CHAMPLAIN	E/O	FRIANT	3305	5464	03305-05464	5	386	0.01	0.60	No	-381	145,161
147	CHERRY	N/O	ANNADALE	2938	5177	02938-05177	508	256	1.98	0.60	No	252	63,504
148	CHESTNUT	S/O	BELMONT	2742	3545	02742-03545	2,223	2,173	1.02	0.27	Yes	50	2,500
149	CHESTNUT	S/O	BUTLER	2842	2856	02842-02856	1,197	743	1.61	0.60	No	454	206,116
150	CHESTNUT	S/O	CALIFORNIA	2856	5278	02856-05278	1,474	1,429	1.03	0.31	Yes	45	2,025
151	CHESTNUT	S/O	CHURCH	2900	3541	02900-03541	1,096	921	1.19	0.60	Yes	175	30,625
152	CHESTNUT	N/O	HERNDON	2253	6107	02253-06107	1,414	505	2.80	0.60	No	909	826,281
153	CHESTNUT	S/O	JENSEN	2927	5291	02927-05291	1,197	1,126	1.06	0.35	Yes	71	5,041
154	CHESTNUT	N/O	NEES	2231	4996	02231-04996	1,055	887	1.19	0.60	Yes	168	28,224
155	CHESTNUT	N/O	OLIVE	2653	2687	02653-02687	2,028	1,332	1.52	0.32	No	696	484,416
156	CHESTNUT	N/O	SHIELDS	2539	5011	02539-05011	1,749	1,204	1.45	0.33	No	545	297,025
157	CHESTNUT	N/O	TEAGUE	3071	5467	03071-05467	845	978	0.86	0.60	Yes	-133	17,689
158	CHURCH	E/O	ARMSTRONG	3317	3557	03317-03557	11	32	0.34	0.60	No	-21	441
159	CHURCH	E/O	BLYTHE	4263	4407	04263-04407	11	34	0.32	0.60	No	-23	529
160	CHURCH	E/O	CHESTNUT	3239	5277	03239-05277	132	323	0.41	0.60	Yes	-191	36,481

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
161	CHURCH	E/O	ELM	2108	5729	02108-05729	225	342	0.66	0.60	Yes	-117	13,689
162	CHURCH	E/O	FOWLER	3317	3557	03317-03557	11	94	0.12	0.60	No	-83	6,889
163	CHURCH	W/O	FRUIT	2885	2992	02885-02992	23	120	0.19	0.60	No	-97	9,409
164	CHURCH	E/O	PEACH	6527	8264	06527-08264	0	157	0.00	0.60	No	-157	24,649
165	CHURCH	W/O	PEACH	2901	3533	02901-03533	137	236	0.58	0.60	Yes	-99	9,801
166	CLINTON	E/O	ANGUS	2580	2581	02580-02581	1,315	1,048	1.25	0.37	Yes	267	71,289
167	CLINTON	E/O	BLACKSTONE	2082	2577	02082-02577	1,552	1,245	1.25	0.33	Yes	307	94,249
168	CLINTON	E/O	CEDAR	2586	5710	02586-05710	851	840	1.01	0.60	Yes	11	121
169	CLINTON	E/O	FIRST	2581	2582	02581-02582	1,258	1,095	1.15	0.36	Yes	163	26,569
170	CLINTON	E/O	FOWLER	12148	12154	12148-12154	57	180	0.32	0.60	No	-123	15,129
171	CLINTON	E/O	FRUIT	2571	2572	02571-02572	1,425	1,467	0.97	0.31	Yes	-42	1,764
172	CLINTON	E/O	MARKS	2564	2565	02564-02565	1,790	1,793	1.00	0.30	Yes	-3	9
173	CLINTON	N/O	MCKINLEY	5783	6119	05783-06119	577	571	1.01	0.60	Yes	6	36
174	CLINTON	E/O	SUNNYSIDE	6633	8228	06633-08228	629	293	2.15	0.60	No	336	112,896
175	CLINTON	E/O	TEMPERANCE	12148	12154	12148-12154	57	69	0.83	0.60	Yes	-12	144
176	CLINTON	W/O	WEST	2568	2569	02568-02569	1,588	1,735	0.92	0.30	Yes	-147	21,609
177	CLOVIS	S/O	CALIFORNIA	3316	5591	03316-05591	1,315	915	1.44	0.60	Yes	400	160,000
178	CLOVIS	N/O	CLINTON	2541	5394	02541-05394	2,308	1,991	1.16	0.28	Yes	317	100,489
179	CLOVIS	S/O	KINGS CANYON	2199	2822	02199-02822	1,357	2,169	0.63	0.27	No	-812	659,344
180	CLOVIS	N/O	MCKINLEY	6631	8232	06631-08232	4,071	2,360	1.73	0.27	No	1,711	2,927,521
181	CLOVIS	N/O	TULARE	3547	7051	03547-07051	2,813	2,331	1.21	0.27	Yes	482	232,324
182	COLE	E/O	AUDUBON	3176	3208	03176-03208	483	423	1.14	0.60	Yes	60	3,600
183	COPPER	E/O	CEDAR	5773	3053	05773-03053	673	603	1.12	0.60	Yes	70	4,900
184	CORNELIA	N/O	DAKOTA	2472	3410	02472-03410	123	803	0.15	0.60	No	-680	462,400
185	DAKOTA	E/O	BLACKSTONE	2078	2485	02078-02485	335	1,032	0.32	0.37	No	-697	485,809
186	DAKOTA	E/O	CEDAR	2492	5708	02492-05708	763	843	0.91	0.60	Yes	-80	6,400
187	DAKOTA	E/O	CHESTNUT	2495	5015	02495-05015	321	976	0.33	0.60	No	-655	429,025
188	DAKOTA	E/O	FOWLER	5016	12157	05016-12157	24	120	0.20	0.60	No	-96	9,216
189	DAKOTA	E/O	MAPLE	2493	2494	02493-02494	510	953	0.54	0.60	Yes	-443	196,249
190	DAKOTA	W/O	MAPLE	2493	5713	02493-05713	707	1,263	0.56	0.33	No	-556	309,136
191	DAKOTA	W/O	PEACH	2495	5015	02495-05015	321	806	0.40	0.60	No	-485	235,225
193	DAKOTA	E/O	WEST	2478	2479	02478-02479	576	574	1.00	0.60	Yes	2	4
194	DIVISADERO	W/O	41	4637	6180	04637-06180	1,771	1,757	1.01	0.30	Yes	14	196
195	DIVISADERO	E/O	FRESNO	2781	5263	02781-05263	1,839	1,475	1.25	0.31	Yes	364	132,496
196	DIVISADERO	E/O	VAN NESS	2778	5237	02778-05237	227	520	0.44	0.60	Yes	-293	85,849
197	E	N/O	STANISLAUS	5413	5501	05413-05501	49	604	0.08	0.60	No	-555	308,025
198	EAST	S/O	CALIFORNIA	2876	2884	02876-02884	281	255	1.10	0.60	Yes	26	676
199	EL DORADO	E/O	E	3489	5413	03489-05413	246	359	0.69	0.60	Yes	-113	12,769
200	EMERSON	W/O	WEST	3214	12297	03214-12297	359	367	0.98	0.60	Yes	-8	64
201	F	N/O	FRESNO	5418	5500	05418-05500	35	101	0.35	0.60	No	-66	4,356
202	FIG	S/O	NORTH	2946	8094	02946-08094	39	189	0.21	0.60	No	-150	22,500
203	FIGARDEN	E/O	BRAWLEY	4628	5060	04628-05060	790	380	2.08	0.60	No	410	168,100
206	FIRST	N/O	ALLUVIAL	3087	3088	03087-03088	846	938	0.90	0.60	Yes	-92	8,464
207	FIRST	N/O	BARSTOW	2351	5006	02351-05006	746	1,742	0.43	0.30	No	-996	992,016
208	FIRST	N/O	BULLARD	2309	2310	02309-02310	1,205	1,654	0.73	0.30	Yes	-449	201,601
209	FIRST	N/O	CLINTON	2555	2581	02555-02581	1,710	1,063	1.61	0.36	No	647	418,609
210	FIRST	N/O	DAKOTA	2467	2488	02467-02488	1,361	899	1.51	0.60	Yes	462	213,444
211	FIRST	N/O	GETTYSBURG	2411	3234	02411-03234	1,454	1,688	0.86	0.30	Yes	-234	54,756
212	FIRST	N/O	HERNDON	2250	6102	02250-06102	1,220	1,029	1.19	0.37	Yes	191	36,481
213	FIRST	N/O	MCKINLEY	2602	2630	02602-02630	1,633	1,261	1.30	0.33	Yes	372	138,384
214	FIRST	N/O	NEES	3073	3178	03073-03178	601	1,145	0.52	0.35	No	-544	295,936
215	FIRST	N/O	SAN JOSE	2351	2364	02351-02364	990	1,626	0.61	0.30	No	-636	404,496
216	FIRST	S/O	SHAW	2138	2397	02138-02397	959	1,806	0.53	0.29	No	-847	717,409
217	FIRST	N/O	SIERRA	2281	5471	02281-05471	1,072	1,879	0.57	0.29	No	-807	651,249
218	FIRST	N/O	TULARE	2764	2783	02764-02783	1,037	896	1.16	0.60	Yes	141	19,881
219	FOWLER	N/O	CHURCH	5304	5592	05304-05592	196	369	0.53	0.60	Yes	-173	29,929
220	FOWLER	N/O	CLINTON	2593	8462	02593-08462	906	376	2.41	0.60	No	530	280,900
221	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	487	1.90	0.60	No	439	192,721
222	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	526	1.76	0.60	No	400	160,000
223	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	400	2.32	0.60	No	526	276,676
224	FOWLER	N/O	DAKOTA	5016	8376	05016-08376	953	1,187	0.80	0.34	Yes	-234	54,756
225	FOWLER	N/O	JENSEN	2906	3317	02906-03317	193	501	0.39	0.60	No	-308	94,864
226	FOWLER	N/O	KINGS CANYON	7056	7082	07056-07082	564	1,149	0.49	0.35	No	-585	342,225
227	FRESNO	E/O	99	4440	5870	04440-05870	1,592	1,637	0.97	0.30	Yes	-45	2,025
228	FRESNO	N/O	CLINTON	2554	2578	02554-02578	984	1,021	0.96	0.37	Yes	-37	1,369
229	FRESNO	N/O	DIVISADERO	2763	6092	02763-06092	881	899	0.98	0.60	Yes	-18	324
230	FRESNO	E/O	E	5418	5870	05418-05870	1,516	1,148	1.32	0.35	Yes	368	135,424
232	FRESNO	N/O	GETTYSBURG	2409	3232	02409-03232	1,484	696	2.13	0.60	No	788	620,944
233	FRESNO	N/O	HERNDON	2249	6100	02249-06100	2,287	2,478	0.92	0.26	Yes	-191	36,481
234	FRESNO	S/O	HERNDON	2249	2280	02249-02280	1,181	1,536	0.77	0.31	Yes	-355	126,025
235	FRESNO	S/O	MCKINLEY	2629	2646	02629-02646	724	893	0.81	0.60	Yes	-169	28,561
236	FRESNO	N/O	NEES	5461	6099	05461-06099	309	1,422	0.22	0.31	No	-1,113	1,238,769
237	FRESNO	S/O	SHAW	2339	3232	02339-03232	1,484	1,582	0.94	0.31	Yes	-98	9,604
238	FRESNO	N/O	SHIELDS	2502	2527	02502-02527	1,022	956	1.07	0.60	Yes	66	4,356
239	FRESNO	E/O	VAN NESS	3015	3016	03015-03016	847	915	0.93	0.60	Yes	-68	4,624
240	FRIANT	N/O	AUDUBON	2221	5036	02221-05036	4,487	4,202	1.07	0.23	Yes	285	81,225
241	FRIANT	N/O	CHAMPLAIN	3304	8116	03304-08116	1,966	1,423	1.38	0.31	No	543	294,849
242	FRIANT	N/O	SHEPHERD	2220	2221	02220-02221	2,852	2,347	1.22	0.27	Yes	505	255,025
244	FRUIT	S/O	ASHLAN	5429	5430	05429-05430	565	690	0.82	0.60	Yes	-125	15,625
245	FRUIT	S/O	CALIFORNIA	2867	2880	02867-02880	195	127	1.54	0.60	Yes	68	4,624

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
246	FRUIT	N/O	CLINTON	2571	3261	02571-03261	369	853	0.43	0.60	Yes	-484	234,256
247	FRUIT	S/O	HERNDON	2245	5058	02245-05058	827	728	1.14	0.60	Yes	99	9,801
248	FRUIT	S/O	SHAW	2380	3270	02380-03270	890	309	2.88	0.60	No	581	337,561
249	FULTON	N/O	DIVISADERO	4386	4384	04386-04384	301	322	0.93	0.60	Yes	-21	441
250	FULTON	N/O	SAN JOAQUIN	5857	5861	05857-05861	86	120	0.72	0.60	Yes	-34	1,156
251	G	N/O	EL DORADO	2775	2776	02775-02776	177	108	1.64	0.60	No	69	4,761
252	G	S/O	STANISLAUS	4392	5191	04392-05191	205	371	0.55	0.60	Yes	-166	27,556
253	G	S/O	STANISLAUS	4392	5191	04392-05191	205	741	0.28	0.60	No	-536	287,296
254	G	N/O	TUOLUMNE	4392	5191	04392-05191	205	371	0.55	0.60	Yes	-166	27,556
255	G	S/O	VENTURA	2105	5879	02105-05879	309	338	0.91	0.60	Yes	-29	841
256	GARFIELD	S/O	BARSTOW	6725	6756	06725-06756	11	52	0.21	0.60	No	-41	1,681
257	GATES	N/O	BLYTHE	3297	4632	03297-04632	1,167	946	1.23	0.60	Yes	221	48,841
258	GATES	N/O	SAN JOSE	3564	4632	03564-04632	1,147	1,056	1.09	0.36	Yes	91	8,281
259	GATES	S/O	SAN JOSE	3297	4632	03297-04632	1,167	760	1.54	0.60	Yes	407	165,649
260	GETTYSBURG	E/O	BLACKSTONE	2076	2408	02076-02408	872	1,105	0.79	0.35	Yes	-233	54,289
261	GETTYSBURG	E/O	CEDAR	2413	2414	02413-02414	1,230	1,401	0.88	0.31	Yes	-171	29,241
262	GETTYSBURG	E/O	WEST	2401	3205	02401-03205	84	128	0.66	0.60	Yes	-44	1,936
263	GOLDEN STATE	N/O	ASHLAN	4635	12254	04635-12254	1,485	1,732	0.86	0.30	Yes	-247	61,009
264	GOLDEN STATE	N/O	BUCKINGHAM	4635	12254	04635-12254	1,485	1,541	0.96	0.31	Yes	-56	3,136
265	GOLDEN STATE	S/O	CHURCH	2892	5406	02892-05406	302	346	0.87	0.60	Yes	-44	1,936
266	GOLDEN STATE	S/O	JENSEN	2892	5406	02892-05406	302	385	0.78	0.60	Yes	-83	6,889
267	GOLDEN STATE	N/O	SHAW	3723	4847	03723-04847	147	822	0.18	0.60	No	-675	455,625
268	GRANTLAND	N/O	BARSTOW	3293	5388	03293-05388	315	350	0.90	0.60	Yes	-35	1,225
269	GRANTLAND	N/O	BULLARD	2294	6165	02294-06165	348	502	0.69	0.60	Yes	-154	23,716
271	H	N/O	DIVISADERO	2761	6182	02761-06182	1,024	1,015	1.01	0.37	Yes	9	81
272	H	S/O	DIVISADERO	2777	3007	02777-03007	565	130	4.35	0.60	No	435	189,225
273	H	N/O	MERCED	4419	5207	04419-05207	581	166	3.50	0.60	No	415	172,225
274	HAYES	N/O	ASHLAN	3402	5633	03402-05633	84	119	0.71	0.60	Yes	-35	1,225
275	HAZELWOOD	N/O	BUTLER	2816	2834	02816-02834	598	257	2.33	0.60	No	341	116,281
276	HERNDON	E/O	BLACKSTONE	2068	4321	02068-04321	5,061	4,169	1.21	0.23	Yes	892	795,664
277	HERNDON	W/O	BRAWLEY	3281	5106	03281-05106	2,783	2,631	1.06	0.26	Yes	152	23,104
280	HERNDON	E/O	CEDAR	2252	4999	02252-04999	3,997	4,235	0.94	0.23	Yes	-238	56,644
281	HERNDON	E/O	CHESTNUT	2253	5002	02253-05002	4,404	3,301	1.33	0.24	No	1,103	1,216,609
282	HERNDON	E/O	FIRST	2251	5004	02251-05004	4,171	5,023	0.83	0.21	Yes	-852	725,904
283	HERNDON	E/O	FRUIT	2246	5037	02246-05037	5,432	5,673	0.96	0.20	Yes	-241	58,081
284	HERNDON	W/O	MARKS	3055	5041	03055-05041	3,334	3,191	1.04	0.25	Yes	143	20,449
285	HERNDON	E/O	MAROA	2068	2248	02068-02248	4,660	3,973	1.17	0.23	Yes	687	471,969
286	HERNDON	E/O	MILLBROOK	2251	5003	02251-05003	4,769	4,208	1.13	0.23	Yes	561	314,721
287	HERNDON	W/O	PALM	2246	5037	02246-05037	5,432	5,673	0.96	0.20	Yes	-241	58,081
289	HUGHES	N/O	KEARNEY	2815	2827	02815-02827	20	14	1.43	0.60	Yes	6	36
290	HUGHES	N/O	NIELSEN	3474	5326	03474-05326	329	116	2.84	0.60	No	213	45,369
291	HUGHES	S/O	SHIELDS	2517	2549	02517-02549	706	599	1.18	0.60	Yes	107	11,449
292	HUNTINGTON	E/O	R	3034	3155	03034-03155	78	214	0.36	0.60	No	-136	18,496
293	INGRAM	N/O	HERNDON	2247	3302	02247-03302	1,188	1,102	1.08	0.35	Yes	86	7,396
294	INYO	E/O	L	3160	5219	03160-05219	428	117	3.66	0.60	No	311	96,721
295	INYO	E/O	VAN NESS	3159	5219	03159-05219	62	176	0.35	0.60	No	-114	12,996
296	ISLAND WATERPARK	N/O	SHAW	6820	5596	06820-05596	2,747	530	5.18	0.60	No	2,217	4,915,089
297	JENNIFER	E/O	GATES	6063	6064	06063-06064	1,091	680	1.60	0.60	No	411	168,921
298	JENSEN	E/O	CEDAR	2925	6296	02925-06296	1,704	1,528	1.12	0.31	Yes	176	30,976
299	JENSEN	E/O	CLOVIS	2929	5411	02929-05411	1,388	993	1.40	0.60	Yes	395	156,025
300	JENSEN	W/O	CORNELIA	2908	5135	02908-05135	208	251	0.83	0.60	Yes	-43	1,849
301	JENSEN	E/O	ELM	2109	5730	02109-05730	899	1,568	0.57	0.31	No	-669	447,561
302	JENSEN	W/O	FRUIT	2913	5146	02913-05146	256	292	0.88	0.60	Yes	-36	1,296
303	JENSEN	E/O	GOLDEN STATE	2923	8440	02923-08440	2,024	2,041	0.99	0.28	Yes	-17	289
304	JENSEN	E/O	MAPLE	2926	3531	02926-03531	1,927	1,459	1.32	0.31	No	468	219,024
305	JENSEN	E/O	PEACH	2928	6200	02928-06200	1,376	1,634	0.84	0.30	Yes	-258	66,564
306	JENSEN	W/O	WILLOW	2927	5276	02927-05276	1,326	1,207	1.10	0.33	Yes	119	14,161
307	KEARNEY	W/O	FRESNO	2833	8410	02833-08410	605	328	1.84	0.60	No	277	76,729
308	KEARNEY	E/O	HUGHES	2827	2828	02827-02828	54	136	0.40	0.60	No	-82	6,724
309	KEARNEY	E/O	MARKS	2826	5329	02826-05329	95	100	0.95	0.60	Yes	-5	25
310	KEARNEY	E/O	WEST	2829	8418	02829-08418	205	148	1.39	0.60	Yes	57	3,249
312	KINGS CANYON	E/O	CEDAR	2189	2190	02189-02190	806	1,379	0.58	0.32	No	-573	328,329
313	KINGS CANYON	W/O	CLOVIS	2198	2199	02198-02199	1,535	1,684	0.91	0.30	Yes	-149	22,201
314	KINGS CANYON	E/O	MAPLE	2193	2194	02193-02194	736	1,273	0.58	0.33	No	-537	288,369
315	LANE	E/O	CHESTNUT	2820	5317	02820-05317	574	405	1.42	0.60	Yes	169	28,561
316	LANE	W/O	PEACH	2821	3555	02821-03555	1,640	304	5.39	0.60	No	1,336	1,784,896
317	LOS ANGELES	E/O	L	3042	3263	03042-03263	195	286	0.68	0.60	Yes	-91	8,281
318	M	N/O	CALAVERAS	4416	5240	04416-05240	86	96	0.90	0.60	Yes	-10	100
321	M	N/O	MERCED	2183	5225	02183-05225	36	139	0.26	0.60	No	-103	10,609
322	M	S/O	VENTURA	2102	3039	02102-03039	929	690	1.35	0.60	Yes	239	57,121
323	MAPLE	S/O	CALIFORNIA	3506	12170	03506-12170	785	801	0.98	0.60	Yes	-16	256
324	MAPLE	N/O	CLINTON	2537	2559	02537-02559	624	536	1.16	0.60	Yes	88	7,744
325	MAPLE	N/O	GETTYSBURG	2416	3143	02416-03143	603	297	2.03	0.60	No	306	93,636
326	MAPLE	S/O	MCKINLEY	2685	2695	02685-02695	887	1,056	0.84	0.36	Yes	-169	28,561
328	MAPLE	N/O	TEAGUE	3070	4598	03070-04598	340	648	0.52	0.60	Yes	-308	94,864
329	MAPLE	N/O	TULARE	2789	3488	02789-03488	1,736	1,228	1.41	0.33	No	508	258,064
330	MARKS	S/O	CALIFORNIA	2863	2903	02863-02903	253	131	1.93	0.60	No	122	14,884
331	MARKS	N/O	CLINTON	4276	12241	04276-12241	688	876	0.79	0.60	Yes	-188	35,344
332	MARKS	S/O	HERNDON	3055	6060	03055-06060	347	1,088	0.32	0.36	No	-741	549,081
333	MARKS	N/O	KEARNEY	2826	5129	02826-05129	305	265	1.15	0.60	Yes	40	1,600

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
334	MARKS	N/O	NIELSEN	5132	5133	05132-05133	234	529	0.44	0.60	Yes	-295	87,025
335	MARKS	S/O	SHAW	2375	2394	02375-02394	1,370	1,699	0.81	0.30	Yes	-329	108,241
336	MAROA	S/O	BULLARD	2306	2332	02306-02332	245	919	0.27	0.60	No	-674	454,276
337	MAROA	N/O	CLINTON	2576	2552	02576-02552	463	461	1.00	0.60	Yes	2	4
338	MAROA	S/O	HERNDON	2248	2275	02248-02275	336	694	0.48	0.60	Yes	-358	128,164
339	MAROA	S/O	SHAW	2384	2396	02384-02396	495	590	0.84	0.60	Yes	-95	9,025
340	MAROA	N/O	SIERRA	2274	2275	02274-02275	301	693	0.43	0.60	Yes	-392	153,664
341	MARTIN LUTHER KING JR	S/O	CALIFORNIA	2704	2872	02704-02872	67	360	0.19	0.60	No	-293	85,849
342	MCKINLEY	E/O	BLACKSTONE	2084	3249	02084-03249	1,788	1,798	0.99	0.30	Yes	-10	100
343	MCKINLEY	E/O	CEDAR	2634	5711	02634-05711	2,121	1,707	1.24	0.30	Yes	414	171,396
344	MCKINLEY	E/O	CHESTNUT	2636	8226	02636-08226	1,581	1,204	1.31	0.33	Yes	377	142,129
345	MCKINLEY	W/O	CLOVIS	2637	2638	02637-02638	1,317	838	1.57	0.60	Yes	479	229,441
346	MCKINLEY	E/O	FIRST	2630	2631	02630-02631	1,759	1,430	1.23	0.31	Yes	329	108,241
347	MCKINLEY	E/O	MARKS	2612	2613	02612-02613	982	215	4.57	0.60	No	767	588,289
348	MCKINLEY	E/O	PALM	2606	2621	02606-02621	1,167	979	1.19	0.60	Yes	188	35,344
349	MCKINLEY	E/O	VAN NESS	2624	2625	02624-02625	1,965	1,281	1.53	0.33	No	684	467,856
350	MCKINLEY	E/O	WEST	2617	2618	02617-02618	1,184	1,128	1.05	0.35	Yes	56	3,136
351	MILBURN	S/O	HERNDON	6058	12269	06058-12269	672	1,211	0.55	0.33	No	-539	290,521
352	MILBURN	N/O	SPRUCE	5526	5831	05526-05831	827	1,236	0.67	0.33	No	-409	167,281
353	MILBURN	S/O	SPRUCE	5526	8043	05526-08043	606	723	0.84	0.60	Yes	-117	13,689
354	MILLBROOK	S/O	ASHLAN	2449	2468	02449-02468	510	597	0.85	0.60	Yes	-87	7,569
355	MILLBROOK	N/O	CLINTON	2583	6192	02583-06192	6	168	0.04	0.60	No	-162	26,244
356	MILLBROOK	N/O	NEES	3074	3076	03074-03076	647	792	0.82	0.60	Yes	-145	21,025
357	MILLBROOK	S/O	SHAW	2975	8112	02975-08112	477	373	1.28	0.60	Yes	104	10,816
358	MINARETS	E/O	BLACKSTONE	2066	4597	02066-04597	561	1,459	0.38	0.31	No	-898	806,404
359	NEES	E/O	AUDUBON	6528	6560	06528-06560	2,224	1,983	1.12	0.28	Yes	241	58,081
360	NEES	E/O	CEDAR	2230	3078	02230-03078	1,813	1,699	1.07	0.30	Yes	114	12,996
361	NEES	E/O	FIRST	2229	3084	02229-03084	1,494	2,388	0.63	0.27	No	-894	799,236
362	NEES	E/O	FRESNO	3114	3115	03114-03115	1,603	2,160	0.74	0.27	Yes	-557	310,249
363	NEES	W/O	FRESNO	2228	5835	02228-05835	1,496	2,322	0.64	0.27	No	-826	682,276
364	NEES	E/O	MAPLE	3080	3097	03080-03097	1,321	1,729	0.76	0.30	Yes	-408	166,464
365	NEES	E/O	WILLOW	2232	4929	02232-04929	1,113	1,198	0.93	0.34	Yes	-85	7,225
366	NIELSEN	E/O	WEST	2772	2773	02772-02773	239	120	1.99	0.60	No	119	14,161
367	NORTH	W/O	CEDAR	3690	5321	03690-05321	716	551	1.30	0.60	Yes	165	27,225
368	NORTH	W/O	CHERRY	2948	5733	02948-05733	221	283	0.78	0.60	Yes	-62	3,844
369	NORTH	E/O	EAST	2951	3152	02951-03152	222	514	0.43	0.60	Yes	-292	85,264
370	NORTH	E/O	ELM	2948	5733	02948-05733	221	521	0.42	0.60	Yes	-300	90,000
371	NORTH	W/O	ELM	2110	2947	02110-02947	206	754	0.27	0.60	No	-548	300,304
372	NORTH	W/O	GOLDEN STATE	2953	2954	02953-02954	568	444	1.28	0.60	Yes	124	15,376
373	NORTH	E/O	MARTIN LUTHER KING JR	2946	2947	02946-02947	206	312	0.66	0.60	Yes	-106	11,236
374	NORTH	E/O	PEACH	2956	8086	02956-08086	215	169	1.27	0.60	Yes	46	2,116
375	NORTH	W/O	WALNUT	2945	3019	02945-03019	65	172	0.38	0.60	No	-107	11,449
376	NORTH	W/O	WEST	3318	8078	03318-08078	60	101	0.59	0.60	Yes	-41	1,681
377	O	S/O	TULARE	4610	5234	04610-05234	275	243	1.13	0.60	Yes	32	1,024
378	O	S/O	VENTURA	4612	6184	04612-06184	230	457	0.50	0.60	Yes	-227	51,529
379	OLIVE	W/O	99	4364	4366	04364-04366	95	724	0.13	0.60	No	-629	395,641
380	OLIVE	E/O	CEDAR	2683	2684	02683-02684	313	841	0.37	0.60	No	-528	278,784
381	OLIVE	W/O	CLOVIS	2692	5491	02692-05491	303	401	0.76	0.60	Yes	-98	9,604
382	OLIVE	E/O	FIRST	2679	2680	02679-02680	489	948	0.52	0.60	Yes	-459	210,681
383	OLIVE	E/O	GOLDEN STATE	2642	2667	02642-02667	483	435	1.11	0.60	Yes	48	2,304
385	OLIVE	W/O	WEBER	2642	2667	02642-02667	483	498	0.97	0.60	Yes	-15	225
386	ORANGE	N/O	CALIFORNIA	2854	2878	02854-02878	111	328	0.34	0.60	No	-217	47,089
387	ORANGE	S/O	CALIFORNIA	2878	3147	02878-03147	310	279	1.11	0.60	Yes	31	961
388	ORANGE	S/O	NORTH	3528	8102	03528-08102	100	45	2.22	0.60	No	55	3,025
389	P	S/O	TULARE	2133	5236	02133-05236	55	379	0.15	0.60	No	-324	104,976
390	P	S/O	VENTURA	6184	4461	06184-04461	88	147	0.60	0.60	Yes	-59	3,481
391	PALM	S/O	BELMONT	2724	5185	02724-05185	607	423	1.43	0.60	Yes	184	33,856
393	PALM	N/O	BULLARD	2303	2304	02303-02304	1,627	1,691	0.96	0.30	Yes	-64	4,096
394	PALM	N/O	CLINTON	2551	2573	02551-02573	1,333	970	1.37	0.60	Yes	363	131,769
395	PALM	N/O	DAKOTA	2463	2482	02463-02482	1,477	1,045	1.41	0.37	No	432	186,624
396	PALM	N/O	HERNDON	2246	6536	02246-06536	2,933	3,138	0.93	0.25	Yes	-205	42,025
397	PALM	S/O	HERNDON	2246	5065	02246-05065	1,471	1,631	0.90	0.30	Yes	-160	25,600
398	PALM	N/O	MCKINLEY	2606	2621	02606-02621	1,167	984	1.19	0.60	Yes	183	33,489
399	PALM	S/O	SHAW	2984	5159	02984-05159	18	1,153	0.02	0.34	No	-1,135	1,288,225
400	PEACH	S/O	ASHLAN	2454	5014	02454-05014	992	1,187	0.84	0.34	Yes	-195	38,025
401	PEACH	N/O	BELMONT	2745	5609	02745-05609	1,808	2,324	0.78	0.27	Yes	-516	266,256
402	PEACH	S/O	CALIFORNIA	3321	3537	03321-03537	734	964	0.76	0.60	Yes	-230	52,900
403	PEACH	N/O	CHURCH	2901	3535	02901-03535	642	631	1.02	0.60	Yes	11	121
404	PEACH	S/O	OLIVE	2690	5700	02690-05700	1,324	1,437	0.92	0.31	Yes	-113	12,769
405	PEACH	N/O	TULARE	2793	3546	02793-03546	1,331	1,355	0.98	0.32	Yes	-24	576
406	PERRIN	W/O	MAPLE	4595	5515	04595-05515	650	771	0.84	0.60	Yes	-121	14,641
407	PERRIN	N/O	SHEPHERD	3309	3310	03309-03310	1,356	1,626	0.83	0.30	Yes	-270	72,900
408	POLK	S/O	HERNDON	3164	6625	03164-06625	463	849	0.55	0.60	Yes	-386	148,996
409	POLK	S/O	SHAW	2370	6295	02370-06295	1,199	275	4.36	0.60	No	924	853,776
410	R	N/O	HUNTINGTON	3034	5258	03034-05258	194	524	0.37	0.60	No	-330	108,900
411	R	N/O	INYO	3034	3155	03034-03155	78	483	0.16	0.60	No	-405	164,025
412	R	N/O	TULARE	3022	3031	03022-03031	114	582	0.20	0.60	No	-468	219,024
413	SAN JOSE	E/O	GATES	3397	4633	03397-04633	21	200	0.11	0.60	No	-179	32,041
414	SAN PABLO	N/O	DIVISADERO	4388	4389	04388-04389	128	84	1.52	0.60	Yes	44	1,936
415	SANTA FE	S/O	PALO ALTO	6058	12269	06058-12269	672	1,089	0.62	0.36	No	-417	173,889

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
416	SHAW	E/O	ANGUS	2137	2138	02137-02138	2,957	1,356	2.18	0.32	No	1,601	2,563,201
417	SHAW	W/O	ANGUS	2136	2137	02136-02137	3,227	3,164	1.02	0.25	Yes	63	3,969
418	SHAW	E/O	BLACKSTONE	2074	2135	02074-02135	3,816	3,486	1.09	0.24	Yes	330	108,900
419	SHAW	W/O	BRAWLEY	3117	3574	03117-03574	2,154	2,199	0.98	0.27	Yes	-45	2,025
420	SHAW	E/O	CEDAR	2140	2141	02140-02141	2,723	3,411	0.80	0.24	Yes	-688	473,344
421	SHAW	W/O	GOLDEN STATE	2371	2372	02371-02372	1,768	2,543	0.70	0.26	No	-775	600,625
422	SHAW	W/O	HAYES	3301	3398	03301-03398	609	1,004	0.61	0.37	No	-395	156,025
423	SHAW	W/O	LOLA	3399	12245	03399-12245	662	1,008	0.66	0.37	Yes	-346	119,716
424	SHAW	E/O	MARKS	2375	5426	02375-05426	2,584	2,939	0.88	0.26	Yes	-355	126,025
425	SHAW	W/O	VAN NESS	2377	4559	02377-04559	3,070	3,160	0.97	0.25	Yes	-90	8,100
426	SHAW	E/O	WEST	2378	2379	02378-02379	3,142	2,961	1.06	0.26	Yes	181	32,761
427	SHEPHERD	E/O	CEDAR	2222	3062	02222-03062	649	1,268	0.51	0.33	No	-619	383,161
428	SHEPHERD	E/O	FRIANT	2221	3059	02221-03059	1,681	2,316	0.73	0.27	No	-635	403,225
429	SHEPHERD	W/O	MAPLE	3062	3063	03062-03063	649	1,182	0.55	0.34	No	-533	284,089
430	SHIELDS	E/O	BLACKSTONE	2080	2526	02080-02526	3,039	2,481	1.22	0.26	Yes	558	311,364
431	SHIELDS	E/O	BLYTHE	2547	3346	02547-03346	286	418	0.68	0.60	Yes	-132	17,424
432	SHIELDS	E/O	CEDAR	2534	5709	02534-05709	1,998	1,553	1.29	0.31	Yes	445	198,025
433	SHIELDS	E/O	FOWLER	3142	5024	03142-05024	473	838	0.56	0.60	Yes	-365	133,225
434	SHIELDS	W/O	SUNNYSIDE	2542	9221	02542-09221	1,188	937	1.27	0.60	Yes	251	63,001
435	SHIELDS	E/O	TEMPERANCE	2544	5018	02544-05018	207	131	1.58	0.60	Yes	76	5,776
436	SHIELDS	E/O	VALENTINE	6171	6173	06171-06173	623	686	0.91	0.60	Yes	-63	3,969
437	SHIELDS	E/O	WEBER	2516	5104	02516-05104	359	393	0.91	0.60	Yes	-34	1,156
438	SHIELDS	E/O	WEST	2519	2520	02519-02520	1,365	826	1.65	0.60	No	539	290,521
439	SIERRA	E/O	BLACKSTONE	2277	12210	02277-12210	592	1,223	0.48	0.33	No	-631	398,161
440	SIERRA	E/O	CEDAR	5474	5481	05474-05481	2	139	0.01	0.60	No	-137	18,769
441	SIERRA	W/O	POLK	5631	6245	05631-06245	0	259	0.00	0.60	No	-259	67,081
442	SIERRA	E/O	WEST	2269	2270	02269-02270	88	605	0.15	0.60	No	-517	267,289
443	SIXTH	N/O	TULARE	2766	2785	02766-02785	67	189	0.35	0.60	No	-122	14,884
444	SPRUCE	W/O	BLYTHE	5039	6057	05039-06057	545	156	3.49	0.60	No	389	151,321
447	TEAGUE	E/O	MAPLE	3070	5469	03070-05469	276	877	0.31	0.60	No	-601	361,201
448	TEILMAN	N/O	NIELSEN	2754	2773	02754-02773	197	135	1.46	0.60	Yes	62	3,844
449	TEMPERANCE	S/O	BUTLER	5303	12198	05303-12198	653	545	1.20	0.60	Yes	108	11,664
450	TEMPERANCE	N/O	CLINTON	2544	8360	02544-08360	663	663	1.00	0.60	Yes	0	0
451	TEMPERANCE	N/O	SHIELDS	2544	8386	02544-08386	1,125	214	5.26	0.60	No	911	829,921
452	THORNE	N/O	KEARNEY	2177	2831	02177-02831	128	176	0.73	0.60	Yes	-48	2,304
453	TRINITY	N/O	STANISLAUS	8412	8428	08412-08428	183	83	2.20	0.60	No	100	10,000
456	TULARE	E/O	41	4408	4640	04408-04640	1,509	2,410	0.63	0.26	No	-901	811,801
457	TULARE	E/O	CEDAR	2787	2788	02787-02788	1,521	1,023	1.49	0.37	No	498	248,004
458	TULARE	E/O	CHESTNUT	2791	5315	02791-05315	747	578	1.29	0.60	Yes	169	28,561
459	TULARE	E/O	E	5419	5421	05419-05421	214	244	0.88	0.60	Yes	-30	900
460	TULARE	E/O	N	3510	4610	03510-04610	1,340	769	1.74	0.60	No	571	326,041
461	TULARE	W/O	R	5253	5254	05253-05254	1,827	1,111	1.64	0.35	No	716	512,656
462	TULARE	E/O	U	4409	4638	04409-04638	2,150	1,737	1.24	0.30	Yes	413	170,569
464	U	S/O	MARIPOSA	4409	5250	04409-05250	505	284	1.78	0.60	No	221	48,841
465	U	N/O	TULARE	4409	5250	04409-05250	505	430	1.17	0.60	Yes	75	5,625
466	VALENTINE	S/O	ASHLAN	3254	12176	03254-12176	249	231	1.08	0.60	Yes	18	324
467	VALENTINE	S/O	BARSTOW	3563	3566	03563-03566	30	245	0.12	0.60	No	-215	46,225
468	VALENTINE	S/O	CALIFORNIA	2862	5137	02862-05137	181	48	3.77	0.60	No	133	17,689
469	VALENTINE	S/O	CLINTON	2563	3442	02563-03442	39	151	0.26	0.60	No	-112	12,544
470	VALENTINE	S/O	MCKINLEY	2660	3467	02660-03467	7	106	0.07	0.60	No	-99	9,801
471	VAN NESS	N/O	41	4467	6186	04467-06186	935	476	1.96	0.60	No	459	210,681
472	VAN NESS	S/O	CALIFORNIA	2875	2882	02875-02882	182	192	0.95	0.60	Yes	-10	100
474	VAN NESS	N/O	DIVISADERO	2778	2762	02778-02762	483	201	2.40	0.60	No	282	79,524
475	VAN NESS	S/O	FRESNO	3026	3494	03026-03494	473	673	0.70	0.60	Yes	-200	40,000
476	VAN NESS	N/O	HERNDON	2243	5043	02243-05043	591	303	1.95	0.60	No	288	82,944
477	VAN NESS	S/O	MCKINLEY	2645	2624	02645-02624	180	542	0.33	0.60	No	-362	131,044
478	VAN NESS	N/O	SAN JOAQUIN	3010	8406	03010-08406	459	503	0.91	0.60	Yes	-44	1,936
479	VAN NESS	N/O	SHAW	2988	4852	02988-04852	335	406	0.83	0.60	Yes	-71	5,041
480	VAN NESS	N/O	SIERRA	2268	3182	02268-03182	756	414	1.83	0.60	No	342	116,964
481	VAN NESS	N/O	STANISLAUS	3010	4393	03010-04393	427	543	0.79	0.60	Yes	-116	13,456
482	VAN NESS	N/O	STANISLAUS	3010	4393	03010-04393	427	526	0.81	0.60	Yes	-99	9,801
483	VAN NESS	S/O	VENTURA	2104	3037	02104-03037	888	674	1.32	0.60	Yes	214	45,796
484	VENTURA	W/O	41	2184	5256	02184-05256	1,523	1,215	1.25	0.33	Yes	308	94,864
485	VENTURA	E/O	E	2106	5424	02106-05424	1,303	965	1.35	0.60	Yes	338	114,244
487	VENTURA	E/O	H	5223	8554	05223-08554	1,660	1,087	1.53	0.36	No	573	328,329
489	VENTURA	E/O	MAYOR	3500	5497	03500-05497	409	367	1.11	0.60	Yes	42	1,764
490	VENTURA	E/O	P	2100	5255	02100-05255	1,520	1,076	1.41	0.36	No	444	197,136
491	VENTURA	E/O	VAN NESS	2103	2104	02103-02104	1,046	930	1.12	0.60	Yes	116	13,456
492	WALNUT	S/O	CALIFORNIA	3586	6751	03586-06751	160	275	0.58	0.60	Yes	-115	13,225
493	WALNUT	S/O	CHURCH	2886	5166	02886-05166	81	111	0.73	0.60	Yes	-30	900
495	WALNUT	S/O	GROVE	2915	5166	02915-05166	49	110	0.45	0.60	Yes	-61	3,721
497	WALNUT	N/O	JENSEN	2915	5166	02915-05166	49	174	0.28	0.60	No	-125	15,625
498	WALNUT	N/O	NORTH	2945	3027	02945-03027	27	16	1.69	0.60	No	11	121
500	WEBER	N/O	OLIVE	2667	2698	02667-02698	886	806	1.10	0.60	Yes	80	6,400
501	WEBER	E/O	VALENTINE	3268	5111	03268-05111	1,010	918	1.10	0.60	Yes	92	8,464
502	WEST	N/O	ASHLAN	2438	3214	02438-03214	1,933	1,418	1.36	0.31	No	515	265,225
504	WEST	S/O	CALIFORNIA	2865	3029	02865-03029	134	82	1.63	0.60	No	52	2,704
505	WEST	N/O	CLINTON	2569	3260	02569-03260	1,671	957	1.75	0.60	No	714	509,796
506	WEST	S/O	DAKOTA	2478	2499	02478-02499	1,495	1,388	1.08	0.32	Yes	107	11,449
507	WEST	N/O	GETTYSBURG	2401	3123	02401-03123	1,771	1,714	1.03	0.30	Yes	57	3,249

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared	
508	WEST	S/O	HERNDON	2244	3145	02244-03145	620	1,079	0.57	0.36	No	-459	210,681	
509	WEST	S/O	KEARNEY	2095	2829	02095-02829	81	148	0.55	0.60	Yes	-67	4,489	
510	WEST	N/O	MCKINLEY	2596	2617	02596-02617	1,387	981	1.41	0.60	Yes	406	164,836	
511	WEST	N/O	SANTA FE	2401	12298	02401-12298	1,766	1,418	1.25	0.31	Yes	348	121,104	
512	WEST	N/O	SHAW	4534	2010	04534-02010	3,451	1,481	2.33	0.31	No	1,970	3,880,900	
513	WEST	N/O	SIERRA	2269	3145	02269-03145	680	944	0.72	0.60	Yes	-264	69,696	
514	WEST	S/O	SIERRA	2269	3187	02269-03187	742	1,068	0.69	0.36	Yes	-326	106,276	
515	WHITES BRIDGE	E/O	WEST	2176	5754	02176-05754	131	240	0.55	0.60	Yes	-109	11,881	
516	WILLOW	S/O	CALIFORNIA	3534	3536	03534-03536	238	286	0.83	0.60	Yes	-48	2,304	
517	WILLOW	S/O	HERNDON	2254	5511	02254-05511	2,298	2,240	1.03	0.27	Yes	58	3,364	
518	WILLOW	N/O	SPRUCE	3100	3111	03100-03111	1,572	1,963	0.80	0.28	Yes	-391	152,881	
519	WILLOW	N/O	TEAGUE	3072	5468	03072-05468	848	1,687	0.50	0.30	No	-839	703,921	
520	WISHON	N/O	CLINTON	4352	4354	04352-04354	174	624	0.28	0.60	No	-450	202,500	
521	WISHON	N/O	FLORADORA	4355	4356	04355-04356	207	1,074	0.19	0.36	No	-867	751,689	
522	ELM AVE	S/O	CALIFORNIA	2120	6090	02120-06090	325	466	0.70	0.60	Yes	-141	19,881	
						Subtotal	**463,732**	**476,825**			**Model/Count Ratio =**	**0.97**	Targets	
											Percent Within Target Deviation =	**60%**	>75%	
											Percent Root Mean Square Error =	**46%**	<40%	
											Correlation Coefficient =	**0.88**	>0.88	

ATTACHMENT B

DMEIR Table 5.14-2
Roadway Functional Class and Peak Hour Level-of-Service Thresholds

It should be noted that this traditional methodology used to analyze the roadway system does not consider the potential impact on walking, bicycling, and transit. Pedestrians, bicyclists, and transit riders are all users of the roadway system but may not be fully recognized in the traffic operations analysis and the calculation of LOS. The LOS thresholds in Table 5.14-2 are based on driver's comfort and convenience. Identifying the need for roadway improvements based on the resulting roadway LOS can have unintended impacts to other modes such as increasing the walking time for pedestrians. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users.

Table 5.14-2: Roadway Functional Class and Peak Hour Level-of-Service Thresholds

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Threshold				
			A	B	C	D	E
Freeway	N/A[1]	4	2,720	4,460	6,630	7,720	8,630
		3+Aux[2]	2,360	3,860	5,640	6,730	7,530
		3	2,000	3,270	4,660	5,740	6,430
		2+Aux	1,650	2,700	3,850	4,760	5,340
		2	1,300	2,130	3,050	3,790	4,260
State Expressway	Divided	6	2,410	3,960	5,730	7,450	8,450
		4	1,610	2,650	3,810	4,960	5,630
		2	810	1,340	1,890	2,470	2,810
City Expressway	Raised Median	6			1,860	6,170	6,520
		5			1,520	5,110	5,430
		4			1,180	4,050	4,340
		2			520	1,910	2,160
Super Arterial	Raised Median	6				4,910	6,240
		5				4,040	5,195
		4				3,170	4,150
Arterial	Raised Median	8			2,120	7,070	7,490
		6			1,560	5,270	5,610
		5			1,280	4,370	4,670
		4			1,000	3,470	3,730
		3			720	2,555	2,795
		2			440	1,640	1,860
	TWLTL[3]	4			940	3,290	3,550
		2			420	1,550	1,760

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Threshold				
			A	B	C	D	E
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
Collector	TWLTL	4			940	3,290	3,550
		2			420	1,550	1,760
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
One-Way	Undivided	3		1,960	2,240	2,430	2,610
		2		1,250	1,490	1,620	1,740
		1		550	740	800	870
Rural State Highway	Undivided	2	310	570	1,020	1,730	2,470
Rural Arterial	Divided	4			1,950	3,580	3,780
	Undivided	2			570	1,230	1,310
Rural Collector/Local	Undivided	2			700	930	1,000

Notes:
[1] N/A - Not applicable for operational class
[2] Aux - Auxiliary Lane
[3] TWLTL – Two-way Left-turn Lane
- LOS is not achievable because of type of facility.
Source: Fehr & Peers 2012.

Exhibit 5.14-2 shows existing AM peak hour traffic volumes (two-way total) and LOS (See Appendix H-3 for detail) and Exhibit 5.14-3 shows existing PM peak hour traffic volumes (two-way total) and LOS (See Appendix H-4 for detail). Exhibit 5.14-4 illustrates the planned roadway number of lanes.

Most roadways operate at LOS D or better during the AM and PM peak hours, except for the following, which operate at LOS E and F:

City of Fresno

- Willow Avenue – Copper to Behymer Avenue (LOS E during the PM peak hour)
- Willow Avenue – Behymer Avenue to Shepherd Avenue (LOS F during the PM peak hour)
- Golden State Boulevard – Shaw Avenue to Swift Avenue (LOS F during the PM peak hour)
- Golden State Boulevard – Motel Drive to Ashlan Avenue (LOS E during the PM peak hour)
- Nees Avenue – Jordan Avenue to Paula Avenue (LOS E during the PM peak hour)
- Cornelia Avenue – Ashlan Avenue to Griffith Way (LOS E during the PM peak hour)
- Marks Avenue – Dakota Avenue to Weber Avenue (LOS E during the PM peak hour)
- Clinton Avenue – Valentine Avenue to Marks Avenue (LOS F during the PM peak hour)

Exhibit B
Final Baseline AQ Technical Review
10-07-14

7 October 2014
14213-00.02262

Ms. Carmen Borg
Shute, Mihaly, and Weinberger
396 Hayes Street
San Francisco, CA 94102

Subject: Review and Comment on Air Quality Analysis, City of Fresno General Plan and Development Code Update Draft Master Environmental Impact Report

Dear Ms. Borg:

At your request, BASELINE Environmental Consulting ("BASELINE") has reviewed the "Air Quality" section of the Draft Master Environmental Impact Report ("DMEIR") prepared for the City of Fresno's General Plan and Development Code Update ("General Plan Update"). BASELINE's review of the DMEIR specifically focused on the adequacy of the information presented to support the significance determinations for air quality impacts and the identification of feasible mitigation measures. This letter documents the results of our review.

1. Inadequate Analysis of Consistency with Applicable Air Quality Plans

Under Impact AIR-1, the DMEIR reports that the General Plan Update would have a less-than-significant impact on the implementation of applicable air quality plans (AQPs). The applicable AQPs adopted by the San Joaquin Valley Air Pollution Control District ("SJVAPCD") include the following:

- The 2004 *Extreme Ozone Attainment Demonstration Plan;*
- The *2007 Ozone Plan;*
- The *2007 PM10 Maintenance Plan and Request for Redesignation;*
- The *2008 PM2.5 Plan*;
- The *2012 PM2.5 Plan*; and
- The *2013 Plan for the Revoked 1-hour Ozone Standard.*

The DMEIR evaluated the significance of the General Plan Update's impact on implementing the applicable AQPs based on the following two criteria (DMEIR page 5.3-32):

1) If development proposed by the General Plan exceeds the growth projections used in the applicable attainment plan, it would produce a potentially significant impact; and
2) If the project includes goals, policies, and development standards that are in conflict with the development related control measures in the attainment plans, the project would be potentially significant.

On page 5.3-32, the DMEIR states compliance with criterion 1) as follows:

> *The growth projections used for the General Plan assume that growth in population, vehicle use and other source categories will occur at historically robust rates that are consistent with the rates used to develop the SJVAPCD's attainment plans.*

The DMEIR does not provide a summary of the quantified population, vehicle use, and other source category growth projections used in the six applicable AQPs or the General Plan Update. By not providing a comparison of the data, the consistency of the plan's growth projections with the applicable AQPs cannot be substantiated. Furthermore, MRO Engineers, Inc. has reported that the analysis of traffic growth projections used in the DMEIR are deficient, because the travel demand forecasting model used in the DMEIR was not properly calibrated to existing conditions. As a result, the future traffic growth estimates for the General Plan Update were underestimated. In addition, insufficient traffic model details were provided regarding how projected daily vehicle miles traveled (VMT) would increase.[1] An increase in traffic growth beyond the projections used in the applicable AQPs could result in a potentially significant impact. Therefore, the current analysis of the General Plan Update's consistency with growth projections used in the applicable AQPs is neither transparent nor adequate to support the finding of a less-than-significant impact.

On page 5.3-33, the DMEIR states compliance with criterion 2) as follows:

> *Review of the proposed goals and policies of the General Plan Update found them to be consistent with the applicable control measures of the SJVAPCD attainment plan.*

No evidence of the review process is documented to substantiate this opinion. There is no discussion of the primary goals and control measures contained in the six applicable AQPs and how they compare to the goals and policies of the General Plan Update. Therefore, the current analysis of the plan's consistency with control measures used in the applicable AQPs is inadequate.

2. Inadequate Analysis of Baseline and Forecasted Criteria Air Pollutant Emissions

Criteria air pollutant emissions for carbon monoxide ("CO"), sulfur dioxide ("SO2), ozone precursors, and particulate matter ("PM") are estimated under Impact AIR-2 and Impact AIR-3. The DMEIR estimated and forecasted annual emissions of CO, SO2, ozone precursors, and PM based on various models and inventories. The ozone precursors included reactive organic gases ("ROG") and nitrogen oxides ("NOx"). There are two fractions of PM emissions that are regulated based on aerodynamic resistance, diameters equal to or less than 10 microns (PM10) and 2.5 microns (PM2.5). As summarized in Tables 5.3-7 and 5.3-9 (DMEIR pages 5.3-36 and 5.3-42, respectively), baseline emissions of criteria pollutants from 2010

[1] MRO Engineers, Inc., 2014. *Review of "Transportation and Traffic" Analysis – Draft Master Environmental Impact Report General Plan and Development Code Update City of Fresno, Fresno County, California*. 10 September.

and future emissions under the General Plan Update were estimated for stationary, area, mobile (on-road and off-road vehicles), electricity, and natural gas sources.

The 2010 baseline estimates of pollutant emissions in the DMEIR were reviewed by comparing the total emissions from all sources to similar estimates provided by the California Air Resources Board ("CARB") in the 2013 edition of *The California Almanac of Emissions and Air Quality.* Each year, CARB publishes a new Almanac that summarizes existing criteria pollutant emissions trends in each county and forecasts emissions from all stationary (including fuel combustion), area, and mobile sources. The forecasts take into account the most recent emissions data, projected growth rates, and future adopted control measures to estimate emissions in future years. The CARB's California Emissions Projection Analysis Model ("CEPAM") was used to extract the 2010 emissions for Fresno County from the current Almanac for stationary, area, and mobile sources.

According to CEPAM for the 2013 Almanac, the 2010 total annual emissions of ROG from stationary, area[2], and mobile sources in Fresno County was about 20,200 tons. Since the City of Fresno's Planning Area represents about 60% of the County's population (DMEIR page 5.3-40), approximately 12,000 tons of ROG emissions could potentially be attributed to the City of Fresno. This estimate of ROG emissions is about four times greater than the 2010 baseline estimate of 3,105 tons reported in Table 5.3-9 (DMEIR page 5.3-42). This major discrepancy indicates that significant deficiencies are likely present in the methods applied by the preparers of the DMEIR to estimate the baseline pollutant emissions. These potential deficiencies are described under Section 3, below.

The estimates of future emissions in the DMEIR are not representative of the changes in emissions that would result from the proposed land uses changes in the General Plan Update. With the exception of emissions from on-road mobile vehicles, forecasted emissions are based on population growth estimates that are independent of the General Plan Update (i.e., the population growth estimates would be the same without the General Plan Update). For instance, there is not evaluation of how changing existing General Industrial (M-2) Zone to a Heavy Industrial (IH) Zone under the General Plan Update will change the net emissions of criteria pollutants in the City. As a result, the forecast of criteria pollutant emissions is not representative of the General Plan Update and the air quality analysis is incomplete.

3. Deficient Modeling Techniques Applied to Estimate Criteria Air Pollutant Emissions

In addition to the inadequate analysis of both baseline and forecasted criteria pollutant emissions discussed in Section 2, above, there are apparent deficiencies in the modeling techniques applied to estimate the criteria pollutant emissions in the DMEIR. These potential deficiencies are further described below for each air pollutant source.

3.1 Construction Emissions

Estimates of "worst-case" annual pollutant emissions from construction activities under the General Plan Update are summarized on DMEIR page 5.3-40 based on an inventory of 2008 emissions

[2] Emissions from farming operations were excluded from the area-source estimate, because the land use is not representative of the City of Fresno.

reported in the CARB's 2009 edition of *The California Almanac of Emissions and Air Quality.* As discussed above, the current Almanac is from 2013 and the CARB's CEPAM provides forecasts of pollutant emissions based on the current Almanac. According to CEPAM for the 2013 Almanac, the "worst-case" construction emissions of ROG would be about 1,500 tons per year, which is almost two times greater than the estimate of 812.6 tons per year reported in in the DMEIR (Table 5.3-8, page 5.3-40). Therefore, the current analysis of construction-related pollutant emissions in the DMEIR fails to analyze the worst-case scenario.

3.2 On-Road Motor Vehicle Emissions

Pollutant emissions from on-road motor vehicles were estimated by the preparers of the DMEIR using emission factors from the CARB's EMFAC2011 model and the DMEIR's traffic analysis data. As described above, the traffic analysis for the DMEIR underestimated future increases in VMT.[3] Therefore, the DMEIR's estimates of pollutant emissions from on-road motor vehicles are underestimated.

3.3 Electricity and Natural Gas Emissions

Pollutant emissions from electricity and natural gas were estimated by the preparers of the DMEIR using 2010 emission data reported by PG&E for residential and commercial properties and then projecting future emissions based on population growth. The emissions from industrial properties were not included in the analysis; therefore, the analysis is incomplete.

3.4 Stationary and Area Source Emissions

The preparers of the DMEIR combined estimates of pollutant emissions from stationary and area sources by using the CARB's CEIDARS database. However, emissions reported from the CEIDARS database are only representative of individual facilities and do not include most area sources, such as natural gas combustion from heating. In addition, the CEIDARS database does not include inventories of PM2.5 emissions, which were excluded from the air quality analysis.

The preparers of the DMEIR did not forecast future changes in pollutant emissions from stationary and area sources. Instead, the 2010 emissions reported from the CEIDARS database were assumed to remain constant over time because "*it would be impossible to predict if the emissions would increase or decrease in the future*"[4]. The CEIDARS database includes consecutive annual inventories of pollutant emissions from individual facilities in the City of Fresno from 1995 to 2012, which could be used to evaluate existing trends. However, no historical emission data or trend analysis was provided to support the opinion that forecasting emissions is impossible.

As discussed above, the CARB's CEPAM for the 2013 Almanac provides forecasts out to 2035 of pollutant emissions from stationary and area sources, including the emissions of PM2.5. For instance, emissions of PM2.5 from stationary sources between 2010 and 2035 are forecasted to steadily increase at a rate of about 7.2 tons per year. Based on the existing trends and forecasts of

[3] *Ibid*.

[4] Note at the bottom of DMEIR summary tables 5.3-7 and 5.3-9, on pages 5.3-36 and 5.3-42, respectively.

pollutant emissions provided by CARB, the DMEIR's assumption that pollutant emissions from stationary and areas sources cannot be analyzed is invalid and the current analysis of stationary and area source pollutant emissions is substantially inadequate.

4. Invalid Application of Project-Level Thresholds of Significance

The DMEIR used the project-level thresholds of significance adopted by the SJVAPCD in the *Guide for Assessing and Mitigating Air Quality Impacts* ("GAMAQI") to evaluate the significance of estimated ROG, NOx, PM10, and PM2.5 emissions from construction and operation under the General Plan Update. As described on DMEIR page 5.3-38, the project-level thresholds of significance were used because "*no other quantitative plan level thresholds have been adopted*". The use of project-level thresholds does not provide any meaningful context to evaluate the total pollutant emissions estimated for all existing and future projects under the General Plan Update. As summarized in Table 5.3-9 on page 5.3-42, the estimated emissions of criteria pollutants from all sources in the City of Fresno are one to two orders of magnitude greater than project-level thresholds, which further emphasizes the misuse of these thresholds to properly evaluate the scale and severity of emissions. Therefore, the use of project-level thresholds to evaluate the significance of ROG, NOx, PM10, and PM2.5 emissions in the DMEIR is invalid.

Since the GAMAQI does not provide guidance for evaluating the significance of criteria pollutant emissions for plans, the SJVAPCD should be consulted to determine an appropriate approach to analysis. For consideration, the Bay Area Air Quality Management District ("BAAQMD") has recommended[5] the following thresholds of significance[6] to evaluate operational-related criteria pollutants emissions for plans:

- Consistency with current AQP control measures; and
- A proposed plan's projected VMT or vehicle trips (either measure may be used) increase is less than or equal to its projected population increase.

As discussed above, the DMEIR has not adequately analyzed the General Plan Update's consistency with applicable AQP control measures and the traffic analysis has underestimated the increase in VMT. Therefore, the evaluation of ROG, NOx, PM10, and PM2.5 emissions in the DMEIR relative to the BAAQMD's recommended criteria remains inadequate.

[5] BAAQMD, 2010. *California Environmental Quality Act Air Quality Guidelines*. May.

[6] On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA before adopting the 2010 thresholds of significance, because the thresholds are considered a "project" subject to CEQA review. The court issued a writ of mandate ordering BAAQMD to set aside and cease dissemination of the adopted 2010 thresholds until approved under CEQA. In view of the court's order, the BAAQMD updated the *CEQA Air Quality Guidelines* in 2012 to exclude the recommended use of the 2010 thresholds for CEQA analysis. On August 13, 2013, the California First Appellate District Court of Appeal reversed the trial court's decision by finding that the adoption of the 2010 thresholds was not itself a "project" requiring CEQA review. Since the adoption process and scientific soundness of the 2010 thresholds of significance have not been challenged, the thresholds provide a meaningful context to evaluate air quality impacts.

5. Inadequate Evaluation of Feasible Mitigation Measures

Under Impact AIR-3, the DMEIR reports that the General Plan Update would have a significant impact on ambient air quality standards from the cumulative emissions of ozone precursors and PM. On page 5.3-50, the DMEIR states the following:

> *No mitigation measures beyond the General Plan policies, ordinances, and regulations are available to further reduce this impact*.

While the DMEIR provides a brief summary of applicable General Plan Update policies on Page 5.3-48, there is no evaluation of how effectively these policies would lessen the significance of the air quality impact. The SJVAPCD's GAMAQI recommends incorporating as many of the policies from the SJVAPCD's *Air Quality Guidelines for General Plans* (AQGGP) into a General Plan as possible. The AQGGP, which was adopted in 1994 and amended in 2005, is a guidance document that contains 75 examples of policies that the cities can directly incorporate into their General Plan. While many of the policies from the AQGGP were incorporated into the 2009 Air Quality Update of the 2025 Fresno General Plan Resources Conservation Element, there is no discussion in the DMEIR regarding the adequacy of the General Plan Update policies to incorporate remaining policies from the AQGGP.

The SJVAPCD's GAMAQI also recommends evaluating plan-level mitigation measures by quantifying the reductions that would result in mobile and area source emissions. There is no discussion or quantification in the DMEIR of how applicable policies would reduce air quality impacts. Since the adequacy of the General Plan Update policies relative to the AQGGP was not evaluated and the potential effect of policies on reducing air quality impacts was not quantified, the evaluation of feasible mitigation measures in the DMEIR is deficient.

6. Inadequate Analysis of Air Quality Impacts to Sensitive Receptors

The DMEIR does not provide an analysis of local community risks from air quality impacts relative to land use changes proposed under the General Plan Update. The location of existing sources of toxic air contaminants ("TACs") (e.g., freeways and gasoline dispensing facilities) are not mapped or evaluated to determine if proposed land use changes under the General Plan Update could potentially increase the exposure of sensitive receptors to TAC sources. As summarized in DMEIR Table 5.3-5, CARB recommends siting new sensitive land uses up to 1,000 feet away from TAC sources. The CARB's recommended setback distances can be used to evaluate if land uses changes under the General Plan Update would result in an increase exposure of sensitive receptors to existing TAC sources.

The SJVAPCD's GAMAQI recommends that General Plans identify intersections and corridors requiring CO hot spot analysis based on the results of the traffic analysis. A CO hot spot analysis includes the quantification of CO emissions and modeling of air dispersion to assess health risks to nearby receptors. The DMEIR does not include any evaluation of local CO impacts on sensitive receptors.

Based on the absence of an analysis of TAC and CO impacts on local communities relative to land use changes in the General Plan Update, the DMEIR analysis of air quality impacts to sensitive receptors is deficient.

7. Conclusions

Our review of the Air Quality section of the DMEIR identified inadequate analysis of feasible mitigation measures and impacts on applicable AQPs, ambient air quality standards, and sensitive receptors. Our review also identified the inappropriate use of project-level thresholds of significance to evaluate air quality impacts under the General Plan Update. These issues should be resolved prior to the City of Fresno's approval of the proposed General Plan Update.

Should you have any questions or comments, please contact us at your convenience.

Sincerely,

Patrick Sutton
Environmental Engineer

631386.1

Exhibit C
PM 2.5 Fact Sheet

Fact Sheet

$PM_{2.5}$ Designations under the Clean Air Act

Common Sources of $PM_{2.5}$

Woodstoves

Photo Credit: WA Dept. of Ecology

Woodstoves are a primary source of $PM_{2.5}$, especially when wood is burned improperly or in uncertified devices. Control measures include public education for proper burning and woodstove changeout programs to replace outdated stoves.

Garbage & Open Burning

Burning trash is a dangerous and localized source of $PM_{2.5}$ which is especially dangerous to elders, children, pregnant women and people with respiratory or heart disease. Control measures include recycling and safe disposal of waste in a landfill.

Field, Forest & Rangeland Burning

Photo credit: Nez Perce Tribe

Large scale burns are major sources of $PM_{2.5}$, especially in areas where air pollution is trapped by topography or weather conditions, Control measures include airshed-wide monitoring for $PM_{2.5}$, phased burns, burn bans or "no burn" days, burn permits and other methods to ensure air quality conditions allow burning.

Mobile Sources / Diesel

Emissions from mobile sources such as cars trucks, tractors and train engines are significant sources of particulate matter and air toxics. Control measures include diesel retrofits, use of low sulfur fuel and educational outreach campaigns to encourage less driving and idling.

Stationary Sources

Industrial activities are an additional source of $PM_{2.5}$, but actually are a smaller contributor to high $PM_{2.5}$ levels across Region 10 compared with woodsmoke or field or forest burning.

What is $PM_{2.5}$?

$PM_{2.5}$ is particulate matter less than 2.5 microns in diameter composed of very small bits of ash, wood tars, soot and other substances created by combustion. To give you a sense for how tiny this is, the period at the end of this sentence is about 500 microns across. $PM_{2.5}$ particles are so small that they can evade the body's natural defense mechanisms and penetrate deep into lung tissue. The $PM_{2.5}$ particles can damage lung tissue, which can lead to serious respiratory problems. In 2006, EPA lowered the 24-hour fine particle standard from 65 micrograms per cubic meter $\mu g/m^3$) to 35 $\mu g/m^3$ to provide greater protection to public health from exposure to fine particles.

What are important sources of $PM_{2.5}$ in the Northwest and Alaska?

During the winter, when $PM_{2.5}$ levels are highest, key contributors in the Northwest and Alaska include burning of wood in woodstoves and fireplaces. During the summer, spring and fall, open burning, which has long been used as a waste disposal practice and as a management tool for croplands, rangelands, and forests, is a key source of $PM_{2.5}$. In addition, mobile sources and stationary sources can contribute to $PM_{2.5}$ levels.

What are $PM_{2.5}$ designations?

When EPA revises a standard, we are then required to designate all geographic areas within the United States as attainment, unclassifiable, or nonattainment under Section 107 of the Clean Air Act (CAA). Designating an area under the CAA is accomplished through a formal rulemaking process outlined in Section 107(d) of the Act. If an area does not meet the national standard for $PM_{2.5}$, an area will be designated as nonattainment. Attainment areas are areas that meet the standard, and unclassifiable areas are areas that cannot be classified on the basis of available information as meeting or not meeting the standard.

Which areas are subject to EPA's designations?

EPA will be making designations for all areas in the country, both for state lands and for Indian country. Under the process set out in the Clean Air Act, only states are required to submit recommendations for designations to EPA December 18, 2007.

How can tribes participate in the designations process?

Unlike states, tribes are not obligated to submit designation recommendations but are invited to participate in the designations process by submitting a designation recommendation for Indian country and/or by engaging in formal or informal consultation with EPA and states. Tribal consultation is important part of the designations process. Through consultation EPA can gather important information from tribes about designations of areas in Indian country or adjacent state land. Tribes can also through consultation, learn about state plans to prepare their recommendations for designation of lands which may surround Indian country.

What is the timeline for $PM_{2.5}$ designations?

December 18, 2006 - $PM_{2.5}$ standard strengthened.

Summer 2007 – EPA sends letters to states/tribes asking for designation recommendations and inviting consultation.

December 18, 2007 – States' designation recommendations are due to EPA. Tribes requested to send by this date.

August 2008 – EPA will send letters to states/tribes announcing whether or not we agree with their designation recommendations and to all areas that did not send letters announcing our proposed designation for their area.

August/Sept 2008 – EPA will open a 30 day public comment period on EPA's response to states/tribes recommendations.

December 18, 2008 – By this date EPA will issue final designations for all areas.

March 2012 - State attainment plans are due for state areas designated as nonattainment for $PM_{2.5}$.

What are the requirements for state or tribal areas that have been designated unclassifiable for $PM_{2.5}$?

An unclassifiable designation does not trigger any additional requirements for states/tribes. Existing requirements (Prevention of Significant Deterioration, FARR, etc.) do not change as a result of this designation.

What are the requirements for state or tribal areas that have been designated attainment?

An attainment designation does not trigger any additional requirements for states/tribes. Existing requirements (Prevention of Significant Deterioration, FARR, etc.) do not change as a result of this designation.

What are the requirements for state or tribal areas that have been designated nonattainment?

States with nonattainment areas are required to develop and submit plans to show how they will attain the $PM_{2.5}$ standard as expeditiously as possible. These plans are referred to as State Implementation Plans or SIPs. These plans are due in 2012 and should contain regulations and technical justification for how those regulations will result in attainment in the future. In addition, states are required to meet the standard within 5-10 years of the submittal of the attainment plan (or attainment SIP). Tribes with areas of Indian country adjacent to state nonattainment areas should work with states as they develop these plans. Tribes with nonattainment areas are not required to follow a specific timeline for submitting plans and attaining the standard but EPA encourages tribes to work with EPA to take appropriate actions to reduce $PM_{2.5}$ emissions.

What are the requirements for tribal stationary sources located in $PM_{2.5}$ nonattainment areas?

New and modified major sources must utilize control technologies that achieve the lowest emissions possible and must offset their increased emissions with reductions from existing sources. Existing sources must employ reasonable controls. Stationary sources may be required to reduce emissions further in order to attain the $PM_{2.5}$ standard.

Where can the public get more information about $PM_{2.5}$ designations?

Visit the EPA website http://epa.gov/pmdesignations or contact Krishna Viswanathan (206-553-2684) or Gina Bonifacino (206-553-2970) at the Regional Office.

Exhibit D
CARB Final Air Quality and Land Use Handbook

AIR QUALITY AND LAND USE HANDBOOK: A COMMUNITY HEALTH PERSPECTIVE

April 2005

California Environmental Protection Agency
California Air Resources Board

Air Agency Contacts

Federal-

U.S. EPA, Region 9
Phone: (866)-EPA-WEST
Website: www.epa.gov/region09
Email: r9.info@epa.gov

-State-

California Air Resources Board
Phone: (916) 322-2990 (public info)
(800) 363-7664 (public info)
(800) 952-5588 (complaints)
(866)-397-5462 (env. justice)
Website: www.arb.ca.gov
Email: helpline@arb.ca.gov

-Local-

Amador County APCD
Phone: (209) 257-0112
Website: www.amadorapcd.org
E-Mail: jharris@amadorapcd.org

Antelope Valley AQMD
Phone: (661) 723-8070
Complaint Line: (888) 732-8070
Website: www.avaqmd.ca.gov
E-Mail: bbanks@avaqmd.ca.gov

Bay Area AQMD
Phone: (415) 749-5000
Complaint Line: (800) 334-6367
Website: www.baaqmd.gov
E-Mail: webmaster@baaqmd.gov

Butte County AQMD
Phone: (530) 891-2882
Website: www.bcaqmd.org
E-Mail: air@bcaqmd.org

Calaveras County APCD
Phone: (209) 754-6504
E-Mail: lgrewal@co.calaveras.ca.us

Colusa County APCD
Phone: (530) 458-0590
Website: www.colusanet.com/apcd
E-Mail: ccair@colusanet.com

El Dorado County AQMD
Phone: (530) 621-6662
Website:
www.co.el-dorado.ca.us/emd/apcd
E-Mail: mcctaggart@co.el-dorado.ca.us

Feather River AQMD
Phone: (530) 634-7659
Website: www.fraqmd.org
E-Mail: fraqmd@fraqmd.org

Glenn County APCD
Phone: (530) 934-6500
http://www.countyofglenn.net/air_pollution_control
E-Mail: ktokunaga@countyofglenn.net

Great Basin Unified APCD
Phone: (760) 872-8211
Website: www.gbuapcd.org
E-Mail: gb1@greatbasinapcd.org

Imperial County APCD
Phone: (760) 482-4606
E-Mail: reyesromero@imperialcounty.net

Kern County APCD
Phone: (661) 862-5250
Website: www.kernair.org
E-Mail: kcapcd@co.kern.ca.us

Lake County AQMD
Phone: (707) 263-7000
Website: www.lcaqmd.net
E-Mail: bobr@pacific.net

Lassen County APCD
Phone: (530) 251-8110
E-Mail: lassenag@psln.com

Mariposa County APCD
Phone: (209) 966-2220
E-Mail: air@mariposacounty.org

Mendocino County AQMD
Phone: (707) 463-4354
Website:
www.co.mendocino.ca.us/aqmd
E-Mail:
mcaqmd@co.mendocino.ca.us

Modoc County APCD
Phone: (530) 233-6419
E-Mail: modapcd@hdo.net

Mojave Desert AQMD
Phone: (760) 245-1661
(800) 635-4617
Website: www.mdaqmd.ca.gov

Monterey Bay Unified APCD
Phone: (831) 647-9411
(800) 253-6028 (Complaints)
Website: www.mbuapcd.org
E-Mail: dquetin@mbuapcd.org

North Coast Unified AQMD
Phone: (707) 443-3093
Website: www.ncuaqmd.org
E-Mail: lawrence@ncuaqmd.org

Northern Sierra AQMD
Phone: (530) 274-9360
Website: www.myairdistrict.com
E-Mail: office@myairdistrict.com

Northern Sonoma County APCD
Phone: (707) 433-5911
E-Mail: nsc@sonic.net

Placer County APCD
Phone: (530) 889-7130
Website:
http://www.placer.ca.gov/airpollution/airpolut.htm
E-Mail: pcapcd@placer.ca.gov

Sacramento Metro AQMD
Phone: (916) 874-4800
Website: www.airquality.org
E-Mail: kshearer@airquality.org

San Diego County APCD
Phone: (858) 650-4700
Website: www.sdapcd.org

San Joaquin Valley APCD
Phone: (559) 230-6000 (General)
(800) 281-7003
(San Joaquin, Stanislaus, Merced)
(800) 870-1037
(Madera, Fresno, Kings)
(800) 926-5550
(Tulare and Valley portion of Kern)
Website: www.valleyair.org
E-Mail: sjvapcd@valleyair.org

San Luis Obispo County APCD
Phone: (805) 781-5912
Website: www.slocleanair.org
E-Mail: info@slocleanair.org

Santa Barbara County APCD
Phone (805) 961-8800
Website: www.sbcapcd.org
Email us: apcd@sbcapcd.org

Shasta County AQMD
Phone: (530) 225-5789
Website:
www.co.shasta.ca.us/Departments/Resourcemgmt/drm/aqmain.htm
E-Mail: scdrm@snowcrest.net

Siskiyou County APCD
Phone: (530) 841-4029
E-Mail: ebeck@siskiyou.ca.us

South Coast AQMD
Phone: (909) 396-2000
Complaint Line: 1-800-CUT-SMOG
Website: www.aqmd.gov
Email: bwallerstein@aqmd.gov

Tehama County APCD
Phone: (530) 527-3717
Website: www.tehcoapcd.net
Email: general@tehcoapcd.net

Tuolumne County APCD
Phone: (209) 533-5693
E-Mail:
bsandman@co.tuolumne.ca.us

Ventura County APCD
Phone: (805) 645-1400
Complaint Line: (805) 654-2797
Website: www.vcapcd.org
E-Mail: info@vcapcd.org

Yolo-Solano AQMD
Phone: (530) 757-3650
Website: www.ysaqmd.org
Email: administration@ysaqmd.org

To My Local Government Colleagues....

I am pleased to introduce this informational guide to air quality and land use issues focused on community health. As a former county supervisor, I know from experience the complexity of local land use decisions. There are multiple factors to consider and balance. This document provides important public health information that we hope will be considered along with housing needs, economic development priorities, and other quality of life issues.

An important focus of this document is prevention. We hope the air quality information provided will help inform decision-makers about the benefits of avoiding certain siting situations. The overarching goal is to avoid placing people in harm's way. Recent studies have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. What is encouraging is that the health risk is greatly reduced with distance. For that reason, we have provided some general recommendations aimed at keeping appropriate distances between sources of air pollution and land uses such as residences.

Land use decisions are a local government responsibility. The Air Resources Board's role is advisory and these recommendations do not establish regulatory standards of any kind. However, we hope that the information in this document will be seriously considered by local elected officials and land use agencies. We also hope that this document will promote enhanced communication between land use agencies and local air pollution control agencies. We developed this document in close coordination with the California Air Pollution Control Officers Association with that goal in mind.

I hope you find this document both informative and useful.

Barbara Riordan

Mrs. Barbara Riordan
Interim Chairman
California Air Resources Board

TABLE OF CONTENTS

EXECUTIVE SUMMARY **ES-1**

1. ARB RECOMMENDATIONS ON SITING NEW SENSITIVE LAND USES **1**

Freeways and High Traffic Roads 8

Distribution Centers 11

Rail Yards 15

Ports 19

Petroleum Refineries 21

Chrome Plating Operations 23

Dry Cleaners Using Perchloroethylene (Perc Dry Cleaners) 27

Gasoline Dispensing Facilities 30

Other Facility Types that Emit Air Pollutants of Concern 32

Potential Sources of Odor and Dust Complaints 32

2. HANDBOOK DEVELOPMENT **35**

3. KEY COMMUNITY FOCUSED ISSUES LAND USE AGENCIES SHOULD CONSIDER **38**

Incompatible Land Uses 38

Cumulative Air Pollution Impacts 39

4. MECHANISMS FOR INTEGRATING LOCALIZED AIR QUALITY CONCERNS INTO LAND USE PROCESSES **40**

General Plans 41

Zoning 42

Land Use Permitting Processes 43

Outreach to Other Agencies 51

5. AVAILABLE TOOLS TO EVALUATE CUMULATIVE AIR POLLUTION EMISSIONS AND RISK **53**

6. ARB PROGRAMS TO REDUCE AIR POLLUTION IN COMMUNITIES **55**

7. WAYS TO ENHANCE MEANINGFUL PUBLIC PARTICIPATION **58**

APPENDICES

Appendix A Land Use Classifications And Associated Facility Categories That Could Emit Air Pollutants

Appendix B Land Use-Based Reference Tools To Evaluate New Projects For Potential Air Pollution Impacts

Appendix C ARB And Local Air District Information And Tools Concerning Cumulative Air Pollution Impacts

Appendix D Land Use And Air Quality Agency Roles In The Land Use Process

Appendix E Special Processes That Apply To School Siting

Appendix F General Processes Used By Land Use Agencies To Address Air Pollution Impacts

Appendix G Glossary Of Key Air Pollution Terms

Acknowledgments

The ARB staff would like to acknowledge the exceptional contributions made to this document by members of the ARB Environmental Justice Stakeholders Group. Since 2001, ARB staff has consistently relied on this group to provide critical and constructive input on implementing the specifics of ARB's environmental justice policies and actions. The Stakeholders Group is convened by the ARB, and comprised of representatives from local land use and air agencies, community interest groups, environmental justice organizations, academia, and business. Their assistance and suggestions throughout the development of this Handbook have been invaluable.

Executive Summary

The Air Resources Board's (ARB) primary goal in developing this document is to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of air pollution. Recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. Other studies have shown that diesel exhaust and other cancer-causing chemicals emitted from cars and trucks are responsible for much of the overall cancer risk from airborne toxics in California. Also, ARB community health risk assessments and regulatory programs have produced important air quality information about certain types of facilities that should be considered when siting new residences, schools, day care centers, playgrounds, and medical facilities (i.e., sensitive land uses). Sensitive land uses deserve special attention because children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the non-cancer effects of air pollution. There is also substantial evidence that children are more sensitive to cancer-causing chemicals.

Focusing attention on these siting situations is an important preventative action. ARB and local air districts have comprehensive efforts underway to address new and existing air pollution sources under their respective jurisdictions. The issue of siting is a local government function. As more data on the connection between proximity and health risk from air pollution become available, it is essential that air agencies share what we know with land use agencies. We hope this document will serve that purpose.

The first section provides ARB recommendations regarding the siting of new sensitive land uses near freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline dispensing facilities. This list consists of the air pollution sources that we have evaluated from the standpoint of the proximity issue. It is based on available information and reflects ARB's primary areas of jurisdiction – mobile sources and toxic air contaminants. A key air pollutant common to many of these sources is particulate matter from diesel engines. Diesel particulate matter (diesel PM) is a carcinogen identified by ARB as a toxic air contaminant and contributes to particulate pollution statewide.

Reducing diesel particulate emissions is one of ARB's highest public health priorities and the focus of a comprehensive statewide control program that is reducing diesel PM emissions each year. ARB's long-term goal is to reduce diesel PM emissions 85% by 2020. However, cleaning up diesel engines will take time as new engine standards phase in and programs to accelerate fleet turnover or retrofit existing engines are implemented. Also, these efforts are reducing diesel particulate emissions on a statewide basis, but do not yet capture every site where diesel vehicles and engines may congregate. Because living or going to school too close to such air pollution sources may increase both cancer and non-cancer health risks, we are recommending that proximity be considered in the siting of new sensitive land uses.

There are also other key toxic air contaminants associated with specific types of facilities. Most of these are subject to stringent state and local air district regulations. However, what we know today indicates that keeping new homes and other sensitive land uses from siting too close to such facilities would provide additional health protection. Chrome platers are a prime example of facilities that should not be located near vulnerable communities because of the cancer health risks from exposure to the toxic material used during their operations.

In addition to source specific recommendations, we also encourage land use agencies to use their planning processes to ensure the appropriate separation of industrial facilities and sensitive land uses. While we provide some suggestions, how to best achieve that goal is a local issue. In the development of these guidelines, we received valuable input from local government about the spectrum of issues that must be considered in the land use planning process. This includes addressing housing and transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. All of these factors are important considerations. The recommendations in the Handbook need to be balanced with other State and local policies.

Our purpose with this document is to highlight the potential health impacts associated with proximity to air pollution sources so planners explicitly consider this issue in planning processes. We believe that with careful evaluation, infill development, mixed use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level. One suggestion for achieving this goal is more communication between air agencies and land use planners. Local air districts are an important resource that should be consulted regarding sources of air pollution in their jurisdictions. ARB staff will also continue to provide updated technical information as it becomes available.

Our recommendations are as specific as possible given the nature of the available data. In some cases, like refineries, we suggest that the siting of new sensitive land uses should be avoided immediately downwind. However, we leave definition of the size of this area to local agencies based on facility specific considerations. Also, project design that would reduce air pollution exposure may be part of the picture and we encourage consultation with air agencies on this subject.

In developing the recommendations, our first consideration was the adequacy of the data available for an air pollution source category. Using that data, we assessed whether we could reasonably characterize the relative exposure and health risk from a proximity standpoint. That screening provided the list of air pollution sources that we were able to address with specific recommendations. We also considered the practical implications of making hard and fast recommendations where the potential impact area is large, emissions will be reduced with time, and air agencies are in the process of looking at options for additional emission control. In the end, we tailored our recommendations to minimize the highest exposures for each source category independently. Due to the large variability in relative risk in the source categories, we chose not to apply

a uniform, quantified risk threshold as is typically done in air quality permitting programs. Instead, because these guidelines are not regulatory or binding on local agencies, we took a more qualitative approach in developing the distance-based recommendations.

Where possible, we recommend a minimum separation between a new sensitive land use and known air pollution risks. In other cases, we acknowledge that the existing health risk is too high in a relatively large area, that air agencies are working to reduce that risk, and that in the meantime, we recommend keeping new sensitive land uses out of the highest exposure areas. However, it is critical to note that our implied identification of the high exposure areas for these sources does not mean that the risk in the remaining impact area is insignificant. Rather, we hope this document will bring further attention to the potential health risk throughout the impact area and help garner support for our ongoing efforts to reduce health risk associated with air pollution sources. Areas downwind of major ports, rail yards, and other inter-modal transportation facilities are prime examples.

We developed these recommendations as a means to share important public health information. The underlying data are publicly available and referenced in this document. We also describe our rationale and the factors considered in developing each recommendation, including data limitations and uncertainties. These recommendations are advisory and should not be interpreted as defined "buffer zones." We recognize the opportunity for more detailed site-specific analyses always exists, and that there is no "one size fits all" solution to land use planning.

As California continues to grow, we collectively have the opportunity to use all the information at hand to avoid siting scenarios that may pose a health risk. As part of ARB's focus on communities and children's health, we encourage land use agencies to apply these recommendations and work more closely with air agencies. We also hope that this document will help educate a wider audience about the value of preventative action to reduce environmental exposures to air pollution.

1. ARB Recommendations on Siting New Sensitive Land Uses

Protecting California's communities and our children from the health effects of air pollution is one of the most fundamental goals of state and local air pollution control programs. Our focus on children reflects their special vulnerability to the health impacts of air pollution. Other vulnerable populations include the elderly, pregnant women, and those with serious health problems affected by air pollution. With this document, we hope to more effectively engage local land use agencies as partners in our efforts to reduce health risk from air pollution in all California communities.

Later sections emphasize the need to strengthen the connection between air quality and land use in both planning and permitting processes. Because the siting process for many, but not all air pollution sources involves permitting by local air districts, there is an opportunity for interagency coordination where the proposed location might pose a problem. To enhance the evaluation process from a land use perspective, section 4 includes recommended project related questions to help screen for potential proximity related issues.

Unlike industrial and other stationary sources of air pollution, the siting of new homes or day care centers does not require an air quality permit. Because these situations fall outside the air quality permitting process, it is especially important that land use agencies be aware of potential air pollution impacts.

The following recommendations address the issue of siting "sensitive land uses" near specific sources of air pollution; namely:

- High traffic freeways and roads
- Distribution centers
- Rail yards
- Ports
- Refineries
- Chrome plating facilities
- Dry cleaners
- Large gas dispensing facilities

The recommendations for each category include a summary of key information and guidance on what to avoid from a public health perspective.

Sensitive individuals refer to those segments of the population most susceptible to poor air quality (i.e., children, the elderly, and those with pre-existing serious health problems affected by air quality). Land uses where sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses).

We are characterizing sensitive land uses as simply as we can by using the example of residences, schools, day care centers, playgrounds, and medical facilities. However, a variety of facilities are encompassed. For example, residences can include houses, apartments, and senior living complexes. Medical facilities can include hospitals, convalescent homes, and health clinics. Playgrounds could be play areas associated with parks or community centers.

In developing these recommendations, ARB first considered the adequacy of the data available for each air pollution source category. We assessed whether we could generally characterize the relative exposure and health risk from a proximity standpoint. The documented non-cancer health risks include triggering of asthma attacks, heart attacks, and increases in daily mortality and hospitalization for heart and respiratory diseases. These health impacts are well documented in epidemiological studies, but less easy to quantify from a particular air pollution source. Therefore, the cancer health impacts are used in this document to provide a picture of relative risk. This screening process provided the list of source categories we were able to address with specific recommendations. In evaluating the available information, we also considered the practical implications of making hard and fast recommendations where the potential impact area is large, emissions will be reduced with time, and air agencies are in the process of looking at options for additional emission control. Due to the large variability in relative risk between the source categories, we chose not to apply a uniform, quantified risk threshold as is typically done in regulatory programs. Therefore, in the end, we tailored our recommendations to minimize the highest exposures for each source category independently. Additionally, because this guidance is not regulatory or binding on local agencies, we took a more qualitative approach to developing distance based recommendations.

Where possible, we recommend a minimum separation between new sensitive land uses and existing sources. However, this is not always possible, particularly where there is an elevated health risk over large geographical areas. Areas downwind of ports and rail yards are prime examples. In such cases, we recommend doing everything possible to avoid locating sensitive receptors within the highest risk zones. Concurrently, air agencies and others will be working to reduce the overall risk through controls and measures within their scope of authority.

The recommendations were developed from the standpoint of siting new sensitive land uses. Project-specific data for new and existing air pollution sources are available as part of the air quality permitting process. Where such information is available, it should be used. Our recommendations are designed to fill a gap where information about existing facilities may not be readily available. These recommendations are only guidelines and are not designed to substitute for more specific information if it exists.

A summary of our recommendations is shown in Table 1-1. The basis and references[1] supporting each of these recommendations, including health studies, air quality modeling and monitoring studies is discussed below beginning with freeways and summarized in Table 1-2. As new information becomes available, it will be included on ARB's community health web page.

[1]Detailed information on these references are available on ARB's website at: http://www.ARB.ca.gov/ch/landuse.htm.

Table 1-1

Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities*

Source Category	Advisory Recommendations
Freeways and High-Traffic Roads	• Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Centers	• Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). • Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	• Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. • Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	• Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the ARB on the status of pending analyses of health risks.
Refineries	• Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	• Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloro-ethylene	• Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. • Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	• Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

*Notes:

- These recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues.

- Recommendations are based primarily on data showing that the air pollution exposures addressed here (i.e., localized) can be reduced as much as 80% with the recommended separation.
- The relative risk for these categories varies greatly (see Table 1-2). To determine the actual risk near a particular facility, a site-specific analysis would be required. Risk from diesel PM will decrease over time as cleaner technology phases in.
- These recommendations are designed to fill a gap where information about existing facilities may not be readily available and are not designed to substitute for more specific information if it exists. The recommended distances take into account other factors in addition to available health risk data (see individual category descriptions).
- Site-specific project design improvements may help reduce air pollution exposures and should also be considered when siting new sensitive land uses.
- This table does not imply that mixed residential and commercial development in general is incompatible. Rather it focuses on known problems like dry cleaners using perchloroethylene that can be addressed with reasonable preventative actions.
- A summary of the basis for the distance recommendations can be found in Table 1-2.

Table 1-2

Summary of Basis for Advisory Recommendations

Source Category	Range of Relative Cancer Risk[1,2]	Summary of Basis for Advisory Recommendations
Freeways and High-Traffic Roads	300 – 1,700	• In traffic-related studies, the additional non-cancer health risk attributable to proximity was seen within 1,000 feet and was strongest within 300 feet. California freeway studies show about a 70% drop off in particulate pollution levels at 500 feet.
Distribution Centers[3]	Up to 500	• Because ARB regulations will restrict truck idling at distribution centers, transport refrigeration unit (TRU) operations are the largest onsite diesel PM emission source followed by truck travel in and out of distribution centers. • Based on ARB and South Coast District emissions and modeling analyses, we estimate an 80 percent drop-off in pollutant concentrations at approximately 1,000 feet from a distribution center.
Rail Yards	Up to 500	• The air quality modeling conducted for the Roseville Rail Yard Study predicted the highest impact is within 1,000 feet of the Yard, and is associated with service and maintenance activities. The next highest impact is between a half to one mile of the Yard, depending on wind direction and intensity.
Ports	Studies underway	• ARB will evaluate the impacts of ports and develop a new comprehensive plan that will describe the steps needed to reduce public health impacts from port and rail activities in California. In the interim, a general advisory is appropriate based on the magnitude of diesel PM emissions associated with ports.
Refineries	Under 10	• Risk assessments conducted at California refineries show risks from air toxics to be under 10 chances of cancer per million.[4] • Distance recommendations were based on the amount and potentially hazardous nature of many of the pollutants released as part of the refinery process, particularly during non-routine emissions releases.
Chrome Platers	10-100	• ARB modeling and monitoring studies show localized risk of hexavalent chromium diminishing significantly at 300 feet. There are data limitations in both the modeling and monitoring studies. These include variability of plating activities and uncertainty of emissions such as fugitive dust. Hexavalent chromium is one of the most potent toxic air contaminants. Considering these factors, a distance of 1,000 feet was used as a precautionary measure.
Dry Cleaners Using Perchloro-ethylene (perc)	15-150	• Local air district studies indicate that individual cancer risk can be reduced by as much as 75 percent by establishing a 300 foot separation between a sensitive land use and a one-machine perc dry cleaning operation. For larger operations (2 machines or more), a separation of 500 feet can reduce risk by over 85 percent.

Source Category	Range of Relative Cancer Risk[1,2]	Summary of Basis for Advisory Recommendations
Gasoline Dispensing Facilities (GDF)[5]	Typical GDF: Less than 10 Large GDF: Between Less than 10 and 120	• Based on the CAPCOA Gasoline Service Station Industry-wide Risk Assessment Guidelines, most typical GDFs (less than 3.6 million gallons per year) have a risk of less than 10 at 50 feet under urban air dispersion conditions. Over the last few years, there has been a growing number of extremely large GDFs with sales over 3.6 and as high as 19 million gallons per year. Under rural air dispersion conditions, these large GDFs can pose a larger risk at a greater distance.

[1]For cancer health effects, risk is expressed as an estimate of the increased chances of getting cancer due to facility emissions over a 70-year lifetime. This increase in risk is expressed as chances in a million (e.g., 10 chances in a million).

[2]The estimated cancer risks are a function of the proximity to the specific category and were calculated independent of the regional health risk from air pollution. For example, the estimated regional cancer risk from air toxics in the Los Angeles region (South Coast Air Basin) is approximately 1,000 in a million.

[3]Analysis based on refrigerator trucks.

[4]Although risk assessments performed by refineries indicate they represent a low cancer risk, there is limited data on non-cancer effects of pollutants that are emitted from these facilities. Refineries are also a source of non-routine emissions and odors.

[5]A typical GDF in California dispenses under 3.6 million gallons of gasoline per year. The cancer risk for this size facility is likely to be less than 10 in a million at the fence line under urban air dispersion conditions.

A large GDF has fuel throughputs that can range from 3.6 to 19 million gallons of gasoline per year. The upper end of the risk range (i.e., 120 in a million) represents a hypothetical worst case scenario for an extremely large GDF under rural air dispersion conditions.

Freeways and High Traffic Roads

Air pollution studies indicate that living close to high traffic and the associated emissions may lead to adverse health effects beyond those associated with regional air pollution in urban areas. Many of these epidemiological studies have focused on children. A number of studies identify an association between adverse non-cancer health effects and living or attending school near heavily traveled roadways (see findings below). These studies have reported associations between residential proximity to high traffic roadways and a variety of respiratory symptoms, asthma exacerbations, and decreases in lung function in children.

One such study that found an association between traffic and respiratory symptoms in children was conducted in the San Francisco Bay Area. Measurements of traffic-related pollutants showed concentrations within 300 meters (approximately 1,000 feet) downwind of freeways were higher than regional values. Most other studies have assessed exposure based on proximity factors such as distance to freeways or traffic density.

These studies linking traffic emissions with health impacts build on a wealth of data on the adverse health effects of ambient air pollution. The data on the effects of proximity to traffic-related emissions provides additional information that can be used in land use siting and regulatory actions by air agencies. The key observation in these studies is that close proximity increases both exposure and the potential for adverse health effects. Other effects associated with traffic emissions include premature death in elderly individuals with heart disease.

Key Health Findings

- Reduced lung function in children was associated with traffic density, especially trucks, within 1,000 feet and the association was strongest within 300 feet. (Brunekreef, 1997)
- Increased asthma hospitalizations were associated with living within 650 feet of heavy traffic and heavy truck volume. (Lin, 2000)
- Asthma symptoms increased with proximity to roadways and the risk was greatest within 300 feet. (Venn, 2001)
- Asthma and bronchitis symptoms in children were associated with proximity to high traffic in a San Francisco Bay Area community with good overall regional air quality. (Kim, 2004)
- A San Diego study found increased medical visits in children living within 550 feet of heavy traffic. (English, 1999)

In these and other proximity studies, the distance from the roadway and truck traffic densities were key factors affecting the strength of the association with adverse health effects. In the above health studies, the association of traffic-related emissions with adverse health effects was seen within 1,000 feet and was

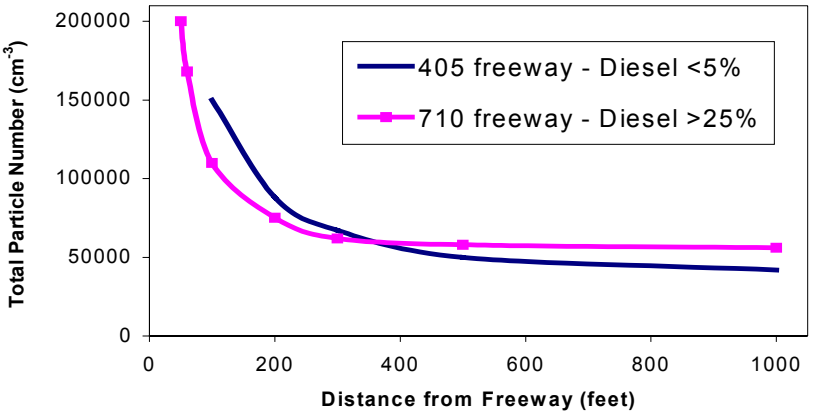
strongest within 300 feet. This demonstrates that the adverse effects diminished with distance.

In addition to the respiratory health effects in children, proximity to freeways increases potential cancer risk and contributes to total particulate matter exposure. There are three carcinogenic toxic air contaminants that constitute the majority of the known health risk from motor vehicle traffic – diesel particulate matter (diesel PM) from trucks, and benzene and 1,3-butadiene from passenger vehicles. On a typical urban freeway (truck traffic of 10,000-20,000/day), diesel PM represents about 70 percent of the potential cancer risk from the vehicle traffic. Diesel particulate emissions are also of special concern because health studies show an association between particulate matter and premature mortality in those with existing cardiovascular disease.

Distance Related Findings

A southern California study (Zhu, 2002) showed measured concentrations of vehicle-related pollutants, including ultra-fine particles, decreased dramatically within approximately 300 feet of the 710 and 405 freeways. Another study looked at the validity of using distance from a roadway as a measure of exposure

Figure 1-1
Decrease In Concentration of Freeway Diesel PM Emissions With Distance



to traffic related air pollution (Knape, 1999). This study showed that concentrations of traffic related pollutants declined with distance from the road, primarily in the first 500 feet.

These findings are consistent with air quality modeling and risk analyses done by ARB staff that show an estimated range of potential cancer risk that decreases with distance from freeways. The estimated risk varies with the local meteorology, including wind pattern. As an example, at 300 feet downwind from a freeway (Interstate 80) with truck traffic of 10,000 trucks per day, the potential cancer risk was as high as 100 in one million (ARB Roseville Rail Yard Study). The cancer health risk at 300 feet on the upwind side of the freeway was much

less. The risk at that distance for other freeways will vary based on local conditions – it may be higher or lower. However, in all these analyses the relative exposure and health risk dropped substantially within the first 300 feet. This phenomenon is illustrated in Figure 1-1.

State law restricts the siting of new schools within 500 feet of a freeway, urban roadways with 100,000 vehicles/day, or rural roadways with 50,000 vehicles with some exceptions.[2] However, no such requirements apply to the siting of residences, day care centers, playgrounds, or medical facilities. The available data show that exposure is greatly reduced at approximately 300 feet. In the traffic-related studies the additional health risk attributable to the proximity effect was strongest within 1,000 feet.

The combination of the children's health studies and the distance related findings suggests that it is important to avoid exposing children to elevated air pollution levels immediately downwind of freeways and high traffic roadways. These studies suggest a substantial benefit to a 500-foot separation.

The impact of traffic emissions is on a gradient that at some point becomes indistinguishable from the regional air pollution problem. As air agencies work to reduce the underlying regional health risk from diesel PM and other pollutants, the impact of proximity will also be reduced. In the meantime, as a preventative measure, we hope to avoid exposing more children and other vulnerable individuals to the highest concentrations of traffic-related emissions.

Recommendation

- Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.

References

- Brunekreef, B. et al. *"Air pollution from truck traffic and lung function in children living near motorways."* Epidemiology. 1997; 8:298-303
- Lin, S. et al. *"Childhood asthma hospitalization and residential exposure to state route traffic."* Environ Res. 2002;88:73-81
- Venn. et al. *"Living near a main road and the risk of wheezing illness in children."* American Journal of Respiratory and Critical Care Medicine. 2001; Vol.164, pp. 2177-2180
- Kim, J. et al. *"Traffic-related air pollution and respiratory health: East Bay Children's Respiratory Health Study."* American Journal of Respiratory and Critical Care Medicine 2004; Vol. 170. pp. 520-526

[2] Section 17213 of the California Education Code and section 21151.8 of the California Public Resources Code. See also Appendix E for a description of special processes that apply to school siting.

- Zhu, Y et al. *"Study of Ultra-Fine Particles Near A Major Highway With Heavy-Duty Diesel Traffic."* Atmospheric Environment. 2002 ; 36:4323-4335
- Knape, M. *"Traffic related air pollution in city districts near motorways."* The Science of the Total Environment. 1999; 235:339-341
- *Roseville Rail Yard Study.* ARB (October 2004)
- *ARB Diesel Risk Reduction Plan.* (2000)
- Delfino RJ *"Epidemiologic Evidence for Asthma and Exposure to Air Toxics: Linkages Between Occupational, Indoor, and Community Air Pollution Research."* Environmental Health Perspectives. (2002) 110 (supplement 4): 573-589
- English P., Neutra R., Scalf R. Sullivan M. Waller L. Zhu L. *"Examining Associations Between Childhood Asthma and Traffic Flow Using a Geographic Information System*." (1999) Environmental Health Perspectives 107(9): 761-767

Distribution Centers

Distribution centers or warehouses are facilities that serve as a distribution point for the transfer of goods. Such facilities include cold storage warehouses, goods transfer facilities, and inter-modal facilities such as ports. These operations involve trucks, trailers, shipping containers, and other equipment with diesel engines. A distribution center can be comprised of multiple centers or warehouses within an area. The size can range from several to hundreds of acres, involving a number of different transfer operations and long waiting periods. A distribution center can accommodate hundreds of diesel trucks a day that deliver, load, and/or unload goods up to seven days a week. To the extent that these trucks are transporting perishable goods, they are equipped with diesel-powered transport refrigeration units (TRUs) or TRU generator sets.

The activities associated with delivering, storing, and loading freight produces diesel PM emissions. Although TRUs have relatively small diesel-powered engines, in the normal course of business, their emissions can pose a significant health risk to those nearby. In addition to onsite emissions, truck travel in and out of distribution centers contributes to the local pollution impact.

ARB is working to reduce diesel PM emissions through regulations, financial incentives, and enforcement programs. In 2004, ARB adopted two airborne toxic control measures that will reduce diesel PM emissions associated with distribution centers. The first will limit nonessential (or unnecessary) idling of diesel-fueled commercial vehicles, including those entering from other states or countries. This statewide measure, effective in 2005, prohibits idling of a vehicle more than five minutes at any one location.[3] The elimination of unnecessary idling will reduce the localized impacts caused by diesel PM and other air toxics

[3] For further information on the Anti-Idling ATCM, please click on: http://www.arb.ca.gov/toxics/idling/outreach/factsheet.pdf

in diesel vehicle exhaust. This should be a very effective new strategy for reducing diesel PM emissions at distribution centers as well as other locations.

The second measure requires that TRUs operating in California become cleaner over time. The measure establishes in-use performance standards for existing TRU engines that operate in California, including out-of-state TRUs. The requirements are phased-in beginning in 2008, and extend to 2019.[4]

ARB also operates a smoke inspection program for heavy-duty diesel trucks that focuses on reducing truck emissions in California communities. Areas with large numbers of distribution centers are a high priority.

Key Health Findings

Diesel PM has been identified by ARB as a toxic air contaminant and represents 70 percent of the known potential cancer risk from air toxics in California. Diesel PM is an important contributor to particulate matter air pollution. Particulate matter exposure is associated with premature mortality and health effects such as asthma exacerbation and hospitalization due to aggravating heart and lung disease.

Distance Related Findings

Although distribution centers are located throughout the state, they are usually clustered near transportation corridors, and are often located in or near population centers. Diesel PM emissions from associated delivery truck traffic and TRUs at these facilities may result in elevated diesel PM concentrations in neighborhoods surrounding those sites. Because ARB regulations will restrict truck idling at distribution centers, the largest continuing onsite diesel PM emission source is the operation of TRUs. Truck travel in and out of distribution centers also contributes to localized exposures, but specific travel patterns and truck volumes would be needed to identify the exact locations of the highest concentrations.

As part of the development of ARB's regulation for TRUs, ARB staff performed air quality modeling to estimate exposure and the associated potential cancer risk of onsite TRUs for a typical distribution center. For an individual person, cancer risk estimates for air pollution are commonly expressed as a probability of developing cancer from a lifetime (i.e., 70 years) of exposure. These risks were calculated independent of regional risk. For example, the estimated regional cancer risk from air toxics in the Los Angeles region (South Coast Air Basin) is approximately 1,000 additional cancer cases per one million population.

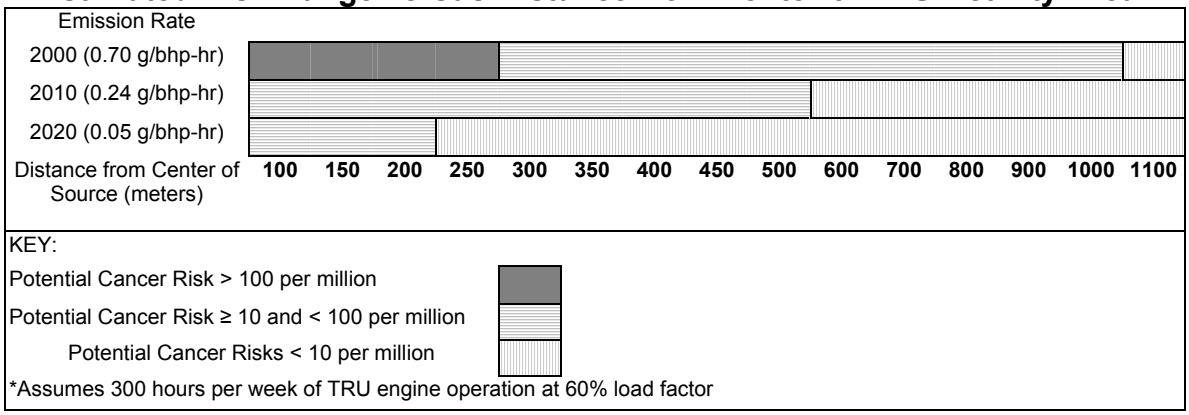
[4] For further information on the Transport Refrigeration Unit ATCM, please click on: http://www.arb.ca.gov/diesel/documents/trufaq.pdf

The diesel PM emissions from a facility are dependent on the size (horsepower), age, and number of engines, emission rates, the number of hours the truck engines and/or TRUs operate, distance, and meteorological conditions at the site. This assessment assumes a total on-site operating time for all TRUs of 300 hours per week. This would be the equivalent of 40 TRU-equipped trucks a day, each loading or unloading on-site for one hour, 12 hours a day and seven days a week.

As shown in Figure 1-2 below, at this estimated level of activity and assuming a current fleet diesel PM emission rate, the potential cancer risk would be over 100 in a million at 800 feet from the center of the TRU activity. The estimated potential cancer risk would be in the 10 to 100 per million range between 800 to 3,300 feet and fall off to less than 10 per million at approximately 3,600 feet. However with the implementation of ARB's regulation on TRUs, the risk will be significantly reduced.[5] We have not conducted a risk assessment for distribution centers based on truck traffic alone, but on an emissions basis, we would expect similar risks for a facility with truck volumes in the range of 100 per day.

Figure 1-2

Estimated Risk Range versus Distance from Center of TRU Activity Area*

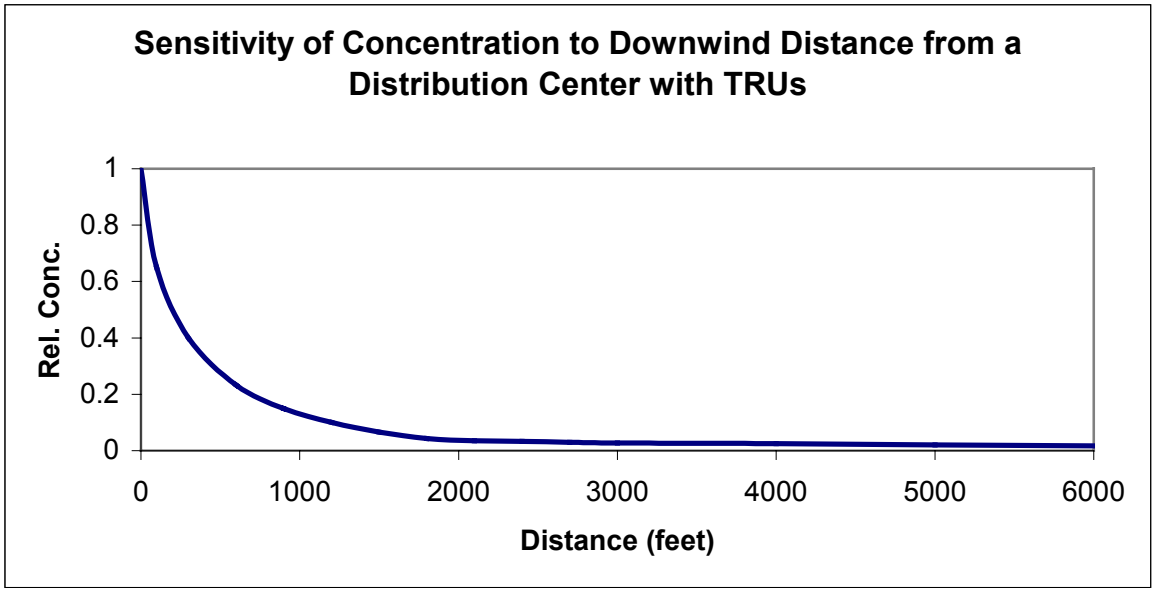


The estimated potential cancer risk level in Figure 1-2 is based on a number of assumptions that may not reflect actual conditions for a specific site. For example, increasing or decreasing the hours of diesel engine operations would change the potential risk levels. Meteorological and other facility specific parameters can also impact the results. Therefore, the results presented here are not directly applicable to any particular facility or operation. Rather, this information is intended to provide an indication as to the potential relative levels of risk that may be observed from operations at distribution centers. As shown in Figure 1-2, the estimated risk levels will decrease over time as lower-emitting diesel engines are used.

[5] These risk values assume an exposure duration of 70 years for a nearby resident and uses the methodology specified in the 2003 OEHHA health risk assessment guidelines.

Another air modeling analysis, performed by the South Coast Air Quality Management District (South Coast AQMD), evaluated the impact of diesel PM emissions from distribution center operations in the community of Mira Loma in southern California. Based on dispersion of diesel PM emissions from a large distribution center, Figure 1-3 shows the relative pollution concentrations at varying distances downwind. As Figure 1-3 shows, there is about an 80 percent drop off in concentration at approximately 1,000 feet.

Figure 1-3
Decrease In Relative Concentration of Risk
With Distance



Both the ARB and the South Coast AQMD analyses indicate that providing a separation of 1,000 feet would substantially reduce diesel PM concentrations and public exposure downwind of a distribution center. While these analyses do not provide specific risk estimates for distribution centers, they provide an indication of the range of risk and the benefits of providing a separation. ARB recommends a separation of 1,000 feet based on the combination of risk analysis done for TRUs and the decrease in exposure predicted with the South Coast AQMD modeling. However, ARB staff plans to provide further information on distribution centers as we collect more data and implement the TRU control measure.

Taking into account the configuration of distribution centers can also reduce population exposure and risk. For example, locating new sensitive land uses away from the main entry and exit points helps to reduce cancer risk and other health impacts.

Recommendations

- Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating TRUs per day, or where TRU unit operations exceed 300 hours per week).

- Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.

References

- *Airborne Toxic Control Measure To Limit Diesel-Fueled Commercial Motor Vehicle Idling.* ARB (August 20, 2004). Rule effectiveness date awaiting submittal of regulation to the Office of Administration Law. http://www.arb.ca.gov/regact/idling/idling.htm

- *Revised Staff Report: Initial Statement of Reasons for Proposed Rulemaking. Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate.* ARB (October 28, 2003). http://www.arb.ca.gov/regact/trude03/revisor.doc

- *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis.* SCAQMD (August 2003) http://www.aqmd.gov/ceqa/handbook/diesel_analysis.doc

- *"Mira Loma Study: Analysis of the Impact of Diesel Particulate Emissions from Warehouse/Distribution Center Operations",* PowerPoint presentation. SCAQMD (July 31, 2002)

Rail Yards

Rail yards are a major source of diesel particulate air pollution. They are usually located near inter-modal facilities, which attract heavy truck traffic, and are often sited in mixed industrial and residential areas. ARB, working with the Placer County air district and Union Pacific Railroad, recently completed a study[6] of the Roseville Rail Yard (Yard) in northern California that focused on the health risk from diesel particulate. A comprehensive emissions analysis and air quality modeling were conducted to characterize the estimated potential cancer risk associated with the facility.

[6] To review the study, please click on: http://www.arb.ca.gov/diesel/documents/rrstudy.htm

The Yard encompasses about 950 acres on a one-quarter mile wide by four-mile long strip of land that parallels Interstate 80. It is surrounded by commercial, industrial, and residential properties. The Yard is one of the largest service and maintenance rail yards in the West with over 30,000 locomotives visiting annually.

Using data provided by Union Pacific Railroad, the ARB determined the number and type of locomotives visiting the Yard annually and what those locomotives were doing - moving, idling, or undergoing maintenance testing. Union Pacific provided the annual, monthly, daily, and hourly locomotive activity in the yard including locomotive movements; routes for arrival, departure, and through trains; and locomotive service and testing. This information was used to estimate the emissions of particulate matter from the locomotives, which was then used to model the potential impacts on the surrounding community.

The key findings of the study are:

- Diesel PM emissions in 2000 from locomotive operations at the Roseville Yard were estimated at about 25 tons per year.

- Of the total diesel PM in the Yard, moving locomotives accounted for about 50 percent, idling locomotives about 45 percent, and locomotive testing about five percent.

- Air quality modeling predicts potential cancer risks greater than 500 in a million (based on 70 years of exposure) in a 10-40 acre area immediately adjacent to the Yard's maintenance operations.

- The risk assessment also showed elevated cancer risk impacting a larger area covering about a 10 by 10 mile area around the Yard.

The elevated concentrations of diesel PM found in the study contribute to an increased risk of cancer and premature death due to cardiovascular disease, and non-cancer health effects such as asthma and other respiratory illnesses. The magnitude of the risk, the general location, and the size of the impacted area depended on the meteorological data used to characterize conditions at the Yard, the dispersion characteristics, and exposure assumptions. In addition to these variables, the nature of locomotive activity will influence a risk characterization at a particular rail yard. For these reasons, the quantified risk estimates in the Roseville Rail Yard Study cannot be directly applied to other rail yards. However, the study does indicate the health risk due to diesel PM from rail yards needs to be addressed. ARB, in conjunction with the U.S. Environmental Protection Agency (U.S. EPA), and local air districts, is working with the rail industry to identify and implement short term, mid-term and long-term mitigation strategies. ARB also intends to conduct a second rail study in southern California to increase its understanding of rail yard operations and the associated public health impacts.

Key Health Findings

Diesel PM has been identified by ARB as a toxic air contaminant and represents 70 percent of the known potential cancer risk from air toxics in California. Diesel PM is an important contributor to particulate matter air pollution. Particulate matter exposure is associated with premature mortality and health effects such as asthma exacerbation and hospitalization due to aggravating heart and lung disease.

Distance Related Findings

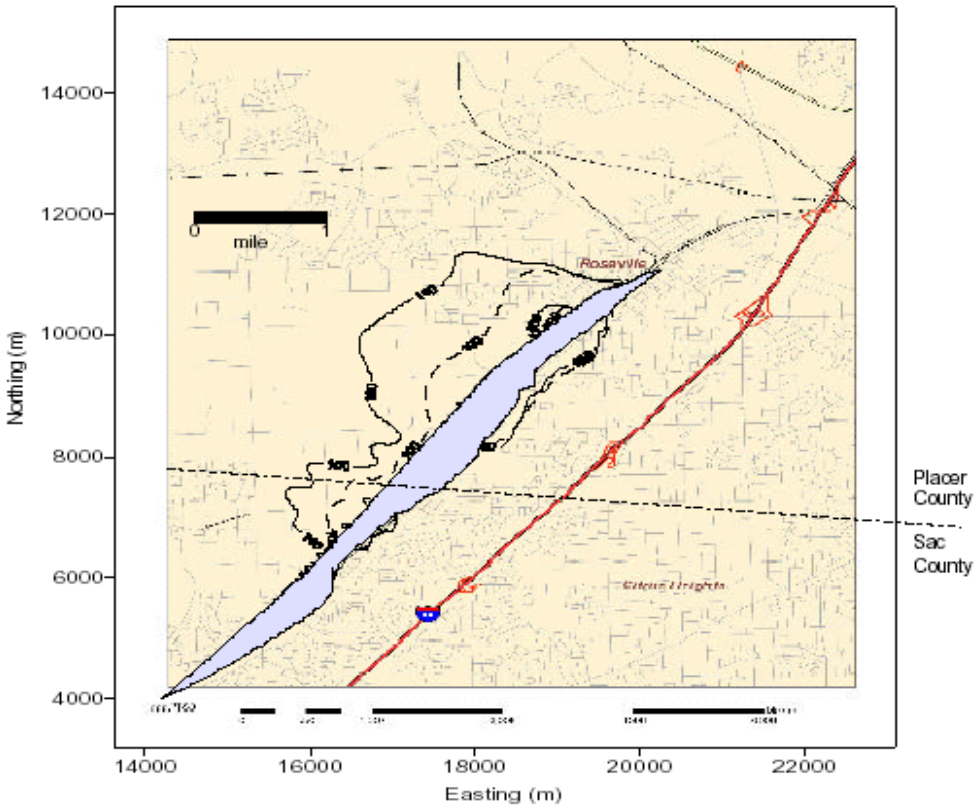
Two sets of meteorological data were used in the Roseville study because of technical limitations in the data. The size of the impact area was highly dependent on the meteorological data set used. The predicted highest impact area ranged from 10 - 40 acres with the two different meteorological data sets. This area, with risks estimated above 500 in a million, is adjacent to an area that includes a maintenance shop (see Figure 1-4). The high concentration of diesel PM emissions is due to the number of locomotives and nature of activities in this area, particularly idling locomotives.

The area of highest impact is within 1,000 feet of the Yard. The next highest impact zone as defined in the report had a predicted risk between 500 and 100 in one million and extends out between a half to one mile in some spots, depending on which meteorological conditions were assumed. The impact areas are irregular in shape making it difficult to generalize about the impact of distance at a particular location. However, the Roseville Rail Yard Study clearly indicates that the localized health risk is high, the impact area is large, and mitigation of the locomotive diesel PM emissions is needed.

For facilities like rail yards and ports, the potential impact area is so large that the real solution is to substantially reduce facility emissions. However, land use planners can avoid encroaching upon existing rail facilities and those scheduled for expansion. We also recommend that while air agencies tackle this problem, land use planners try not to add new sensitive individuals into the highest exposure areas. Finally, we recommend that land use agencies consider the potential health impacts of rail yards in their planning and permitting processes. Additional limitations and mitigation may be feasible to further reduce exposure on a site-specific basis.

Figure 1-4

Estimated Cancer Risk from the Yard
(100 and 500 in a million risk isopleths)



Notes: 100/Million Contours: Solid Line – Roseville Met Data; Dashed Line-McClellan Met Data, Urban Dispersion Coefficients, 80th Percentile Breathing Rate, All Locomotives' Activities (23 TPY), 70-Year Exposure

Recommendation

- Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard[7].
- Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.

References

- *Roseville Rail Yard Study.* ARB (2004)

[7] The rail yard risk analysis was conducted for the Union Pacific rail yard in Roseville, California. This rail yard is one of the largest in the state. There are other rail yards in California with comparable levels of activity that should be considered "major" for purposes of this Handbook.

Ports

Air pollution from maritime port activities is a growing concern for regional air quality as well as air quality in nearby communities. The primary air pollutant associated with port operations is directly emitted diesel particulate. Port-related activities also result in emissions that form ozone and secondary particulate in the atmosphere. The emission sources associated with ports include diesel engine-powered ocean-going ships, harbor craft, cargo handling equipment, trucks, and locomotives. The size and concentration of these diesel engines makes ports one of the biggest sources of diesel PM in the state. For that reason, ARB has made it a top priority to reduce diesel PM emissions at the ports, in surrounding communities, and throughout California.

International, national, state, and local government collaboration is critical to reducing port emissions based on both legal and practical considerations. For example, the International Maritime Organization (IMO) and the U.S. EPA establish emission standards for ocean-going vessels and U.S.-flagged harbor craft, respectively. ARB is pursuing further federal actions to tighten these standards. In addition, ARB and local air districts are reducing emissions from ports through a variety of approaches. These include: incentive programs to fund cleaner engines, enhanced enforcement of smoke emissions from ships and trucks, use of dockside electricity instead of diesel engines, cleaner fuels for ships, harbor craft, locomotives, and reduced engine idling. The two ATCMs that limit truck idling and reduce emissions from TRUs (discussed under “Distribution Centers”) also apply to ports.

ARB is also developing several other regulations that will reduce port-related emissions. One rule would require ocean-going ships to use a cleaner marine diesel fuel to power auxiliary engines while in California coastal waters and at dock. Ships that frequently visit California ports would also be required to further reduce their emissions. ARB has adopted a rule that would require harbor craft to use the same cleaner diesel fuel used by on-road trucks in California. In 2005, ARB will consider a rule that would require additional controls for in-use harbor craft, such as the use of add-on emission controls and accelerated turnover of older engines.

Key Health Findings

Port activities are a major source of diesel PM. Diesel PM has been identified by ARB as a toxic air contaminant and represents 70 percent of the known potential cancer risk from air toxics in California. Diesel PM is an important contributor to particulate matter air pollution. Particulate matter exposure is associated with premature mortality and health effects such as asthma exacerbation and hospitalization due to aggravating heart and lung disease.

Distance Related Findings

The Ports of Los Angeles and Long Beach provide an example of the emissions impact of port operations. A comprehensive emissions inventory was completed in June 2004. These ports combined are one of the world's largest and busiest seaports. Located in San Pedro Bay, about 20 miles south of downtown Los Angeles, the port complex occupies approximately 16 square miles of land and water. Port activities include five source categories that produce diesel emissions. These are ocean-going vessels, harbor craft, cargo handling equipment, railroad locomotives, and heavy-duty trucks.

The baseline emission inventory provides emission estimates for all major air pollutants. This analysis focuses on diesel PM from in-port activity because these emissions have the most potential health impact on the areas adjacent to the port. Ocean vessels are the largest overall source of diesel PM related to the ports, but these emissions occur primarily outside of the port in coastal waters, making the impact more regional in nature.

The overall in-port emission inventory for diesel particulate for the ports of Los Angeles and Long Beach is estimated to be 550 tons per year. The emissions fall in the following major categories: ocean-going vessels (17%), harbor craft (25%), cargo handling (47%), railroad locomotive (3%), and heavy duty vehicles (8%). In addition to in-port emissions, ship, rail, and trucking activities also contribute to regional emissions and increase emissions in nearby neighborhoods. Off-port emissions associated with related ship, rail, and trucking activities contribute an additional 680 tons per year of diesel particulate at the Port of Los Angeles alone.

To put this in perspective, the diesel PM emissions estimated for the Roseville Yard in ARB's 2004 study are 25 tons per year. The potential cancer risk associated with these emissions is 100 in one million at a distance of one mile, or one half mile, depending on the data set used. This rail yard covers one and a half square miles. The Los Angeles and Long Beach ports have combined diesel PM emissions of 550 tons per year emitted from a facility that covers a much larger area - 16 miles. The ports have about twice the emission density of the rail yard - 34 tons per year per square mile compared to 16 tons per year per square mile. However, while this general comparison is illustrative of the overall size of the complex, a detailed air quality modeling analysis would be needed to assess the potential health impact on specific downwind areas near the ports.

ARB is in the process of evaluating the various port-related emission sources from the standpoint of existing emissions, growth forecasts, new control options, regional air quality impacts, and localized health risk. A number of public processes - both state and local - are underway to address various aspects of these issues. Until more of these analyses are complete, there is little basis for recommending a specific separation between new sensitive land uses and ports.

For example, the type of data we have showing the relationship between air pollutant concentrations and distance from freeways is not yet available.

Also, the complexity of the port facilities makes a site-specific analysis critical. Ports are a concentration of multiple emission sources with differing dispersion and other characteristics. In the case of the Roseville rail yard, we found a high, very localized impact associated with a particular activity, service and maintenance. By contrast, the location, size, and nature of impact areas can be expected to vary substantially for different port activities. For instance, ground level emissions from dockside activities would behave differently from ship stack level emissions.

Nonetheless, on an emissions basis alone, we expect locations downwind of ports to be substantially impacted. For that reason, we recommend that land use agencies track the current assessment efforts, and consider limitations on the siting of new sensitive land uses in areas immediately downwind of ports.

Recommendations

Avoid siting new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the ARB on the status of pending analyses of health risks.

References

- *Roseville Rail Yard Study.* ARB (2004)
- Final Draft, "*Port-Wide Baseline Air Emissions Inventory."* Port of Los Angeles (June 2004)
- Final Draft, "*2002 Baseline Air Emissions Inventory."* Port of Long Beach (February 2004)

Petroleum Refineries

A petroleum refinery is a complex facility where crude oil is converted into petroleum products (primarily gasoline, diesel fuel, and jet fuel), which are then transported through a system of pipelines and storage tanks for final distribution by delivery truck to fueling facilities throughout the state. In California, most crude oil is delivered either by ship from Alaska or foreign sources, or is delivered via pipeline from oil production fields within the state. The crude oil then undergoes many complex chemical and physical reactions, which include distillation, catalytic cracking, reforming, and finishing. These refining processes have the potential to emit air contaminants, and are subject to extensive emission controls by district regulations.

As a result of these regulations covering the production, marketing, and use of gasoline and other oil by-products, California has seen significant regional air quality benefits both in terms of cleaner fuels and cleaner operating facilities. In

the 1990s, California refineries underwent significant modifications and modernization to produce cleaner fuels in response to changes in state law. Nevertheless, while residual emissions are small when compared to the total emissions controlled from these major sources, refineries are so large that even small amounts of fugitive, uncontrollable emissions and associated odors from the operations, can be significant. This is particularly the case for communities that may be directly downwind of the refinery. Odors can cause health symptoms such as nausea and headache. Also, because of the size, complexity, and vast numbers of refinery processes onsite, the occasional refinery upset or malfunction can potentially result in acute or short-term health effects to exposed individuals.

Key Health Findings

Petroleum refineries are large single sources of emissions. For volatile organic compounds (VOCs), eight of the ten largest stationary sources in California are petroleum refineries. For oxides of nitrogen (NOx), four of the ten largest stationary sources in California are petroleum refineries. Both of these compounds react in the presence of sunlight to form ozone. Ozone impacts lung function by irritating and damaging the respiratory system. Petroleum refineries are also large stationary sources of both particulate matter under 10 microns in size (PM_{10}) and particulate matter under 2.5 microns in size ($PM_{2.5}$). Exposure to particulate matter aggravates a number of respiratory illnesses, including asthma, and is associated with premature mortality in people with existing cardiac and respiratory disease. Both long-term and short-term exposure can have adverse health impacts. Finer particles pose an increased health risk because they can deposit deep in the lung and contain substances that are particularly harmful to human health. NOx are also significant contributors to the secondary formation of $PM_{2.5}$.

Petroleum refineries also emit a variety of toxic air pollutants. These air toxics vary by facility and process operation but may include: acetaldehyde, arsenic, antimony, benzene, beryllium, 1,3-butadiene, cadmium compounds, carbonyl sulfide, carbon disulfide, chlorine, dibenzofurans, diesel particulate matter, formaldehyde, hexane, hydrogen chloride, lead compounds, mercury compounds, nickel compounds, phenol, 2,3,7,8 tetrachlorodibenzo-p-dioxin, toluene, and xylenes (mixed) among others. The potential health effects associated with these air toxics can include cancer, respiratory irritation, and damage to the central nervous system, depending on exposure levels.

Distance Related Findings

Health risk assessments for petroleum refineries have shown risks from toxic air pollutants that have quantifiable health risk values to be around 10 potential cancer cases per million. Routine air monitoring and several air monitoring studies conducted in the San Francisco Bay Area (Crockett) and the South Coast Air Basin (Wilmington) have not identified significant health risks specifically

associated with refineries. However, these studies did not measure diesel PM as no accepted method currently exists, and there are many toxic air pollutants that do not have quantifiable health risk values.

In 2002, ARB published a report on the results of the state and local air district air monitoring done near oil refineries. The purpose of this evaluation was to try to determine how refinery-related emissions might impact nearby communities. This inventory of air monitoring activities included 10 ambient air monitoring stations located near refineries in Crockett and four stations near refineries in Wilmington. These monitoring results did not identify significant increased health risks associated with the petroleum refineries. In 2002-2003, ARB conducted additional monitoring studies in communities downwind of refineries in Crockett and Wilmington. These monitoring results also did not indicate significant increased health risks from the petroleum refineries.

Consequently, there are no air quality modeling or air monitoring data that provides a quantifiable basis for recommending a specific separation between refineries and new sensitive land uses. However, in view of the amount and potentially hazardous nature of many of the pollutants released as part of the refinery process, we believe the siting of new sensitive land uses immediately downwind should be avoided. Land use agencies should consult with the local air district when considering how to define an appropriate separation for refineries within their jurisdiction.

Recommendations

- Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.

References

- *Review of Current Ambient Air Monitoring Activities Related to California Bay Area and South Coast Refineries. ARB (March 2002)* http://www.arb.ca.gov/aaqm/qmosqual/special/mldrefinery.pdf
- *Community Air Quality Monitoring: Special Studies – Crockett. ARB (September 2004)* http://www.arb.ca.gov/ch/communities/studies/crockett/crockett.htm
- *Wilmington Study - Air Monitoring Results. ARB (2003)* http://www.arb.ca.gov/ch/communities/studies/wilmington/wilmington.htm

Chrome Plating Operations

Chrome plating operations rely on the use of the toxic metal hexavalent chromium, and have been subject to ARB and local air district control programs for many years. Regulation of chrome plating operations has reduced statewide emissions substantially. However, due to the nature of chrome plating

operations and the highly toxic nature of hexavalent chromium, the remaining health risk to nearby residents is a continuing concern.

Chrome plating operations convert hexavalent chromium in solution to a chromium metal layer by electroplating, and are categorized based upon the thickness of the chromium metal layer applied. In “decorative plating”, a layer of nickel is first plated over a metal substrate. Following this step, a thin layer of chromium is deposited over the nickel layer to provide a decorative and protective finish, for example, on faucets and automotive wheels. “Hard chrome plating” is a process in which a thicker layer of chromium metal is deposited directly on metal substrates such as engine parts, industrial machinery, and tools to provide greater protection against corrosion and wear.

Hexavalent chromium is emitted into the air when an electric current is applied to the plating bath. Emissions are dependent upon the amount of electroplating done per year and the control requirements. A unit of production referred to as an ampere-hour represents the amount of electroplating produced. Small facilities have an annual production rate of 100,000 – 500,000 ampere-hours, while medium-size facilities may have a production rate of 500,000 to about 3 million ampere-hours. The remaining larger facilities have a range of production rates that can be as high as 80 million ampere-hours.

The control requirements, which reduce emissions from the plating tanks, vary according to the size and type of the operation. Facilities either install add-on pollution control equipment, such as filters and scrubbers, or in-tank controls, such as fume suppressants and polyballs. With this combination of controls, the overall hexavalent chromium emissions have been reduced by over 90 percent. Larger facilities typically have better controls that can achieve efficiencies greater than 99 percent. However, even with stringent controls, the lack of maintenance and good housekeeping practices can lead to problems. And, since the material itself is inherently dangerous, any lapse in compliance poses a significant risk to nearby residents.

A 2002 ARB study in the San Diego community of Barrio Logan measured unexpectedly high concentrations of hexavalent chromium near chrome platers. The facilities were located in a mixed-use area with residences nearby. The study found that fugitive dust laden with hexavalent chromium was an important source of emissions that likely contributed to the elevated cancer risk. Largely as a result of this study, ARB is in the process of updating the current requirements to further reduce the emissions from these facilities.

In December 2004, the ARB adopted an ATCM to reduce emissions of hexavalent chromium and nickel from thermal spraying operations through the installation of best available control technology. The ATCM requires all existing facilities to comply with its requirements by January 1, 2006. New and modified thermal spraying operations must comply upon initial startup. An existing thermal spraying facility may be exempt from the minimum control efficiency

requirements of the ATCM if it is located at least 1,640 feet from the nearest sensitive receptor and emits no more than 0.5 pound per year of hexavalent chromium.[8]

Key Health Findings

Hexavalent chromium is one of the most toxic air pollutants regulated by the State of California. Hexavalent chromium is a carcinogen and has been identified in worker health studies as causing lung cancer. Exposure to even very low levels of hexavalent chromium should be avoided.

The California Office of Environmental Health Hazard Assessment has found that: 1) many epidemiological studies show a strong association between hexavalent chromium exposure in the work place and respiratory cancer; and 2) all short-term assays reported show that hexavalent chromium compounds can cause damage to human DNA.

Hexavalent chromium when inhaled over a period of many years can cause a variety of non-cancer health effects. These health effects include damage to the nose, blood disorders, lung disease, and kidney damage. The non-cancer health impacts occur with exposures considerably higher than exposures causing significant cancer risks. It is less likely that the public would be exposed to hexavalent chromium at levels high enough to cause these non-cancer health effects. Non-cancer health effects, unlike cancer health effects, have a threshold or exposure level below which non-cancer health effects would not be expected.

Distance Related Findings

ARB's 2002 Barrio Logan Study measured concentrations of hexavalent chromium in the air near two chrome plating facilities. The study was conducted from December 2001 to May 2002. There were two chrome platers on the street - one decorative and one hard plater. The purpose of the study was to better understand the near source impact of hexavalent chromium emissions. Air monitors were placed at residences next to the platers and at varying distances down the street. The monitors were moved periodically to look at the spatial distribution of the impact. Source testing and facility inspections identified one of the facilities as the likely source.

The first two weeks of monitoring results showed unexpectedly high levels of hexavalent chromium at a number of the monitoring sites. The high concentrations were intermittent. The concentrations ranged from 1 to 22 ng/m3 compared to the statewide average of 0.1 ng/m3. If these levels were to continue for 70 years, the potential cancer risk would be 150 in one million. The highest value was found at an air monitor behind a house adjacent to one of the

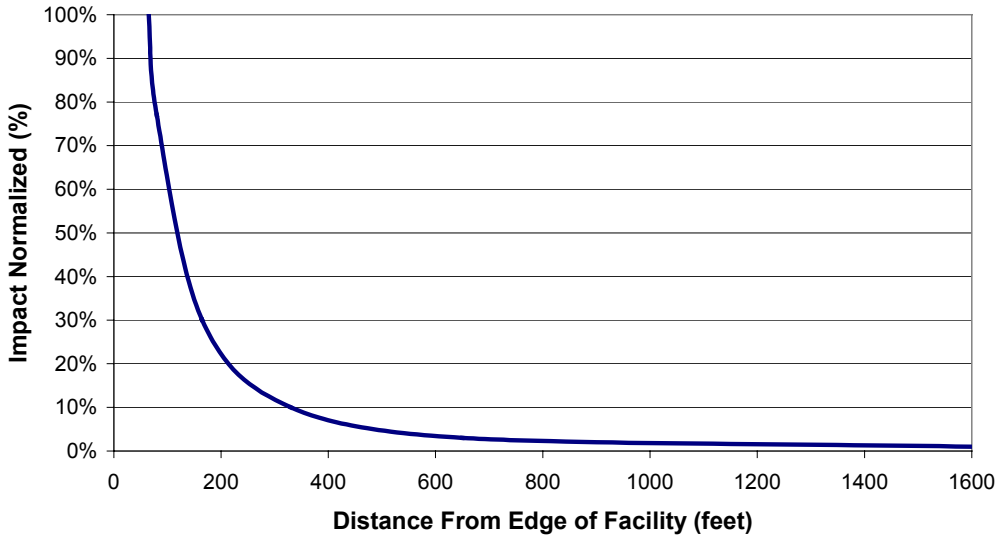
[8] For further information on the ATCM, please refer to: http://www.arb.ca.gov/regact/thermspr/thermalspr.htm

plating facilities–approximately 30 feet from the back entrance. Lower, but significant concentrations were found at an ambient air monitor 250 feet away.

The monitoring covered a period when the facility was not operating its plating tank. During this period, one of the highest concentrations was measured at an adjacent house. It appears that chromium-laden dust was responsible for high concentrations at this location since there was no plating activity at the time. Dust samples from the facility were tested and found to contain high levels of hexavalent chromium. On the day the highest concentration was measured at the house next door, a monitor 350 feet away from the plater's entrance showed very little impact. Similar proximity effects are shown in ARB modeling studies.

Figure 1-5 shows how the relative health risk varies as a function of distance from a chrome plater. This analysis is based on a medium-sized chrome plater with an annual production rate of 3 million ampere-hours. As shown in Figure 1- 5, the potential health risk drops off rapidly, with over 90 percent reduction in risk within 300 feet. This modeling was done in 2003 as part of a review of ARB's current air toxic control measure for chrome platers and is based on data from a recent ARB survey of chrome platers in California. The emission

Figure 1-5
Risk vs. Distance From Chrome Plater
(Based on plating tank emissions)



rates are only for plating operations. Because there are insufficient data available to directly quantify the impacts, the analysis does not include fugitive emissions, which the Barrio Logan analysis indicated could be significant.

Both the ARB Barrio Logan monitoring results and ARB's 2003 modeling analysis suggests that the localized emissions impact of a chrome plater diminishes significantly at 300 feet. However, in developing our recommendation, we also considered the following factors:

- some chrome platers will have higher volumes of plating activity,
- potential dust impacts were not modeled,
- we have only one monitoring study looking at the impact of distance, and,
- hexavalent chromium is one of the most potent toxic air contaminants ARB has identified.

Given these limitations in the analysis, we recommend a separation of 1,000 feet as a precautionary measure. For large chrome platers, site specific information should be obtained from the local air district.

Recommendation

- Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.

References

- *Ambient Air Monitoring for Hexavalent Chromium and Metals in Barrio Logan: May 2001 through May 2002.* ARB, Monitoring and Laboratory Division (October 14, 2003)
- *Draft Barrio Logan Report.* ARB, Planning and Technical Support Division (November 2004)
- *Proposed Amendments to the Hexavalent Chromium Control Measure for Decorative and Hard Chrome Plating and Chromic Acid Anodizing Facilities.* ARB (April 1998)
- Murchison, Linda; Suer, Carolyn; Cook, Jeff. *"Neighborhood Scale Monitoring in Barrio Logan," (*AWMA Annual Conference Proceedings, June 2003)

Dry Cleaners Using Perchloroethylene (Perc Dry Cleaners)

Perchloroethylene (perc) is the solvent most commonly used by the dry cleaning industry to clean clothes or other materials. The ARB and other public health agencies have identified perc as a potential cancer-causing compound. Perc persists in the atmosphere long enough to contribute to both regional air pollution and localized exposures. Perc dry cleaners are the major source of perc emissions in California.

Since 1990, the statewide concentrations and health risk from exposure to perc has dropped over 70 percent. This is due to a number of regulatory requirements on perc dry cleaners and other sources, including degreasing operations, brake cleaners, and adhesives. ARB adopted an Airborne Toxic Control Measure (ATCM) for Perc Emissions from Dry Cleaning Operations in 1993. ARB has also prohibited the use of perc in aerosol adhesives and automotive brake cleaners.

Perc dry cleaners statewide are required to comply with ARB and local air district regulations to reduce emissions. However, even with these controls, some emissions continue to occur. Air quality studies indicate that there is still the potential for significant risks even near well-controlled dry cleaners. The South Coast AQMD has adopted a rule requiring that all new dry cleaners use alternatives to perc and that existing dry cleaners phase out the use of perc by December 2020. Over time, transition to non-toxic alternatives should occur. However, while perc continues to be used, a preventative approach should be taken to siting of new sensitive land uses.

Key Health Findings

Inhalation of perc may result in both cancer and non-cancer health effects. An assessment by California's Office of Environmental Health Hazard Assessment (OEHHA) concluded that perc is a potential human carcinogen and can cause non-cancer health effects. In addition to the potential cancer risk, the effects of long-term exposure include dizziness, impaired judgment and perception, and damage to the liver and kidneys. Workers have shown signs of liver toxicity following chronic exposure to perc, as well as kidney dysfunction and neurological effects. Non-cancer health effects occur with higher exposure levels than those associated with significant cancer risks. The public is more likely to be exposed to perchloroethylene at levels causing significant cancer risks than to levels causing non-cancer health effects. Non-cancer health effects, unlike cancer health effects, have a threshold or exposure level below which non-cancer health effects would not be expected. The ARB formally identified perc as a toxic air contaminant in October 1991.

One study has determined that inhalation of perc is the predominant route of exposure to infants living in apartments co-located in the same building with a business operating perc dry cleaning equipment. Results of air sampling within co-residential buildings indicate that dry cleaners can cause a wide range of exposures depending on the type and maintenance of the equipment. For example, a well-maintained state-of-the-art system may have risks in the range of 10 in one million, whereas a badly maintained machine with major leaks can have potential cancer risks of thousands in one million.

The California Air Pollution Control Officers Association (CAPCOA) is developing Industry-wide Risk Assessment Guidelines for Perchloroethylene Dry Cleaners which, when published, will provide detailed information on public health risk from exposure to emissions from this source.

Distance Related Findings

Risk created by perc dry cleaning is dependent on the amount of perc emissions, the type of dry cleaning equipment, proximity to the source, and how the emissions are released and dispersed (e.g., type of ventilation system, stack parameters, and local meteorology). Dry cleaners are often located near

residential areas, and near shopping centers, schools, day-care centers, and restaurants.

The vast majority of dry cleaners in California have one dry cleaning machine per facility. The South Coast AQMD estimates that an average well-controlled dry cleaner uses about 30 to 160 gallons of cleaning solvent per year, with an average of about 100 gallons. Based on these estimates, the South Coast AQMD estimates a potential cancer risk between 25 to 140 in one million at residential locations 75 feet or less from the dry cleaner, with an average of about 80 in one million. The estimate could be as high as 270 in one million for older machines.

CAPCOA's draft industry-wide risk assessment of perc dry cleaning operations indicates that the potential cancer risk for many dry cleaners may be in excess of potential cancer risk levels adopted by the local air districts. The draft document also indicates that, in general, the public's exposure can be reduced by at least 75 percent, by providing a separation distance of about 300 feet from the operation. This assessment is based on a single machine with perc use of about 100 gallons per year. At these distances, the potential cancer risk would be less than 10 potential cases per million for most scenarios.

The risk would be proportionately higher for large, industrial size, dry cleaners. These facilities typically have two or more machines and use 200 gallons or more per year of perc. Therefore, separation distances need to be greater for large dry cleaners. At a distance of 500 feet, the remaining risk for a large plant can be reduced by over 85 percent.

In California, a small number of dry cleaners that are co-located (sharing a common wall, floor, or ceiling) with a residence have the potential to expose the inhabitants of the residence to high levels of perc. However, while special requirements have been imposed on these existing facilities, the potential for exposure still exists. Avoiding these siting situations in the future is an important preventative measure.

Local air districts are a source of information regarding specific dry cleaning operations—particularly for large industrial operations with multiple machines. The 300 foot separation recommended below reflects the most common situation – a dry cleaner with only one machine. While we recommend 500 feet when there are two or more machines, site specific information should be obtained from the local air district for some very large industrial operations. Factors that can impact the risk include the number and type of machines, controls used, source configuration, building dimensions, terrain, and meteorological data.

Recommendation

- Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines provide 500 feet. For operations with 3 or more machines, consult with the local air district.

- Do not site new sensitive land uses in the same building with perc dry cleaning operations.

References

- *Proposed Amended Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems,* Final Staff Report. South Coast AQMD. (October 2002)
- *Air Toxic Control Measure for Emissions of Perchloroethylene from Dry Cleaning Operations.* ARB (1994) (http://www.arb.ca.gov/toxics/atcm/percatcm.htm)
- *"An Assessment of Tetrachloroethylene in Human Breast Milk"*, Judith Schreiber, New York State Department of Health – Bureau of Toxic Substance Assessment, Journal of Exposure Analysis and Environmental Epidemiology, Vol.2, Suppl.2, pp. 15-26, 1992.
- Draft *Air Toxics "Hot Spots" Program Perchloroethylene Dry Cleaner Industry-wide Risk Assessment Guidelines.* (CAPCOA (November 2002)
- *Final Environmental Assessment for Proposed Amended Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems.* South Coast AQMD. (October 18, 2002)

Gasoline Dispensing Facilities

Refueling at gasoline dispensing facilities releases benzene into the air. Benzene is a potent carcinogen and is one of the highest risk air pollutants regulated by ARB. Motor vehicles and motor vehicle-related activity account for over 90 percent of benzene emissions in California. While gasoline-dispensing facilities account for a small part of total benzene emissions, near source exposures for large facilities can be significant.

Since 1990, benzene in the air has been reduced by over 75 percent statewide, primarily due to the implementation of emissions controls on motor vehicle vapor recovery equipment at gas stations, and a reduction in benzene levels in gasoline. However, benzene levels are still significant. In urban areas, average benzene exposure is equivalent to about 50 in one million.

Gasoline dispensing facilities tend to be located in areas close to residential and shopping areas. Benzene emissions from the largest gas stations may result in near source health risk beyond the regional background and district health risk thresholds. The emergence of very high gasoline throughput at large retail or

wholesale outlets makes this a concern as these types of outlets are projected to account for an increasing market share in the next few years.

Key Health Findings

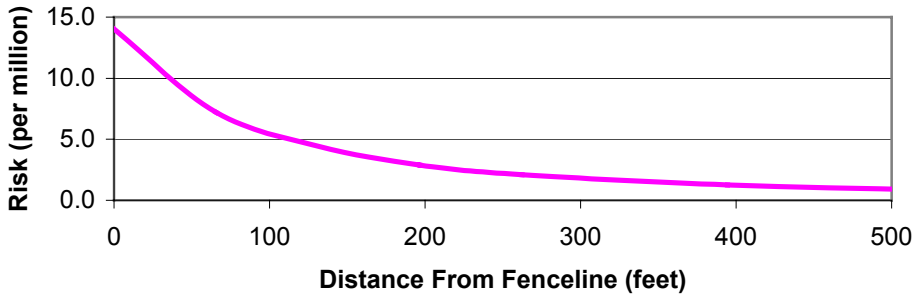
Benzene is a human carcinogen identified by ARB as a toxic air contaminant. Benzene also can cause non-cancer health effects above a certain level of exposure. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness. It is unlikely that the public would be exposed to levels of benzene from gasoline dispensing facilities high enough to cause these non-cancer health effects.

Distance Related Findings

A well-maintained vapor recovery system can decrease emissions of benzene by more than 90% compared with an uncontrolled facility. Almost all facilities have emission control systems. Air quality modeling of the health risks from gasoline dispensing facilities indicate that the impact from the facilities decreases rapidly as the distance from the facility increases.

Statistics reported in the ARB's staff reports on Enhanced Vapor Recovery released in 2000 and 2002, indicated that almost 96 percent of the gasoline dispensing facilities had a throughput less than 2.4 million gallons per year. The remaining four percent, or approximately 450 facilities, had throughputs exceeding 2.4 million gallons per year. For these stations, the average gasoline throughput was 3.6 million gallons per year.

Figure 1-6
Gasoline Dispensing Facility Health Risk
for 3,600,000 gal/yr throughput



As shown in Figure 1-6, the risk levels for a gasoline dispensing facility with a throughput of 3.6 million gallons per year is about 10 in one million at a distance of 50 feet from the fenceline. However, as the throughput increases, the potential risk increases.

As mentioned above, air pollution levels in the immediate vicinity of large gasoline dispensing facilities may be higher than the surrounding area (although tailpipe emissions from motor vehicles dominates the health impacts). Very large gasoline dispensing facilities located at large wholesale and discount centers may dispense nine million gallons of gasoline per year or more. At nine million gallons, the potential risk could be around 25 in one million at 50 feet, dropping to about five in one million at 300 feet. Some facilities have throughputs as high as 19 million gallons.

Recommendation

- Avoid siting new sensitive land uses within 300 feet of a large gasoline dispensing facility (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

References

- *Gasoline Service Station Industry-wide Risk Assessment Guidelines.* California Air Pollution Control Officers Association (December 1997 and revised November 1, 2001)
- *Staff Report on Enhanced Vapor Recovery.* ARB (February 4, 2000)
- *The California Almanac of Emissions and Air Quality.* ARB (2004)
- *Staff Report on Enhanced Vapor Recovery Technology Review.* ARB (October 2002)

Other Facility Types that Emit Air Pollutants of Concern

In addition to source specific recommendations, Table 1-3 includes a list of other industrial sources that could pose a significant health risk to nearby sensitive individuals depending on a number of factors. These factors include the amount of pollutant emitted and its toxicity, the distance to nearby individuals, and the type of emission controls in place. Since these types of facilities are subject to air permits from local air districts, facility specific information should be obtained where there are questions about siting a sensitive land use close to an industrial facility.

Potential Sources of Odor and Dust Complaints

Odors and dust from commercial activities are the most common sources of air pollution complaints and concerns from the public. Land use planning and permitting processes should consider the potential impacts of odor and dust on surrounding land uses, and provide for adequate separation between odor and dust sources. As with other types of air pollution, a number of factors need to be considered when determining an adequate distance or mitigation to avoid odor or

Table 1-3 – Examples of Other Facility Types That Emit[1] Air Pollutants of Concern

Categories	Facility Type	Air Pollutants of Concern
Commercial		
	Autobody Shops	Metals, Solvents
	Furniture Repair	Solvents[2], Methylene Chloride
	Film Processing Services	Solvents, Perchloroethylene
	Distribution Centers	Diesel Particulate Matter
	Printing Shops	Solvents
	Diesel Engines	Diesel Particulate Matter
Industrial		
	Construction	Particulate Matter, Asbestos
	Manufacturers	Solvents, Metals
	Metal Platers, Welders, Metal Spray (flame spray) Operations	Hexavalent Chromium, Nickel, Metals
	Chemical Producers	Solvents, Metals
	Furniture Manufacturers	Solvents
	Shipbuilding and Repair	Hexavalent chromium and other metals, Solvents
	Rock Quarries and Cement Manufacturers	Particulate Matter, Asbestos
	Hazardous Waste Incinerators	Dioxin, Solvents, Metals
	Power Plants	Benzene, Formaldehyde, Particulate Matter
	Research and Development Facilities	Solvents, Metals, etc.
Public		
	Landfills	Benzene, Vinyl Chloride, Diesel Particulate Matter
	Waste Water Treatment Plants	Hydrogen Sulfide
	Medical Waste Incinerators	Dioxin, Benzene, PAH, PCBs, 1,3-Butadiene
	Recycling, Garbage Transfer Stations	Diesel Particulate Matter
	Municipal Incinerators	Dioxin, Benzene, PAH, PCBs, 1,3-Butadiene
Transportation		
	Truck Stops	Diesel Particulate Matter
Agricultural Operations		
	Farming Operations	Diesel Particulate Matter, VOCs, NOx, PM10, CO, SOx, Pesticides
	Livestock and Dairy Operations	Ammonia, VOCs, PM10

[1]Not all facilities will emit pollutants of concern due to process changes or chemical substitution. Consult the local air district regarding specific facilities.
[2]Some solvents may emit toxic air pollutants, but not all solvents are toxic air contaminants.

dust complaints in a specific situation. Local air districts should be consulted for advice when these siting situations arise.

Table 1-4 lists some of the most common sources of odor complaints received by local air districts. Complaints about odors are the responsibility of local air districts and are covered under state law. The types of facilities that can cause odor complaints are varied and can range from small commercial facilities to large industrial facilities, and may include waste disposal and recycling operations. Odors can cause health symptoms such as nausea and headache. Facilities with odors may also be sources of toxic air pollutants (See Table 1-3). Some common sources of odors emitted by facilities are sulfur compounds, organic solvents, and the decomposition/digestion of biological materials. Because of the subjective nature of an individual's sensitivity to a particular type of odor, there is no specific rule for assigning appropriate separations from odor sources. Under the right meteorological conditions, some odors may still be offensive several miles from the source.

Table 1-4
Sources of Odor Complaints

- Sewage Treatment Plants
- Landfills
- Recycling Facilities
- Waste Transfer Stations
- Petroleum Refineries
- Biomass Operations
- Autobody Shops
- Coating Operations
- Fiberglass Manufacturing
- Foundries
- Rendering Plants
- Livestock Operations

Sources of dust are also common sources of air pollution-related complaints. Operations that can result in dust problems are rock crushing, gravel production, stone quarrying, and mining operations. A common source of complaints is the dust and noise associated with blasting that may be part of these operations. Besides the health impacts of dust as particulate matter, thick dust also impairs visibility, aesthetic values, and can soil homes and automobiles. Local air districts typically have rules for regulating dust sources in their jurisdictions, but dust sources can still be a concern. Therefore, separation of these facilities from residential and other new sensitive land uses should be considered.

In some areas of California, asbestos occurs naturally in stone deposits. Asbestos is a potent carcinogenic substance when inhaled. Asbestos-containing dust may be a public health concern in areas where asbestos-containing rock is mined, crushed, processed, or used. Situations where asbestos-containing gravel has been used in road paving materials are also a source of asbestos exposure to the general public. Planners are advised to consult with local air pollution agencies in areas where asbestos-containing gravel or stone products are produced or used.

2. Handbook Development

ARB and local air districts share responsibility for improving statewide air quality. As a result of California's air pollution control programs, air quality has improved and health risk has been reduced statewide. However, state and federal air quality standards are still exceeded in many areas of California and the statewide health risk posed by toxic air contaminants (air toxics) remains too high. Also, some communities experience higher pollution exposures than others - making localized impacts, as well regional or statewide impacts, an important consideration. It is for this reason that this Handbook has been produced - to promote better, more informed decision-making by local land use agencies that will improve air quality and public health in their communities.

Land use policies and practices, including planning, zoning, and siting activities, can play a critical role in air quality and public health at the local level. For instance, even with the best available control technology, some projects that are sited very close to homes, schools, and other public places can result in elevated air pollution exposures. The reverse is also true – siting a new school or home too close to an existing source of air pollution can pose a public health risk. The ARB recommendations in section 1 address this issue.

> *This Handbook is an informational document that we hope will strengthen the relationship between air quality and land use agencies. It highlights the need for land use agencies to address the potential for new projects to result in localized health risk or contribute to cumulative impacts where air pollution sources are concentrated.*

Avoiding these incompatible land uses is a key to reducing localized air pollution exposures that can result in adverse health impacts, especially to sensitive individuals.

Individual siting decisions that result in incompatible land uses are often the result of locating "sensitive" land uses next to polluting sources. These decisions can be of even greater concern when existing air pollution exposures in a community are considered. In general terms, this is often referred to as the issue of "cumulative impacts." ARB is working with local air districts to better define these situations and to make information about existing air pollution levels (e.g., from local businesses, motor vehicles, and other areawide sources) more readily available to land use agencies.

In December 2001, the ARB adopted "Policies and Actions for Environmental Justice" (Policies). These Policies were developed in coordination with a group of stakeholders, representing local government agencies, community interest

groups, environmental justice organizations, academia, and business (Environmental Justice Stakeholders Group).

The Policies included a commitment to work with land use planners, transportation agencies, and local air districts to develop ways to identify, consider, and reduce cumulative air pollution emissions, exposure, and health risks associated with land use planning and decision-making. Developed under the auspices of the ARB's Environmental Justice Stakeholders Group, this Handbook is a first step in meeting that commitment.

ARB has produced this Handbook to help achieve several objectives:

- Provide recommendations on situations to avoid when siting new residences, schools, day care centers, playgrounds, and medical-related facilities (sensitive sites or sensitive land uses);

- Identify approaches that land use agencies can use to prevent or reduce potential air pollution impacts associated with general plan policies, new land use development, siting, and permitting decisions;

- Improve and facilitate access to air quality data and evaluation tools for use in the land use decision-making process;

- Encourage stronger collaboration between land use agencies and local air districts to reduce community exposure to source-specific and cumulative air pollution impacts; and

- Emphasize community outreach approaches that promote active public involvement in the air quality/land use decision-making process.

This Handbook builds upon California's 2003 General Plan Guidelines. These Guidelines, developed by the Governor's Office of Planning and Research (OPR), explain the land use planning process and applicable legal requirements. This Handbook also builds upon a 1997 ARB report, "The Land Use-Air Quality Linkage" ("Linkage Report").[9] The Linkage Report was an outgrowth of the California Clean Air Act which, among other things, called upon local air districts to focus particular attention on reducing emissions from sources that indirectly cause air pollution by attracting vehicle trips. Such indirect sources include, but are not limited to, shopping centers, schools and universities, employment centers, warehousing, airport hubs, medical offices, and sports arenas. The Linkage Report summarizes data as of 1997 on the relationships between land use, transportation, and air quality, and highlights strategies that can help to reduce the use of single occupancy automobile use. Such strategies

[9] To access this report, please refer to ARB's website or click on: http://www.arb.ca.gov/ch/programs/link97.pdf

complement ARB regulatory programs that continue to reduce motor vehicle emissions.

In this Handbook, we identify types of air quality-related information that we recommend land use agencies consider in the land use decision-making processes such as the development of regional, general, and community plans; zoning ordinances; environmental reviews; project siting; and permit issuance. The Handbook provides recommendations on the siting of new sensitive land uses based on current analyses. It also contains information on approaches and methodologies for evaluating new projects from an air pollution perspective.

The Handbook looks at air quality issues associated with emissions from industrial, commercial, and mobile sources of air pollution. Mobile sources continue to be the largest overall contributors to the state's air pollution problems, representing the greatest air pollution health risk to most Californians. Based on current health risk information for air toxics, the most serious pollutants on a statewide basis are diesel PM, benzene, and 1,3-butadiene, all of which are primarily emitted by motor vehicles. From a state perspective, ARB continues to pursue new strategies to further reduce motor vehicle-related emissions in order to meet air quality standards and reduce air toxics risk.

While mobile sources are the largest overall contributors to the state's air pollution problems, industrial and commercial sources can also pose a health risk, particularly to people near the source. For this reason, the issue of incompatible land uses is an important focus of this document.

Handbook Audience

Even though the primary users of the Handbook will likely be agencies responsible for air quality and land use planning, we hope the ideas and technical issues presented in this Handbook will also be useful for:

- public and community organizations and community residents;
- federal, state and regional agencies that fund, review, regulate, oversee, or otherwise influence environmental policies and programs affected by land use policies; and
- private developers.

3. Key Community Focused Issues Land Use Agencies Should Consider

Two key air quality issues that land use agencies should consider in their planning, zoning, and permitting processes are:

1) **Incompatible Land Uses.** Localized air pollution impacts from incompatible land use can occur when polluting sources, such as a heavily trafficked roadway, warehousing facilities, or industrial or commercial facilities, are located near a land use where sensitive individuals are found such as a school, hospital, or homes.

2) **Cumulative Impacts.** Cumulative air pollution impacts can occur from a concentration of multiple sources that individually comply with air pollution control requirements or fall below risk thresholds, but in the aggregate may pose a public health risk to exposed individuals. These sources can be heavy or light-industrial operations, commercial facilities such as autobody shops, large gas dispensing facilities, dry cleaners, and chrome platers, and freeways or other nearby busy transportation corridors.

Incompatible Land Uses

Land use policies and practices can worsen air pollution exposure and adversely affect public health by mixing incompatible land uses. Examples include locating new sensitive land uses, such as housing or schools, next to small metal plating facilities that use a highly toxic form of chromium, or very near large industrial facilities or freeways. Based on recent monitoring and health-based studies, we now know that air quality impacts from incompatible land uses can contribute to increased risk of illness, missed work and school, a lower quality of life, and higher costs for public health and pollution control.[10]

Avoiding incompatible land uses can be a challenge in the context of mixed-use industrial and residential zoning. For a variety of reasons, government agencies and housing advocates have encouraged the proximity of affordable housing to employment centers, shopping areas, and transportation corridors, partially as a means to reduce vehicle trips and their associated emissions. Generally speaking, typical distances in mixed-use communities between businesses and industries and other land uses such as homes and schools, should be adequate to avoid health risks. However, generalizations do not always hold as we addressed in section 1 of this Handbook.

In terms of siting air pollution sources, the proposed location of a project is a major factor in determining whether it will result in localized air quality impacts. Often, the problem can be avoided by providing an adequate distance or setback

[10] For more information, the reader should refer to ARB's website on community health: http://www.arb.ca.gov/ch/ch.htm

between a source of emissions and nearby sensitive land uses. Sometimes, suggesting project design changes or mitigation measures in the project review phase can also reduce or avoid potential impacts. This underscores the importance of addressing potential incompatible land uses as early as possible in the project review process, ideally in the general plan itself.

Cumulative Air Pollution Impacts

The broad concept of cumulative air pollution impacts reflects the combination of regional air pollution levels and any localized impacts. Many factors contribute to air pollution levels experienced in any location. These include urban background air pollution, historic land use patterns, the prevalence of freeways and other transportation corridors, the concentration of industrial and commercial businesses, and local meteorology and terrain.

When considering the potential air quality impacts of polluting sources on individuals, project location and the concentration of emissions from air pollution sources need to be considered in the land use decision-making process. In section 4, the Handbook offers a series of questions that helps land use agencies determine if a project should undergo a more careful analysis. This holds true regardless of whether the project being sited is a polluting source or a sensitive land use project.

Large industrial areas are not the only land uses that may result in public health concerns in mixed-use communities. Cumulative air pollution impacts can also occur if land uses do not adequately provide setbacks or otherwise protect sensitive individuals from potential air pollution impacts associated with nearby light industrial sources. This can occur with activities such as truck idling and traffic congestion, or from indirect sources such as warehousing facilities that are located in a community or neighborhood.

In October 2004, Cal/EPA published its Environmental Justice Action Plan. In February 2005, the Cal/EPA Interagency Working Group approved a working definition of "cumulative impacts" for purposes of initially guiding the pilot projects that are being conducted pursuant to that plan. Cal/EPA is now in the process of developing a Cumulative Impacts Assessment Guidance document. Cal/EPA will revisit the working definition of "cumulative impacts" as the Agency develops that guidance. The following is the working definition:

> *"Cumulative impacts means exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socio-economic factors, where applicable, and to the extent data are available."*

4. Mechanisms for Integrating Localized Air Quality Concerns Into Land Use Processes

Land use agencies should use each of their existing planning, zoning, and permitting authorities to address the potential health risk associated with new projects. Land use-specific mechanisms can go a long way toward addressing both localized and cumulative impacts from new air pollution sources that are not otherwise addressed by environmental regulations. Likewise, close collaboration and communication between land use agencies and local air districts in both the planning and project approval stages can further reduce these impacts. Local agency partnerships can also result in early identification of potential impacts from proposed activities that might otherwise escape environmental review. When this happens, pollution problems can be prevented or reduced before projects are approved, when it is less complex and expensive to mitigate.

The land use entitlement process requires a series of planning decisions. At the highest level, the General Plan sets the policies and direction for the jurisdiction, and includes a number of mandatory elements dealing with issues such as housing, circulation, and health hazards. Zoning is the primary tool for implementing land use policies. Specific or community plans created in conjunction with a specific project also perform many of the same functions as a zoning ordinance. Zoning can be modified by means of variances and conditional use permits. The latter are frequently used to insure compatibility between otherwise conflicting land uses. Finally, new development usually requires the approval of a parcel or tract map before grading and building permits can be issued. These parcel or tract maps must be consistent with the applicable General Plan, zoning and other standards.

Land use agencies can use their planning authority to separate industrial and residential land uses, or to require mitigation where separation is not feasible. By separating incompatible land uses, land use agencies can prevent or reduce both localized and cumulative air pollution impacts without denying what might otherwise be a desirable project.[11] For instance:

- a dry cleaner could open a storefront operation in a community with actual cleaning operations performed at a remote location away from residential areas;
- gas dispensing facilities with lower fuel throughput could be sited in mixed-use areas;
- enhanced building ventilation or filtering systems in schools or senior care centers can reduce ambient air from nearby busy arterials; or
- landscaping and regular watering can be used to reduce fugitive dust at a building construction site near a school yard.

[11] It should be noted that such actions should also be considered as part of the General Plan or Plan element process.

The following general and specific land use approaches can help to reduce potential adverse air pollution impacts that projects may have on public health.

General Plans

The primary purpose of planning, and the source of government authority to engage in planning, is to protect public health, safety, and welfare. In its most basic sense, a local government General Plan expresses the community's development goals and embodies public policy relative to the distribution of future land uses, forming the basis for most land use decisions. Therefore, the most effective mechanism for dealing with the central land use concept of compatibility and its relationship to cumulative air pollution impacts is the General Plan. Well before projects are proposed within a jurisdiction, the General Plan sets the stage for where projects can be sited, and their compatibility with comprehensive community goals, objectives, and policies.

In 2003, OPR revised its General Plan Guidelines, highlighting the importance of incorporating sustainable development and environmental justice policies in the planning process. The OPR General Plan Guidelines provides an effective and long-term approach to reduce cumulative air pollution impacts at the earliest planning stages. In light of these important additions to the Guidelines, land use agencies should consider updating their General Plans or Plan elements to address these revisions.

The General Plan and related Plan elements can be used to avoid incompatible land uses by incorporating air quality considerations into these documents. For instance, a General Plan safety element with an air quality component could be used to incorporate policies or objectives that are intended to protect the public from the potential for facility breakdowns that may result in a dangerous release of air toxics. Likewise, an air quality component to the transportation circulation element of the General Plan could include policies or standards to prevent or reduce local exposure to diesel exhaust from trucks and other vehicles. For instance, the transportation circulation element could encourage the construction of alternative routes away from residential areas for heavy-duty diesel trucks. By considering the relationship between air quality and transportation, the circulation element could also include air quality policies to prevent or reduce trips and travel, and thus vehicle emissions. Policies in the land use element of the General Plan could identify areas appropriate for future industrial, commercial, and residential uses. Such policies could also introduce design and distance parameters that reduce emissions, exposure, and risk from industrial and some commercial land uses (e.g., dry cleaners) that are in close proximity to residential areas or schools.

Land use agencies should also consider updating or creating an air quality element in the jurisdiction's General Plan. In the air quality element, local decision-makers could develop long-term, effective plans and policies to address

air quality issues, including cumulative impacts. The air quality element can also provide a general reference guide that informs local land use planners about regional and community level air quality, regulatory air pollution control requirements and guidelines, and references emissions and pollution source data bases and assessment and modeling tools. As is further described in Appendix C of the Handbook, new assessment tools that ARB is developing can be included into the air quality element by reference. For instance, ARB's statewide risk maps could be referenced in the air quality element as a resource that could be consulted by developers or land use agencies

Zoning

The purpose of "zoning" is to separate different land uses. Zoning ordinances establish development controls to ensure that private development takes place within a given area in a manner in which:

- All uses are compatible (e.g., an industrial plant is not permitted in a residential area);
- Common development standards are used (e.g., all homes in a given area are set back the same minimum distance from the street); and,
- Each development does not unreasonably impose a burden upon its neighbors (e.g., parking is required on site so as not to create neighborhood parking problems).

To do this, use districts called "zones" are established and standards are developed for these zones. The four basic zones are residential, commercial, industrial and institutional.

Land use agencies may wish to consider how zoning ordinances, particularly those for mixed-use areas, can be used to avoid exacerbating poor land use practices of the past or contributing to localized and cumulative air pollution impacts in the community.

Sometimes, especially in mixed-use zones, there is a potential for certain categories of existing businesses or industrial operations to result in cumulative air pollution impacts to new development projects. For example:

- An assisted living project is proposed for a mixed-use zone adjacent to an existing chrome plating facility, or several dry cleaners;
- Multiple industrial sources regulated by a local air district are located directly upwind of a new apartment complex;
- A new housing development is sited in a mixed-use zone that is downwind or adjacent to a distribution center that attracts diesel-fueled delivery trucks and TRUs; or
- A new housing development or sensitive land use is sited without adequate setbacks from an existing major transportation corridor or rail yard.

As part of the public process for making zoning changes, local land use agencies could work with community planning groups, local businesses, and community residents to determine how best to address existing incompatible land uses.

Land Use Permitting Processes

■ Questions to Consider When Reviewing New Projects

Very often, just knowing what questions to ask can yield critical information about the potential air pollution impacts of proposed projects – both from the perspective of a specific project as well as in the nature of existing air pollution sources in the same impact area. Available land use information can reveal the proximity of air pollution sources to sensitive individuals, the potential for incompatible land uses, and the location and nature of nearby air pollution sources. Air quality data, available from the ARB and local air districts, can provide information about the types and amounts of air pollution emitted in an area, regional air quality concentrations, and health risk estimates for specific sources.

General Plans and zoning maps are an excellent starting point in reviewing project proposals for their potential air pollution impacts. These documents contain information about existing or proposed land uses for a specific location as well as the surrounding area. Often, just looking at a map of the proposed location for a facility and its surrounding area will help to identify a potential adjacent incompatible land use.

The following pages are a “pull-out” list of questions to consider along with cross-references to pertinent information in the Handbook. These questions are intended to assist land use agencies in evaluating potential air quality-related concerns associated with new project proposals.

The first group of questions contains project-related queries designed to help identify the potential for localized project impacts, particularly associated with incompatible land uses. The second group of questions focuses on the issue of potential cumulative impacts by including questions about existing emissions and air quality in the community, and community feedback. Depending on the answers to these questions, a land use agency may decide a more detailed review of the proposal is warranted.

The California Department of Education has already developed a detailed process for school siting which is outlined in Appendix E. However, school districts may also find this section helpful when evaluating the most appropriate site for new schools in their area. At a minimum, using these questions may encourage school districts to engage throughout their siting process with land use agencies and local air districts. The combined expertise of these entities can be useful in devising relevant design standards and mitigation measures that can

reduce exposure to cumulative emissions, exposure, and health risk to students and school workers.

As indicated throughout the Handbook, we strongly encourage land use agencies to consult early and often with local air districts. Local air districts have the expertise, many of the analytical tools, and a working knowledge of the sources they regulate. It is also critical to fully involve the public and businesses that could be affected by the siting decision. The questions provided in the chart below do not imply any particular action should be taken by land use agencies. Rather the questions are intended to improve the assessment process and facilitate informed decision-making.

- **Project-Related Questions**

This section includes project-related questions that, in conjunction with the questions in the next section, can be used to tailor the project evaluation. These questions are designed to help identify the potential for incompatible land uses from localized project impacts.

Questions to Consider When Reviewing New Projects

Project-Related Questions	Cross-Reference to Relevant Handbook Sections
1. Is the proposed project: ▲ A business or commercial license renewal ▲ A new or modified commercial project ▲ A new or modified industrial project ▲ A new or modified public facility project ▲ A new or modified transportation project ▲ A housing or other development in which sensitive individuals may live or play	See Appendix A for typical land use classifications and associated project categories that could emit air pollutants.
2. Does the proposed project: ▲ Conform to the zoning designation? ▲ Require a variance to the zoning designation? ▲ Include plans to expand operations over the life of the business such that additional emissions may increase the pollution burden in the community (e.g., from additional truck operations, new industrial operations or process lines, increased hours of operation, build-out to the property line, etc.)?	See Appendix F for a general explanation of land use processes. In addition, Section 3 contains a discussion of how land use planning, zoning, and permitting practices can result in incompatible land uses or cumulative air pollution impacts.
3. Has the local air district provided comments or information to assist in the analysis?	See Section 5 and Appendix C for a description of air quality-related tools that the ARB and local air districts use to provide information on potential air pollution impacts.
4. Have public meetings been scheduled with the affected community to solicit their involvement in the decision-making process for the proposed project?	See Section 7 for a discussion of public participation, information and outreach tools.
5. If the proposed project will be subject to local air district regulations: ▲ Has the project received a permit from the local air district? ▲ Would it comply with applicable local air district requirements? ▲ Is the local air district contemplating new regulations that would reduce emissions from the source over time? ▲ Will potential emissions from the project	See Appendix C for a description of local air district programs.

Project-Related Questions	Cross-Reference to Relevant Handbook Sections
trigger the local air district's new source review for criteria pollutants or air toxics emissions? ▲ Is the local air district expected to ask the proposed project to perform a risk assessment? ▲ Is there sufficient new information or public concern to call for a more thorough environmental analysis of the proposed project? ▲ Are there plans to expand operations over time? ▲ Are there land-use based air quality significance thresholds or design standards that could be applied to this project in addition to applicable air district requirements?	
6. If the proposed project will release air pollution emissions, either directly or indirectly, but is not regulated by the local air district: ▲ Is the local air district informed of the project? ▲ Does the local air district believe that there could be potential air pollution impacts associated with this project category because of the proximity of the project to sensitive individuals? ▲ If the project is one in which individuals live or play (e.g., a home, playground, convalescent home, etc.), does the local air district believe that the project's proximity to nearby sources could pose potential air pollution impacts? ▲ Are there indirect emissions that could be associated with the project (e.g., truck traffic or idling, transport refrigeration unit operations, stationary diesel engine operations, etc.) that will be in close proximity to sensitive individuals? ▲ Will the proposed project increase or serve as a magnet for diesel traffic? ▲ Are there land-use based air quality significance thresholds or design standards that could be applied to this project in addition to applicable air district requirements? ▲ Is there sufficient new information or public concern to call for a more thorough environmental analysis of the proposed project? ▲ Should the site approval process include identification and mitigation of potential	See Section 1 for recommendations on situations to avoid when siting projects where sensitive individuals would be located (sensitive sites).

Project-Related Questions	Cross-Reference to Relevant Handbook Sections
direct or indirect emissions associated with the potential project?	
7. Does the local air district or land use agency have pertinent information on the source, such as: ▲ Available permit and enforcement data, including for the owner or operator of the proposed source that may have other sources in the State. ▲ Proximity of the proposed project to sensitive individuals. ▲ Number of potentially exposed individuals from the proposed project. ▲ Potential for the proposed project to expose sensitive individuals to odor or other air pollution nuisances. ▲ Meteorology or the prevailing wind patterns between the proposed project and the nearest receptor, or between the proposed sensitive receptor project and sources that could pose a localized or cumulative air pollution impact.	See Appendix C for a description of local air district programs. See Appendix B for a listing of useful information that land use agencies should have on hand or have accessible when reviewing proposed projects for potential air pollution impacts. Also, do not hesitate to contact your local air district regarding answers to any of these questions that might not be available at the land use agency. See Section 1 for recommendations on situations to avoid when siting projects where sensitive individuals would be located (sensitive sites).
8. Based upon the project application, its location, and the nature of the source, could the proposed project: ▲ Be a polluting source that is located in proximity to, or otherwise upwind, of a location where sensitive individuals live or play? ▲ Attract sensitive individuals and be located in proximity to or otherwise downwind, of a source or multiple sources of pollution, including polluting facilities or transportation-related sources that contribute emissions either directly or indirectly? ▲ Result in health risk to the surrounding community?	See Section 3 for a discussion of what is an incompatible land use and the potential cumulative air pollution impacts. See Section 1 for recommendations on situations to avoid when siting projects where sensitive individuals would be located (sensitive sites).
9. If a CEQA categorical exemption is proposed, were the following questions considered: ▲ Is the project site environmentally sensitive as defined by the project's location? (A project that is ordinarily insignificant in its impact on the environment may in a particularly sensitive environment be significant.) ▲ Would the project and successive future projects of the same type in the approximate location potentially result in cumulative impacts? ▲ Are there "unusual circumstances" creating the possibility of significant effects?	See CEQA Guidelines section 15300, and Public Resources Code, section 21084. See Section 1 for recommendations on situations to avoid when siting projects where sensitive individuals would be located (sensitive sites). See also Section 5 and Appendix C for a description of air quality-related tools that the ARB and local air districts use to provide information on potential air pollution impacts.

- **Questions Related to Cumulative Impact Assessment**

The following questions can be used to provide the decision-maker with a better understanding of the potential for cumulative air pollution impacts to an affected community. Answers to these questions will help to determine if new projects or activities warrant a more detailed review. It may also help to see potential environmental concerns from the perspective of the affected community. Additionally, responses can provide local decision-makers with information with which to assess the best policy options for addressing neighborhood-scale air pollution concerns.

The questions below can be used to identify whether existing tools and procedures are adequate to address land use-related air pollution issues. This process can also be used to pinpoint project characteristics that may have the greatest impact on community-level emissions, exposure, and risk. Such elements can include: the compliance record of existing sources including those owned or operated by the project proponent; the concentration of emissions from polluting sources within the approximate area of sensitive sites; transportation circulation in proximity to the proposed project; compatibility with the General Plan and General Plan elements; etc.

The local air district can provide useful assistance in the collection and evaluation of air quality-related information for some of the questions and should be consulted early in the process.

Questions Related to Cumulative Impact Assessment

Technical Questions	Cross-Reference to Relevant Handbook Sections
1. Is the community home to industrial facilities?	See Appendix A for typical land use classifications and associated project categories that could emit air pollutants.
2. Do one or more major freeways or high-traffic volume surface streets cut through the community?	See transportation circulation element of your general plan. See also Appendix B for useful information that land use agencies should have on hand or have accessible when reviewing proposed projects for potential air pollution impacts. See Section 1 for recommendations on situations to avoid when siting projects where sensitive individuals would be located (sensitive sites).
3. Is the area classified for mixed-use zoning?	See your general plan and zoning ordinances.
4. Is there an available list of air pollution sources in the community?	Contact your local air district.
5. Has a walk-through of the community been conducted to gather the following information:	See Appendix B for a listing of useful information that land use agencies

Technical Questions	Cross-Reference to Relevant Handbook Sections
▲ Corroborate available information on land use activities in the area (e.g., businesses, housing developments, sensitive individuals, etc.)? ▲ Determine the proximity of existing and anticipated future projects to residential areas or sensitive individuals? ▲ Determine the concentration of emission sources (including anticipated future projects) to residential areas or sensitive individuals?	should have on hand or have accessible when reviewing proposed projects for potential air pollution impacts. Also contact your local air district.
6. Has the local air district been contacted to obtain information on sources in the community?	See Section 7 for a discussion of public participation, information and outreach tools.
7. What categories of commercial establishments are currently located in the area and does the local air district have these sources on file as being regulated or permitted?	See Appendix A for typical land use classifications and associated project categories that could emit air pollutants. Also contact your local air district.
8. What categories of indirect sources such as distribution centers or warehouses are currently located in the area?	See Appendix A for typical land use classifications and associated project categories that emit air pollutants.
9. What air quality monitoring data are available?	Contact your local air district.
10. Have any risk assessments been performed on emission sources in the area?	Contact your local air district.
11. Does the land use agency have the capability of applying a GIS spatial mapping tool that can overlay zoning, sub-development information, and other neighborhood characteristics, with air pollution and transportation data?	See Appendix B for a listing of useful information that land use agencies should have on hand or have accessible when reviewing proposed projects for potential air pollution impacts. Also contact your local air district for tools that can be used to supplement available land use agency tools.
12. Based on available information, is it possible to determine if the affected community or neighborhood experiences elevated health risk due to a concentration of air pollution sources in close proximity, and if not, can the necessary information be obtained?	Contact your local air district. Also see Section 1 for recommendations on situations to avoid when siting projects where sensitive individuals would be located (sensitive sites).
13. Does the community have a history of chronic complaints about air quality?	See Section 7 for a discussion of public participation, information and outreach tools. Also contact your local air district.
14. Is the affected community included in the public participation process for the agency's decision?	See Section 7 for a discussion of public participation, information and outreach tools.
15. Have community leaders or groups been contacted about any pre-existing or chronic community air quality concerns?	See Section 7 for a discussion of public participation, information and outreach tools. Also contact your local air district.

- **Mitigation Approaches**

In addition to considering the suitability of the project location, opportunities for mitigation of air pollution impacts should be considered. Sometimes, a land use agency may find that selection of a different project location to avoid a health risk is not feasible. When that happens, land use agencies should consider design improvements or other strategies that would reduce the risk. Such strategies could include performance or design standards, consultation with local air districts and other agencies on appropriate actions that these agencies should, or plan to, undertake, and consultation and outreach in the affected community. Potential mitigation measures should be feasible, cost-effective solutions within the available resources and authority of implementing agencies to enforce.[12]

- **Conditional Use Permits and Performance Standards**

Some types of land uses are only allowed upon approval of a conditional use permit (also called a CUP or special use permit). A conditional use permit does not re-zone the land but specifies conditions under which a particular land use will be permitted. Such land uses could be those with potentially significant environmental impacts. Local zoning ordinances specify the uses for which a conditional use permit is required, the zones they may be allowed in, and public hearing procedures. The conditional use permit imposes special requirements to ensure that the use will not be detrimental to its surroundings.

In the context of land use planning, performance standards are requirements imposed on projects or project categories through conditional use permits to ensure compliance with general plan policies and local ordinances. These standards could apply to such project categories as distribution centers, very large gas dispensing facilities, autobody shops, dry cleaners, and metal platers. Land use agencies may wish to consider adding land use-based performance standards to zoning ordinances in existing mixed-use communities for certain air pollution project categories. Such standards would provide certainty and equitable treatment to all projects of a similar nature, and reserve the more resource intensive conditional or special use permits to projects that require a more detailed analysis. In developing project design or performance standards, land use agencies should consult with the local air district. Early and regular consultation can avoid duplication or inconsistency with local air district control requirements when considering the site-specific design and operation of a project.

[12] A land use agency has the authority to condition or deny a project based upon information collected and evaluated through the land use decision-making process. However, any denial would need to be based upon identifiable, generally applicable, articulated standards set forth in the local government's General Plan and zoning codes. One way of averting this is to conduct early and regular outreach to the community and the local air district so that community and environmental concerns can be addressed and accommodated into the project proposal.

Examples of land use-based air quality-specific performance standards include the following:

- Placing a process vent away from the direction of the local playground that is nearby or increasing the stack height so that emissions are dispersed to reduce the emissions impact on surrounding homes or schools.
- Setbacks between the project fence line and the population center.
- Limiting the hours of operation of a facility to avoid excess emissions exposure or foul odors to nearby individuals.
- An ordinance that requires fleet operators to use cleaner vehicles before project approval (if a new business), or when expanding the fleet (if an existing business); and
- Providing alternate routes for truck operations that discourage detours into residential neighborhoods.

Outreach to Other Agencies

When questions arise regarding the air quality impacts of projects, including potential cumulative impacts, land use agencies should consult the local air district. Land use agencies should also consider the following suggestions to avoid creating new incompatible land uses:

- Consult with the local air district to help determine if emissions from a particular project will adversely impact sensitive individuals in the area, if existing or future effective regulations or permit requirements will affect the proposed project or other sources in the vicinity of the proposed project, or if additional inspections should be required.
- Check with ARB for new information and modeling tools that can help evaluate projects seeking to site within your jurisdiction.
- Become familiar with ARB's Land Use-Air Quality Linkage Report to determine whether approaches and evaluation tools contained in the Report can be used to reduce transportation-related impacts on communities.
- Contact and collaborate with other state agencies that play a role in the land use decision-making process, e.g., the State Department of Education, the California Energy Commission, and Caltrans. These agencies have information on mitigation measures and mapping tools that could be useful in addressing local problems.

- **Information Clearinghouse**

  - Land use agencies can refer to the ARB statewide electronic information clearinghouse for information on what measures other jurisdictions are using to address comparable issues or sources.[13]

[13] This information can be accessed from ARB's website by going to: http://www.arb.ca.gov/ch/clearinghouse.htm

The next section addresses available air quality assessment tools that land use agencies can use to evaluate the potential for localized or cumulative impacts in their communities.

5. Available Tools to Evaluate Cumulative Air Pollution Emissions and Risk

Until recently, California has traditionally approached air pollution control from the perspective of assessing whether the pollution was regional, category-specific, or from new or existing sources. This methodology has been generally effective in reducing statewide and regional air pollution impacts and risk levels. However, such an incremental, category-by-category, source-by-source approach may not always address community health impacts from multiple sources - including mobile, industrial, and commercial facilities.

As a result of air toxics and children's health concerns over the past several years, ARB and local air districts have begun to develop new tools to evaluate and inform the public about cumulative air pollution impacts at the community level. One aspect of ARB's programs now underway is to consolidate and make accessible air toxics emissions and monitoring data by region, using modeling tools and other analytical techniques to take a preliminary look at emissions, exposure, and health risk in communities.

ARB has developed multiple tools to assist local air districts perform assessments of cumulative emissions, exposure, and risk on a neighborhood scale. These tools include:

- Regional risk maps that show trends in potential cancer risk from toxic air pollutants in southern and central California between 1990 and 2010. These maps are based on the U.S. EPA's ASPEN model. These maps provide an estimate of background levels of toxic air pollutant risk but are not detailed enough to assess individual neighborhoods or facilities.[14]

- The Community Health Air Pollution Information System (CHAPIS) is a user-friendly, Internet-based system for displaying information on emissions from sources of air pollution in an easy to use mapping format. CHAPIS contains information on air pollution emissions from selected large facilities and small businesses that emit criteria and toxic air pollutants. It also contains information on air pollution emissions from motor vehicles. When released in 2004, CHAPIS did not contain information on every source of air pollution or every air pollutant. However, ARB continues to work with local air districts to include all of the largest air pollution sources and those with the highest documented air pollution risk. Additional facilities will be added to CHAPIS as more data become available.[15]

[14] For further information on these maps, please visit ARB's website at: http://www.arb.ca.gov/toxics/cti/hlthrisk/hlthrisk.htm

[15] For further information on CHAPIS, please click on: http://www.arb.ca.gov/ch/chapis1/chapis1.htm

- The Hot Spots Analysis and Reporting Program (HARP) is a software database package that evaluates emissions from one or more facilities to determine the overall health risk posed by the facility(-ies) on the surrounding community. Proper use of HARP ensures that the risk assessment meets the latest risk assessment guidelines published by the State Office of Environmental Health Hazard Assessment (OEHHA). HARP is designed with air quality professionals in mind and is available from the ARB.

- The Urban Emissions Model (URBEMIS) is a computer program that can be used to estimate emissions associated with land development projects in California such as residential neighborhoods, shopping centers, office buildings, and construction projects. URBEMIS uses emission factors available from the ARB to estimate vehicle emissions associated with new land uses.

Local air districts, and others can use these tools to assess a new project, or plan revision. For example, these tools can be used to:

- Identify if there are multiple sources of air pollution in the community;
- Identify the major sources of air pollution in the area under consideration;
- Identify the background potential cancer risk from toxic air pollution in the area under consideration;
- Estimate the risk from a new facility and how it adds to the overall risk from other nearby facilities; and
- Provide information to decision-makers and key stakeholders on whether there may be significant issues related to cumulative emissions, exposure, and health risk due to a permitting or land use decision.

If an air agency wishes to perform a cumulative air pollution impact analysis using any of these tools, it should consult with the ARB and/or the local air district to obtain information or assistance on the data inputs and procedures necessary to operate the program. In addition, land use agencies could consult with local air districts to determine the availability of land use and air pollution data for entry into an electronic Geographical Information System (GIS) format. GIS is an easier mapping tool than the more sophisticated models described in Appendix C. GIS mapping makes it possible to superimpose land use with air pollution information so that the spatial relationship between air pollution sources, sensitive receptors, and air quality can be visually represented. Appendix C provides a general description of the impact assessment process and micro-scale, or community level modeling tools that are available to evaluate potential cumulative air pollution impacts. Modeling protocols will be accessible on ARB's website as they become available. The ARB will also provide land use agencies and local air districts with statewide regional modeling results and information regarding micro-scale modeling.

6. ARB Programs to Reduce Air Pollution in Communities

ARB's regulatory programs reduce air pollutant emissions through statewide strategies that improve public health in all California communities. ARB's overall program addresses motor vehicles, consumer products, air toxics, air-quality planning, research, education, enforcement, and air monitoring. Community health and environmental justice concerns are a consideration in all these programs. ARB's programs are statewide but recognize that extra efforts may be needed in some communities due to historical mixed land-use patterns, limited participation in public processes in the past, and a greater concentration of air pollution sources in some communities.

ARB's strategies are intended to result in better air quality and reduced health risk to residents throughout California. The ARB's priority is to prevent or reduce the public's exposure to air pollution, including from toxic air contaminants that pose the greatest risk, particularly to infants and children who are more vulnerable to air pollution.

In October 2003, ARB updated its statewide control strategy to reduce emissions from source categories within its regulatory authority. A primary focus of the strategy is to achieve federal and state air quality standards for ozone and particulate matter throughout California, and to reduce health risk from diesel PM. Along with local air districts, ARB will continue to address air toxics emissions from regulated sources (see Table 6-1 for a summary of ARB activities). As indicated earlier, ARB will also provide analytical tools and information to land use agencies and local air districts to help assess and mitigate cumulative air pollution impacts.

The ARB will continue to consider the adoption of or revisions to needed air toxics control measures as part of the state's ongoing air toxics assessment program.[16]

As part of its effort to reduce particulate matter and air toxics emissions from diesel PM, the ARB has developed a Diesel Risk Reduction Program[17] that lays out several strategies in a three-pronged approach to reduce emissions and their associated risk:

- Stringent emission standards for all new diesel-fueled engines;
- Aggressive reductions from in-use engines; and
- Low sulfur fuel that will reduce PM and still provide the quality of diesel fuel needed to control diesel PM.

[16] For continuing information and updates on state measures, the reader can refer to ARB's website at http://www.arb.ca.gov/toxics/toxics.htm.
[17] For a comprehensive description of the program, please refer to ARB's website at http://www.arbB.ca.gov/diesel/dieselrrp.htm.

Table 6-1
ARB ACTIONS TO ADDRESS
CUMULATIVE AIR POLLUTION IMPACTS IN COMMUNITIES

Information Collection

- Improve emission inventories, air monitoring data, and analysis tools that can help to identify areas with high cumulative air pollution impacts
- Conduct studies in coordination with OEHHA on the potential for cancer and non-cancer health effects from air pollutants emitted by specific source categories
- Establish web-based clearinghouse for local land use strategies

Emission Reduction Approaches (2004-2006)*

- Through a public process, consider development and/or amendment of regulations and related guidance to reduce emissions, exposure, and health risk at a statewide and local level for the following sources:
  - Diesel PM sources such as stationary diesel engines, transport refrigeration units, portable diesel engines, on-road public fleets, off-road public fleets, heavy-duty diesel truck idling, harbor craft vessels, waste haulers
  - Other air toxics sources, such as formaldehyde in composite wood products, hexavalent chromium for chrome plating and chromic acid anodizing, thermal spraying, and perchloroethylene dry cleaning
- Develop technical information for the following:*
  - Distribution centers
  - Modeling tools such as HARP and CHAPIS
- Adopt rules and pollution prevention initiatives within legal authority to reduce emissions from mobile sources and fuels, and consumer products
- Develop and maintain Air Quality Handbook as a tool for use by land use agencies and local air districts to address cumulative air pollution impacts

Other Approaches

- Establish guidelines for use of statewide incentive funding for high priority mobile source emission reduction projects

*Because ARB will continue to review the need to adopt or revise statewide measures, the information contained in this chart will be updated on an ongoing basis.

A number of ARB's diesel risk reduction strategies have been adopted. These include measures to reduce emissions from refuse haulers, urban buses, transport refrigeration units, stationary and portable diesel engines, and idling trucks and school buses. These sources are all important from a community perspective.[18]

[18] The reader can refer to ARB's website for information on its mobile source-related programs at: http://www.arb.ca.gov/msprog/msprog.htm, as well as regulations adopted and under consideration as part of the Diesel Risk Reduction Program at: http://www.arb.ca.gov/diesel/dieselrrp.htm

The ARB will continue to evaluate the health effects of air pollutants while implementing programs with local air districts to reduce air pollution in all California communities.

Local air districts also have ambitious programs to reduce criteria pollutants and air toxics from regulated sources in their region. Many of these programs also benefit air quality in local communities as well as in the broader region. For more information on what is being done in your area to reduce cumulative air pollution impacts through air pollution control programs, you should contact your local air district.[19]

[19] Local air district contacts can be found on the inside cover to this Handbook.

7. Ways to Enhance Meaningful Public Participation

Community involvement is an important part of the land use process. The public is entitled to the best possible information about the air they breathe and what is being done to prevent or reduce unhealthful air pollution in their communities. In particular, information on how land use decisions can affect air pollution and public health should be made accessible to all communities, including low-income and minority communities.

Effective community participation consistently relies on a two-way flow of information – from public agencies to community members about opportunities, constraints, and impacts, and from community members back to public officials about needs, priorities, and preferences. The outreach process needed to build understanding and local neighborhood involvement requires data, methodologies, and formats tailored to the needs of the specific community. More importantly, it requires the strong collaboration of local government agencies that review and approve projects and land uses to improve the physical and environmental surroundings of the local community.

Many land use agencies, especially those in major metropolitan areas, are familiar with, and have a long-established public review process. Nevertheless, public outreach can often be improved. Active public involvement requires engaging the public in ways that do not require their previous interest in or knowledge of the land use or air pollution control requirements, and a commitment to taking action where appropriate to address the concerns that are raised.

■ Direct Community Outreach

In conjunction with local air districts, land use agencies should consider designing an outreach program for community groups, other stakeholders, and local government agency staffs that address the problem of cumulative air pollution impacts, and the public and government role in reducing them. Such a program could consider analytical tools that assist in the preparation and presentation of information in a way that supports sensible decision-making and public involvement. Table 7-1 contains some general outreach approaches that might be considered.

Table 7-1
Public Participation Approaches

- Staff and community leadership awareness training on environmental justice programs and community-based issues
- Surveys to identify the website information needs of interested community-based organizations and other stakeholders
- Information materials on local land use and air district authorities
- Community-based councils to facilitate and invite resident participation in the planning process
- Neighborhood CEQA scoping sessions that allows for community input prior to technical analysis
- Public information materials on siting issues are under review including materials written for the affected community, and in different media that widens accessibility
- Public meetings
- Identify other opportunities to include community-based organizations in the process

To improve outreach, local land use agencies should consider the following activities:

- Hold meetings in communities affected by agency programs, policies, and projects at times and in places that encourage public participation, such as evenings and weekends at centrally located community meeting rooms, libraries, and schools.
- Assess the need for and provide translation services at public meetings.
- Hold community meetings to update residents on the results of any special air monitoring programs conducted in their neighborhood.
- Hold community meetings to discuss and evaluate the various options to address cumulative impacts in their community.
- In coordination with local air districts, make staff available to attend meetings of community organizations and neighborhood groups to listen to and, where appropriate, act upon community concerns.
- Establish a specific contact person for environmental justice issues.
- Increase student and community awareness of local government land use activities and policies through outreach opportunities.
- Make air quality and land use information available to communities in an easily understood and useful format, including fact sheets, mailings, brochures, public service announcements, and web pages, in English and other languages.
- On the local government web-site, dedicate a page or section to what the land use program is doing regarding environmental justice and cumulative environmental impacts, and, as applicable, activities conducted with local air districts such as neighborhood air monitoring studies, pollution prevention, air pollution sources in neighborhoods, and risk reduction.

- Allow, encourage, and promote community access to land use activities, including public meetings, General Plan or Community Plan updates, zoning changes, special studies, CEQA reviews, variances, etc.
- Distribute information in multiple languages, as needed, on how to contact the land use agency or local air district to obtain information and assistance regarding environmental justice programs, including how to participate in public processes.
- Create and distribute a simple, easy-to-read, and understandable public participation handbook, which may be based on the "Public Participation Guidebook" developed by ARB.

- **Other Opportunities for Meaningful Public Outreach**

  - Community-Based Planning Committees

  Neighborhood-based or community planning advisory councils could be established to invite and facilitate direct resident participation into the planning process. With the right training and technical assistance, such councils can provide valuable input and a forum for the review of proposed amendments to plans, zone changes, land use permits, and suggestions as to how best to prevent or reduce cumulative air pollution impacts in their community.

  - Regional Partnerships

  Consider creating regional coalitions of key growth-related organizations from both the private and public sectors, with corporations, communities, other jurisdictions, and government agencies. Such partnerships could facilitate agreement on common goals and win-win solutions tailored specifically for the region. With this kind of dialogue, shared vision, and collaboration, barriers can be overcome and locally acceptable sustainable solutions implemented. Over the long term, such strategies will help to bring about clean air in communities as well as regionally.

LAND USE CLASSIFICATIONS AND ASSOCIATED FACILITY CATEGORIES THAT COULD EMIT AIR POLLUTANTS

(1) Land Use Classifications – by Activity[i]	(2) Facility or Project Examples	(3) Key Pollutants[ii,iii]	(4) Air Pollution Permits[iv]
COMMERCIAL/ LIGHT INDUSTRIAL: SHOPPING, BUSINESS, AND COMMERCIAL			
▲ Primarily retail shops and stores, office, commercial activities, and light industrial or small business	Dry cleaners; drive-through restaurants; gas dispensing facilities; auto body shops; metal plating shops; photographic processing shops; textiles; apparel and furniture upholstery; leather and leather products; appliance repair shops; mechanical assembly cleaning; printing shops	VOCs, air toxics, including diesel PM, NOx, CO, SOx	Limited; Rules for applicable equipment
▲ Goods storage or handling activities, characterized by loading and unloading goods at warehouses, large storage structures, movement of goods, shipping, and trucking.	Warehousing; freight-forwarding centers; drop-off and loading areas; distribution centers	VOCs, air toxics, including diesel PM, NOx, CO, SOx	No[v]
LIGHT INDUSTRIAL: RESEARCH AND DEVELOPMENT			
▲ Medical waste at research hospitals and labs	Incineration; surgical and medical instrument manufacturers, pharmaceutical manufacturing, biotech research facilities	Air toxics, NOx, CO, SOx	Yes
▲ Electronics, electrical apparatus, components, and accessories	Computer manufacturer; integrated circuit board manufacturer; semi-conductor production	Air toxics, VOCs	Yes
▲ College or university lab or research center	Medical waste incinerators; lab chemicals handling, storage and disposal	Air toxics, NOx, CO, SOx, PM10	Yes
▲ Research and development labs	Satellite manufacturer; fiber-optics manufacturer; defense contractors; space research and technology; new vehicle and fuel testing labs	Air toxics, VOCs	Yes
▲ Commercial testing labs	Consumer products; chemical handling, storage and disposal	Air toxics, VOCs	Yes

(1) Land Use Classifications – by Activity[i]	(2) Facility or Project Examples	(3) Key Pollutants[ii,iii]	(4) Air Pollution Permits[iv]
INDUSTRIAL: NON-ENERGY-RELATED			
▲ Assembly plants, manufacturing facilities, industrial machinery	Adhesives; chemical; textiles; apparel and furniture upholstery; clay, glass, and stone products production; asphalt materials; cement manufacturers, wood products; paperboard containers and boxes; metal plating; metal and canned food product fabrication; auto manufacturing; food processing; printing and publishing; drug, vitamins, and pharmaceuticals; dyes; paints; pesticides; photographic chemicals; polish and wax; consumer products; metal and mineral smelters and foundries; fiberboard; floor tile and cover; wood and metal furniture and fixtures; leather and leather products; general industrial and metalworking machinery; musical instruments; office supplies; rubber products and plastics production; saw mills; solvent recycling; shingle and siding; surface coatings	VOCs, air toxics, including diesel PM, NOx, PM, CO, SOx	Yes
INDUSTRIAL: ENERGY AND UTILITIES			
▲ Water and sewer operations	Pumping stations; air vents; treatment	VOCs, air toxics, NOx, CO, SOx, PM10	Yes
▲ Power generation and distribution	Power plant boilers and heaters; portable diesel engines; gas turbine engines	NOx, diesel PM, NOx, CO, SOx, PM10, VOCs	Yes
▲ Refinery operations	Refinery boilers and heaters; coke cracking units; valves and flanges; flares	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM10	Yes
▲ Oil and gas extraction	Oil recovery systems; uncovered wells	NOx, diesel PM, VOCs, CO, SOx, PM10	Yes
▲ Gasoline storage, transmission, and marketing	Above and below ground storage tanks; floating roof tanks; tank farms; pipelines	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM10	Yes
▲ Solid and hazardous waste treatment, storage, and disposal activities.	Landfills; methane digester systems; process recycling facility for concrete and asphalt materials	VOCs, air toxics, NOx, CO, SOx, PM10	Yes
CONSTRUCTION (NON-TRANSPORTATION)			
	Building construction; demolition sites	PM (re-entrained road dust), asbestos, diesel PM, NOx, CO, SOx, PM10, VOCs	Limited; state and federal off-road equipment standards

(1) Land Use Classifications – by Activity[i]	(2) Facility or Project Examples	(3) Key Pollutants[ii,iii]	(4) Air Pollution Permits[iv]
DEFENSE			
	Ordnance and explosives demolition; range and testing activities; chemical production; degreasing; surface coatings; vehicle refueling; vehicle and engine operations and maintenance	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM10	Limited; prescribed burning; equipment and solvent rules
TRANSPORTATION			
▲ Vehicular movement	Residential area circulation systems; parking and idling at parking structures; drive-through establishments; car washes; special events; schools; shopping malls, etc.	VOCs, NOx, PM (re-entrained road dust) air toxics e.g., benzene, diesel PM, formaldehyde, acetaldehyde, 1,3 butadiene, CO, SOx, PM10	No
▲ Road construction and surfacing	Street paving and repair; new highway construction and expansion	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM10	No
▲ Trains	Railroads; switch yards; maintenance yards	VOCs, NOx, CO, SOx, PM10, air toxics, including diesel PM	Limited; Applicable state and federal MV standards, and possible equipment rules
▲ Marine and port activities	Recreational sailing; commercial marine operations; hotelling operations; loading and un-loading; servicing; shipping operations; port or marina expansion; truck idling		
▲ Aircraft	Takeoff, landing, and taxiing; aircraft maintenance; ground support activities		
▲ Mass transit and school buses	Bus repair and maintenance		
NATURAL RESOURCES			
▲ Farming operations	Agricultural burning; diesel operated engines and heaters; small food processors; pesticide application; agricultural off-road equipment	Diesel PM, VOCs, NOx, PM10, CO, SOx, pesticides	Limited[vi]; Agricultural burning requirements, applicable state and federal mobile source standards; pesticide rules
▲ Livestock and dairy operations	Dairies and feed lots	Ammonia, VOCs, PM10	Yes[vii]
▲ Logging	Off-road equipment e.g., diesel fueled chippers, brush hackers, etc.	Diesel PM, NOx, CO, SOx, PM10, VOCs	Limited; Applicable state/federal mobile source standards
▲ Mining operations	Quarrying or stone cutting; mining; drilling or dredging	PM10, CO, SOx, VOCs, NOx, and asbestos in some geographical areas	Applicable equipment rules and dust controls

(1) Land Use Classifications – by Activity[i]	(2) Facility or Project Examples	(3) Key Pollutants[ii,iii]	(4) Air Pollution Permits[iv]
RESIDENTIAL			
Housing	Housing developments; retirement developments; affordable housing	Fireplace emissions (PM10, NOx, VOCs, CO, air toxics); Water heater combustion (NOx, VOCs, CO)	No[vii]
ACADEMIC AND INSTITUTIONAL			
▲ Schools, including school-related recreational activities	Schools; school yards; vocational training labs/classrooms such as auto repair/painting and aviation mechanics	Air toxics	Yes/No[viii]
▲ Medical waste	Incineration	Air toxics, NOx, CO, PM10	Yes
▲ Clinics, hospitals, convalescent homes		Air toxics	Yes

[i] These classifications were adapted from the American Planning Association's "Land Based Classification Standards." The Standards provide a consistent model for classifying land uses based on their characteristics. The model classifies land uses by refining traditional categories into multiple dimensions, such as activities, functions, building types, site development character, and ownership constraints. Each dimension has its own set of categories and subcategories. These multiple dimensions allow users to have precise control over land-use classifications. For more information, the reader should refer to the Association's website at http://www.planning.org/LBCS/GeneralInfo/.

[ii] This column includes key criteria pollutants and air toxic contaminants that are most typically associated with the identified source categories.

Additional information on specific air toxics that are attributed to facility categories can be found in ARB's Emission Inventory Criteria and Guidelines Report for the Air Toxics Hot Spots Program (May 15, 1997). This information can be viewed at ARB's web site at http://www.arb.ca.gov/ab2588/final96/guide96.pdf.

Criteria air pollutants are those air pollutants for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set. Criteria pollutants include ozone (formed by the reaction of volatile organic compounds and nitrogen oxides in the presence of sunlight), particulate matter, nitrogen dioxide, sulfur dioxide, carbon monoxide, and lead.

Volatile organic compounds (VOCs) combine with nitrogen oxides to form ozone, as well as particulate matter. VOC emissions result primarily from incomplete fuel combustion and the evaporation of chemical solvents and fuels. On-road mobile sources are the largest contributors to statewide VOC emissions. Stationary sources of VOC emissions include processes that use solvents (such as dry-cleaning, degreasing, and coating operations) and petroleum-related processes (such as petroleum refining, gasoline marketing and dispensing, and oil and gas extraction). Areawide VOC sources include consumer products, pesticides, aerosols and paints, asphalt paving and roofing, and other evaporative emissions.

Nitrogen oxides (NOx) are a group of gaseous compounds of nitrogen and oxygen, many of which contribute to the formation of ozone and particulate matter. Most NOx emissions are produced by the combustion of fuels. Mobile sources make up about 80 percent of the total statewide NOx emissions. Mobile sources include on-road vehicles and trucks, aircraft, trains, ships, recreational boats, industrial and construction equipment, farm

equipment, off-road recreational vehicles, and other equipment. Stationary sources of NOx include both internal and external combustion processes in industries such as manufacturing, food processing, electric utilities, and petroleum refining. Areawide source, which include residential fuel combustion, waste burning, and fires, contribute only a small portion of the total statewide NOx emissions, but depending on the community, may contribute to a cumulative air pollution impact.

Particulate matter (PM) refers to particles small enough to be breathed into the lungs (under 10 microns in size). It is not a single substance, but a mixture of a number of highly diverse types of particles and liquid droplets. It can be formed directly, primarily as dust from vehicle travel on paved and unpaved roads, agricultural operations, construction and demolition.

Carbon monoxide (CO) is a colorless and odorless gas that is directly emitted as a by-product of combustion. The highest concentrations are generally associated with cold stagnant weather conditions that occur during winter. CO problems tend to be localized.

An Air Toxic Contaminant (air toxic) is defined as an air pollutant that may cause or contribute to an increase in mortality or in serous illness, or which may pose a present or potential hazard to human health. Similar to criteria pollutants, air toxics are emitted from stationary, areawide, and mobile sources. They contribute to elevated regional and localized risks near industrial and commercial facilities and busy roadways. The ten compounds that pose the greatest statewide risk are: acetaldehyde; benzene; 1,3-butadiene; carbon tetrachloride; diesel particulate matter (diesel PM); formaldehyde; hexavalent chromium; methylene chloride; para-dichlorobenzene; and perchloroethylene. The risk from diesel PM is by far the largest, representing about 70 percent of the known statewide cancer risk from outdoor air toxics. The exhaust from diesel-fueled engines is a complex mixture of gases, vapors, and particles, many of which are known human carcinogens. Diesel PM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute about 26 percent of statewide diesel PM emissions, with an additional 72 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and other equipment. Stationary engines in shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations contribute about two percent of statewide emissions. However, when this number is disaggregated to a sub-regional scale such as neighborhoods, the risk factor can be far greater.

[iii] The level of pollution emitted is a major determinant of the significance of the impact.

[iv] Indicates whether facility activities listed in column 4 are generally subject to local air district permits to operate. This does not include regulated products such as solvents and degreasers that may be used by sources that may not require an operating permit per se, e.g., a gas station or dry cleaner.

[v] Generally speaking, warehousing or distribution centers are not subject to local air district permits. However, depending on the district, motor vehicle fleet rules may apply to trucks or off-road vehicles operated and maintained by the facility operator. Additionally, emergency generators or internal combustion engines operated on the site may require an operating permit.

[vi] Authorized by recent legislation SB700.

[vii] Local air districts do not require permits for woodburning fireplaces inside private homes. However, some local air districts and land use agencies do have rules or ordinances that require new housing developments or home re-sales to install U.S. EPA –certified stoves. Some local air districts also ban residential woodburning during weather inversions that concentrate smoke in residential areas. Likewise, home water heaters are not subject to permits; however, new heaters could be subject to emission limits that are imposed by federal or local agency regulations.

[viii] Technical training schools that conduct activities normally permitted by a local air district could be subject to an air permit.

LAND USE-BASED REFERENCE TOOLS TO EVALUATE NEW PROJECTS FOR POTENTIAL AIR POLLUTION IMPACTS

Land use agencies generally have a variety of tools and approaches at hand, or accessible from local air districts that can be useful in performing an analysis of potential air pollution impacts associated with new projects. These tools and approaches include:

- Base map of the city or county planning area and terrain elevations.
- General Plan designations of land use (existing and proposed).
- Zoning maps.
- Land use maps that identify existing land uses, including the location of facilities that are permitted or otherwise regulated by the local air district. Land use agencies should consult with their local air district for information on regulated facilities.
- Demographic data, e.g., population location and density, distribution of population by income, distribution of population by ethnicity, and distribution of population by age. The use of population data is a normal part of the planning process. However, from an air quality perspective, socioeconomic data is useful to identify potential community health and environmental justice issues.
- Emissions, monitoring, and risk-based maps created by the ARB or local air districts that show air pollution-related health risk by community across the state.
- Location of public facilities that enhance community quality of life, including parks, community centers, and open space.
- Location of industrial and commercial facilities and other land uses that use hazardous materials, or emit air pollutants. These include chemical storage facilities, hazardous waste disposal sites, dry cleaners, large gas dispensing facilities, auto body shops, and metal plating and finishing shops.
- Location of sources or facility types that result in diesel on-road and off-road emissions, e.g., stationary diesel power generators, forklifts, cranes, construction equipment, on-road vehicle idling, and operation of transportation refrigeration units. Distribution centers, marine terminals and ports, rail yards, large industrial facilities, and facilities that handle bulk goods are all examples of complex facilities where these types of emission sources are frequently concentrated.[1] Very large facilities, such as ports, marine terminals, and airports, could be analyzed regardless of proximity to a receptor if they are within the modeling area.
- Location and zoning designations for existing and proposed schools, buildings, or outdoor areas where sensitive individuals may live or play.
- Location and density of existing and proposed residential development.
- Zoning requirements, property setbacks, traffic flow requirements, and idling restrictions for trucks, trains, yard hostlers[2], construction equipment, or school buses.
- Traffic counts (including diesel truck traffic counts), within a community to validate or augment existing regional motor vehicle trip and speed data.

[1] The ARB is currently evaluating the types of facilities that may act as complex point sources and developing methods to identify them.

[2] Yard hostler means a tractor less than 300 horsepower that is used to transfer semi-truck or tractor-trailer containers in and around storage, transfer, or distribution yards or areas and is often equipped with a hydraulic lifting fifth wheel for connection to trailer containers.

ARB AND LOCAL AIR DISTRICT INFORMATION AND TOOLS CONCERNING CUMULATIVE AIR POLLUTION IMPACTS

It is the ARB's policy to support research and data collection activities toward the goal of reducing cumulative air pollution impacts. These efforts include updating and improving the air toxics emissions inventory, performing special air monitoring studies in specific communities, and conducting a more complete assessment of non-cancer health effects associated with air toxics and criteria pollutants.[1] This information is important because it helps us better understand links between air pollution and the health of sensitive individuals -- children, the elderly, and those with pre-existing serious health problems affected by air quality.

ARB is working with CAPCOA and OEHHA to improve air pollutant data and evaluation tools to determine when and where cumulative air pollution impacts may be a problem. The following provides additional information on this effort.

How are emissions assessed?

Detailed information about the sources of air pollution in an area is collected and maintained by local air districts and the ARB in what is called an emission inventory. Emission inventories contain information about the nature of the business, the location, type and amount of air pollution emitted, the air pollution-producing processes, the type of air pollution control equipment, operating hours, and seasonal variations in activity. Local districts collect emission inventory data for most stationary source categories.

Local air districts collect air pollution emission information directly from facilities and businesses that are required to obtain an air pollution operating permit. Local air districts use this information to compile an emission inventory for areas within their jurisdiction. The ARB compiles a statewide emission inventory based on the information collected by the ARB and local air districts. Local air districts provide most of the stationary source emission data, and ARB provides mobile source emissions as well as some areawide emission sources such as consumer products and paints. ARB is also developing map-based tools that will display information on air pollution sources.

Criteria pollutant data have been collected since the early 1970's, and toxic pollutant inventories began to be developed in the mid-1980's.

[1] A criteria pollutant is any air pollutant for which EPA has established a National Ambient Air Quality Standard or for which California has established a State Ambient Air Quality Standard, including: carbon monoxide, lead, nitrogen oxides, ozone, particulates and sulfur oxides. Criteria pollutants are measured in each of California's air basins to determine whether the area meets or does not meet specific federal or state air quality standards. Air toxics or air toxic contaminants are listed pollutants recognized by California or EPA as posing a potential risk to health.

How is the toxic emission inventory developed?

Emissions data for toxic air pollutants is a high priority for communities because of concerns about potential health effects. Most of ARB's air toxics data is collected through the toxic "Hot Spots" program. Local air districts collect emissions data from industrial and commercial facilities. Facilities that exceed health-based thresholds are required to report their air toxics emissions as part of the toxic "Hot Spots" program and update their emissions data every four years. Facilities are required to report their air toxics emissions data if there is an increase that would trigger the reporting threshold of the hotspots program. Air toxics emissions from motor vehicles and consumer products are estimated by the ARB. These estimates are generally regional in nature, reflecting traffic and population.

The ARB also maintains chemical speciation profiles that can be used to estimate toxics emissions when no toxic emissions data is available.

What additional toxic emissions information is needed?

In order to assess cumulative air pollution impacts, updated information from individual facilities is needed. Even for sources where emissions data are available, additional information such as the location of emissions release points is often needed to better model cumulative impacts. In terms of motor vehicles, emissions data are currently based on traffic models that only contain major roads and freeways. Local traffic data are needed so that traffic emissions can be more accurately assigned to specific streets and roads. Local information is also needed for off-road emission sources, such as ships, trains, and construction equipment. In addition, hourly maximum emissions data are needed for assessing acute air pollution impacts.

What work is underway?

ARB is working with CAPCOA to improve toxic emissions data, developing a community health air pollution information system to improve access to emission information, conducting neighborhood assessment studies to better understand toxic emission sources, and conducting surveys of sources of toxic pollutants.

How is air pollution monitored?

While emissions data identify how much air pollution is going into the air, the state's air quality monitoring network measures air pollutant levels in outdoor air. The statewide air monitoring network is primarily designed to measure regional exposure to air pollutants, and consists of more than 250 air monitoring sites.

The air toxics monitoring network consists of approximately 20 permanent sites. These sites are supplemented by special monitoring studies conducted by ARB and local air districts. These sites measure approximately sixty toxic air pollutants. Diesel PM, which is the major driver of urban air toxic risk, is not monitored directly. Ten of the

60 toxic pollutants, not including diesel, account for most of the remaining potential cancer risk in California urban areas.

What additional monitoring has been done?

Recently, additional monitoring has been done to look at air quality at the community level. ARB's community monitoring was conducted in six communities located throughout the state. Most sites were in low-income, minority communities located near major sources of air pollution, such as refineries or freeways. The monitoring took place for a year or more in each community, and included measurements of both criteria and toxic pollutants.

What is being learned from community monitoring?

In some cases, the ARB or local air districts have performed air quality monitoring or modeling studies covering a particular region of the state. When available, these studies can give information about regional air pollution exposures.

The preliminary results of ARB's community monitoring are providing insights into air pollution at the community level. Urban background levels are a major contributor to the overall risk from air toxics in urban areas, and this urban background tends to mask the differences between communities. When localized elevated air pollutant levels were measured, they were usually associated with local ground-level sources of toxic pollutants. The most common source of this type was busy streets and freeways. The impact these ground-level sources had on local air quality decreased rapidly with distance from the source. Pollutant levels usually returned to urban background levels within a few hundred meters of the source.

These results indicate that tools to assess cumulative impacts must be able to account for both localized, near-source impacts, as well as regional background air pollution. The tools that ARB is developing for this purpose are air quality models.

How can air quality modeling be used?

While air monitoring can directly measure cumulative exposure to air pollution, it is limited because all locations cannot be monitored. To address this, air quality modeling provides the capability to estimate exposure when air monitoring is not feasible. Air quality modeling can be refined to assess local exposure, identify locations of potential hot spots, and identify the relative contribution of emission sources to exposure at specific locations. The ARB has used this type of information to develop regional cumulative risk maps that estimate the cumulative cancer air pollution risk for most of California. While these maps only show one air pollution-related health risk, it does provide a useful starting point.

What is needed for community modeling?

Air quality models have been developed to assess near-source impacts, but they have very exacting data requirements. These near-source models estimate the impact of local sources, but do not routinely include the contribution from regional air pollution background. To estimate cumulative air pollution exposure at a neighborhood scale, a modeling approach needs to combine features of both micro-scale and regional models.

In addition, improved methods are needed to assess near-source impacts under light and variable wind conditions, when high local concentrations are more likely to occur. A method for modeling long-term exposure to air pollutants near freeways and other high traffic areas is also needed.

What modeling work has ARB developed?

A key component of ARB's Community Health Program is the Neighborhood Assessment Program (NAP). As described later in this section, the NAP studies are being conducted to better understand pollution impacts at the community level. Through two such studies conducted in Barrio Logan (San Diego) and Wilmington (Los Angeles), ARB is refining community-level modeling methodologies. Regional air toxics modeling is also being performed to better understand regional air pollution background levels.

In a parallel effort, ARB is developing modeling protocols for estimating cumulative emissions, exposure, and risk from air pollution. The protocols will cover modeling approaches and uncertainties, procedures for running the models, the development of statewide risk maps, and methods for estimating health risks. The protocols are subject to an extensive peer review process prior to release.

How are air pollution impacts on community health assessed?

On a statewide basis, ARB's toxic air contaminant program identifies and reduces public exposure to air toxics. The focus of the program has been on reducing potential cancer risk, because monitoring results show potential urban cancer risk levels are too high. ARB has also looked for potential non-cancer risks based on health reference levels provided by OEHHA. On a regional basis, the pollutants measured in ARB's toxic monitoring network are generally below the OEHHA non-cancer reference exposure levels.

As part of its community health program, the ARB is looking at potential cancer and non-cancer risk. This could include chronic or acute health effects. If the assessment work shows elevated exposures on a localized basis, ARB will work with OEHHA to assess the health impacts.

What tools has ARB developed to assess cumulative air pollution impacts?

ARB has developed the following tools and reports to assist land use agencies and local air districts assess and reduce cumulative emissions, exposure, and risk on a neighborhood scale.

Statewide Risk Maps

ARB has produced regional risk maps that show the statewide trends for Southern and Central California in estimated potential cancer risk from air toxics between 1990 and 2010.[2] These maps will supplement U.S. EPA's ASPEN model and are available on the ARB's Internet site. These maps are best used to obtain an estimate of the regional background air pollution health risk and are not detailed enough to estimate the exact risk at a specific location.

ARB also has maps that focus in more detail on smaller areas that fall within the Southern and Central California regions for these same modeled years. The finest visual resolution available in the maps on this web site is two by two kilometers. These maps are not detailed enough to assess individual neighborhoods or facilities.

Community Health Air Pollution Information System (CHAPIS)

CHAPIS is an Internet-based procedure for displaying information on emissions from sources of air pollution in an easy to use mapping format. CHAPIS uses Geographical Information System (GIS) software to deliver interactive maps over the Internet. CHAPIS relies on emission estimates reported to the ARB's emission inventory database - California Emissions Inventory Development and Reporting System, or CEIDARS.

Through CHAPIS, air district staff can quickly and easily identify pollutant sources and emissions within a specified area. CHAPIS contains information on air pollution emissions from selected large facilities and small businesses that emit criteria and toxic air pollutants. It also contains information on air pollution emissions from motor vehicle and areawide emissions. CHAPIS does not contain information on every source of air pollution or every air pollutant. It is a major long-term objective of CHAPIS to include all of the largest air pollution sources and those with the highest documented air pollution risk. CHAPIS will be updated on a periodic basis and additional facilities will be added to CHAPIS as more data becomes available.

CHAPIS is being developed in stages to assure data quality. The initial release of CHAPIS will include facilities emitting 10 or more tons per year of nitrogen oxides, sulfur dioxide, carbon monoxide, PM10, or reactive organic gases; air toxics from refineries and power plants of 50 megawatts or more; and facilities that conducted health risk

[2]ARB maintains state trends and local potential cancer risk maps that show statewide trends in potential inhalable cancer risk from air toxics between 1990 and 2010. This information can be viewed at ARB's web site at http://www.arb.ca.gov/toxics/cti/hlthrisk/hlthrisk.htm)

assessments under the California Air Toxics "Hot Spots" Information and Assessment Program.[3]

CHAPIS can be used to identify the emission contributions from mobile, area, and point sources on that community.

"Hot Spots" Analysis and Reporting Program (HARP)

HARP[4] is a software package available from the ARB and is designed with air quality professionals in mind. It models emissions and release data from one or more facilities to estimate the potential health risk posed by the selected facilities on the neighboring community. HARP uses the latest risk assessment guidelines published by OEHHA.

With HARP, a user can perform the following tasks:

- Create and manage facility databases;
- Perform air dispersion modeling;
- Conduct health risk analyses;
- Output data reports; and
- Output results to GIS mapping software.

HARP can model downwind concentrations of air toxics based on the calculated emissions dispersion at a single facility. HARP also has the capability of assessing the risk from multiple facilities, and for multiple locations of concern near those facilities. While HARP has the capability to assess multiple source impacts, there had been limited application of the multiple facility assessment function in the field at the time of HARP's debut in 2003. HARP can also evaluate multi-pathway, non-inhalation health risk resulting from air pollution exposure, including skin and soil exposure, and ingestion of meat and vegetables contaminated with air toxics, and other toxics that have accumulated in a mother's breast milk.

Neighborhood Assessment Program (NAP)

The NAP[5] has been a key component of ARB's Community Health Program. It includes the development of tools that can be used to perform assessments of cumulative air pollution impacts on a neighborhood scale. The NAP studies have been done to better understand how air pollution affects individuals at the neighborhood level. Thus far, ARB has conducted neighborhood scale assessments in Barrio Logan and Wilmington.

As part of these studies, ARB is collecting data and developing a modeling protocol that can be used to conduct cumulative air pollution impact assessments. Initially these

[3] California Health & Safety Code section 44300, et seq.
[4] More detailed information can be found on ARB's website at: http://www.arb.ca.gov/toxics/harp/harp.htm
[5] For more information on the Program, please refer to: http://www.arb.ca.gov/ch/programs/nap/nap.htm

assessments will focus on cumulative inhalation cancer health risk and chronic non-cancer impacts. The major challenge is developing modeling methods that can combine both regional and localized air pollution impacts, and identifying the critical data necessary to support these models. The objective is to develop methods and tools from these studies that can ultimately be applied to other areas of the state. In addition, the ARB plans to use these methods to replace the ASPEN regional risk maps currently posted on the ARB Internet site.

Urban Emissions Model (URBEMIS)

URBEMIS[6] is a computer program that can be used to estimate emissions associated with land development projects in California such as residential neighborhoods, shopping centers, office buildings, and construction projects. URBEMIS uses emission factors available from the ARB to estimate vehicle emissions associated with new land uses. URBEMIS estimates sulfur dioxide emissions from motor vehicles in addition to reactive organic gases, nitrogen oxides, carbon monoxide, and PM10.

Land-Use Air Quality Linkage Report[7]

This report summarizes data currently available on the relationships between land use, transportation and air quality. It also highlights strategies that can help to reduce the use of the private automobile. It also briefly summarizes two ARB-funded research projects. The first project analyzes the travel patterns of residents living in five higher density, mixed use neighborhoods in California, and compares them to travel in more auto-oriented areas. The second study correlates the relationship between travel behavior and community characteristics, such as density, mixed land uses, transit service, and accessibility for pedestrians.

[6] For more information on this model, please refer to ARB's website at http://www.arb.ca.gov/html/soft.htm.

[7] To access this report, please refer to ARB's website or click on: http://www.arb.ca.gov/ch/programs/link97.pdf

LAND USE AND AIR QUALITY AGENCY ROLES IN THE LAND USE PROCESS

A wide variety of federal, state, and local government agencies are responsible for regulatory, planning, and siting decisions that can have an impact on air pollution. They include local land use agencies, regional councils of government, school districts, local air districts, ARB, the California Department of Transportation (Caltrans), and the Governor's Office of Planning and Research (OPR) to name a few. This Section will focus on the roles and responsibilities of local and state agencies. The role of school districts will be discussed in Appendix E.

Local Land Use Agencies

Under the State Constitution, land use agencies have the primary authority to plan and control land use.[1] Each of California's incorporated cities and counties are required to adopt a comprehensive, long-term General Plan.[2]

The General Plan's long-term goals are implemented through zoning ordinances. These are local laws adopted by counties and cities that describe for specific areas the kinds of development that will be allowed within their boundaries.

Land use agencies are also the lead for doing environmental assessments under CEQA for new projects that may pose a significant environmental impact, or for new or revised General Plans.

Local Agency Formation Commissions (LAFCOs)

Operating in each of California's 58 counties, LAFCOs are composed of local elected officials and public members who are responsible for coordinating changes in local governmental boundaries, conducting special studies that review ways to reorganize, simplify, and streamline governmental structures, and preparing a sphere of influence for each city and special district within each county. Each Commission's efforts are directed toward seeing that local government services are provided efficiently and economically while agricultural and open-space lands are protected. LAFCO decisions strive to balance the competing needs in California for efficient services, affordable housing, economic opportunity, and conservation of natural resources.

[1] The legal basis for planning and land use regulation is the "police power" of the city or county to protect the public's health, safety and welfare. The California Constitution gives cities and counties the power to make and enforce all local police, sanitary and other ordinances and regulations not in conflict with general laws. State law reference: California Constitution, Article XI §7.

[2] OPR General Plan Guidelines, 2003: http://www.opr.ca.gov/planning/PDFs/General_Plan_Guidelines_2003.pdf

Councils of Government (COG)

COGs are organizations composed of local counties and cities that serve as a focus for the development of sound regional planning, including plans for transportation, growth management, hazardous waste management, and air quality. They can also function as the metropolitan planning organization for coordinating the region's transportation programs. COGs also prepare regional housing need allocations for updates of General Plan housing elements.

Local Air Districts

Under state law, air pollution control districts or air quality management districts (local air districts) are the local government agencies responsible for improving air quality and are generally the first point of contact for resolving local air pollution issues or complaints. There are 35 local air districts in California[3] that have authority and primary responsibility for regional clean air planning. Local air districts regulate stationary sources of air pollutants within their jurisdiction including but not limited to industrial and commercial facilities, power plants, construction activities, outdoor burning, and other non-mobile sources of air pollution. Some local air districts also regulate public and private motor vehicle fleet operators such as public bus systems, private shuttle and taxi services, and commercial truck depots.

- **Regional Clean Air Plans**

Local air districts are responsible for the development and adoption of clean air plans that protect the public from the harmful effects of air pollution. These plans incorporate strategies that are necessary to attain ambient air quality standards. Also included in these regional air plans are ARB and local district measures to reduce statewide emissions from mobile sources, consumer products, and industrial sources.

- **Facility-Specific Considerations**

Permitting. In addition to the planning function, local air districts adopt and enforce regulations, issue permits, and evaluate the potential environmental impacts of projects.

Pollution is regulated through permits and technology-based rules that limit emissions from operating units within a facility or set standards that vehicle fleet operators must meet. Permits to construct and permits to operate contain very specific requirements and conditions that tell each regulated source what it must do to limit its air pollution in compliance with local air district rules, regulations, and state law. Prior to receiving a permit, new facilities must go through a New Source Review (NSR) process that establishes air pollution control requirements for the facility. Permit conditions are typically contained in the permit to operate and specify requirements that businesses must follow; these may include limits on the amount of pollution that can be emitted, the

[3] Contact information for local air districts in California is listed in the front of this Handbook.

type of pollution control equipment that must be installed and maintained, and various record-keeping requirements.

Local air districts also notify the public about new permit applications for major new facilities, or major modifications to existing facilities that seek to locate within 1,000 feet of a school.

Local air districts can also regulate other types of sources to reduce emissions. These include regulations to reduce emissions from the following sources:

- hazardous materials in products used by industry such as paints, solvents, and de-greasers;
- agricultural and residential burning;
- leaking gasoline nozzles at service stations;
- public fleet vehicles such as sanitation trucks and school buses; and
- fugitive or uncontrolled dust at construction sites.

However, while emissions from industrial and commercial sources are typically subject to the permit authority of the local air district, sensitive sites such as a day care center, convalescent home, or playground are not ordinarily subject to an air permit. Local air district permits address the air pollutant emissions of a project but not its location.

Under the state's air toxics program, local air districts regulate air toxic emissions by adopting ARB air toxic control measures, or more stringent district-specific requirements, and by requiring individual facilities to perform a health risk assessment if emissions at the source exceed district-specific health risk thresholds[4], [5] (See the section on ARB programs for a more detailed summary of this program).

One approach by which local air districts regulate air toxics emissions is through the "Hot Spots" program.[6] The risk assessments submitted by the facilities under this

---

[4] Cal/EPA's Office of Environmental Health Hazard Assessment has published "A Guide to Health Risk Assessment" for lay people involved in environmental health issues, including policymakers, businesspeople, members of community groups, and others with an interest in the potential health effects of toxic chemicals. To access this information, please refer to http://www.oehha.ca.gov/pdf/HRSguide2001.pdf

[5] Section 44306 of the California Health & Safety Code defines a health risk assessment as a detailed comprehensive analysis that a polluting facility uses to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations, and to assess and quantify both the individual and population-wide health risks associated with those levels of exposure.

[6] AB-2588 (the Air Toxics "Hot Spots" Information and Assessment Act) requires local air districts to prioritize facilities by high, intermediate, and low priority categories to determine which must perform a health risk assessment. Each district is responsible for establishing the prioritization score threshold at which facilities are required to prepare a health risk assessment. In establishing priorities for each facility, local air districts must consider the potency, toxicity, quantity, and volume of hazardous materials released from the facility, the proximity of the facility to potential receptors, and any other factors that the district determines may indicate that the facility may pose a significant risk. All facilities within the highest category must prepare a health risk assessment. In addition, each district may require facilities in the intermediate and low priority categories to also submit a health risk assessment.

Table D-1
Local Sources of Air Pollution, Responsible Agencies, and Associated Regulatory Programs

Source	Examples	Primary Agency	Applicable Regulations
Large Stationary	Refineries, power plants, chemical facilities, certain manufacturing plants	Local air districts	Operating permit rules Air Toxics "Hot Spots" Law (AB 2588) Local district rules Air Toxic Control Measures (ATCMs)* New Source Review rules Title V permit rules
Small Stationary	Dry cleaners, auto body shops, welders, chrome plating facilities, service stations, certain manufacturing plants	Local air districts	Operating permit conditions, Air Toxics "Hot Spots" Law (AB 2588) Local district rules ATCMs* New Source Review rules
Mobile (non-fleet)	Cars, trucks, buses	ARB	Emission standards Cleaner-burning fuels (e.g., unleaded gasoline, low-sulfur diesel) Inspection and repair programs (e.g., Smog Check)
Mobile Equipment	Construction equipment	ARB, U.S. EPA	ARB rules U.S. EPA rules
Mobile (fleet)	Truck depots, school buses, taxi services	Local air districts, ARB	Local air district rules ARB urban bus fleet rule
Areawide	Paints and consumer products such as hair spray and spray paint	Local air district, ARB	ARB rules Local air district rules

*ARB adopts ATCMs, but local air districts have the responsibility to implement and enforce these measures or more stringent ones.

program are reviewed by OEHHA and approved by the local air district. Risk assessments are available by contacting the local air district.

Enforcement. Local air districts also take enforcement action to ensure compliance with air quality requirements. They enforce air toxic control measures, agricultural and residential burning programs, gasoline vapor control regulations, laws that prohibit air pollution nuisances, visible emission limits, and many other requirements designed to

clean the air. Local districts use a variety of enforcement tools to ensure compliance. These include notices of violation, monetary penalties, and abatement orders. Under some circumstances, a permit may be revoked.

- **Environmental Review**

As required by the California Environmental Quality Act (CEQA), local air districts also review and comment on proposed land use plans and development projects that can have a significant effect on the environment or public health.[7]

California Air Resources Board

The ARB is the air pollution control agency at the state level that is responsible for the preparation of air plans required by state and federal law. In this regard, it coordinates the activities of all local air districts to ensure all statutory requirements are met and to reduce air pollution emissions for sources under its jurisdiction.

Motor vehicles are the single largest emissions source category under ARB's jurisdiction as well as the largest overall emissions source statewide. ARB also regulates emissions from other mobile equipment and engines as well as emissions from consumer products such as hair sprays, perfumes, cleaners, and aerosol paints.

Air Toxics Program

Under state law, the ARB has a critical role to play in the identification, prioritization, and control of air toxic emissions. The ARB statewide comprehensive air toxics program was established in the early 1980's. The Toxic Air Contaminant Identification and Control Act of 1983 (AB 1807, Tanner 1983) created California's program to reduce exposure to air toxics.[8] The Air Toxics "Hot Spots" Information and Assessment Act (Hot Spots program) supplements the AB 1807 program, by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Under AB 1807, the ARB is required to use certain criteria to prioritize the identification and control of air toxics. In selecting substances for review, the ARB must consider criteria relating to emissions, exposure, and health risk, as well as persistence in the atmosphere, and ambient concentrations in the community. AB 1807 also requires the ARB to use available information gathered from the Hot Spots program when prioritizing compounds.

The ARB identifies pollutants as toxic air contaminants and adopts statewide air toxic control measures (ATCMs). Once ARB adopts an ATCM, local air districts must

[7] Section 4 of this Handbook contains more information on the CEQA process.
[8] For a general background on California's air toxics program, the reader should refer to ARB's website at http://www.arb.ca.gov/toxics/tac/appendxb.htm.

implement the measure, or adopt and implement district-specific measures that are at least as stringent as the state standard. Taken in the aggregate, these ARB programs will continue to further reduce emissions, exposure, and health risk statewide.

With regard to the land use decision-making process, ARB, in conjunction with local air districts, plays an advisory role by providing technical information on land use-related air issues.

Other Agencies

Governor's Office of Planning and Research (OPR)

In addition to serving as the Governor's advisor on land use planning, research, and liaison with local government, OPR develops and implements the state's policy on land use planning and coordinates the state's environmental justice programs. OPR updated its General Plan Guidelines in 2003 to highlight the importance of sustainable development and environmental justice policies in the planning process. OPR also advises project proponents and government agencies on CEQA provisions and operates the State Clearinghouse for environmental and federal grant documents.

California Department of Housing and Community Development

The Department of Housing and Community Development (HCD) administers a variety of state laws, programs and policies to preserve and expand housing opportunities, including the development of affordable housing. All local jurisdictions must update their housing elements according to a staggered statutory schedule, and are subject to certification by HCD. In their housing elements, cities and counties are required to include a land inventory which identifies and zones sites for future residential development to accommodate a mix of housing types, and to remove barriers to the development of housing.

An objective of state housing element law is to increase the overall supply and affordability of housing. Other fundamental goals include conserving existing affordable housing, improving the condition of the existing housing stock, removing regulatory barriers to housing production, expanding equal housing opportunities, and addressing the special housing needs of the state's most vulnerable residents (frail elderly, disabled, large families with children, farmworkers, and the homeless).

Transportation Agencies

Transportation agencies can also influence mobile source-related emissions in the land use decision-making process. Local transportation agencies work with land use agencies to develop a transportation (circulation) element for the General Plan. These local government agencies then work with other transportation-related agencies, such as the Congestion Management Agency (CMA), Metropolitan Planning Organization

(MPO), Regional Transportation Planning Agency (RTPA), and Caltrans to develop long and short range transportation plans and projects.

Caltrans is the agency responsible for setting state transportation goals and for state transportation planning, design, construction, operations and maintenance activities. Caltrans is also responsible for delivering California's multibillion-dollar state Transportation Improvement Program, a list of transportation projects that are approved for funding by the California Transportation Commission in a 4-year cycle.

When safety hazards or traffic circulation problems are identified in the existing road system, or when land use changes are proposed such as a new residential subdivision, shopping mall or manufacturing center, Caltrans and/or the local transportation agency ensure the projects meet applicable state, regional, and local goals and objectives.

Caltrans also evaluates transportation-related projects for regional air quality impacts, from the perspective of travel-related emissions as well as road congestion and increases in road capacity (new lanes).

California Energy Commission (CEC)

The CEC is the state's CEQA lead agency for permitting large thermal power plants (50 megawatts or greater). The CEC works closely with local air districts and other federal, state and local agencies to ensure compliance with applicable laws, ordinances, regulations and standards in the permitting, construction, operation and closure of such plants. The CEC uses an open and public review process that provides communities with outreach and multiple opportunities to participate and be heard. In addition to its comprehensive environmental impact and engineering design assessment process, the CEC also conducts an environmental justice evaluation. This evaluation involves an initial demographic screening to determine if a qualifying minority or low-income population exists in the vicinity of the proposed project. If such a population is present, staff considers possible environmental justice impacts including from associated project emissions in its technical assessments.[9]

Department of Pesticides Regulation (DPR)

Pesticides are industrial chemicals produced specifically for their toxicity to a target pest. They must be released into the environment to do their job. Therefore, regulation of pesticides focuses on using toxicity and other information to ensure that when pesticides are used according to their label directions, potential for harm to people and the environment is minimized. DPR imposes strict controls on use, beginning before pesticide products can be sold in California, with an extensive scientific program to ensure they can be used safely. DPR and county enforcement staff tracks the use of pesticides to ensure that pesticides are used properly. DPR collects periodic

[9] See California Energy Commission, "Environmental Performance Report," July 2001 at http://www.energy.ca.gov/reports/2001-11-20_700-01-001.PDF

measurements of any remaining amounts of pesticides in water, air, and on fresh produce. If unsafe levels are found, DPR requires changes in how pesticides are used, to reduce the possibility of harm. If this cannot be done - that is, if a pesticide cannot be used safely - use of the pesticide will be banned in California.[10]

Federal Agencies

Federal agencies have permit authority over activities on federal lands and certain resources, which have been the subject of congressional legislation, such as air, water quality, wildlife, and navigable waters. The U.S. Environmental Protection Agency generally oversees implementation of the federal Clean Air Act, and has broad authority for regulating certain activities such as mobile sources, air toxics sources, the disposal of toxic wastes, and the use of pesticides. The responsibility for implementing some federal regulatory programs such as those for air and water quality and toxics is delegated by management to specific state and local agencies. Although federal agencies are not subject to CEQA they must follow their own environmental process established under the National Environmental Policy Act (NEPA).

[10] For more information, the reader is encouraged to visit the Department of Pesticide Regulation web site at www.cdpr.ca.gov/docs/empm/pubs/tacmenu.htm.

SPECIAL PROCESSES THAT APPLY TO SCHOOL SITING

The California Education Code and the California Public Resources Code place primary authority for siting public schools with the local school district, which is the 'lead agency' for purposes of CEQA. The California Education Code requires public school districts to notify the local planning agency about siting a new public school or expanding an existing school. The planning agency then reports back to the school district regarding a project's conformity with the adopted General Plan. However, school districts can overrule local zoning and land use designations for schools if they follow specified procedures. In addition, all school districts must evaluate new school sites using site selection standards established in Section 14010 of Title 5 of the California Code of Regulations. Districts seeking state funding for school site acquisition must also obtain site approval from the California Department of Education.

Before making a final decision on a school site acquisition, a school district must comply with CEQA and evaluate the proposed site acquisition/new school project for air emissions and health risks by preparing and certifying an environmental impact report or negative declaration. Both the California Education Code section 17213 and the California Public Resources Code section 21151.8 require school districts to consult with administering agencies and local air districts when preparing the environmental assessment. Such consultation is required to identify both permitted and non-permitted "facilities" that might significantly affect health at the new site. These facilities include, but are not limited to, freeways and other busy traffic corridors, large agricultural operations, and rail yards that are within one-quarter mile of the proposed school site, and that might emit hazardous air emissions, or handle hazardous or acutely hazardous materials, substances, or waste.

As part of the CEQA process and before approving a school site, the school district must make a finding that either it found none of the facilities or significant air pollution sources, or alternatively, if the school district finds that there are such facilities or sources, it must determine either that they pose no significant health risks, or that corrective actions by another governmental entity would be taken so that there would be no actual or potential endangerment to students or school workers.

In addition, if the proposed school site boundary is within 500 feet of the edge of the closest traffic lane of a freeway or traffic corridor that has specified minimum average daily traffic counts, the school district is required to determine through specified risk assessment and air dispersion modeling that neither short-term nor long term exposure poses significant heath risks to pupils.

State law changes effective January 1, 2004 (SB352, Escutia 2003, amending Education Code section 17213 and Public Resources Code section 21151.8) also provides for cases in which the school district cannot make either of those two findings and cannot find a suitable alternative site. When this occurs, the school district must adopt a statement of over-riding considerations, as part of an environmental impact

report, that the project should be approved based on the ultimate balancing of the merits.

Some school districts use a standardized assessment process to determine the environmental impacts of a proposed school site. In the assessment process, school districts can use maps and other available information to evaluate risk, including a local air district's database of permitted source emissions. School districts can also perform field surveys and record searches to identify and calculate emissions from non-permitted sources within one-quarter mile radius of a proposed site. Traffic count data and vehicular emissions data can also be obtained from Caltrans for major roadways and freeways in proximity to the proposed site to model potential emissions impacts to students and school employees. This information is available from the local COG, Caltrans, or local cities and counties for non-state maintained roads.

GENERAL PROCESSES USED BY LAND USE AGENCIES TO ADDRESS AIR POLLUTION IMPACTS

There are several separate but related processes for addressing the air pollution impacts of land use projects. One takes place as part of the planning and zoning function. This consists of preparing and implementing goals and policies contained in county or city General Plans, community or area plans, and specific plans governing land uses such as residential, educational, commercial, industrial, and recreational activities. It also includes recommending locations for thoroughfares, parks and other public improvements.

Land use agencies also have a permitting function that includes performing environmental reviews and mitigation when projects may pose a significant environmental impact. They conduct inspections for zoning permits issued, enforce the zoning regulations and issue violations as necessary, issue zoning certificates of compliance, and check compliance when approving certificates of occupancy.

Planning

- **General Plan**[1]

The General Plan is a local government "blueprint" of existing and future anticipated land uses for long-term future development. It is composed of the goals, policies, and general elements upon which land use decisions are based. Because the General Plan is the foundation for all local planning and development, it is an important tool for implementing policies and programs beneficial to air quality. Local governments may choose to adopt a separate air quality element into their General Plan or to integrate air quality-beneficial objectives, policies, and strategies in other elements of the Plan, such as the land use, circulation, conservation, and community design elements.

More information on General Plan elements is contained in Appendix D.

- **Community Plans**

Community or area plans are terms for plans that focus on a particular region or community within the overall general plan area. It refines the policies of the general plan as they apply to a smaller geographic area and is implemented by ordinances and other discretionary actions, such as zoning.

[1] In October 2003, OPR revised its General Plan Guidelines. An entire chapter is now devoted to a discussion of how sustainable development and environmental justice goals can be incorporated into the land use planning process. For further information, the reader is encouraged to obtain a copy of OPR's General Plan Guidelines, or refer to their website at: http://www.opr.ca.gov/planning/PDFs/General_Plan_Guidelines_2003.pdf

- **Specific Plan**

A specific plan is a hybrid that can combine policies with development regulations or zoning requirements. It is often used to address the development requirements for a single project such as urban infill or a planned community. As a result, its emphasis is on concrete standards and development criteria.

- **Zoning**

Zoning is the public regulation of the use of land. It involves the adoption of ordinances that divide a community into various districts or zones. For instance, zoning ordinances designate what projects and activities can be sited in particular locations. Each zone designates allowable uses of land within that zone, such as residential, commercial, or industrial. Zoning ordinances can address building development standards, e.g., minimum lot size, maximum building height, minimum building setback, parking, signage, density, and other allowable uses.

Land Use Permitting

In addition to the planning and zoning function, land use agencies issue building and business permits, and evaluate the potential environmental impacts of projects. To be approved, projects must be located in a designated zone and comply with applicable ordinances and zoning requirements.

Even if a project is sited properly in a designated zone, a land use agency may require a new source to mitigate potential localized environmental impacts to the surrounding community below what would be required by the local air district. In this case, the land use agency could condition the permit by limiting or prescribing allowable uses including operating hour restrictions, building standards and codes, property setbacks between the business property and the street or other structures, vehicle idling restrictions, or traffic diversion.

Land use agencies also evaluate the environmental impacts of proposed land use projects or activities. If a project or activity falls under CEQA, the land use agency requires an environmental review before issuing a permit to determine if there is the potential for a significant impact, and if so, to mitigate the impact or possibly deny the project.

- **Land Use Permitting Process**

In California, the authority to regulate land use is delegated to city and county governments. The local land use planning agency is the local government administrative body that typically provides information and coordinates the review of development project applications. Conditional Use Permits (CUP) typically fall within a land use agency's discretionary authority and therefore are subject to CEQA. CUPs are

intended to provide an opportunity to review the location, design, and manner of development of land uses prior to project approval. A traditional purpose of the CUP is to enable a municipality to control certain uses that could have detrimental environmental effects on the community.

The process for permitting new discretionary projects is quite elaborate, but can be broken down into five fundamental components:

- Project application
- Environmental assessment
- Consultation
- Public comment
- Public hearing and decision

Project Application

The permit process begins when the land use agency receives a project application, with a detailed project description, and support documentation. During this phase, the agency reviews the submitted application for completeness. When the agency deems the application to be complete, the permit process moves into the environmental review phase.

Environmental Assessment

If the project is discretionary and the application is accepted as complete, the project proposal or activity must undergo an environmental clearance process under CEQA and the CEQA Guidelines adopted by the California Resources Agency.[2] The purpose of the CEQA process is to inform decision-makers and the public of the potential significant environmental impacts of a project or activity, to identify measures to minimize or eliminate those impacts to the point they are no longer significant, and to discuss alternatives that will accomplish the project goals and objectives in a less environmentally harmful manner.

What is a "Lead Agency"?

A lead agency is the public agency that has the principal responsibility for carrying out or approving a project that is subject to CEQA. In general, the land use agency is the preferred public agency serving as lead agency because it has jurisdiction over general land uses. The lead agency is responsible for determining the appropriate environmental document, as well as its preparation.

What is a "Responsible Agency"?

A responsible agency is a public agency with discretionary approval authority over a portion of a CEQA project (e.g., projects requiring a permit). As a responsible agency, the agency is available to the lead agency and project proponent for early consultation on a project to apprise them of applicable rules and regulations, potential adverse impacts, alternatives, and mitigation measures, and provide guidance as needed on applicable methodologies or other related issues.

What is a "Commenting Agency"?

A commenting agency is any public agency that comments on a CEQA document, but is neither a lead agency nor a responsible agency. For example, a local air district, as the agency with the responsibility for comprehensive air pollution control, could review and comment on an air quality analysis in a CEQA document for a proposed distribution center, even though the project was not subject to a permit or other pollution control requirements.

[2] Projects and activities that may have a significant adverse impact on the environment are evaluated under CEQA Guidelines set forth in title 14 of the California Code of Regulations, sections 15000 et seq.

To assist the lead agency in determining whether the project or activity may have a significant effect that would require the preparation of an EIR, the land use agency may consider criteria, or thresholds of significance, to assess the potential impacts of the project, including its air quality impacts. The land use agency must consider any credible evidence in addition to the thresholds, however, in determining whether the project or activity may have a significant effect that would trigger the preparation of an EIR.

The screening criteria to determine significance is based on a variety of factors, including local, state, and federal regulations, administrative practices of other public agencies, and commonly accepted professional standards. However, the final determination of significance for individual projects is the responsibility of the lead agency. In the case of land use projects, the lead agency would be the City Council or County Board of Supervisors.

A new land use plan or project can also trigger an environmental assessment under CEQA if, among other things, it will expose sensitive sites such as schools, day care centers, hospitals, retirement homes, convalescence facilities, and residences to substantial pollutant concentrations.[3]

CEQA only applies to "discretionary projects." Discretionary means the public agency must exercise judgment and deliberation when deciding to approve or disapprove a particular project or activity, and may append specific conditions to its approval. Examples of discretionary projects include the issuance of a CUP, re-zoning a property, or widening of a public road. Projects that are not subject to the exercise of agency discretion, and can therefore be approved administratively through the application of set standards are referred to as ministerial projects. CEQA does not apply to ministerial projects.[4] Examples of typical ministerial projects include the issuance of most building permits or a business license.

Once a potential environmental impact associated with a project is identified through an environmental assessment, mitigation must be considered. A land use agency should incorporate mitigation measures that are suggested by the local air district as part of the project review process.

Consultation

Application materials are provided to various departments and agencies that may have an interest in the project (e.g., air pollution, building, police, fire, water agency, Fish and Game, etc.) for consultation and input.

[3] Readers interested in learning more about CEQA should contact OPR or visit their website at http://www.opr.ca.gov/.

[4] See California Public Resources Code section 21080(b)(1).

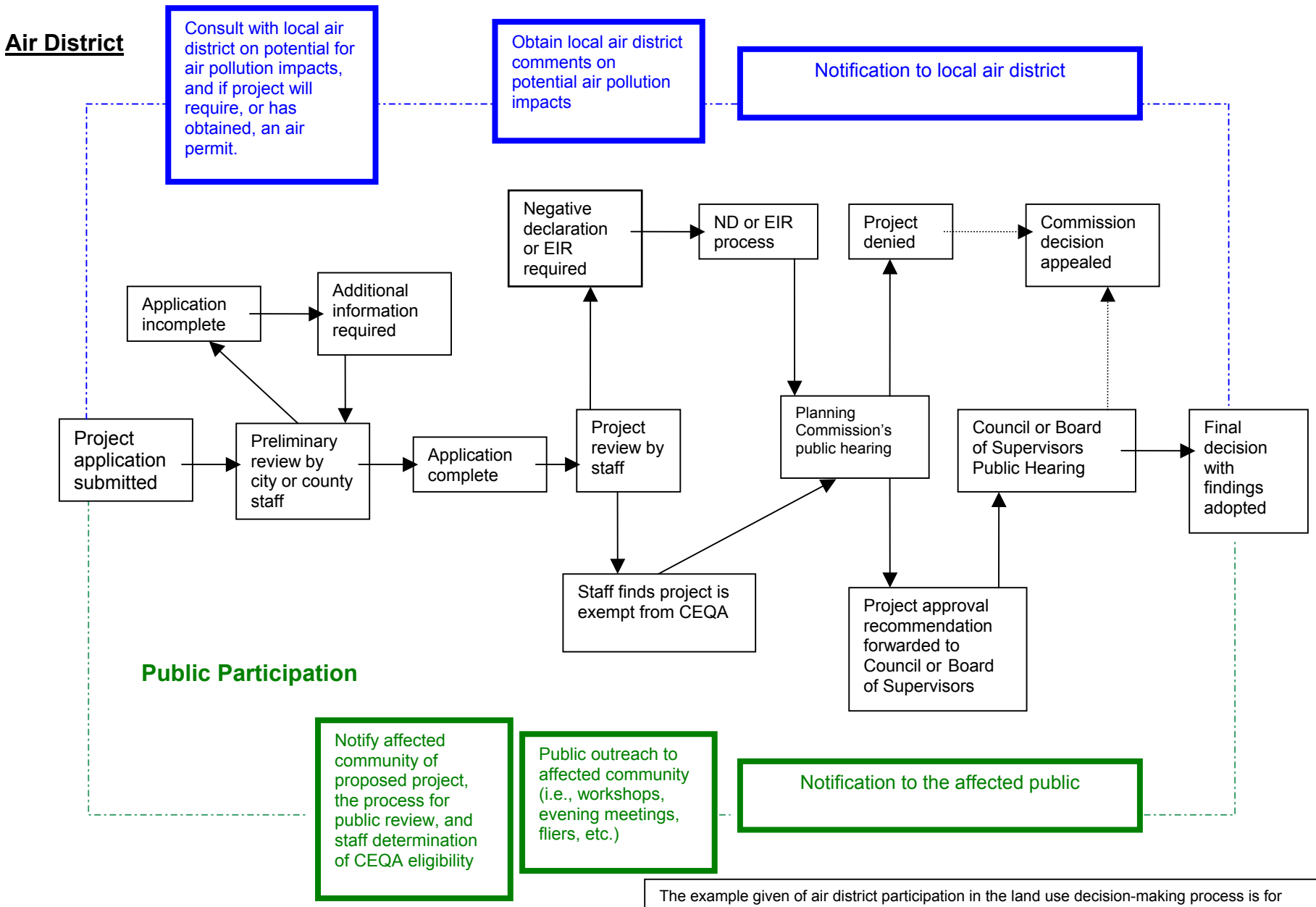
Public Comment

Following the environmental review process, the Planning Commission reviews application along with the staff's report on the project assessment and a public comment period is set and input is solicited.

Public Hearing and Decision

Permit rules vary depending on the particular permit authority in question, but the process generally involves comparing the proposed project with the land use agency standards or policies. The procedure usually leads to a public hearing, which is followed by a written decision by the agency or its designated officer. Typically, a project is approved, denied, or approved subject to specified conditions.

USE PERMIT (DISCRETIONARY ACTION) REVIEW PROCESS*



The example given of air district participation in the land use decision-making process is for illustrative purposes only. In reality, the land use siting process involves the ongoing participation of multiple affected agencies and stakeholders throughout the process.

GLOSSARY OF KEY AIR POLLUTION TERMS

Air Pollution Control Board or Air Quality Management Board: Serves as the governing board for local air districts. It consists of appointed or elected members from the public or private sector. It conducts public hearings to adopt local air pollution regulations.

Air Pollution Control Districts or Air Quality Management Districts (local air district): A county or regional agency with authority to regulate stationary and area sources of air pollution within a given county or region. Governed by a district air pollution control board.

Air Pollution Control Officer (APCO): Head of a local air pollution control or air quality management district.

Air Toxic Control Measures (ATCM): A control measure adopted by the ARB (Health and Safety Code section 39666 et seq.), which reduces emissions of toxic air contaminants.

Ambient Air Quality Standards: An air quality standard defines the maximum amount of a pollutant that can be present in the outdoor air during a specific time period without harming the public's health. Only U.S. EPA and the ARB may establish air quality standards. No other state has this authority. Air quality standards are a measure of clean air. More specifically, an air quality standard establishes the concentration at which a pollutant is known to cause adverse health effects to sensitive groups within the population, such as children and the elderly. Federal standards are referred to as National Ambient Air Quality Standards (NAAQS); state standards are referred to as California ambient air quality standards (CAAQS).

Area-wide Sources: Sources of air pollution that individually emit small amounts of pollution, but together add up to significant quantities of pollution. Examples include consumer products, fireplaces, road dust, and farming operations.

Attainment vs. Nonattainment Area: An attainment area is a geographic area that meets the National Ambient Air Quality Standards for the criteria pollutants and a non-attainment area is a geographic area that doesn't meet the NAAQS for criteria pollutants.

Attainment Plan: Attainment plans lay out measures and strategies to attain one or more air quality standards by a specified date.

California Clean Air Act (CCAA): A California law passed in 1988, which provides the basis for air quality planning and regulation independent of federal regulations. A major element of the Act is the requirement that local air districts in violation of the CAAQS

must prepare attainment plans which identify air quality problems, causes, trends, and actions to be taken to attain and maintain California's air quality standards by the earliest practicable date.

California Environmental Quality Act (CEQA): A California law that sets forth a process for public agencies to make informed decisions on discretionary project approvals. The process helps decision-makers determine whether any potential, significant, adverse environmental impacts are associated with a proposed project and to identify alternatives and mitigation measures that will eliminate or reduce such adverse impacts.[1]

California Health and Safety Code: A compilation of California laws, including state air pollution laws, enacted by the Legislature to protect the health and safety of people in California. Government agencies adopt regulations to implement specific provisions of the California Health and Safety Code.

Clean Air Act (CAA): The federal Clean Air Act was adopted by the United States Congress and sets forth standards, procedures, and requirements to be implemented by the U.S. Environmental Protection Agency (U.S. EPA) to protect air quality in the United States.

Councils of Government (COGs): There are 25 COGs in California made up of city and county elected officials. COGs are regional agencies concerned primarily with transportation planning and housing; they do not directly regulate land use.

Criteria Air Pollutant: An air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set. Examples include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM10 and PM2.5. The term "criteria air pollutants" derives from the requirement that the U.S. EPA and ARB must describe the characteristics and potential health and welfare effects of these pollutants. The U.S. EPA and ARB periodically review new scientific data and may propose revisions to the standards as a result.

District Hearing Board: Hears local air district permit appeals and issues variances and abatement orders. The local air district board appoints the members of the hearing board.

Emission Inventory: An estimate of the amount of pollutants emitted into the atmosphere from mobile, stationary, area-wide, and natural source categories over a specific period of time such as a day or a year.

Environmental Impact Report (EIR): The public document used by a governmental agency to analyze the significant environmental effects of a proposed project, to identify

[1] To track the submittal of CEQA documents to the State Clearinghouse within the Office of Planning and Research, the reader can refer to CEQAnet at http://www.ceqanet.ca.gov.

alternatives, and to disclose possible ways to reduce or avoid the possible negative environmental impacts.

Environmental Justice: California law defines environmental justice as the fair treatment of people of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (California Government Code sec.65040.12(c)).

General Plans: A statement of policies developed by local governments, including text and diagrams setting forth objectives, principles, standards, and plan proposals for the future physical development of the city or county.

Hazardous Air Pollutants (HAPs): An air pollutant listed under section 112 (b) of the federal Clean Air Act as particularly hazardous to health. U.S. EPA identifies emission sources of hazardous air pollutants, and emission standards are set accordingly. In California, HAPs are referred to as toxic air contaminants.

Land Use Agency: Local government agency that performs functions associated with the review, approval, and enforcement of general plans and plan elements, zoning, and land use permitting. For purposes of this Handbook, a land use agency is typically a local planning department.

Mobile Source: Sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats, and airplanes.

National Ambient Air Quality Standard (NAAQS): A limit on the level of an outdoor air pollutant established by the US EPA pursuant to the Clean Air Act. There are two types of NAAQS. Primary standards set limits to protect public health and secondary standards set limits to protect public welfare.

Negative Declaration (ND): When the lead agency (the agency responsible for preparing the EIR or ND) under CEQA, finds that there is no substantial evidence that a project may have a significant environmental effect, the agency will prepare a "negative declaration" instead of an EIR.

New Source Review (NSR): A federal Clean Air Act requirement that state implementation plans must include a permit review process, which applies to the construction and operation of new or modified stationary sources in nonattainment areas. Two major elements of NSR to reduce emissions are best available control technology requirements and emission offsets.

Office of Planning and Research (OPR): OPR is part of the Governor's office. OPR has a variety of functions related to local land-use planning and environmental programs. It provides General Plan Guidelines for city and county planners, and coordinates the state clearinghouse for Environmental Impact Reports.

Ordinance: A law adopted by a City Council or County Board of Supervisors. Ordinances usually amend, repeal or supplement the municipal code; provide zoning specifications; or appropriate money for specific purposes.

Overriding Considerations: A ruling made by the lead agency in the CEQA process when the lead agency finds the importance of the project to the community outweighs potential adverse environmental impacts.

Public Comment: An opportunity for the general public to comment on regulations and other proposals made by government agencies. You can submit written or oral comments at the public meeting or send your written comments to the agency.

Public Hearing: A public hearing is an opportunity to testify on a proposed action by a governing board at a public meeting. The public and the media are welcome to attend the hearing and listen to, or participate in, the proceedings.

Public Notice: A public notice identifies the person, business, or local government seeking approval of a specific course of action (such as a regulation). It describes the activity for which approval is being sought, and describes the location where the proposed activity or public meeting will take place.

Public Nuisance: A public nuisance, for the purposes of air pollution regulations, is defined as a discharge from any source whatsoever of such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. (Health and Safety Code section 41700).

Property Setback: In zoning parlance, a setback is the minimum amount of space required between a lot line and a building line.

Risk: For cancer health effects, risk is expressed as an estimate of the increased chances of getting cancer due to facility emissions over a 70-year lifetime. This increase in risk is expressed as chances in a million (e.g.,10 chances in a million).

Sensitive Individuals: Refers to those segments of the population most susceptible to poor air quality (i.e., children, the elderly, and those with pre-existing serious health problems affected by air quality).

Sensitive Sites or Sensitive Land Uses: Land uses where sensitive individuals are most likely to spend time, including schools and schoolyards, parks and playgrounds, day care centers, nursing homes, hospitals, and residential communities.

Setback: An area of land separating one parcel of land from another that acts to soften or mitigate the effects of one land use on the other.

State Implementation Plan (SIP): A plan prepared by state and local agencies and submitted to U.S. EPA describing how each area will attain and maintain national ambient air quality standards. SIPs include the technical information about emission inventories, air quality monitoring, control measures and strategies, and enforcement mechanisms. A SIP is composed of local air quality management plans and state air quality regulations.

Stationary Sources: Non-mobile sources such as power plants, refineries, and manufacturing facilities.

Toxic Air Contaminant (TAC): An air pollutant, identified in regulation by the ARB, which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health. TACs are considered under a different regulatory process (California Health and Safety Code section 39650 et seq.) than pollutants subject to State Ambient Air Quality Standards. Health effects associated with TACs may occur at extremely low levels. It is often difficult to identify safe levels of exposure, which produce no adverse health effects.

Urban Background: The term is used in this Handbook to represent the ubiquitous, elevated, regional air pollution levels observed in large urban areas in California.

Zoning ordinances: City councils and county boards of supervisors adopts zoning ordinances that set forth land use classifications, divides the county or city into land use zones as delineated on the official zoning, maps, and set enforceable standards for future develop

Exhibit E
Assessment and Mitigation for Air Pollutant Health Effects

Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review

Rajiv Bhatia

Thomas Rivard

May 6, 2008

Program on Health, Equity, & Sustainability
Occupational & Environmental Health Section
Department of Public Health
City and County of San Francisco

CONTENTS

1. **OVERVIEW**

2. **BACKGROUND**
   - a. **Vehicle-related Air Pollutants of Concern to Health**
   - b. **Epidemiology of Roadway Related Health Effects**
   - c. **Intra-urban Exposure Variation**
   - d. **Sensitive Populations**
   - e. **Regulation of mobile source pollutants**

3. **EXISTING RELATED GUIDANCE AND STANDARDS**
   - a. **US Environmental Protection Agency**
   - b. **California Air Resources Board**
   - c. **California Environmental Quality Act**
   - d. **City and County of San Francisco General Plan**

4. **EXPOSURE AND HEALTH EFFECTS ASSESSMENT**
   - a. **Infill development and sources of land use—air quality conflicts**
   - b. **Air Quality Exposure Assessment**
   - c. **Health Effects Assessment**

5. **MITIGATION**
   - a. **Reroute or reduce traffic through circulation changes or traffic demand reduction.**
   - b. **Relocate project outside hazardous zones around roadway of concern**
   - c. **Provide mechanical ventilation systems with fresh air filtration and building designs with reduced infiltration to mitigate particulate exposure.**

6. **APPENDIXES**
   - a. **References**
   - b. **San Francisco Dispersion Modeling Case Study**
   - c. **Air Pollutant Monitoring in San Francisco**
   - d. **Map of Asthma Hospitalizations**
   - e. **Map of Traffic Volumes**

I OVERVIEW – PREVENTING ROADWAY AIR QUALITY HAZARDS

Motor vehicles have been and will remain a major source of air pollution in the United States. While air pollutant emissions from motor vehicles are monitored and regulated on a regional basis, roadway air pollutant emissions vary significantly within a place or city meaning exposure is higher for those living near freeways and busy roadways.

Health research has consistently demonstrated that children living within 100-200 meters of freeways or busy roadways have poorer lung function and more asthma and respiratory symptoms than those living further away. Health effects, both chronic and acute, may result from exposure to both criteria air pollutants and mobile source air toxic. Health effects of air pollutant exposures may also involve synergistic effects among air pollutants, traffic noise and other traffic-related stressors.

In California, significant residential development is now occurring near freeways or busy arterial roadways. While infill development can reduce regional and global air pollution burdens, trends will increase exposure to air pollutants and their associated health burden for residents living in such developments.

In 2005, the California Air Resources Board issued guidance on preventing roadway related air quality conflicts, suggesting localities avoid placing new sensitive uses within 500 ft of many freeways. This guidance is advisory, and no existing federal and state regulations protect sensitive residential land uses from air pollution "hot spots" that occur near busy roadways. Federal and state agencies control air pollutants by regulating vehicle engine emissions on a "per mile" basis, generally ignoring impacts due to localized traffic intensity.

Good practice in planning and public health requires examining environmental hazards and potential health effects on a project-level basis and appropriate avoidance or mitigation. Furthermore, the California Environmental Quality Act (CEQA) requires the examination of potentially significant human health effects associated with environmental change. Preventative steps to avoid future land use air quality conflicts from busy roadways could include:

- Screening projects for exposure to high traffic volumes
- Examination of air quality exposure on a project-level basis
- Comprehensive health effects analysis involving identifying sensitive (receptors) populations, estimating exposure, and calculating health risks.
- Requirements to either avoid residential development or other sensitive uses at a site with relative high levels of vehicle air pollutants or building ventilation design improvements to filter outside air and locate air intakes away from pollution sources.
- Disclosure of exposure, health risks and included mitigations to future residents.

Guidance and regulations are needed to prevent health impacts associated with locating new residential uses near roadway air pollution hot spots. This document outlines a rationale and approach for the assessment and mitigation of air pollution health effects on sensitive uses from proximate roadway sources. Prevention of adverse air quality health effects requires a close coordination between public health, land use and transportation agencies. The table below outlines the key elements of a suggested program to evaluate and prevent roadway related effects at the project-level.

Programmatic Element	Description
Hazard Identification	Assess the cumulative vehicle volume on roadways within a 200 meter buffer of the sensitive site. The following sources may provide traffic data: • Caltrans Traffic Data (http://traffic-counts.dot.ca.gov/) • Local Public Works Departments • California Environmental Health Tracking Program's (CEHTP) spatial linkage web service to. (http://www.ehib.org/traffic_tool.jsp) • Environmental Impact Reports on projects in the area (Typically available from Departments of Planning) ***A potential hazard exists if average daily traffic volume exceeds the following thresholds*:*** 1. 100,000 vehicles / day within a 150 meter radius 2. 50,000 vehicles / day within a 100 meter radius 3. 10,000 vehicles /day within a 50 meter radius. **Note that the threshold of 100,000 vehicles with a 150 meter radius roughly corresponds to the CARB guidance avoiding sensitive uses. Thresholds for 100 meters and 50 meters are equivalent with regards to area traffic volume density.*
Exposure Assessment	Estimate concentration of PM 2.5 contributed by proximate roadway sources within a 150 meter radius of the project using physical based dispersion models using local data on vehicle volumes, vehicle types, emissions characteristics, meteorology. SFDPH recommends CAL3QHCR Line Source Dispersion Model with best available local meteorology. Other dispersion models may be appropriate as well.
Health Effects Assessment	If indicated quantify potential effects of roadway-related exposures to criteria and non-criteria pollutants on health outcomes using established risk assessment principles.
Action Threshold for Mitigation	Compare roadway contribution to annual average PM 2.5 concentration to an action threshold of 0.2 ug /m3 of PM 2.5.
Mitigation	***For sites with roadway contributions to PM 2.5 above the threshold concentration, prevent exposure or apply mitigations using the following hierarchy:*** 1. Relocate project outside hazardous zones around roadway of concern 2. Reroute or reduce traffic through circulation changes or traffic demand reduction. 3. Provide mechanical ventilation systems with best available supply intake air location; with fresh air filtration and building designs; and with reduced infiltration to mitigate particulate exposure.
Disclosure	For residents purchasing or renting property in proximity to hazardous roadway air pollution sources, provide information on exposure, hazards, and mitigations.

II BACKGROUND

The following sections provide the rationale for preventing air quality impacts from roadway sources though planning and the regulation of land uses. The section reviews vehicle pollutants, the epidemiology of roadway related health effects, intra-urban pollution variation, and sensitive populations.

Vehicle Related Air Pollutants

Engine exhaust, from diesel, gasoline, and other combustion engines, is a complex mixture of particles and gases, with collective and individual toxicological characteristics. Vehicle tailpipe emissions includes criteria air pollutants such as particulate matter and carbon monoxide, ozone precursor compounds such as nitrogen oxides (NO_x) and other hazardous air pollutants (e.g., air toxics) not regulated by EPA as criteria pollutants. Air pollutants associated with vehicle emissions are described in the table below.

Particulate matter (PM) represents a heterogeneous group of pollutants associated with vehicle emissions (WHO 2003). Collectively exposure fine particles are strongly associated with mortality, respiratory diseases and lung development in children, and other endpoints such as hospitalization for cardiopulmonary disease. Based on toxicological and epidemiological research, smaller particles and those associated with traffic appear more closely related to health effects (Schlesinger 2006). PM characteristics that may contribute to toxicity include: metal content; presence of polycyclic aromatic hydrocarbons and other toxic organic components. Other particulate matter characteristics that may be important to human health effects include: mass concentration; number concentration; acidity; particle surface chemistry; metals; carbon composition; and origin.

Motor vehicles aslo emit air toxics. EPA has identified six priority mobile source air toxics, including benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, naphthalene, and diesel exhaust. Similarly, the California Air Resources Board (CARB) has identified 10 air toxics of concern, five of which are emitted by on-road mobile sources: benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and diesel PM (California Air Resources Board, 2001).

Mobile source air toxics are known or suspected to cause cancer or other serious health or environmental effects. Benzene is of particular concern because it is a known carcinogen and most of the nation's benzene emissions come from mobile sources. Diesel exhaust particulate matter (DPM) is a toxic air contaminant and known lung carcinogen resulting from combustion of diesel fuel in heavy duty trucks and heavy equipment.

Air Pollutants and Pollutant Mixtures with Important Motor Vehicle Sources

	Air Pollutant	Source	Health Effects
Criteria Pollutants	**Ozone**	Tropospheric ozone is formed in the atmosphere from chemical transformation of certain air pollutants in the presence of sunlight. Ozone precursors include vehicles, other combustion processes and the evaporation of solvents, paints, and fuels	Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.
	Carbon Monoxide (CO)	Produced due to the incomplete combustion of fuels, particularly by motor vehicles	Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood resulting in fatigue, impaired central nervous system function, and induced angina.
	Particulate Matter ***(PM_{10} and $PM_{2.5}$)***	Diverse sources including motor vehicles (tailpipe emissions as well as brake pad and tire wear, wood burning fireplaces and stoves, industrial facilities, and ground-disturbing activities	Impaired lung function, exacerbation of acute and chronic respiratory ailments, including bronchitis and asthma, excess emergency room visits and hospital admissions, pre-mature arteriosclerosis, and premature death.
	Nitrogen Dioxide (NO_2)	Combustion processes in vehicles and industrial operations	Increase the risk of acute and chronic respiratory disease and reduce visibility
	Sulfur Dioxide (SO_2)	Combustion of sulfur-containing fuels such as oil, coal, and diesel	Increased risk of acute and chronic respiratory
Non-criteria Pollutants	***Diesel exhaust***	Diesel engines	Probable human carcinogen (IARC Group 2A) Diesel engines also emit particulate matter criteria pollutants produced through combustion.
	Benzene	Gasoline engines	Known human carcinogen (IARC Group 1A)
	1,3 butadiene	Motor vehicle engines	Probable human carcinogen (IARC Group 2A)
	Benzo(a) pyrene	Motor vehicle engines	Probable human carcinogen (IARC Group 2A)

Epidemiology of Roadway Proximity Health Effects

Proximity to air pollution sources increases both exposure and hazards. With regards to roadway proximity effects, epidemiologic studies have consistently demonstrated that children living in proximity to freeways or busy roadways have poorer respiratory health outcomes (Delfino 2002). More recent research has found that health effects of roadway proximity may extend to coronary artery disease in adults. Several specific studies of roadway proximity health effects are briefly described below:

- A study of children in the Netherlands found that lung function declined with increasing truck traffic density especially for children living within 300 meters of motorways (Brunekreef 1997).
- Children in Erie County, New York hospitalized for asthma were more likely to live within 200 meters of heavily trafficked roads (Lin 2002).
- Among children living within 150 m of a main road in Nottingham, United Kingdom, the risk of wheeze increased with increasing proximity to the road (Venn 2001).
- In Oakland California, school children at schools in proximity to high volume roadways experienced more asthma and bronchitis symptoms (Kim 2004).
- In a low income population of children in San Diego, children with asthma living within 168 meters of high traffic flows were more likely than those residing near lower traffic flows to have more medical care visits for asthma (English 1999).
- In a study of Southern California School Children, living within 75 m of a major road was associated with an increased risk of lifetime asthma, prevalent asthma, and wheeze (McConnell 2006).
- In a study conducted in 12 southern California communities, children who lived with 500 meters of a freeway had reduced growth in lung capacity relate to those living greater than 1500 meters from the freeway (Guaderman 2004)
- In a study in Cincinnati, residence within 100 meters of stop and go bus and truck traffic predicted infant wheezing (Ryan 2005).
- In a study of German adults, residence within 200 meters of a major road predicted coronary artery calcification (Hoffman 2007). In the same population, residence within 150 meters of a major road predicted manifest coronary heart disease (Hoffmann 2007).

It is important to make clear distinction between specific roadway related health effects due to specific effects of particular air contaminants (e.g., diesel exhaust, benzene), health effects related to hot spots of criteria pollutants (e.g., fine particulate matter, carbon monoxide), and health effects due to the cumulative burden of roadway proximity. Unlike the epidemiological relationship between diesel exhaust and lung cancer hazard, at present, it is not possible to attribute the effects of roadway proximity on non-cancer health effects described above to one or more specific vehicle types or vehicle pollutants.

Intra-Urban Variation in Air Pollution Exposure due to Traffic

Within an area or place, exposure typically varies spatially with higher levels of exposure in proximity to sources of pollution. Roadways are important sources of intra-area variation for several air pollutants.

Several techniques have been employed to help estimate intra-urban variation in air pollutant concentrations dues to roadway sources; these techniques include pollutant monitoring, interpolation, land use regression, and dispersion analysis (Jerrett 2005).

Regional monitoring data conducted for NAAQS standards does not provide monitoring sufficient to adequately define for intra-urban exposure variation or hot spots due to traffic generated air pollutants. However, research in some locations based on measurements of shows that a significant share of spatial intra-urban air pollution variation in ambient levels of $PM_{2.5}$ is due to local traffic sources. For example, measurement of particulate matter along roads in different regions in the Netherlands has found that particle count is 40% higher 100 meters downwind of major traffic sources (Weijers 2004).

Land use regression techniques have been used to create a city-wide or region wide model of exposure based on land use and transportation characteristics (Ryan 2007). Researchers have created land use regression models for nitrogen dioxide validated in Alameda, San Diego, and Los Angeles have all found proximity to traffic to be key predictor of ambient nitrogen dioxide concentrations. A recent analysis in the New York City region found that traffic within 300-500 meters explained 37-44% of the variance of PM 2.5 (Ross 2007). Another analysis in the Los Angeles region found that traffic density within 300 meters along with industrial uses and government land predicted 69% of the variation in regional concentrations of $PM_{2.5}$ (Moore 2007).

Line source dispersion models are another available tool to predict variation of ambient concentrations of pollutants from traffic sources near roadways taking into account meteorological conditions, pollutant type, and other parameters (Jerrett 2005). One published study compared PM2.5 emissions predicted using the CALINE model against actual measures, finding an acceptable correspondence between measured and modeled levels for a suburban setting in Sacramento, California (Yura 2007).

A recent meta-analysis, based on 33 exposure studies, found significant spatial difference exist in multiple traffic related pollutants relative to proximity to busy roadways (Zhou 2007). The meta-analysis focused upon four pollutants; carbon dioxide, nitrogen oxides, particulates and ultrafine particulates. A variety of factors significantly influenced the spatial extent or the area of significant health impact associated with proximity to high traffic roadways. Such factors as background pollutant concentration, chemical reactivity (NO conversion NO2 and ultrafine coalescence to larger particulates), chemical inertness, meteorology, and health significance threshold all served to define the size of the spatial extent. The authors concluded that a 500 meter buffer around a high traffic roadway would be protective under most circumstances.

Roadway Air Pollutants in Infiltration into Indoor environments

Research shows consistent strong correlations between outdoor and indoor concentrations of traffic related air pollutants including constituents of particulate matter, such as benzene and PAHs, and volatile organic compounds, VOC's (Fishcer 2000). In one study, exposure in indoor environments to particulates, measured via light absorption, was 19-26% higher even when accounting for indoor sources such as appliances for cooking and heating (Wichmann 2005).

Sensitive Uses

The CARB Handbook puts the focus of its guidance on "land uses where sensitive individuals are most likely to spend time [including] schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities." It is important to note, however, that air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, population subgroups with higher rates of respiratory disease such as asthma and COPD, populations with other environmental or occupational health exposures that impact cardiovascular or respiratory diseases. Still, the focus on sensitive uses is appropriate because it not possible, within the context of planning, to distinguish sensitive uses with regards to population vulnerabilities

Environmental Justice Issues

Poverty confers a general susceptibility to the health effects of environmental stressors. For example, poorer residents may be more likely to live in crowded substandard housing and be more likely to live near industrial or roadway sources of air pollution. In California, the proportion of children of color living in high traffic density block is inversely related to median family income, and children of color are three times more likely to live in high-traffic areas than white children (Gunier 2003).

II APPLICABLE POLICIES, REGULATIONS, LAWS, AND GUIDANCE

Federal and State Regulation of Criteria Air Pollutants

The USEPA identifies 6 criteria air pollutants that have important human health impacts; these include Ozone (O_3), carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The Clean Air Act requires the EPA to develop specific public health and welfare-based exposure standards for the six criteria air pollutants and directing States to develop plans to achieve theses standards. Nationally, a network of air quality monitors provides information on ambient concentrations of criteria air pollutants. California has state standards for the six criteria pollutants that are more stringent than the federal standards.

Despite promulgation of National Ambient Air Quality Standards for criteria pollutants and implementation of air quality control plans, air pollutants continue to have significant impacts on human health. In part, these ongoing effects are due to non-attainment of air quality standards; however, exposure to air pollutants also results in health impacts even when levels are below existing standards (Johnson and Graham 2005).

Particulate matter is an example of a criteria air pollutant with documented health effects below the NAAQS criteria standards and even$PM_{2.5}$ levels measured below State AAQS are not optimally protective of public health. In fact, there is no scientifically known no-effects threshold for $PM_{2.5}$ suggesting the health benefits from incremental improvements. According to a cost-benefit analysis recently done by the USEPA, reducing the NAAQS for $PM_{2.5}$ by 1 ug per cubic meter from 15 to 14 would result in 1900 fewer premature deaths, 3700 fewer non-fatal heart attacks, and 2000 fewer emergency room visits for asthma each year (USEPA 2006).

Similarly, the 2002 State of California Air Resources Board Air Quality Standards Staff Report for Particulate Matter estimated that significant health effects benefits would accrue from reducing ambient $PM_{2.5}$ from current levels to natural background concentrations for every county in California (CARB 2002). The results of that health benefits analysis conducted for the California Standards is detailed in the table below.

Health Benefits of Reducing Ambient $PM_{2.5}$ to Natural Background Levels for California

Health Outcome	Estimated Benefits of Exposure Reduction
Mortality from Long Term Exposures in people over	9391premature deaths /year
Mortality from Short Term Exposures in all ages	4014premature deaths /year
Chronic Bronchitis	11,414 cases /year
COPD Hospitalizations	1241 hospitalizations /year
Pneumonia Hospitalizations	1791 hospitalizations /year
Cardiovascular Hospitalizations	3180 hospitalizations /year
Asthma Hospitalizations	950 hospitalizations /year
Acute Bronchitis in ages 8-12	32,923 cases/year
Asthma Attacks	344,532 cases/year
Work Loss Days	2,923,535

Federal and State Regulation of Mobile Source Air Toxics

Toxic air contaminants (TACs), including benzene and diesel exhaust, are a category of air pollutants not regulated under Federal Criteria air pollution rules but known to have adverse human health effects, ranging from birth defects to cancer. Toxic air contaminants from mobile Sources are primarily regulated by the Federal government. For example, in February 2007, EPA finalized a rule to reduce hazardous air pollutants from mobile sources (Control of Hazardous Air Pollutants from Mobile Sources, February 9, 2007). The rule will limit the benzene content of gasoline and reduce toxic emissions from passenger vehicles and gas cans and will be fully implemented by 2030.

The Clean Air Act of 1967 also allowed California to regulate vehicles sold within the State and to require those vehicles to meet more stringent emission standards. The California Air Resources Board is responsible for establishing emission standards for vehicles sold in California and has a variety of new programs directed at improving air quality through vehicle emission reduction.

- Amendments to California low emission vehicle regulations will extend passenger car emission standards to sport utility vehicles and pickup trucks.
- New on board diagnostic system regulations requires monitoring of all vehicle functions that may affect vehicle emissions.
- New heavy duty trucks and busses are being required to significantly reduce emissions of diesel particulates and nitrogen dioxide.
- Idling restriction for these large diesel vehicles are also being implemented to reduce exposure to school children and residents.
- The Air Resources Board has created a variety of incentive and grant programs to either upgrade vehicle emissions or remove vehicles from the statewide inventory.

US EPA Rules on Hot Spot Analysis for Transportation Projects

The US Environmental Protection Agency (EPA) currently requires qualitative hot spot analysis for particulate matter (PM) for new transportation projects in Federal nonattainment or maintenance areas for PM10 or PM2.5 (USEPA 2006). Requirements for quantitative hot spot analysis e.g., using dispersion modeling to determine concentrations at receptor locations) are pending EPA speciification of procedures for analysis. This rule does not apply to locating new sensitive uses adjacent to existing roadway pollution sources.

California Air Resources Board Guidance on Land Use-Air Quality Conflicts

The California Air Resources Board does not regulate local land use planning but rather air pollutant emissions from vehicles. However, because of the robust evidence relating proximity to roadways and a range of non-cancer and cancer health effects, the California Air Resource Board created guidance for avoiding air quality conflicts in land use planning in their *Air Quality and Land Use Handbook: A Community Health Perspective* (2005). In the guidance, CARB recommends not locating sensitive land uses, including residential developments, within 500 feet of a highway with more than 100,000 vehicles per day. CARB recommendations relevant to transportation-related land use-air quality conflicts are listed in the table below.

California Air Resource Board Guidance on Land Use-Air Quality Conflicts

Pollutions Source	Recommendations
Freeways and High Volume Roadways	*Avoid siting sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.*
Distribution Centers	*Avoid siting sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating TRUs per day, or where TR unit operations exceed 300 hours per week).* *Take into account the configuration of existing distribution centers and avoid locating residences and other sensitive land uses near entry and exit points.*
Rail Yards	*Avoid siting sensitive land uses within 1,000 feet of a major service and maintenance rail yar* *Within one mile of a rail yard, consider possible siting limitations and mitigation approaches*
Ports	*Consider limitations on the siting of sensitive land uses immediately downwind of ports in the most heavily impacted zones.* *Consult with local air districts for the latest available data on health risks associated with po emissions.*

California Environmental Quality Act

The California Environmental Quality Act CEQA requires an environmental impact report (EIR) where discretionary public agency decision have potentially adverse impacts on the environment (California Public Resources Code. § 21000). The regulations for CEQA specifically require that the EIR discuss "health and safety problems caused by the physical changes" (California Code of Regulations. §15126.2). CEQA standards also require an EIS whenever environmental effects of a project have the potential to cause substantial adverse effects on human beings, either directly or indirectly (California Code of Regulations. §15065). In evaluating significant impacts, CEQA explicitly requires consideration of potential environmental effects resulting from bring people in proximity to environmental hazards. (CCR §15126.2)

The Bay Area Air Quality Management District (BAAQMD) last updated guidance for project level environmental review in December 1999 and current guidance does not address the air quality issues presented in the CARB Air Quality and Land Use Handbook with respect to sensitive receivers.

Most cities do not have do not have specific guidance for the analysis of project-level land use air quality conflicts. However, many jurisidictions including San Francisco do have significance thresholds relevant to potential air quality and heath conflicts from roadways sources. The typical wording of San Francisco's significance threshold relevant to roadway proximity health effects is as follows:

> ***Implementation of the proposed project would have a significant effect on air quality if it would:…***
> ***Expose Sensitive Receptors to Substantial Pollution Concentrations***

The recent environmental review of the Eastern Neighborhoods Community Plans in San Francisco concluded that rezoning in these areas would likely result significant environmental impacts to new residential uses because of the respiratory health effects of living near busy roadways SFDCP 2007. In this case, the Draft EIR also included innovative mitigations to require residential projects to analyze roadway pollution and mitigate effects on new residential uses through ventilation systems and building design.

General Plan Policies

Most cities in California have General Plans that include an Element developed to protect air quality. For example, the San Francisco's General Plan Air Quality Element establishes a goal of clean air planning to *reduce the level of pollutants in the air, to protect and improve public health, welfare and quality of life of the citizens of San Francisco and the residents of the metropolitan region*. The General Plan also recognized that the majority of air pollutants are generated on roadways from vehicle emissions. Policy 3.7 calls for calls for assessment of air quality hazards through modeling and prevention of new air quality hazards through building design

> **POLICY 3.7 Exercise air quality modeling in building design for sensitive land uses such as residential developments that are located near the sources of pollution such as freeways and industries.** *Project review and approval in the City should consider air quality implications. Certain land uses such as some types of industrial uses and freeways generally emit air pollutants that could be hazardous to human health, particularly that of sensitive receptors such as children, elderly and people with respiratory diseases. When reviewing new housing projects or other land uses to be used by sensitive receptors, location of industrial sites or other sources of air pollution should be considered in the design of the building to orient the air intake of the building away from the sources of pollution. Conversely, future industrial and other air polluting development should consider the existence of sensitive receptors in the vicinity.*

III ASSESSMENT OF AIR POLLUTION EXPOSURE AND HEALTH EFFECTS

In general, urban infill land use development can affect population health effects of air quality in two related ways.

- First, growth and development may result in new local area sources of air pollution through new transportation facilities, greater personal vehicle use, or increased demand for energy.
- Second, growth and development can bring a population in proximity to a pre-existing source of air pollution, like busy roadways, increasing exposure and hazard.

In general, pre-development assessment in areas potentially near hazardous air pollutions sources, such as busy roadways, should include at a minimum: (1) air quality modeling or direct measurement air pollutants under existing conditions; (2) modeling or estimation of future air quality conditions including changes associated with new or proposed uses; (3) identification of sensitive uses and exposed populations; and (4) where necessary, a health effects assessment as described above (BAAQMD 1999). Prevention of adverse air quality health effects requires a close coordination between land use and transportation systems planning. Specific mitigations include circulation changes or traffic demand reduction and filtration of ambient air.

The following assessment steps are designed to evaluate the increase in exposure associated with the specific change in traffic volume and type. Examples of air pollutant modeling and health risk assessment based on this approach are described in Appendix I.

Step 1: Hazard Identification

Prior to development approval, the developer should verify the intensity of area traffic in a 200 meter buffer using available sources of traffic data. The following sources may provide traffic data:

- Caltrans Traffic Data (http://traffic-counts.dot.ca.gov/)
- Local Public Works Departments
- California Environmental Health Tracking Program's (CEHTP) spatial linkage web service to. (http://www.ehib.org/traffic_tool.jsp) Within tool follow the following steps: (1) Select geocode address. (2) Enter address. (3) Select extract traffic metrics. (4) Enter radius in meters of buffer (150, 100, and 50 meters, as below. (5) Submit query. (6) Determine if sum of all unadjusted traffic volumes within buffer exceed potential hazard level.
- Environmental Impact Reports on projects in the area (Typically available from Departments of Planning)

A potential hazard exists if average daily traffic volume exceeds the following thresholds:

- 100,000 vehicles / day within a 150 meter radius
- 50,000 vehicles / day within a 100 meter radius
- 10,000 vehicles /day within a 50 meter radius.
- When heavy diesel bus and truck counts are available they shall be counted as equivalent to 22 vehicles when determining potential hazards (EMFAC, 2007).

The threshold of 100,000 vehicles with a 150 meter radius roughly corresponds to the CARB guidance avoiding sensitive uses. Thresholds for 100 meters and 50 meters are equivalent with regards to area traffic volume density.

Infill development is permissible in areas where the average daily traffic volumes are below these thresholds. Further analysis of hazards is generally not indicated if vehicle volumes fall below the above criteria.

Step 2: Exposure Estimation

Exposure modeling should occur for all sites a potential air quality hazard. As discussed above, assessment of air pollution using community wide monitoring data does not provide estimates of actual population exposure within a city and specifically within-area variation in air pollution hazards due to roadways. Exposure to roadway related air pollutants can be roughly estimated using distance or proximity to a pollution source as a proxy for exposure, however, this approach does not account for traffic characteristics, facility characteristics and meteorology. Exposure can be estimated using repeated measurements over representative traffic volume and meteorological conditions, but reliable exposure monitoring and evaluation requires multiple measurements over a period of multiple seasons.

For planning purposes, exposure can be more rapidly and efficiently estimated using Gaussian dispersion models based on physical characteristics of emissions, meteorology, link type (bridge, elevated, level, or canyon) and receptor horizontal and vertical location. A particular advantage of this technique is that line source regression models have also been used in health effects research relating roadways to adverse health outcomes and there is an established relationship between modeled exposures and health effects (Jerrett 2005).

The CAL3QHCR Line Source Dispersion Model Version 2.0, an enhanced version of CALINE3, is an example of a line source dispersion model that can be used to calculate exposure to an air pollutant at a development site due to roadway vehicle traffic (USEPA 2008). The USEPA recognizes CAL3CHCR as a preferred model for air quality modeling. The model further allows for the use of up to three years of hourly meteorological data in the calculation of receptor exposure. The Sacramento Metropolitan Air Quality District's (SMAQMD) in their recently upgraded CEQA guidance recommends CAL3QHCR should be used in assessment of roadway proximity health risks as the dispersion model to estimate PM_{10} concentrations at defined receptor locations by processing hourly meteorological data over a year, hourly emissions, and traffic volume (SMAQMD 2007).

This guidance suggest that prior to approval of a sensitive use in proximity to a busy roadway, development should model PM 2.5 concentrations attributable to existing and future area traffic for receptors at project site using the CAL3QHCR or anther equivalent methodology. Modeling should estimate both annual average and worst day (24-hour) exposure levels. Receptors may be located in a grid around a proposed development. Discrete receptors must be placed at a minimum at 6 receptors per acre and in the case of multiple storied buildings at ground, middle and rooftop locations which reflect potential worst case exposures. In addition receptors should be placed at the locations of all fresh air intakes. Discrete and grid receptors should encompass the perimeter of the project to include sensitive receiver locations closest to traffic. Suggested Data Sources for Model Parameters are listed below. A variety of graphic user interface programs exist for the CAL3QHCR model which simplify its use and implementation. One such modeling interface is the CAL-Roads View Interface Program produced by Lake Environmental (Lake Environmental 2006).

Model Parameter	Data Source and Typical Assumptions
Traffic data	Average hourly traffic volume (AADT/24hours).
Vehicle Emissions rates	California Air Resources Board EMFAC 2007. Emission in grams/mile is calculated by weighting known automobile, truck, and other type percentages.
Traffic speed	25mph local, 30 mph arterial, 55mph freeway
Temperature and Humidity	Area Annual Average (e.g., 50% relative humidity, and 50 degrees F)
Surface meteorology	Best available 3 year meteorology from BAAQMD
Number of Receptors	Minimum six receptors per acre. Grid receptor in Calroad. Receptors set at expected exposure heights.

Step 3: Threshold Evaluation for Action and Mitigation

In this protocol, PM 2.5 serves as a proxy for pollutant exposures from vehicles, and PM 2.5 is not the only pollutant of concern associated with vehicles or vehicle proximity. No federal, state, or local agency has adopted a health-based standard for evaluating roadway related pollution hot spots related to particulate matter. Based on available research, SFDPH therefore provides the following threshold to trigger action or mitigation.

0.2 ug /m3 of PM 2.5 annual average exposure from roadway vehicles within a 150 meter buffer of a sensitive receptor

The rationale for this threshold is enumerated below:

- A threshold of 0.2 ug / m3 represents about 8-10% of the intra-urban range of PM 2.5 ambient concentration based on available and reliable monitoring data in San Francisco.
- A change in ambient concentration of PM 2.5 by 0.2 ug /m3, independent of other vehicle pollutants would result in significant forecasted health impacts.
    - Based on a recent study of intra-urban pollution in Los Angeles, a 0.2 ug /m3 increase in PM 2.5 would result in a 0.28% increase in non-injury mortality or an increase of about twenty-one excess death per 1,000,000 population per year from non-injury causes in San Francisco (Jerrett 2005). This effect is well above the one-in-a-million lifetime *de minimus* risk threshold for premature death considered insignificant by most regulatory agencies (Asante-Duah 2002).
    - Applying the health effects assessment methodology and Concentration Response Functions in the CARB Staff Report on AAQS for PM published in 2002. A 0.2 ug /m3 increase in PM2.5 affecting a population of 100,000 adults would result in about 20 extra premature deaths per year (CARB 2002). This effect is well above the one-in-a-million lifetime *de minimus* risk threshold for premature death considered insignificant by most regulatory agencies (Asante-Duah 2002).

- A 0.2 ug /m3 increase in PM2.5 would also result in ~160 days per year with respiratory symptoms, 108 days with work limitations, and 577 days with minor activity limitations in the same adult population.

Step 4: Health Effects Analysis

If estimated exposure from near traffic sources is below the 0.2 ug/m3 Pm 2.5 action level for mitigation or if traffic exposures are fully mitigated, this guidance considers development permissible and completion of *Step 4: Health Effects Analysis* is not needed. Health effects analysis may still be desirable even where exposure levels are below the above action threshold to inform stakeholders or decision-makers. Health effects analysis may also be important to inform or motivate additional mitigations.

Forecasting heath effects associated with changes in exposure requires a concentration-response function, estimates of exposure, and baseline incidences of health effects. Concentration-response functions are equations that relate a change in the incidence of an adverse health outcome to the change in an ambient concentration of a pollutant and are typically based on regression analyses from epidemiological studies (WHO 2001). This approach has been used by the US Environmental Protection Agency and the State of California Air Resources Board for Particulate Matter in standard setting for particulate matter (CARB 2002).

Estimating Health Effects from Roadway PM 2.5 Concentrations

This guidance suggests predicting traffic-related PM 2.5 exposure effects on excess mortality from all non-injury causes based on a recent intra-urban air pollution and health study in Los Angeles. Simply stated, estimating excess mortality from a roadway source involves multiplying an estimate of PM2.5 exposure from existing and new traffic sources expressed in ug/m^3 (using CAL3QHCR as described above or an equivalent exposure model) times the crude incidence of mortality from non-injury causes times an effect measure for PM2.5 and mortality.

Excess Mortality $_{\text{Traffic Attributable PM 2.5}}$ **= (Concentration** $_{\text{Traffic Attributable PM 2.5}}$**) (Incidence** $_{\text{Non Injury Mortality}}$**) (Relative Risk** $_{\text{PM2.5}}$**)**

The relative risk (effect measure) in this formula, 0.014, is derived from the study by Jerrett et al. (2005) showed that every 1.0 ug /m3 increase in PM 2.5 results in a 1.4% increase in annual mortality incidence from all non-injury causes. The dose response relationship is consistent with other epidemiologic studies and can be extrapolated to other urban settings to provide a rapid estimate of health effects associated with intra-urban variation in PM 2.5 exposures. California Vital Statistics data or local county public health departments are sources of baseline crude mortality rates for specific categories of causes. The case study in the appendix provides an example of the application of this method.

Estimating Health Effects from Mobile Source Air Toxics

Estimating health effects, including cancer risks, from mobile source air toxics can be complimentary to the estimation of health effects from PM 2.5 described above. A common means of assessing cancer risk is to multiply an estimate of exposure to each carcinogenic substance by a Unit Risk Factor (URF) for that substance. This produces an estimate of excess risk of cancer over a lifetime of exposure. For example, to estimate excess cancer risk from diesel particulate matter exposure from a roadway source on a sensitive use, one would use PM 10 as a conservative estimate of diesel vehicle exhaust emissions. Using EMFAC 2007 to estimate PM 10 emissions and modeling those emissions in CAL3QHCR an annual diesel exposure can be approximated. Multiplying this exposure by the an inhalation cancer risk unit risk factor (URF) diesel exhaust ($3.0 \times 10^{-4.}$ ug/m^3)$^{-1}$ in order to produce an estimate additional lifetime cancer probability.

Excess Lifetime Cancer Risk $_{\text{Traffic Attributable DPM}}$ = (Traffic $_{\text{DPM}}$) (Unit Risk Factor $_{\text{DPM}}$)(1 million population)

Using this method, a roadway contribution of DPM of 1 ug/m^3 translates into risk of 300 excess cancers per one million people exposed over a lifetime ($300 = 1 \times 3.0 \times 10^{-4} \times 10^6$). Examples of the application of Unit Risk Factors are provided in the modeling examples in the Appendix on page 27.

A similar approach may be taken for other air toxics using an appropriate modeling tool for exposure from a roadway source. The table below enumerates unit risk factors for human cancer risk for several priority mobile sources assigned by the California Office of Environmental Health Hazard Assessment (OEHHA).

If health effects on cancer incidence are estimated, analytic protocols should follow the State of California guidance documented in OEHHA's Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment (2003). If cancer risks are estimated, a risk of one in a million as stipulated in the Hot Spots Program (AB 2588) may be used as a thresholds for significant hazards and effects should be estimated for each USEPA priority Mobile Source Air Toxics

OEHHA Unit Risk Factors (expressed in $(mg/m^3)^{-1}$) for USEPA priority Mobile Source Air Toxics

Pollutant	**OEHHA URF**
Acetaldehyde	2.7×10^{-6}
Acrolein	N/A
Benzene	2.9×10^{-5}
1,3-Butadiene	1.7×10^{-4}
Formaldehyde	6.0×10^{-6}
DPM	3.0×10^{-4}

IV MITIGATION OF ROADWAY—SENSITIVE USE AIR QUALITY CONFLICTS

The California Air Resource Board, Air Quality and Land Use Handbook: A Community Health Perspective (2005) made recommendations to avoid locating sensitive land uses, including residential developments, within specific distances of certain known sources of toxic air contaminants (CARB 2005). Specific CARB recommendations for the location of residential uses relative to air pollution sources are listed in the table above. This guidance anticipates that some cases sensitive uses will be proposed or considered within the exclusion zone recommended by CARB and thus provides an approach to air quality assessment and mitigation within recommended zones of exclusion.

Mitigations to prevent impacts on air pollution exposures from roadway sources should follow comprehensive air quality assessment. This guidance recommends that the approach to mitigation should follow the following hierarchy:

1. **Changing Vehicle Circulation or Reducing Traffic**
2. **Locating Sensitive Uses To Minimize Exposure**
3. **Providing Ventilation Systems To Mitigate Roadway Exposures**

Tier 1: Changing Circulation or Reducing Traffic Volumes

Reducing the volume of traffic on streets programmed for residential or mixed-use residential use could significantly decrease the impacts of roadways on air pollution exposure. Circulation changes that would re-route through traffic around proposed new residential and mixed-use residential areas would reduce or displace the location of air pollution hot spots. Re-routing heavy duty truck and freight routes away from residential and mixed use residential areas could have a similar air quality benefit with regards to diesel emissions exposure. In considering circulation changes, it is important to prevent re-routing traffic or heavy duty truck and freight routes to other areas with existing or proposed sensitive uses.

Lowering traffic volumes via a comprehensive area wide traffic demand reduction program could also reduce exposure. The Metropolitan Transportation Agency, the Bay Area Air Quality District, and the South Coast Association of Governments are resources for the identification and evaluation of TDM measures. Vehicle emissions programs such as URBEMIS also allow a planner to estimate the effectiveness of a package of TDM measures on trip generation (URBEMIS 2008).

Tier 2: Locating Sensitive Uses To Minimize Exposure

Exposure analysis may suggest that pollutant concentrations vary across a project site. In this case, results from the exposure analysis can be used to situate sensitive uses within the lowest exposed areas available. If concentrations are below action levels or other levels of concern, further mitigation may not be indicated.

Tier 3: Providing mechanical ventilation systems with fresh air filtration.

When reducing traffic or locating residential uses in the areas of the project not impacted by roadway air pollutants is not feasible, residential uses should incorporate mechanical ventilation systems with ambient air filtration to mitigate exposure particulates and other pollutants of concern. The design of ventilation mitigations to protect sensitive uses from higher levels of pollution from mobile roadway sources should follow hazard and exposure assessment.

If the project anticipates operable windows or other sources of infiltration of ambient air, this guidance recommends that the development install a central HVAC (heating, ventilation and air conditioning) that includes high efficiency filters for particulates (MERV-13 or higher). If required, based on exposure measures, the system could also include a carbon filter to remove other chemical matter. The system should operate to maintain positive pressure within the building interior to prevent entrainment of outdoor air indoors.

Alternatively, if the development limits infiltration though non-operable windows and other techniques, it may reduce the need (and energy requirements) for maintaining building at positive pressure. Minimum design standards for a ventilation conditioned on low-infiltration would include the following: (1) ASHRAE MERV-13 supply air filters; (2) >= 1 air exchanges per hour of fresh outside filtered air ; (3) >= 4 air exchanges / hour recirculation; and (4) <= 0.25 air exchanges per hour in unfiltered infiltration. Systems with the above parameters should remove 80% of fine particulate matter mitigating all expected additional roadway effects of particulates and having added health benefits in terms of reducing allergen loads (Fisk 2001).

In either case, air intake systems for HVAC should be placed based on exposure modeling to minimize roadway air pollution sources. A licensed mechanical engineer should certify that the designed HVAC system offers the best available technology to minimize outdoor to indoor transmission of air pollution.

The developer should also ensure an ongoing maintenance plan for the HVAC and filtration systems. Residential project developers should disclose to buyers the findings of air quality evaluations. Developer should inform occupant's regarding the proper use of any installed air filtration.

V REFERENCES

1. Asante-Duah K. 2002. Public Health Risk Assessment for Human Exposure to Chemicals. Springer. 56-57.
2. BAAQMD (Bay Area Air Quality Management District. 1999. CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans. San Francisco CA: BAAQMD.
3. Brunekreef, B. et al. 1997. Air pollution from truck traffic and lung function in children living near motorways. Epidemiology. 8:298-303.
4. CARB (California Air Resources Board). 2002. Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. Available: http://www.arb.ca.gov/research/aaqs/std-rs/pm-final/pm-final.htm)
5. CARB (California Air Resources Board). 2005 Air Quality and Land Use Handbook: A Community Health Perspective. Available: http://www.arb.ca.gov/ch/landuse.htm.
6. CEQA (California Environmental Quality Act). California Public Resources Code. Division 13: Environmental Protection. § 21000 et seq.
7. Delfino RJ. 2002. Epidemiologic evidence for asthma and exposure to air toxics: linkages between occupational, indoor, and community air pollution research. Environ Health Perspectives. 110 Suppl 4:573-89.
8. English P., Neutra R., Scalf R. Sullivan M. Waller L. Zhu L. 1999. Examining Associations Between Childhood Asthma and Traffic Flow Using a Geographic Information System. Environmental Health Perspectives 107(9): 761-767.
9. Fischer PH, Hoek G, van Reeuwijk H, Briggs DJ, Lebret E, van Wijnen JH, Kingham S, Elliott PE. 2000. Traffic-related difference in outdoor and indoor concentrations of particles and volatile organic compounds in Amsterdam. Atmospheric Environment. 34: 3713-3722.
10. Fisk WJ, Faulker D, Palonen J, Seppanen O. 2002. Performance and Costs of Particle Air Filtration Technologies Indoor Air. 12(4):223-234
11. Gauderman WJ, Avol E, Gilliland F, Vora H, Thomas D, Berhane K, McConnell R, Kuenzli N, Lurmann F, Rappaport E, Margolis H, Bates D, Peters J. 2004.The effect of air pollution on lung development from 10 to 18 years of age. N Engl J Med. 351(11):1057-67. Erratum in: N Engl J Med. 2005 Mar 24;352(12):1276.
12. Gunier RB, Hertz A, Von Behren J, Reynolds P. 2003. Traffic density in California: socioeconomic and ethnic differences among potentially exposed children. J Expo Anal Environ Epidemiol. 13(3):240-6.
13. Hoffmann B, Moebus S, Mohlenkamp S, Stang A, Lehmann N, Dragano N, Schmermund A, Memmesheimer M, Mann K, Erbel R, Jockel KH; Heinz Nixdorf Recall Study Investigative Group. 2007. Residential exposure to traffic is associated with coronary atherosclerosis. Circulation. 116(5):489-96.
14. Hoffmann B, Moebus S, Stang A, Beck EM, Dragano N, Mohlenkamp S, Schmermund A, Memmesheimer M, Mann K, Erbel R, Jockel KH; Heinz Nixdorf RECALL Study Investigative Group. 2006. Residence close to high traffic and prevalence of coronary heart disease. Eur Heart J. 27(22):2696-702.
15. Jerrett M et al. 2005. Spatial Analysis of Air Pollution and Mortality in Los Angeles. Epidemiology. 16: 727-736
16. Jerrett M, et al. 2005. A review and evaluation of intraurban air pollution exposure models Journal of Exposure Analysis and Environmental Epidemiology. 15:185-204.
17. Johnson PRS and Graham JJ. 2005. Fine Particulate Matter National Ambient Air Quality Standards: Public Health Impact on Populations in the Northeastern United States. Environmental Health Perspectives. 113:1140-1147.

18. Kim, J. et al. 2004. Traffic-related air pollution and respiratory health: East Bay Children's Respiratory Health Study." American Journal of Respiratory and Critical Care Medicine 170:520-526.
19. Lake Environmental. 2006. CALRoads View, Air Dispersion Models for Roadways. Available: http://www.baaqmd.gov/tec/data/
20. Lin, S. et al. 2002. Childhood asthma hospitalization and residential exposure to state route traffic. Environ Res. 88:73-81.
21. McConnell, R. B., K. Yao, L. Jerrett, M. Lurmann, F. Gilliland, F. Kunzli, N. Gauderman, J. Avol, E. Thomas, D. Peter, J. 2006. Traffic, susceptibility, and Childhood Asthma." Environmental Health Perspectives 114(5): 766-772.
22. Moore DK, Jerrett M, Mack WJ, Kunzli N. 2007. A land use regression model for predicting ambient fine particulate matter across Los Angeles, CA. Journal of Environmental Monitoring. 9: 246-52.
23. OEEHA (Office of Environmental Health Hazard Assessment). 2003. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Available: http://www.oehha.ca.gov/air/hot_spots/HRAguidefinal.html
24. OEHHA. 2006. Air Pollution from Nearby Traffic and Children's Health: Information for Parents. Availablet: http://www.oehha.ca.gov/eastbaykids/FactsheetParentFinal.pdf
25. OEHHA. 2008 Air Toxics Hot Spots Program Risk Assessment Guidelines. Part II. Technical Support Document for Describing Available Cancer Potency Factors. Available: http://www.oehha.ca.gov/air/cancer_guide/TSD2.html)
26. Ross Z, Jerrett M, Ito K, Tempalski B, Thurston GD. 2007. A land use regression for predicting fine particulate matter concentrations in the New York City region. Atmospheric Environment. 41: 2255-2269.
27. Ryan PH, LeMasters G, Biagini J, Bernstein D, Grinshpun SA, Shukla R, Wilson K, Villareal M, Burkle J, Lockey J. 2005. Is it traffic type, volume, or distance? Wheezing in infants living near truck and bus traffic. J Allergy Clin Immunol. 116(2):279-84.
28. Ryan PH, LeMasters GK. A review of land-use regression models for characterizing intraurban air pollution exposure. Inhal Toxicol. 2007;19 Suppl 1:127-33.
29. Schlesinger RB, Kunzli N, Hidy GM, Gotschi T, Jerrett M. 2006. The Health Relevance of Ambient Particulate Matter Characteristics: Coherence of Toxicological and Epidemiological Inferences. Inhalational Toxicology. 18:95-125.
30. SFDCP (San Francisco Department of Cit Planning). 2007. Eastern Neighborhoods Draft Environmental Impact Report.
31. Sierra Research. 2006. PM 10 Monitoring data from Focused Particulate Monitoring Study Data Collected by Sierra Research From July 9, 2005 to March 24, 2006
32. SMAQMD (Sacramento Air Quality Management District). 2007. Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways.
33. USEPA (US Environmental Protection Agency). 2008 Support Center for Regulatory Atmospheric Modeling. Available at: http://www.epa.gov/scram001/dispersion_prefrec.htm
34. USEPA (US Environmental Protection Agency). 2006. Regulatory Impact Assessment. 2006 National Ambient Air Quality Standards for Particle Pollution.
35. USEPA (US Environmental Protection Agency). 2006. PM2.4 and PM10 Hot-Spot analysis in project-level transportation conformity determinations for the New Pm 2.5 and Existing Pm10 National Ambient Air Quality Standards; Final Rule 40 CFR Part 93. March 10, 2006.
36. Venn. et al. 2001. Living near a main road and the risk of wheezing illness in children. American Journal of Respiratory and Critical Care Medicine. 164:2177-2180.
37. Weijers EP, Khlystov AY, Kos GPA, Erisman JW. 2004. Variability of particulate matter concentrations along roads and motorways determined by a moving measurement unit. Atmospheric Environment. 38: 2993-3002.

38. WHO (World Health Organization). 2001.Quantification of the Health Effects of Exposure to Air Pollution Report of a WHO Working Group Bilthoven, Netherlands 20-22 November 2000 EUROPEAN CENTRE FOR ENVIRONMENT AND HEALTH, 2001
39. WHO (World Health Organization). 2003. Health Aspects of Air Pollution with Particulate Matter, Ozone and Nitrogen Dioxide Report on a WHO Working Group Bonn, Germany 13–15 January 2003. Copenhagen: World Health Organization.
40. Wichmann J, Janssen NAH, van der Zeee S, Brunekreef B. 2005. Traffic-related differences in indoor and personal absorption coefficient measurements in Amsterdam the Netherlands. Atmospheric Environment. 39: 7384-7392.
41. Yura EA Kear T, Neimeier D. 2007. Using Caline dispersion to assess vehicular PM2.5 emissions. Atmospheric Environment. doi;10:1016/j.atomosenve.2007.07.045.
42. Zhou Y Levy JI. 2007. Factors influencing the spatial extent of mobile source air pollution impacts: a meta-analysis. BMC Public Health. 89: 1-11.

APPENDIX I-- EXPOSURE MODELING AND HEALTH RISK ASSESSMENT EXAMPLES FROM SAN FRANCISCO

Several examples below illustrate the use of CAL3QHCR by the San Francisco Health Department to model $PM_{2.5}$ concentration from high volume roadways at potential sensitive receptors for several locations in San Francisco. For some sites in the examples, the examples include estimates of human health hazards attributed to roadway pollutants. The reader should note that modeled pollutant concentrations do not take into account background concentrations or non-roadway sources and health risk assessments do not address all roadway pollutants. Model Parameters, sources, and assumptions for this case study are listed in the table below.

Model Parameter	**Data Sources and Assumptions**
Traffic data	California Department of Transportation Traffic Data (Peak hour traffic volume. Annual average traffic volume. Percentage of Truck Traffic)
Vehicle Emissions rates	California Air Resources Board EMFAC 2007
Traffic speed	25mph local, 30 mph arterial, 55mph freeway
Temperature and Humidity	Area Annual Average (e.g., 50% relative humidity, and 50 degrees F)
Surface meteorology	San Francisco International Airport (Available at the Meteorological Resource Center, http://www.webmet.com/State_pages/met_ca.htm)
Number of Receptors	Minimum six receptors per acre
PM 2.5 Concentration Response Function	Jerrett et al. 2005 (1.4% Increase in Rate of Non-Injury Mortality per unit ug /m^3 increase in PM 2.5)
Cancer Unit Risk Factors for	Office of Environmental Health Hazard Assessment 2002
Crude Non-Injury Mortality Rate	California DPH County Health Status Profiles 2006 (733 /100,000)

Example 1: Executive Park

Example 1 is an air quality analysis of Executive Park, a proposed mixed use residential community adjacent to and to the east of US 101 at the southern border of San Francisco. Figure 1 illustrates modeled annual average PM 2.5 concentrations and modeled DPM concentrations attributable to roadway emissions. The subsequent table provides findings including estimates of exposure from vehicle sources along with associated health effects. The modeled roadway attributable concentrations of PM 2.5 range from <0.10 to 0.5 at the project site. This concentration translates into a 0.7% excess annual risk of mortality for those exposed or 51 excess premature deaths per million people exposed at the location of highest exposure. The maximum modeled level of diesel particulate matter in the Executive Park Project was 0.2. The excess lifetime Cancer Risk attributable to traffic diesel particulate matter (DPM) would be 0.2 ug/m^3 times the unit risk factor for DPM of 3.0 x 10^{-4} times 10^6 population for an addition lifetime risk of 60 cancers in one million exposed people.

Figure 1 Spatial Extent of Roadway Emissions of PM 2.5 at the Executive Park Project Site from US 101 at Alana Street (Annual Average ugs/ m^3**).**

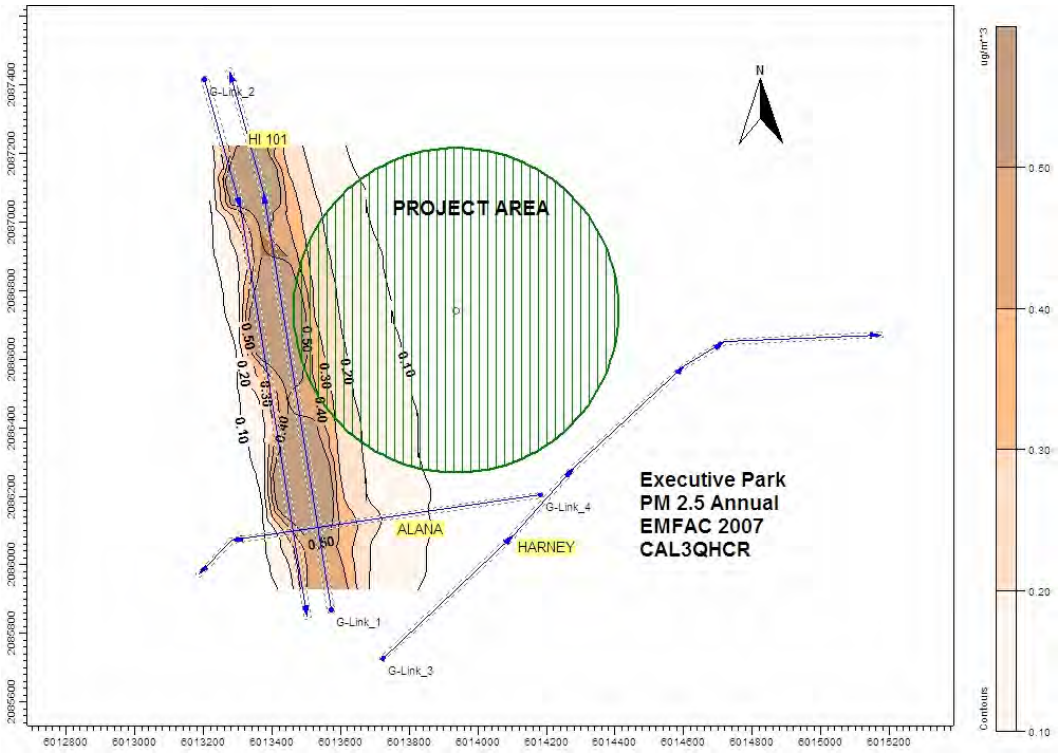
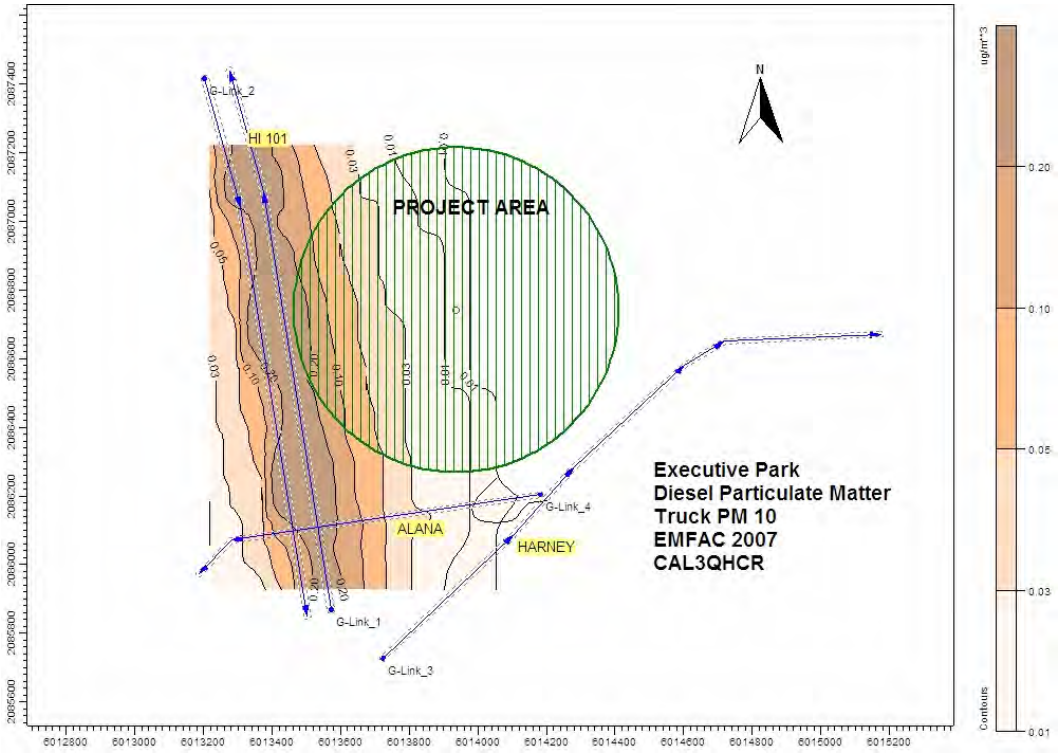


Figure 2. Spatial Extent of Diesel Particulate Matter (DPM) at the Executive Park Project Site from US 101 at Alana Street (Annual Average ugs/ m^3**).**



Modeled $PM_{2.5}$ and Diesel PM Concentrations from Roadway Sources and their Associated Mortality Hazards for the Project Site for the Executive Park Sub Area Plan in San Francisco

Roadway Location & AADT	Roadway PM 2.5 Concentration at Project Site (ugs/ m3)	Mortality Hazard Attributable to Roadway PM 2.5 based on highest site concentration	Roadway DPM Concentration at Project Site	Cancer Hazard Attributable to Roadway Diesel PM based on highest site concentration
US 101 @ Alana 216,000 vehicles/day	0.10 – 0.5 ugs/ m^3	10-51 excess deaths per million population per year	0.01 – 0.2 ugs/ m^3	60 excess cancers per million population

Example 2: 129 Girard Street Project, San Francisco

This example looks at a single family residential development on the upwind side of the Highway 101, Highway 280, Silver Avenue, and Bayshore Boulevard interchange. The impact of prevailing wind from the West disperses much of the particulate matter away from the development site and toward the downwind side of the freeway. Exposures above the action threshold can be seen to impact much of the Silver Terrace neighborhood including a significant portion of the Silver Terrace Playground shown below in green. The development site, however, is exposed below the action threshold. A similar analysis of the diesel particulate matter threshold is seen in Figure 4. Again the downwind dispersion of prevailing westerly wind results in low exposures at the development site.

Figure 3 Spatial Extent of Particulate Matter 2.5 at US 101 I-280 Interchange at Silver Avenue.

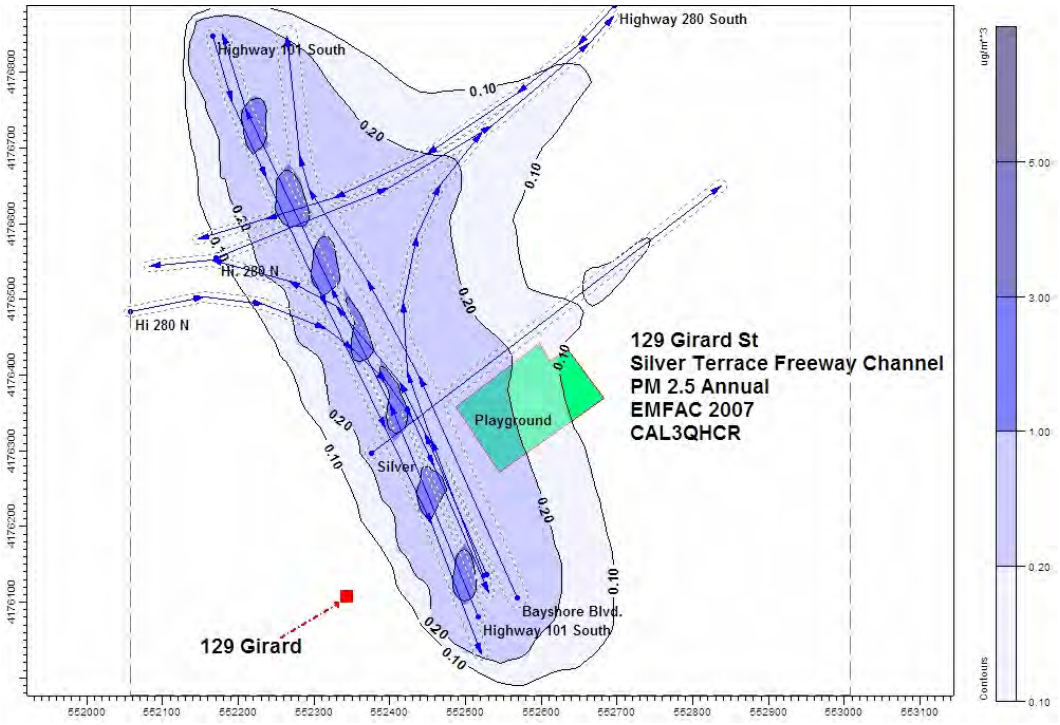
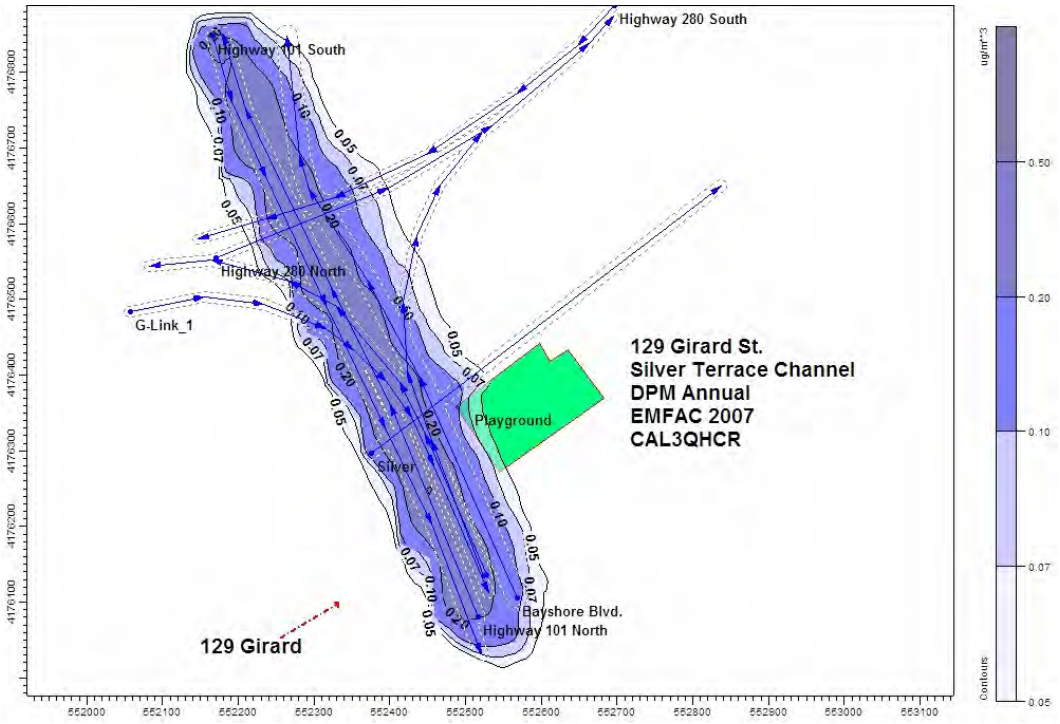


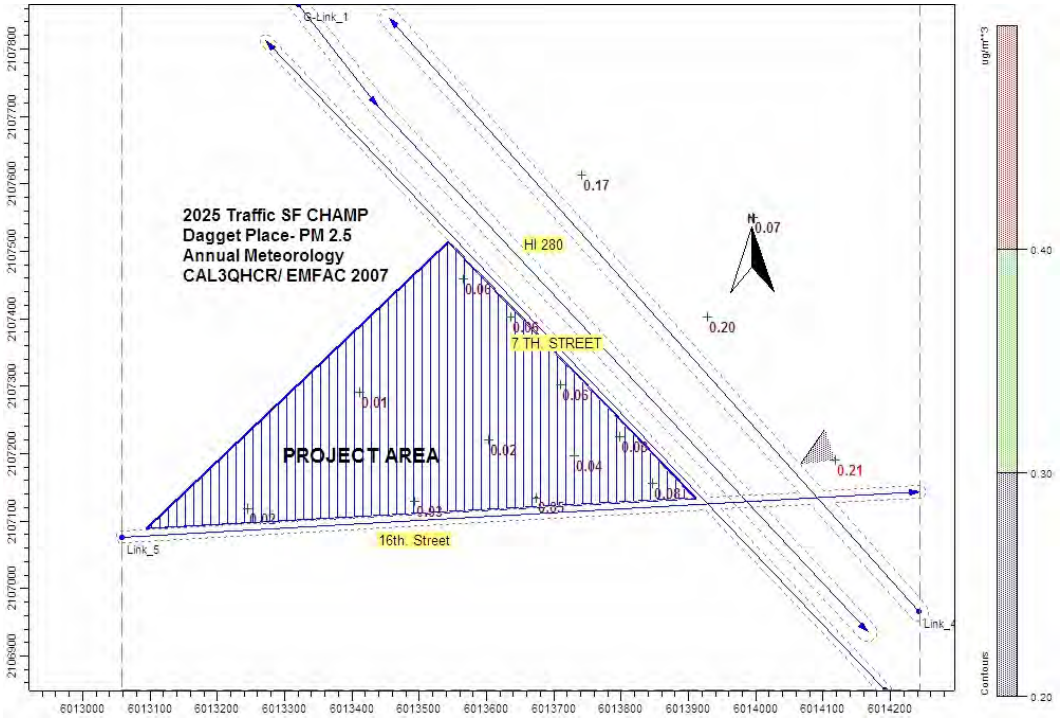
Figure 4 Spatial Extent of Diesel Particulate Matter at US 101 I-280 Interchange at Silver Avenue.



Example 3: Dagget Place Project, San Francisco

Example 3 demonstrates the use of the San Francisco County Transportation Authority traffic model, SF CHAMP, and the model's ability to predict future traffic volumes to the year 2025. In addition, EMFAC 2007, the California Air Resources Board's emission model produces traffic emissions for 2025 by including anticipated improvements in vehicle traffic emissions over time. In this development the effect of prevailing westerly wind, future emissions, and future traffic volumes results in exposure levels at the site beneath the action level of 0.2 ug/m^3. On the other hand, exposures at a similar development on the downwind side of Highway 280 would exceed the action level of 0.2 ugs/m^3.

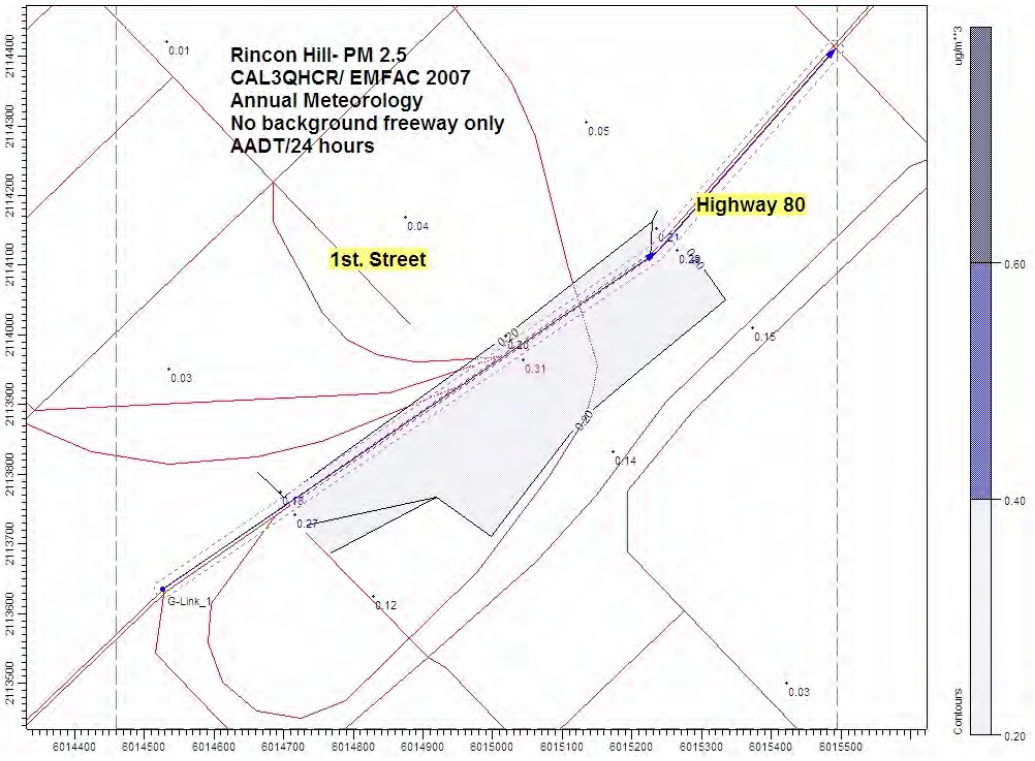
Figure 5 Spatial Extent of Particulate Matter 2.5 from Roadway Emissions at I-280 at 16th Street, San Francisco (Modeled as Annual Average).



Example 4: Rincon Hill, San Francisco

Example 4 represents the modeling of the Rincon Hill Tower on First St. near Highway 280. Again the effect of prevailing westerly wind can be seen with much of the particulate dispersion downwind of the development site. If this same development was located on the downwind side of the freeway it would have exceeded the action level and been subject to health risk assessment similar to Example 1, Executive Park, and would have required mitigations including strategic location of supply air inlets as well as possible filtration.

Figure 6 Spatial Extent of Particulate Matter 2.5 from Roadway Emissions at I-80 at 1st Street, San Francisco (Modeled as Annual Average).



APPENDIX II—AIR QUALITY MONITORING DATA FOR SAN FRANCISCO

In San Francisco, the Bay Air Quality Management District maintains one station for routine collection of monitoring data on criteria air pollutants on Arkansas Street. Criteria air pollutant monitoring data from that station is available at the URL: http://gate1.baaqmd.gov/aqmet/aq.aspx.

Some finer grained long term monitoring for Particulate Matter has recently been conducted in San Francisco for PM_{10} and $PM_{2.5}$ from several community stations contemporaneous with the BAAQMD measures. Sierra Research conducted the monitoring which started in early July 2005 and continued through late March 2006. Monitoring took place at two locations in Bayview/Hunters Point and two locations in Potrero at sites were chosen to be representative of community exposures. The study also monitored at the BAAQMD Arkansas Street monitoring station so that we could directly compare the BAAQMD measurements with those from our program.

Monitoring demonstrated that particulate matter measures (as an annual average) ranged from 16.9 to 20 ugs/m^3 fro PM_{10} and from 7.6 to 9.3 ug/m3 for $PM_{2.5}$. The results of the study are described in the tables below.

PM10 (ug/m3) Monitoring Results from San Francisco Electric Reliability Project

	Monitor Location	BAAQMD Arkansas St	Arkansas St	Southeast Community Center	Muni Maintenance Yard	Potrero Recreation Center	Malcolm X Academy	California Ambient AQ Std
PM 10	Average	19.0	18.6	18.3	20.0	16.9	17.5	20
	Maximum	46.8	45.3	41.5	45.0	36.7	35.2	50
PM 2.5	Average	9.1	8.9	9.3	8.9	7.6	7.9	12
	Maximum	27.7	22.8	22.2	22.7	16.1	18.4	None

Exhibit F
Mira Loma - Consent Judgment

Exempt from Filing Fees pursuant to Government Code section 6103

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF RIVERSIDE
FEB 14 2013
G. Keyes

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF RIVERSIDE

CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE, a not-for-profit corporation,

Petitioner,

v.

COUNTY OF RIVERSIDE; CITY OF JURUPA VALLEY; and DOES 1 through 10, inclusive,

Respondents,

INVESTMENT BUILDING GROUP, a corporation; OBAYASHI CORPORATION, a corporation; DENNIS ROY ARCHITECT, INC., doing business as RGA OFFICE OF ARCHITECTURAL DESIGN, a corporation; O C REAL ESTATE MANAGEMENT, LLC, a limited liability corporation; SP4 DULLES LP, a limited partnership; and DOES 11 through 20, inclusive,

Real Parties in Interest,

PEOPLE OF THE STATE OF CALIFORNIA, ex rel. Kamala D. Harris, Attorney General,

Intervenor/Petitioner.

Case No. RIC1112063

[[redacted] CONSENT JUDGMENT

(Code Civ. Proc., § 664.6)

Judge: Honorable Sharon Waters
Dept: 1
Action Filed: July 19, 2011

This Consent Judgment and Stipulation for Entry of Final Judgment ("Consent Judgment") is hereby stipulated and agreed to by, between, and among the County of Riverside ("County"), the City of Jurupa Valley ("City"), Obayashi Corporation, SP4 Dulles LP, and Investment Building Group as the general partner for the property owner 54 DeForest Partnership L.P. (collectively, "the Real Parties," or "RPIs"), the Center for Community Action and Environmental Justice ("CCAEJ"), and the People of the State of California ex rel. Kamala D. Harris, Attorney General, ("People") (each of whom shall be referred to individually as a "Party" or collectively as the "Parties") to resolve all claims and actions raised in the above-captioned litigation, *Center for Community Action and Environmental Justice at el. v. County of Riverside et al.,* Riverside County Superior Court Case No. RIC1112063 (the "Litigation"), as follows:

I. RECITALS

A. On or about June 14, 2011, the County approved the Real Parties' proposed development of Plot Plan Nos. 16979, 17788, 18875, 18876, 18877, and 18879 on 65.05 gross (60.37 net) acres with a total building area of 1,134,268 square feet ("The Project"). The County's Project approvals included the adoption of Resolution Nos. 2011-170 and 2011-171, the certification of Environmental Impact Report ("EIR") No. 450, and the adoption of the Mitigation Monitoring and Reporting Plan.

B. On or about July 19, 2011, CCAEJ filed a Petition for Writ of Mandate and Petition for Injunctive Relief against the County, City, and Real Parties asserting alleged violations of California Environmental Quality Act ("CEQA") and Government Code section 11135 related to the County's approvals of the Project and certification of the EIR.

C. On or about October 5, 2011, the People filed a Complaint in Intervention and Petition for Writ of Mandate against the County, City, and Real Parties asserting alleged violations of CEQA related to the Project.

D. The Parties agree that this Consent Judgment is a full and complete resolution of all claims that have been asserted in the Litigation, and further that the Parties covenant not to sue on certain other claims set out in paragraphs 4, 8, 11, and 12 of this Consent Judgment.

E. The Parties agree that this Consent Judgment is entered into with the goal of achieving global settlement of any and all claims in the Litigation.

II. JURISDICTION

The Parties agree that the Superior Court of California, County of Riverside has subject matter jurisdiction over the matters alleged in this Litigation and personal jurisdiction over the Parties to this Consent Judgment.

III. TERMS

NOW THEREFORE, in consideration of the mutual covenants, agreements, representations, and warranties contained in this Consent Judgment, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby stipulate and agree to entry of this Consent Judgment, and agree to the terms as set forth below.

A. Exhibit "A".

1. All Parties agree to comply with the terms set forth in Exhibit "A" and accompanying Attachments, attached hereto and incorporated herein by reference.

B. The City's Obligations.

2. The City's execution of this Consent Judgment shall constitute final approval of any and all additional Project mitigation measures or Project features described in Exhibit "A" and accompanying attachments of this Consent Judgment. The Project approvals previously issued on or about June 14, 2011, shall be fully and finally effective on the date the Consent Judgment is entered by the Court, subject to the conditions of approval and mitigation measures set forth in this Consent Judgment or previously required.

3. The City further agrees that, in calculating the expiration date for any and all Project approvals under the Project Condition of Approvals, the Subdivision Map Act, or other laws, the expiration date for those Project approvals shall not include the period of time during which this Litigation was pending. All applicable time periods associated with the Project approvals shall be stayed and extended for a time period commencing with the date the Petition in this Litigation was filed in the Superior Court for Riverside County and ending on the date the Consent Judgment is entered by the Court.

4. City's Covenant Not to Sue. The City covenants not to pursue any civil or administrative claims against the People or against any agency of the State of California arising out of or related to the Litigation.

C. Real Parties' Obligations.

5. Without admitting any liability, and in consideration of the terms of the Consent Judgment, as a compromise and settlement only, and as full and final settlement of all outstanding claims for attorneys' and consultants' fees and costs of suit related to the Litigation, Real Parties agree to make three payments, as described in the following paragraphs.

6. Real Parties agree to pay the sum of $103,000 to CCAEJ (the "Settlement Payment 1"). The Settlement Payment 1 will be in the form of a check made payable to "Johnson & Sedlack Client Trust Account" to be delivered to CCAEJ's counsel, Ray Johnson, within five (5) business days after the entry of this Consent Judgment. Except as set forth in this Paragraph, CCAEJ and their legal counsel specifically waive any right and/or claim to any additional attorneys' fees, costs, and/or consultant fees related to this Litigation and/or the Project.

7. Real Parties shall pay to the City the actual attorney fees and litigation expenses incurred by the City in this Litigation, not to exceed Fifty Thousand Dollars ($50,000). Upon the execution of this Consent Judgment by the Parties, the City shall notify the Real Parties of the total amount of its attorney fees and litigation expenses and the Real Parties shall pay said amount to the City within thirty (30) days of the date of entry of this Consent Judgment via check made out to City of Jurupa Valley.

8. Real Parties' Covenant Not to Sue. The Real Parties, and each of them, covenant not to pursue any civil or administrative claims against the People or against any agency of the State of California arising out of or related to the Litigation.

9. Timing of Payments Required by Exhibit "A". Within thirty (30) days of the entry of this Consent Judgment, Real Parties shall establish an escrow account with First American, the purpose of which shall be to hold in escrow the monetary sums set forth in Exhibit "A" that require Real Parties to make a monetary payment to the City. City shall maintain, including all administrative costs, the escrow account once established. These monetary sums shall be

deposited by the Real Parties in such a manner as to ensure release of those sums to the City as follows:

a. $30,000 shall be released to the City in satisfaction of the Real Parties' obligation under the "Anti-Idling Enforcement" term within thirty (30) days of the entry of this Consent Judgment.

b. $20,000 shall be released to the City in satisfaction of the Real Parties' obligation under the "Restricted Truck Route" term following the City's execution of a contract with a consultant retained to study and prepare environmental documentation of the restricted truck route and within ten (10) days of the city provision of written notice to the Real Parties of same.

c. $20,000 shall be released to the City in satisfaction of the Real Parties' obligation under the "EJ Element in General Plan" term within twelve (12) months of the entry of this Consent Judgment or within two (2) weeks of the City's issuance of its Notice of Preparation or Notice of Intent prepare a CEQA document for its General Plan or an amendment to its General Plan that includes an EJ Element, whichever is sooner.

D. CCAEJ's and People's Obligations.

10. Duty Not to Object or Disrupt Process for Project Approval. CCAEJ, and each of their individual members have represented to all other Parties that they support this Consent Judgment and the Project with the conditions imposed by this Consent Judgment. CCAEJ, on behalf of itself, its current and future members, agents, successors, assigns, designees, affiliates, and officers, will not directly or indirectly object, oppose, delay, frustrate, or disrupt the full and complete approval of the Project – including the issuance of any grading permit, building permits, certificates of occupancy, or any other permits necessary for the implementation of the Project – subject to the terms and conditions of this Consent Judgment, nor will they directly or indirectly encourage or fund others to undertake those actions. CCAEJ, on behalf of itself, its current and future members, agents, successors, assigns, designees, affiliates, and officers, further agree that

they will not submit or provide verbal or written comments to any decision-making body or public agency, or any other public agency that must issue a Project approval, that are critical of the Project or are intended to object to or oppose the full and complete approval of the Project, subject to the terms and conditions of this Consent Judgment. Further, CCAEJ, on behalf of itself, its current and future members, agents, successors, assigns, designees, affiliates, and officers, further agree that they will not directly or indirectly encourage or fund others to undertake the aforementioned actions.

11. CCAEJ's Covenant Not to Sue. CCAEJ, for itself and its current and future members, agents, successors, assigns, designees, affiliates, and officers, agree not to initiate, commence, or participate in any administrative appeal or lawsuit against the County, the City, the Real Parties, or any other public or private entity or the members, affiliates, partners, employees, or officers thereof relating to the Project's environmental review or approval – whether under CEQA, land use, or any other laws – except to enforce the terms of this Consent Judgment. CCAEJ, for itself and its current and future members, employees, agents, successors, assigns, designees, affiliates, and officers, shall not sue (i.e., initiate, commence, or participate in any administrative appeal or lawsuit) to invalidate the Project and the use or modification of the Project including, but not limited to, any approvals needed for the development of any phase of the Project, as long as the development or use is consistent with the terms of this Consent Judgment. CCAEJ, for itself and its current and future members, employees, agents, successors, assigns, designees, affiliates, and officers, further agree not to directly or indirectly encourage or fund others to undertake any of the actions described in this paragraph. The CCAEJ specifically retains, however, the right to assert a claim, demand or cause of action challenging any failure by the County, the City, or Real Parties to comply with this Consent Judgment.

12. People's Covenant Not to Sue. The People agree not to initiate, commence, or participate in any administrative appeal or lawsuit against the City, the Real Parties, or the members, affiliates, partners, employees, or officers thereof for: (a) the claims that were raised in the Litigation; and (b) other CEQA claims that could have been asserted by the People based upon the acts, omissions, and/or events that are alleged in the People's Complaint in Intervention

or that relate to the County's Project approvals issued on or about June 14, 2011. The People specifically retain, however, the right to assert a claim, demand or cause of action challenging any failure by the County, the City, or Real Parties to comply with this Consent Judgment. Except as expressly provided herein, nothing in this Consent Judgment is intended nor shall be construed to limit the People from taking appropriate enforcement actions or otherwise exercising their authority under any law. Further, nothing in this Consent Judgment is intended nor shall be construed to limit the People from taking any action related to any future proposed project, including any future project that may be related to this Project.

13. CCAEJ will not publish or cause to be published any press release or other written public disclosure ("Release") concerning this Consent Judgment or the settlement of the Litigation without first providing the proposed Release to the Real Parties for review and comment. Real Parties shall be provided 48-hours in which to review and provide any comments or requested edits to CCAEJ concerning the Release. CCAEJ agrees to consider any comments or requested edits in good faith prior to finalizing and/or issuing the Release.

E. General Terms.

14. Entry of Judgment. The Parties jointly request that the Court enter this Consent Judgment as a final judgment in the above-captioned action.

15. Retention of Jurisdiction. Pursuant to section 664.6 of the Code of Civil Procedure, the Parties request that the Court shall retain continuing jurisdiction over this matter and the Parties for the purpose of interpreting and enforcing the terms of this Consent Judgment.

16. Limits. This Consent Judgment shall not be construed as creating any right or benefit, substantive or procedural, enforceable at law or in equity, by any Party against the City, the County, or any of their governmental agencies, departments, political subdivisions or any other public entities other than those set forth herein.

17. Notices. Any notice, request, or communication required to be given to the Parties under this Consent Judgment shall be given in writing and shall be personally delivered or mailed by prepaid registered or certified mail to the addresses below:

County of Riverside	Pamela J. Walls Michelle Clack Office of Riverside County Counsel 3960 Orange Street, Suite 500 Riverside, CA 92501 (951) 955-6300/Telephone (951) 955-6363/Facsimile
City of Jurupa Valley	Peter M. Thorson Ginetta L. Giovinco Richards, Watson & Gershon PC 355 South Grand Avenue, 40th Floor Los Angeles, California 90071-3101 (213) 626-8484/Telephone (213) 626-0078/Facsimile
Obayashi Corporation, SP4 Dulles LP, and Investment Building Group (as the general partner for the property owner 54 DeForest Partnership L.P.)	Michelle Ouellette Best Best & Krieger LLP P. O. Box 1028 Riverside, CA 92502 (951) 686-1450 Telephone (951) 686-3083/Facsimile and SP4 Dulles LP c/o Brent Steele, Director CBRE Global Investors, LLC 515 S. Flower Street, Ste. 3100 Los Angeles, CA 90071
Center for Community Action and Environmental Justice	Raymond W. Johnson Abigail A. Broedling Kimberley Foy Johnson & Sedlack 26785 Camino Seco Temecula, CA 92590 (951) 506-9925/Telephone (951) 506-9725/Facsimile
	Sarah E. Morrison Deputy Attorney General Office of the California Attorney General

Office of the California Attorney General	300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 (213) 897-2640/Telephone (213) 897-2802/Facsimile

18. Entire Agreement. The Parties acknowledge that this Consent Judgment is signed and executed without reliance upon any actual or implied promises, warranties or representations made by any of the Parties or by any representative of any of the Parties, other than those which are expressly contained within this Consent Judgment. This Consent Judgment, including the true and correct Recitals above, inclusive of all definitions contained therein, that are incorporated by reference herein as operative covenants and specifically relied upon by the Parties in executing this Consent Judgment, constitutes the entire agreement and understanding among and between the Parties and supersedes any and all other agreements whether oral or written between the Parties.

19. California Civil Code Section 1542. Upon the Effective Date of this Consent Judgment, as that term is defined below, each of the Parties has read and has otherwise been informed of the meaning of Section 1542 of the California Civil Code, and has consulted with its respective counsel, to the extent that any was desired, and understands the provisions of Section 1542. Each of the Parties, except for the People, hereby expressly waives the rights and benefits conferred upon it by the provisions of Section 1542 of the California Civil Code, which provides:

> "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

_____ County's Initials	_____ City's Initials
_____ Real Parties' Initials	_____ CCAEJ Initials

Office of the California Attorney General	300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 (213) 897-2640/Telephone (213) 897-2802/Facsimile

18. Entire Agreement. The Parties acknowledge that this Consent Judgment is signed and executed without reliance upon any actual or implied promises, warranties or representations made by any of the Parties or by any representative of any of the Parties, other than those which are expressly contained within this Consent Judgment. This Consent Judgment, including the true and correct Recitals above, inclusive of all definitions contained therein, that are incorporated by reference herein as operative covenants and specifically relied upon by the Parties in executing this Consent Judgment, constitutes the entire agreement and understanding among and between the Parties and supersedes any and all other agreements whether oral or written between the Parties.

19. California Civil Code Section 1542. Upon the Effective Date of this Consent Judgment, as that term is defined below, each of the Parties has read and has otherwise been informed of the meaning of Section 1542 of the California Civil Code, and has consulted with its respective counsel, to the extent that any was desired, and understands the provisions of Section 1542. Each of the Parties, except for the People, hereby expressly waives the rights and benefits conferred upon it by the provisions of Section 1542 of the California Civil Code, which provides:

> "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

County's Initials	City's Initials
Real Parties' Initials	CCAEJ Initials

Office of the California Attorney General	300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 (213) 897-2640/Telephone (213) 897-2802/Facsimile

18. Entire Agreement. The Parties acknowledge that this Consent Judgment is signed and executed without reliance upon any actual or implied promises, warranties or representations made by any of the Parties or by any representative of any of the Parties, other than those which are expressly contained within this Consent Judgment. This Consent Judgment, including the true and correct Recitals above, inclusive of all definitions contained therein, that are incorporated by reference herein as operative covenants and specifically relied upon by the Parties in executing this Consent Judgment, constitutes the entire agreement and understanding among and between the Parties and supersedes any and all other agreements whether oral or written between the Parties.

19. California Civil Code Section 1542. Upon the Effective Date of this Consent Judgment, as that term is defined below, each of the Parties has read and has otherwise been informed of the meaning of Section 1542 of the California Civil Code, and has consulted with its respective counsel, to the extent that any was desired, and understands the provisions of Section 1542. Each of the Parties, except for the People, hereby expressly waives the rights and benefits conferred upon it by the provisions of Section 1542 of the California Civil Code, which provides:

> "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

County's Initials	City's Initials
Real Parties' Initials	CCAEJ Initials

Office of the California Attorney General	300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 (213) 897-2640/Telephone (213) 897-2802/Facsimile

18. Entire Agreement. The Parties acknowledge that this Consent Judgment is signed and executed without reliance upon any actual or implied promises, warranties or representations made by any of the Parties or by any representative of any of the Parties, other than those which are expressly contained within this Consent Judgment. This Consent Judgment, including the true and correct Recitals above, inclusive of all definitions contained therein, that are incorporated by reference herein as operative covenants and specifically relied upon by the Parties in executing this Consent Judgment, constitutes the entire agreement and understanding among and between the Parties and supersedes any and all other agreements whether oral or written between the Parties.

19. California Civil Code Section 1542. Upon the Effective Date of this Consent Judgment, as that term is defined below, each of the Parties has read and has otherwise been informed of the meaning of Section 1542 of the California Civil Code, and has consulted with its respective counsel, to the extent that any was desired, and understands the provisions of Section 1542. Each of the Parties, except for the People, hereby expressly waives the rights and benefits conferred upon it by the provisions of Section 1542 of the California Civil Code, which provides:

> "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

_____	_____
County's Initials	City's Initials
JML 11/3/13	
Real Parties' Initials	CCAEJ Initials

Office of the California Attorney General	300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 (213) 897-2640/Telephone (213) 897-2802/Facsimile

18. Entire Agreement. The Parties acknowledge that this Consent Judgment is signed and executed without reliance upon any actual or implied promises, warranties or representations made by any of the Parties or by any representative of any of the Parties, other than those which are expressly contained within this Consent Judgment. This Consent Judgment, including the true and correct Recitals above, inclusive of all definitions contained therein, that are incorporated by reference herein as operative covenants and specifically relied upon by the Parties in executing this Consent Judgment, constitutes the entire agreement and understanding among and between the Parties and supersedes any and all other agreements whether oral or written between the Parties.

19. California Civil Code Section 1542. Upon the Effective Date of this Consent Judgment, as that term is defined below, each of the Parties has read and has otherwise been informed of the meaning of Section 1542 of the California Civil Code, and has consulted with its respective counsel, to the extent that any was desired, and understands the provisions of Section 1542. Each of the Parties, except for the People, hereby expressly waives the rights and benefits conferred upon it by the provisions of Section 1542 of the California Civil Code, which provides:

> "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

_____ County's Initials

PRJ BG City's Initials

_____ Real Parties' Initials

_____ CCAEJ Initials

Office of the California Attorney General	300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 (213) 897-2640/Telephone (213) 897-2802/Facsimile

18. Entire Agreement. The Parties acknowledge that this Consent Judgment is signed and executed without reliance upon any actual or implied promises, warranties or representations made by any of the Parties or by any representative of any of the Parties, other than those which are expressly contained within this Consent Judgment. This Consent Judgment, including the true and correct Recitals above, inclusive of all definitions contained therein, that are incorporated by reference herein as operative covenants and specifically relied upon by the Parties in executing this Consent Judgment, constitutes the entire agreement and understanding among and between the Parties and supersedes any and all other agreements whether oral or written between the Parties.

19. California Civil Code Section 1542. Upon the Effective Date of this Consent Judgment, as that term is defined below, each of the Parties has read and has otherwise been informed of the meaning of Section 1542 of the California Civil Code, and has consulted with its respective counsel, to the extent that any was desired, and understands the provisions of Section 1542. Each of the Parties, except for the People, hereby expressly waives the rights and benefits conferred upon it by the provisions of Section 1542 of the California Civil Code, which provides:

> "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR."

_____	_____
County's Initials	City's Initials
_____	_____
Real Parties' Initials	CCAEJ Initials

20. Amendments and Modifications. This Consent Judgment may only be amended or modified on a noticed motion by one of the Parties with subsequent approval by the Court, or upon written consent by all of the Parties and the subsequent approval of the Court.

21. Settlement, No Admissions by Parties. Each of the Parties acknowledges that this Consent Judgment relates to the avoidance of litigation and the preclusion of actions described above. The Parties, therefore, agree that this Consent Judgment is not to be treated or construed, at any time or in any manner whatsoever, as an admission by any Party that any of the allegations in the Litigation has merit.

22. Choice of Law and Choice of Forum. This Consent Judgment shall be deemed to have been executed and delivered within the State of California; the rights and obligations of the Parties hereunder shall be governed, construed and enforced in accordance with the laws of the State of California. The venue for any dispute arising from or related to this Consent Judgment, its performance, and its interpretation shall be the Superior Court of California, County of Riverside.

23. Joint Preparation. This Consent Judgment has been jointly drafted. No presumptions or rules of interpretation based upon the identity of the party preparing or drafting the Consent Judgment, or any part thereof, shall be applicable or invoked.

24. Damages. The Parties agree that the sole and exclusive remedy for breach of this Consent Judgment shall be an action for specific performance or injunction. In no event shall any Party be entitled to monetary damages for breach of this Consent Judgment.

25. Enforcement of Consent Judgment. No action for breach of this Consent Judgment shall be brought or maintained until: (a) the non-breaching Party provides written notice to the breaching Party which explains with particularity the nature of the claimed breach, and (b) within thirty (30) days after receipt of said notice, the breaching Party fails to cure the claimed breach or, in the case of a claimed breach which cannot be reasonably remedied within a thirty (30) day period, the breaching Party fails to commence to cure the claimed breach within such thirty (30) day period, and thereafter diligently complete the activities reasonably necessary to remedy the claimed breach.

26. City Attorneys' Fees. Separate and apart from the Parties' obligations as described herein, the Real Parties and their successors in interest separately agree to indemnify the City of Jurupa Valley and hold it harmless for any damages it may incur or attorney fees and litigation expenses it may incur arising from any action brought by the Petitioners, the People or persons other than the Real Parties to enforce the terms of this Consent Judgment or to otherwise challenge the Project. In the event such litigation is filed and served on the City, the City shall promptly notify the Real Parties and their successors in interest and Real Parties and their successors in interest shall deposit with the City an amount for attorneys fees as litigation expenses as estimated by the City Attorney for the City of Jurupa Valley, which deposit shall be replenished as necessary.

27. Authorized Signatory. Each Party represents and warrants to each other Party that its signature to this Consent Judgment has the authority to legally bind the Party, and this Consent Judgment does in fact bind the Party.

28. Parties Bound. This Consent Judgment shall apply to and be binding upon the Parties and each of them, and their officers, directors, agents, trustees, successors, and assigns.

29. People Not Liable. The People or any agency of the State of California shall not be liable for any injury or damage to persons or property resulting from acts or omissions by the County, City, or Real Parties, or their directors, officers, employees, agents, representatives or contractors, in carrying out activities pursuant to this Consent Judgment, nor shall the People or any agency of the State of California be held as a party to or guarantor of any contract entered into by the County, City or Real Parties in carrying out the requirements of this Consent Judgment.

30. Effective Date. This Consent Judgment is effective as of the date on which the Court enters this Consent Judgment on the Court's docket.

31. Counterparts. This Consent Judgment may be executed in counterparts and when so executed by the Parties, shall become binding upon them and each such counterpart will be an original document.

32. Costs and Attorneys' Fees. Except to the extent provided above, no party shall

claim costs or attorneys' fees from any other Party related to the Litigation. Further, each Party agrees that the terms of this Consent Judgment do not establish any Party as a "prevailing party" for purposes of claiming either costs or attorneys fees, and each Party specifically waives any other right that Party may have to seek costs or attorneys fees related to the Litigation.

IT IS SO STIPULATED AND AGREED.

RESPONDENT COUNTY OF RIVERSIDE

Dated: 1/31/13

ATTEST:
KECIA HARPER-IHEM, Clerk
By _____ DEPUTY

_____
for County of Riverside

by _____

RESPONDENT CITY OF JURUPA VALLEY

Dated: _____

_____
Laura Roughton, Mayor, for City of Jurupa Valley

REAL PARTIES IN INTEREST

Dated: _____

_____
for Obayashi Corporation

by _____

Dated: _____

_____
for Investment Building Group, as the general partner for 54 DeForest Partnership L.P.

by _____

Dated: _____

_____
for SP4 Dulles LP

by _____

claim costs or attorneys' fees from any other Party related to the Litigation. Further, each Party agrees that the terms of this Consent Judgment do not establish any Party as a "prevailing party" for purposes of claiming either costs or attorneys fees, and each Party specifically waives any other right that Party may have to seek costs or attorneys fees related to the Litigation.

IT IS SO STIPULATED AND AGREED.

RESPONDENT COUNTY OF RIVERSIDE

Dated: _____

_____
for County of Riverside

by_____

RESPONDENT CITY OF JURUPA VALLEY

Dated: _____

_____
Verne Lauritzen, Mayor, for City of Jurupa Valley

REAL PARTIES IN INTEREST

Dated: _____

_____
for Obayashi Corporation

by_____

Dated: _____

_____
for Investment Building Group, as the general partner for 54 DeForest Partnership L.P.

by_____

Dated: _____

_____
for SP4 Dulles LP

by_____

claim costs or attorneys' fees from any other Party related to the Litigation. Further, each Party agrees that the terms of this Consent Judgment do not establish any Party as a "prevailing party" for purposes of claiming either costs or attorneys fees, and each Party specifically waives any other right that Party may have to seek costs or attorneys fees related to the Litigation.

IT IS SO STIPULATED AND AGREED.

RESPONDENT COUNTY OF RIVERSIDE

Dated: _____

_____
for County of Riverside

by_____

RESPONDENT CITY OF JURUPA VALLEY

Dated: _____

_____
Laura Roughton, Mayor, for City of Jurupa Valley

REAL PARTIES IN INTEREST

Dated: Jan. 16, 2013

_____
for Obayashi Corporation

by Yoshiharu Nakamura, Executive Officer

Dated: _____

_____
for Investment Building Group, as the general partner for 54 DeForest Partnership L.P.

by_____

Dated: _____

_____
for SP4 Dulles LP

by_____

claim costs or attorneys' fees from any other Party related to the Litigation. Further, each Party agrees that the terms of this Consent Judgment do not establish any Party as a "prevailing party" for purposes of claiming either costs or attorneys fees, and each Party specifically waives any other right that Party may have to seek costs or attorneys fees related to the Litigation.

IT IS SO STIPULATED AND AGREED.

RESPONDENT COUNTY OF RIVERSIDE

Dated: _____

_____
for County of Riverside

by_____

RESPONDENT CITY OF JURUPA VALLEY

Dated: _____

_____
Laura Roughton, Mayor, for City of Jurupa Valley

REAL PARTIES IN INTEREST

Dated: _____

_____
for Obayashi Corporation

by_____

Dated: 1/3/13

_____
for Investment Building Group, as the general partner for 54 DeForest Partnership L.P.

by JACK M. LANGSON, PRESIDENT

Dated: _____

_____
for SP4 Dulles LP

by_____

claim costs or attorneys' fees from any other Party related to the Litigation. Further, each Party agrees that the terms of this Consent Judgment do not establish any Party as a "prevailing party" for purposes of claiming either costs or attorneys fees, and each Party specifically waives any other right that Party may have to seek costs or attorneys fees related to the Litigation.

IT IS SO STIPULATED AND AGREED.

RESPONDENT COUNTY OF RIVERSIDE

Dated: _____

_____
for County of Riverside

by_____

RESPONDENT CITY OF JURUPA VALLEY

Dated: _____

_____
Laura Roughton, Mayor, for City of Jurupa Valley

REAL PARTIES IN INTEREST

Dated: _____

_____
for Obayashi Corporation

by_____

Dated: _____

_____
for Investment Building Group, as the general partner for 54 DeForest Partnership L.P.

by_____

Dated: 1/9/13

_____
for SP4 Dulles LP

by_____
Philip G. Hemeb
Vice President

John M. Gilb
Vice President

PETITIONER CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE

Dated: Jan. 10, 2013

Penny J. Newman
for Center for Community Action and Environmental Justice
by Penny J. Newman, Ex. Dir.

INTERVENOR PEOPLE OF STATE OF CALIFORNIA

KAMALA D. HARRIS
Attorney General of California

Dated: _____

SARAH E. MORRISON
Deputy Attorney General

Attorneys for Intervenor People of the State of California, ex rel. Kamala D. Harris, Attorney General

Approved as to form by:

Dated: _____

Pamela J. Walls, County Counsel
for the County of Riverside

Dated: _____

Peter M. Thorson, City Attorney
for the City of Jurupa Valley

Dated: _____

Michelle Ouellette, for Obayashi Corporation, SP4 Dulles LP, and Investment Building Group (as the general partner for the property owner 54 DeForest Partnership L.P.)

Dated: Jan 10, 2013

Raymond W. Johnson, for Center for Community Action and Environmental Justice

PETITIONER CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE

Dated: _____

_____
for Center for Community Action and Environmental Justice
by_____

INTERVENOR PEOPLE OF STATE OF CALIFORNIA

KAMALA D. HARRIS
Attorney General of California

Dated: 1/2/13

_____
SARAH E. MORRISON
Deputy Attorney General

Attorneys for Intervenor People of the State of California, ex rel. Kamala D. Harris, Attorney General

Approved as to form by:

Dated: _____

_____
Pamela J. Walls, County Counsel
for the County of Riverside

Dated: _____

_____
Peter M. Thorson, City Attorney
for the City of Jurupa Valley

Dated: _____

_____
Michelle Ouellette, for Obayashi Corporation, SP4 Dulles LP, and Investment Building Group (as the general partner for the property owner 54 DeForest Partnership L.P.)

Dated: _____

_____
Raymond W. Johnson, for Center for Community Action and Environmental Justice

PETITIONER CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE

Dated: _____

_____
for Center for Community Action and Environmental Justice
by_____

INTERVENOR PEOPLE OF STATE OF CALIFORNIA

KAMALA D. HARRIS
Attorney General of California

Dated:_____

_____
SARAH E. MORRISON
Deputy Attorney General

Attorneys for Intervenor People of the State of California, ex rel. Kamala D. Harris, Attorney General

Approved as to form by:

Dated: 1/30/13

_____ for
Pamela J. Walls, County Counsel
for the County of Riverside
Michelle Clack Deputy County Counsel

Dated: _____

_____
Peter M. Thorson, City Attorney
for the City of Jurupa Valley

Dated: _____

_____
Michelle Ouellette, for Obayashi Corporation, SP4 Dulles LP, and Investment Building Group (as the general partner for the property owner 54 DeForest Partnership L.P.)

Dated: _____

_____
Raymond W. Johnson, for Center for Community Action and Environmental Justice

PETITIONER CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE

Dated: _____

_____
for Center for Community Action and Environmental Justice
by _____

INTERVENOR PEOPLE OF STATE OF CALIFORNIA

KAMALA D. HARRIS
Attorney General of California

Dated: _____

_____
SARAH E. MORRISON
Deputy Attorney General

Attorneys for Intervenor People of the State of California, ex rel. Kamala D. Harris, Attorney General

Approved as to form by:

Dated: _____

_____
Pamela J. Walls, County Counsel
for the County of Riverside

Dated: January 17, 2013

_____
Peter M. Thorson, City Attorney
for the City of Jurupa Valley

Dated: _____

_____
Michelle Ouellette, for Obayashi Corporation, SP4 Dulles LP, and Investment Building Group (as the general partner for the property owner 54 DeForest Partnership L.P.)

Dated: _____

_____
Raymond W. Johnson, for Center for Community Action and Environmental Justice

PETITIONER CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE

Dated: _____

_____
for Center for Community Action and Environmental Justice
by_____

INTERVENOR PEOPLE OF STATE OF CALIFORNIA

KAMALA D. HARRIS
Attorney General of California

Dated:_____

_____
SARAH E. MORRISON
Deputy Attorney General

Attorneys for Intervenor People of the State of California, ex rel. Kamala D. Harris, Attorney General

Approved as to form by:

Dated: _____

_____
Pamela J. Walls, County Counsel
for the County of Riverside

Dated: _____

_____
Peter M. Thorson, City Attorney
for the City of Jurupa Valley

Dated: January 17, 2013

_____
Michelle Ouellette, for Obayashi Corporation, SP4 Dulles LP, and Investment Building Group (as the general partner for the property owner 54 DeForest Partnership L.P.)

Dated: _____

_____
Raymond W. Johnson, for Center for Community Action and Environmental Justice

IT IS SO ORDERED, ADJUDGED AND DECREED.

Dated: FEB 14 2013

Daniel A. Ottolia

Honorable Judge [redacted]
Judge of the Superior Court

EXHIBIT A

1. EJ Element in General Plan: Within the timeframes for adopting or updating general plans as required by law, as part of the proceedings of the City of Jurupa Valley (City) to adopt or update its General Plan, City agrees to use its best efforts to prepare an environmental justice element that includes specific policies, analyze any impacts of that element in any CEQA document prepared for the General Plan, and hold hearings or conduct other proceedings to consider the adoption of that environmental justice element. The environmental justice element prepared by the City shall be consistent with the California Office of Planning & Research ("OPR") General Plan Guidelines concerning environmental justice as they now exist or may hereafter be amended, and the Office of the Attorney General's guidance entitled, Environmental Justice at the Local and Regional Level – Legal Background (dated July 10, 2012), a copy of which is attached to the Consent Judgment as Exhibit B. The Real Parties in Interest (RPIs) shall contribute a total of $20,000 toward the preparation and consideration of the general plan element by the City.

The Parties understand and agree that, in the context of the City's processing its General Plan, including any Environmental Justice element, the City cannot guarantee the ultimate outcome of any public hearings before the City's Planning Commission or City Council, nor prevent any opposition thereto by members of the public affected by or interested in the General Plan. The Parties recognize that the adoption or amendment of the General Plan is a discretionary act and that nothing in this Consent Judgment limits, in any manner, the City's exercise of its police power under the California Constitution. Nothing in this Consent Judgment limits the City's discretion to determine what policies and provisions should be included in the environmental justice element. Subject to the foregoing, the City, to the extent allowed by law, shall facilitate and promote the proceedings necessary to complete processing of its General Plan and consideration of an Environmental Justice Element in the General Plan.

2. CEQA Analysis for Particular Future Projects to Address Impacts to Overburdened and Sensitive Communities: To further environmental justice, as defined to include the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, the City agrees to use its best efforts to analyze, as part of CEQA review, whether projects may impact certain overburdened communities and sensitive populations, including low income communities and communities of color. This analysis shall incorporate outreach to, and encourage the participation of, overburdened communities and sensitive populations, and shall be consistent with specific standards, including CEQA and the CEQA Guidelines, (Cal. Code Regs., tit. 14, § 15000 *et seq.*), and the Office of the Attorney General's guidance entitled, Environmental Justice at the Local and Regional Level – Legal Background (dated July 10, 2012), a copy of which is attached to the Consent Judgment as Exhibit B. The requirement to analyze impacts to overburdened and sensitive communities as part of CEQA review shall be included as a policy/action in any EJ element that the City may adopt for its General Plan.

3. **Restricted Truck Route:** Within fifteen (15) months of the entry of the Consent Judgment, the City agrees to use its best efforts to conduct proceedings for the adoption of an ordinance restricting trucks with gross vehicle weight rating ("GVWR") over 16,000 lbs. from accessing the portion of Etiwanda Avenue adjacent to Mira Loma Village (between the 60 Freeway and Hopkins Street). The restricted truck route ordinance proceedings shall comply with the California Environmental Quality Act (CEQA), and may include a study to determine if there are potential alternate routes for trucks with GVWR over 16,000 lbs on roadways other than Etiwanda Avenue described above. In the event that the City does not adopt a restricted truck route ordinance within two years of the entry of the Consent Judgment, then the RPIs agree that a new condition of approval will apply to the Project. That new condition shall require that the developers/owners of the Project request of all initial tenants, in writing, that any trucks accessing the Project site with GVWR over 16,000 lbs. owned or operated by tenants of the Project buildings avoid traveling on the portion of Etiwanda Avenue adjacent to Mira Loma Village (between the 60 Freeway and Hopkins Street).

The Parties understand and agree that, in the context of the City's processing an ordinance designating a restricted truck route, the City cannot guarantee the ultimate outcome of any public hearings before the City's Planning Commissions or City Council, nor prevent any opposition thereto by members of the public affected by or interested in the proposed truck route. The Parties recognize that the adoption of a restricted truck route ordinance is a discretionary act and that nothing in this Consent Judgment limits, in any manner, the City's exercise of its police power under the California Constitution. Subject to the foregoing, the City, to the extent allowed by law, shall facilitate and promote the proceedings necessary to complete processing of an restricted truck route.

As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit and the City agrees to honor RPIs' request. RPIs agree to contribute a total of $20,000 to the City for the cost of the study and environmental review associated with the restricted truck route payable to the City within the time period set forth in the Consent Judgment. The City shall not be obligated to expend any funding beyond this sum for the study. If additional funding for the study associated with the restricted truck route proceedings is needed, the City may apply to the Center for Community Action and Environmental Justice (CCAEJ) for additional funding from the Mira Loma Mitigation Trust Account ("Trust Account") described in Paragraph 12 of this Exhibit.

4. **Air Filtration Systems:** RPIs agree to fund the purchase, installation and maintenance of in-home air filtration systems for each residential parcel within Mira Loma Village, at a total cost of $1,700 per parcel, plus an additional $43,000 sum to cover administration costs. RPIs' provision of funding shall constitute its sole obligation with regard to this term. The air filtration systems shall be selected by the owners of each parcel, although recommendations as to the filtration systems selected may be provided to the parcel owners by the CCAEJ in consultation with South Coast Air Quality Management District ("SCAQMD"). A map of the Mira Loma Village and the 103 eligible residential parcels is attached hereto as Attachment 2. The air filtration funds provided by the RPIs will be deposited into the Trust Account described in Paragraph 12 of this Exhibit. In the event that CCAEJ, in consultation with SCAQMD,

determines that the air filtration systems will not be effective or necessary, the funds designated for air filtration systems in the Trust Account will be available to fund other mitigation to reduce the Project's air quality impacts, as determined by CCAEJ in consultation with the Attorney General's Office and SCAQMD. If the air filtration systems are determined by CCAEJ to be effective, then the designated funds in the Trust Account shall be distributed to Mira Loma Village residents upon presentation to the trust administrator of evidence showing that the resident is a parcel owner and receipts documenting air filtration system purchase, installation, and/or maintenance costs and/or expenditures on other air quality mitigation expenditures. Similarly, designated funds in the Trust Account may also be distributed directly to air filtration contractors or installers upon presentation to the trust administrator of an invoice or other evidence documenting that the contractor or installer has – on behalf of a parcel owner – purchased, installed, or maintained an air filtration system or made other air quality mitigation expenditures. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

5. **Anti-Idling Enforcement:** Within seven (7) months from the entry of the Consent Judgment, the City agrees to use its best efforts to implement a program to enforce the Air Resources Board's ("ARB") anti-idling regulation (Cal. Code Regs., tit. 13, § 2485) either through its enforcement of the ARB Regulations or through its adoption of a City truck anti-idling ordinance.

The City further agrees to the hiring/assigning of a code enforcement officer, whose duties shall include the enforcement of ARB's anti-idling regulation on a City-wide basis, including the vicinity of the Project. The extent of enforcement activity and the hiring or assigning of a code enforcement officer for the truck anti-idling enforcement program shall be subject to the City Council's discretion in establishing budget priorities for the City and the consequent budgeting of funds for enforcement of the truck anti-idling program. The Parties recognize that the enforcement of anti-idling regulations is a discretionary act and that nothing in this Consent Judgment limits, in any manner, the City's exercise of its police power under the California Constitution. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request. The City recognizes that this measure applies on a City-wide basis and is not solely applicable to the Project.

The RPIs agree to pay the City a total of $30,000 toward the costs associated with the City's code enforcement program.

6. **Clean Trucks:** In place of Plot Plan 17788 Condition of Approval 10.Planning.52 (which applies *only* to Plot Plan 17788), RPIs agree that the developers/owners of *all* Project plot plans shall establish a diesel minimization plan requiring that at least 90 percent of the trucks with GVWR greater than 16,000 lbs. that both visit the Project site and are owned or operated by a tenant of one of the Plot Plan buildings, shall meet or exceed 2007 model year emissions equivalent engine standards as currently defined in California Code of Regulations Title 13, Division 3, Chapter 1,

Article 4.5, Section 2025. From the date the Consent Judgment is entered and for ten years thereafter, Project tenants who own or operate the trucks described above shall maintain evidence of compliance with the diesel minimization plan, including license plates, engine model year, retrofit technology if applicable, and engine family name. Evidence of compliance shall be available for inspection upon reasonable notice provided to the owner/operator of a request to inspect such documentation. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

7. **Buffers:** RPIs agree that Plot Plan 18876 shall include a partially landscaped setback between the Mira Loma Village houses and the buildings within Plot Plan 18876 along the northern boundary of Mira Loma Village. The setback shall be as determined by the property owner but in no event shall be less than sixty-six (66) feet wide as measured from the edge of the buildings within Plot Plan 18876 to the existing wall separating Mira Loma Village from Plot Plan 18876. Concurrent with the construction of Plot Plan buildings adjacent to the Mira Loma Village, RPIs agree to enhance the vegetative portions of the setback and buffer zones along the northern and eastern boundaries of Mira Loma Village within the Project site. Specifically, RPIs will plant and maintain a vegetative buffer zone along the northern boundary of the Mira Loma Village (in Plot Plan 18876) in a manner determined by the property owner, but including not less than twenty 24" box California Pepper Trees and ten 24" box Bottlebrush Trees (these trees having been selected by CCAEJ in order to reduce diesel particulate matter.) Additionally, Plot Plan 18876 shall include not fewer than eight 24" box Sycamore Trees in its parking lot adjacent to the northern boundary of Mira Loma Village. The RPIs further agree to, concurrent with the construction of Plot Plan buildings adjacent to the Mira Loma Village, landscape the areas being dedicated by the Project as public parks near the Mira Loma Village's eastern boundary (a total of approximately 52,000 square feet) with drought tolerant plants, including not less than 50% Buffalo Grass turf by area, and, further, to provide a vegetative buffer in those park areas and along the remainder of the Mira Loma Village's eastern edge, including not less than eight 24" box American Sycamore trees, twenty 24" box California Pepper Trees, and not fewer than fifteen 24" box Bottlebrush trees (each tree type having been selected by CCAEJ in order to reduce diesel particulate matter). Additionally, Plot Plans 18877 and 18879 shall include a combined total of not less than eight 24" box American Sycamore trees in their parking lots adjacent to the eastern boundary of Mira Loma Village. Additionally, RPIs agree to modify the Project buildings immediately adjacent to the Mira Loma Village's northern boundary by reducing the elevated building parapets in order to reduce visual impacts. Finally, RPIs shall offer not less than two 24" box shade trees to each of the ten property owners who own a home immediately adjacent to the southern boundary of Plot Plan 18876. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

8. **Photovoltaic Installation:** RPIs agree that all Project buildings in excess of 100,000 square feet will be constructed as solar-ready buildings (including the upgrade of building structural, electrical and roofing systems in a manner sufficient to support the

installations of photovoltaic solar systems). RPIs also agree to apply to Southern California Edison's ("SCE") solar program and to other programs that may provide financing for the installation of solar photovoltaic systems ("PV Systems") on the Project site. To the extent that RPIs obtain a grant or rebate providing a financial offset for the cost of PV Systems, RPIs shall install PV solar capacity up to the amount of the grant or rebate but in no event would the PV Systems be less than 100 kW. To the extent that RPIs do not obtain a grant or rebate, RPIs shall install one or more PV Systems on the Project site providing a Project-wide total of 100 kW capacity. In the event that there are alternatives to PV Systems deemed reasonably equivalent in reducing/offsetting global greenhouse affects, if the alternatives are approved by the Attorney General's Office and CCAEJ, the RPIs may at their election implement those in place of the PV Systems. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

9. **Air Monitoring:** RPIs agree to provide a total of $85,000 in order to fund activities related to measuring black carbon levels and/or other indicators of diesel particulate matter in the Mira Loma Village vicinity, including the installation and maintenance of an air monitoring station. RPIs' provision of funding shall constitute its sole obligation with regard to this term. Any air monitoring data from the air monitoring station shall be made available to CCAEJ and SCAQMD in a manner to be determined by CCAEJ and SCAQMD during the design and installation of the air monitoring station. The air monitoring funds will be deposited by RPIs into the Trust Account described in Paragraph 12 of this Exhibit. In the event that CCAEJ, in consultation with SCAQMD, determines that the air monitoring activities will not be effective or necessary, or that the use of the funds for other mitigation, such as the donation of the funds to the City of Jurupa Valley for the completion of the Restricted Truck Route term is preferable, the funds designated for air monitoring in the Trust Account will be available to fund such other mitigation to reduce the Project's air quality impacts, as determined by CCAEJ in consultation with the Attorney General's Office and SCAQMD. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

10. **Electrification:** RPIs agree to install and maintain a minimum of two Level 2 Electric Vehicle Supply Equipment ("EVSE') at each Plot Plan with buildings in excess of 100,000 square feet, placed in a manner that allows charging of trucks or vehicles at each loading dock of the building or at a separate parking area on each Plot Plan. RPIs agree that each Project building in excess of 100,000 square feet will be constructed with necessary infrastructure (conduit and electrical capacity) to support the installation of one Level 3 EVSE (DC Fast Charging) per building. Additionally, the owners/developers of Plot Plan 17788 agree to pay for one Level 3 charging station, at an approximate cost of $75,000, to be installed by the owners/developers of that Plot Plan concurrent with the Plot Plan's construction. However, within thirty (30) days of the execution of this Settlement by the Parties, the CCAEJ may elect to have the owners/developers of Plot Plan 17788 deposit an additional sum of $75,000 into the Trust Account to be put towards additional air quality mitigation, with the deposit of the

funds being required at the time that Plot Plan 17788 receives a building permit. Such election shall be made in writing, and the notice of any such election shall be provided in the manner identified in the "Notices" term of the Consent Judgment. To the extent that no written election is made, then the owners/developers of Plot Plan 17788 shall install one Level 3 charging station as specified above. To the extent that a written election is made, the deposit of the $75,000 into the Trust Account would absolve Plot Plan 17788 from the requirement identified herein to pay for one Level 3 charging station. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

11. Green Building: RPIs agree to construct Project buildings in excess of 100,000 square feet at a LEED Silver or higher level. As part of its settlement of the Litigation, RPIs have specifically requested the City to include this term as a mitigation measure for the Project as set forth in Attachment 1 to this Exhibit, and the City agrees to honor RPIs' request.

12. Mira Loma Mitigation Trust Account: Within thirty (30) days of the entry of the Consent Judgment, the RPIs and CCAEJ shall execute a written trust agreement establishing the Mira Loma Mitigation Trust Account ("Trust Account") to be administered by CCAEJ. Thereafter, upon 1) the issuance of the first building permit for any of the Project's Plot Plans or 2) four (4) weeks prior to the commencement of grading within Plot Plans 18876 or 18877, whichever occurs first, the RPIs shall deposit a total of $303,100 into the Trust Account, which includes $175,100 for Air Filtration Systems and $43,000 for Trust Account administration costs as identified in Paragraph 4 of this Exhibit A, and $85,000 for Air Monitoring activities as defined in Paragraph 9 of this Exhibit A. The governing purpose of the Trust Account shall be to fund mitigation to evaluate and/or reduce the localized air quality impacts of the Project, and to cover any administrative costs incurred by the CCAEJ in managing the trust account. Specifically, the monies in the Trust Account shall be allocated in a manner to fund the measures described in Paragraphs 4 and 9 of this Exhibit. In the event that CCAEJ, in consultation with SCAQMD, determines that there are insufficient funds for certain mitigation, that the mitigation is unnecessary, or that other mitigation is preferable, the funds in the Trust Account will be available to fund other mitigation to reduce the Project's air quality impacts, such as the Restricted Truck Route ordinance described in Paragraph 3 above, as determined by CCAEJ in consultation with the Attorney General's Office and SCAQMD. The administration of the Trust Account shall be consistent with applicable laws and regulations governing trust regulations. The Trust Account shall be maintained for four years following the entry of the Consent Judgment. To the extent that funds within the Trust Account are not exhausted by the end of that four year period, the funds shall be distributed to CCAEJ to be used at CCAEJ's discretion, in consultation with the Attorney General's Office and SCAQMD, to evaluate and/or reduce the Project's localized air quality impacts.

13. Parties' Support for City's Efforts to Implement Settlement: Each of the Parties hereto, except the People, agrees to publically express their support in written or oral communications to the City Council for the City's efforts to fulfill its obligations to implement the requirements of this Consent Judgment; provided, however, that the

Parties shall retain their rights to object to an action or proposed action of the City Council or the City Staff that the Party does not believe fulfills the City's obligation under this Consent Judgment.

Attachment 1

(Revised Mitigation Monitoring and Reporting Program)

Consent Judgment Mitigation Monitoring and Reporting Program

Consent Judgment – Mitigation Measures

The following Mitigation Monitoring and Reporting Program reflects mitigation measures that have been added and imposed through the Riverside County Superior Court's entry of a Consent Judgment in the matter styled *Center for Community Action and Environmental Justice (CCAEJ) et al. v. County of Riverside et al.* (Riverside County Superior Court Case Number 1112063), which challenged the approval of Plot Plans 16979, 17788, 18875, 18876, 18877, and 18879 on California Environmental Quality Act and other grounds. These mitigation measures are mandatory and binding on each of the Project Plot Plans, unless specified otherwise herein. In the event of a conflict between this MMRP and the Consent Judgment, the Consent Judgment shall control. This Consent Judgment Mitigation Monitoring and Reporting Program applies in addition to – not in place of – the MMRP that was previously adopted for the Project by the County of Riverside on June 14, 2011.

Impact Category	Mitigation Measure	Implementation Timing	Monitoring/ Reporting Method	Responsible Monitoring Party
Air Quality and Greenhouse Gases	**Restricted Truck Route Ordinance**. The City shall use its best efforts to conduct proceedings for the adoption of an ordinance restricting trucks with gross vehicle weight rating (GVWR) over 16,000 lbs. from accessing the portion of Etiwanda Avenue adjacent to Mira Loma Village (between the 60 Freeway and Hopkins Street). The restricted truck route ordinance proceedings shall comply with the California Environmental Quality Act (CEQA), and may include a study to determine if there are potential alternate routes for trucks with GVWR over 16,000 lbs on roadways other than Etiwanda Avenue described above.	Within fifteen (15) months of the entry of the Consent Judgment.	Any proceeding to adopt such an ordinance shall be publicly noticed.	City of Jurupa Valley
	Restricted Truck Route Ordinance Alternative. In the event that the City does not adopt a restricted truck route ordinance within two years of the entry of the Consent Judgment, the Project Applicants shall request of all initial tenants, in writing, that any trucks accessing the Project site with	Two years following the entry of the Consent Judgment.	The Project Applicants shall copy the City on their written request.	City of Jurupa Valley

	GVWR over 16,000 lbs. owned or operated by tenants of the Project buildings avoid traveling on the portion of Etiwanda Avenue adjacent to Mira Loma Village (between the 60 Freeway and Hopkins Street).			
	Restricted Truck Route Payment. The Project Applicants shall deposit $20,000 into an escrow account opened pursuant to the Consent Judgment for the cost of the study and environmental review associated with the consideration of a restricted truck route ordinance.	Following the City's execution of a contract with a consultant retained to study and prepare environmental documentation of the restricted truck route and within ten (10) days of the City's provision of written notice to the Project Applicants of the same.	The City shall notify Project Applicants in writing of the City's execution of a contract with a consultant.	City of Jurupa Valley
Air Quality and Greenhouse Gases	**Air Filtration Systems**. The Project Applicants shall fund the purchase, installation and maintenance of in-home air filtration systems for each qualifying residential parcel within Mira Loma Village at a cost of $1,700 per parcel, plus an additional $43,000 sum to cover administration costs. "Qualifying residential parcels" are the 103 eligible residential parcels reflected in the map attached to the Consent Judgment as Attachment 2. The air filtration systems shall be selected by the owners of each parcel, although recommendations as to the filtration systems selected may be provided to the parcel owners by the CCAEJ in consultation with the South Coast Air Quality Management District (SCAQMD). In the event that CCAEJ, in consultation with SCAQMD, determines that the air filtration systems will not be effective or necessary, the funds designated for air filtration systems in the Trust Account will be available to fund other mitigation to reduce the Project's air quality impacts, as determined by CCAEJ in consultation with the Attorney General's Office and SCAQMD. If the air filtration systems are determined by CCAEJ to be effective, then, the designated funds in the Trust Account shall be distributed to Mira	Within thirty (30) days of the entry of the Consent Judgment, the Project Applicants and CCAEJ shall execute a written trust agreement establishing the Mira Loma Mitigation Trust Account ("Trust Account") to be administered by CCAEJ. Thereafter, upon 1) the issuance of the first building permit for any of the Project's Plot Plans or 2) four (4) weeks prior to the commencement of grading within Plot Plans 18876 or 18877, whichever occurs first, the Project Applicants shall deposit into the Trust Account $175,100 for Air Filtration Systems and $43,000 for Trust Account administration costs.	Trustee shall provide written confirmation of deposit to CCAEJ in the manner required in the written trust agreement.	CCAEJ

	Loma Village residents upon presentation to the trust administrator of evidence showing that the resident is a parcel owner and receipts documenting air filtration system purchase, installation, and/or maintenance costs and/or expenditures on other air quality mitigation expenditures. Similarly, designated funds in the Trust Account may also be distributed directly to air filtration contractors or installers upon presentation to the trust administrator of an invoice or other evidence documenting that the contractor or installer has – on behalf of the parcel owner – purchased, installed, or maintained an air filtration system or made other air quality mitigation expenditures.			
Air Quality and Greenhouse Gases	**Anti-Idling Enforcement**. Within seven (7) months from the entry of the Consent Judgment, the City agrees to use its best efforts to implement a program to enforce the Air Resources Board's ("ARB") anti-idling regulation (Cal. Code Regs., tit. 13, § 2485) either through its enforcement of the ARB Regulations or through its adoption of a City truck anti-idling ordinance. The City further agrees to the hiring/assigning of a code enforcement officer, whose duties shall include the enforcement of ARB's anti-idling regulation on a City-wide basis, including the vicinity of the Project. The extent of enforcement activity and the hiring or assigning of a code enforcement officer for the truck anti-idling enforcement program shall be subject to the City Council's discretion in establishing budget priorities for the City and the consequent budgeting of funds for enforcement of the truck anti-idling program. Such measure shall apply on a City-wide basis and is not solely applicable to the Project.	Within thirty (30) days of the entry of the Consent Judgment, the Project Applicants shall deposit $30,000 into an escrow account opened pursuant to the Consent Judgment. Within seven (7) months from the entry of the Consent Judgment, the City agrees to use its best efforts to implement the program called for by this measure.	Escrow Company shall provide written confirmation of deposit to City and Project Applicants.	City of Jurupa Valley
Air Quality and Greenhouse Gases	**Clean Trucks**. In place of Plot Plan 17788 Condition of Approval 10.PLANNING.52 (which applies *only* to Plot Plan 17788), the	The diesel minimization plan shall be put in place for each Plot Plan prior to the commencement of the operation of diesel	The Project tenants shall maintain evidence of	City of Jurupa Valley

	Project Applicants shall establish a diesel minimization plan requiring that at least ninety percent (90%) of the trucks with GVWR greater than 16,000 lbs. that both visit the Project site and are owned or operated by a tenant of one of the Plot Plan buildings, shall meet or exceed 2007 model year emissions equivalent engine standards as currently defined in California Code of Regulations Title 13, Division 3, Chapter 1, Article 4.5, Section 2025. The diesel minimization plan shall include a provision that requires Project tenants who own or operate trucks of the size described above to maintain evidence of compliance with the diesel minimization plan, including license plates, engine model year, retrofit technology if applicable, and engine family name. Evidence of compliance shall be available for inspection upon reasonable notice provided to the owner/operator of a request to inspect such documentation.	trucks with GVWR greater than 16,000 lbs. that both visit the Project site and are owned or operated by a tenant of one of the Plot Plan buildings From the date that the Consent Judgment is entered and for ten (10) years thereafter, Project tenants shall maintain the requisite evidence of compliance called for in the Clean Trucks Mitigation Measures.	compliance.	
Air Quality, Greenhouse Gases, and Aesthetic Impacts	**Buffers for Plot Plan 18876**. The owner/developer of Plot Plan 18876 shall include a partially landscaped setback between the Mira Loma Village houses and the buildings within Plot Plan 18876 along the northern boundary of Mira Loma Village. The setback shall be as determined by the property owner but in no event shall be less than sixty-six (66) feet wide as measured from the edge of the buildings within Plot Plan 18876 to the existing wall separating Mira Loma Village from Plot Plan 18876. Concurrent with the construction of Plot Plan buildings adjacent to the Mira Loma Village, the Project Applicants shall enhance the vegetative portions of the setback and buffer zones along the northern and eastern boundaries of Mira Loma Village within the Project site. Specifically, the Project Applicants shall plant and maintain a	Prior to issuance of first certificate of occupancy on Plot Plan 18876.	Confirmation prior to issuance of first certificate of occupancy on Plot Plan 18876.	City of Jurupa Valley

	vegetative buffer zone along the northern boundary of the Mira Loma Village (in Plot Plan 18876) in a manner determined by the property owner, but including not less than twenty 24" box California Pepper Trees and ten 24" box Bottlebrush trees. Additionally, Plot Plan 18876 shall include not fewer than eight 24" box Sycamore Trees in its parking lot adjacent to the northern boundary of Mira Loma Village. Furthermore, the Project Applicants shall, concurrent with the construction of Plot Plan buildings adjacent to the Mira Loma Village, landscape areas being dedicated by the Project as public parks near the Mira Loma Village's eastern boundary (a total of approximately 52,000 square feet) with drought tolerant plants, including not less than 50% Buffalo Grass turf by area, and, further, to provide a vegetative buffer in those park areas and along the remainder of the Mira Loma Village's eastern edge, including not less than eight 24" box American Sycamore trees, twenty 24" box California Pepper Trees, and not fewer than fifteen 24" box Bottlebrush trees. Finally, the Project Applicants shall offer not less than two 24" box shade trees to each of the ten property owners who own a home immediately adjacent to the southern boundary of Plot Plan 18876			
	Buffers for Plot Plans 18877 and 18879. Additionally, Plot Plans 18877 and 18879 shall include a combined total of not less than eight 24" box American Sycamore trees in their parking lots adjacent to the eastern boundary of Mira Loma Village.	Prior to issuance of first certificate of occupancy on Plot Plans 18877 and 18879.	Confirmation prior to issuance of first certificate of occupancy on Plot Plans 18877 and 18879.	City of Jurupa Valley
	Additional Buffer. Additionally, the Project Applicants shall modify the Project buildings immediately adjacent to the Mira Loma Village's northern boundary by reducing the	Prior to issuance of first certificate of occupancy for Plot Plan 18876.	Confirmation prior to issuance of first certificate of occupancy.	City of Jurupa Valley

	elevated building parapets in order to reduce visual impacts.			
Air Quality and Greenhouse Gases	**Photovoltaic Installation**. All Project building in excess of 100,000 square feet shall be constructed as solar ready buildings (including the upgrade of building structural, electrical and roofing systems in a manner sufficient to support the installations of photovoltaic solar systems).	Prior to the issuance of the certificate of occupancy for each building over 100,000 square feet.	Confirmation prior to issuance of first certificate of occupancy for each building over 100,000 square feet.	City of Jurupa Valley
	The Project Applicants shall apply to Southern California Edison's ("SCE") solar program and to other programs that may provide financing for the installation of solar photovoltaic systems ("PV Systems") on the Project site. To the extent that the Project Applicants obtain a grant or rebate providing a financial offset for the cost of the PV Systems, the Project Applicants shall install PV solar capacity up to the amount of the grant or rebate but in no event would the PV Systems be less than 100 kW. To the extent that the Project Applicants do not obtain a grant or rebate, the Project Applicants shall install one or more PV Systems on the Project site providing a Project-wide total of 100 kW capacity. In the event that there are alternatives to the PV Systems deemed reasonably equivalent in reducing/offsetting global greenhouse affects, if the alternatives are approved by the Attorney General's Office and CCAEJ, the Project Applicants may at their election implement those in place of the PV Systems.	The Project Applicants shall submit an application to SCE prior to the issuance of the first certificate of occupancy for any building in excess of 100,000 square feet. Installation of the system shall occur prior to the issuance of the last certificate of occupancy for any Project building.	The Project Applicants shall submit to the City copies of the Project Applicants' completed SCE applications.	City of Jurupa Valley
Air Quality and Greenhouse Gases	**Air Monitoring**. The Project Applicants shall contribute $85,000 in order to (1) fund activities related to measuring black carbon levels and/or other indicators of diesel particulate matter in the Mira Loma Village vicinity, including the installation and maintenance of an air monitoring station; and/or (2) provide additional funds which	Within thirty (30) days of the entry of the Consent Judgment, the Project Applicants and CCAEJ shall execute a written trust agreement establishing the Mira Loma Mitigation Trust Account ("Trust Account") to be administered by CCAEJ. Thereafter, upon 1) the issuance of the first building permit for any of the Project's Plot Plans or	Air monitoring data from the air monitoring station shall be made available to the CCAEJ and SCAQMD in a manner to be determined by CCAEJ and SCAQMD during the	CCAEJ/SCAQMD

	may be made available to the City of Jurupa Valley in order to complete the Restricted Truck Route term. In the event that the CCAEJ, in consultation with SCAQMD, determines that the air monitoring activities will not be effective or necessary, or that the donation of the funds to the City of Jurupa Valley for the completion of the Restricted Truck Route term is preferable, the funds designated for air monitoring in the Trust Account will be available to fund such other mitigation to reduce the Project's air quality impacts, as determined by CCAEJ in consultation with the Attorney General's Office and SCAQMD.	2) four (4) weeks prior to the commencement of grading within Plot Plans 18876 or 18877, whichever occurs first, the Project Applicants shall deposit into the Trust Account $85,000 for Air Monitoring activities.	design and installation of the air monitoring station.	
Air Quality and Greenhouse Gases	**Electrification**. Project Applicants agree to install and maintain a minimum of two Level 2 Electric Vehicle Supply Equipment ("EVSE') at each Plot Plan with buildings in excess of 100,000 square feet, placed in a manner that allows charging of trucks or vehicles at each loading dock of the building or at a separate parking area on each Plot Plan. Project Applicants agree that each Project building in excess of 100,000 square feet will be constructed with necessary infrastructure (conduit and electrical capacity) to support the installation of one Level 3 EVSE (DC Fast Charging) per building.	Prior to the issuance of the first certificate of occupancy for each building over 100,000 square feet.	Confirm prior to issuance of first certificate of occupancy for each building over 100,000 square feet.	City of Jurupa Valley
	Electrification for Plot Plan 17788. The owners/developers of Plot Plan 17788 agree to pay for one Level 3 charging station, at an approximate cost of $75,000, to be installed by the owners/developers of that Plot Plan concurrent with the Plot Plan's construction. However, within thirty (30) days of the execution of this Settlement by the Parties, the CCAEJ may elect to have the	Prior to the issuance of any certificate of occupancy for Plot Plan 17788.	Confirm prior to issuance of certificate of occupancy for Plot Plan 17788.	City of Jurupa Valley

	owners/developers of Plot Plan 17788 deposit an additional sum of $75,000 into the Trust Account to be put towards additional air quality mitigation, with the deposit of the funds being required at the time that Plot Plan 17788 receives a building permit. Such election shall be made in writing, and the notice of any such election shall be provided in the manner identified in the "Notices" term of the Consent Judgment. To the extent that no written election is made, then the owners/developers of Plot Plan 17788 shall install one Level 3 charging station as specified above. To the extent that a written election is made, the deposit of the $75,000 into the Trust Account would absolve Plot Plan 17788 from the requirement identified herein to pay for one Level 3 charging station.			
Air Quality and Greenhouse Gases	**Green Building**. The Project Applicants shall construct Project buildings in excess of 100,000 square feet at a LEED Silver or higher level.	Prior to the issuance of a certificate of occupancy for any building over 100,000 square feet.	Confirm prior to issuance of a certificate of occupancy for any building over 100,000 square feet.	City of Jurupa Valley

Attachment 2

(Map of the Mira Loma Village's 103 Residential Parcels)

Mira Loma Village

EXHIBIT B

(Environmental Justice at the Local and Regional Level – Legal Background (Office of the Attorney General - July 10, 2012)

KAMALA D. HARRIS
Attorney General

State of California
DEPARTMENT OF JUSTICE

Environmental Justice at the Local and Regional Level
Legal Background

Cities, counties, and other local governmental entities have an important role to play in ensuring environmental justice for all of California's residents. Under state law:

> "[E]nvironmental justice" means the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.

(Gov. Code, § 65040.12, subd. (e).) Fairness in this context means that the *benefits* of a healthy environment should be available to everyone, and the *burdens* of pollution should not be focused on sensitive populations or on communities that already are experiencing its adverse effects.

Many local governments recognize the advantages of environmental justice; these include healthier children, fewer school days lost to illness and asthma, a more productive workforce, and a cleaner and more sustainable environment. Environmental justice cannot be achieved, however, simply by adopting generalized policies and goals. Instead, environmental justice requires an ongoing commitment to identifying existing and potential problems, and to finding and applying solutions, both in approving specific projects and planning for future development.

There are a number of state laws and programs relating to environmental justice. This document explains two sources of environmental justice-related responsibilities for local governments, which are contained in the Government Code and in the California Environmental Quality Act (CEQA).

Government Code

Government Code section 11135, subdivision (a) provides in relevant part:

> No person in the State of California shall, on the basis of race, national origin, ethnic group identification, religion, age, sex, sexual orientation, color, or disability, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state....

While this provision does not include the words "environmental justice," in certain circumstances, it can require local agencies to undertake the same consideration of fairness in the distribution of environmental benefits and burdens discussed above. Where, for example, a general plan update is funded by or receives financial assistance from the state or a state agency, the local government should take special care to ensure that the plan's goals, objectives, policies

and implementation measures (a) foster equal access to a clean environment and public health benefits (such as parks, sidewalks, and public transportation); and (b) do not result in the unmitigated concentration of polluting activities near communities that fall into the categories defined in Government Code section 11135.[1] In addition, in formulating its public outreach for the general plan update, the local agency should evaluate whether regulations governing equal "opportunity to participate" and requiring "alternative communication services" (*e.g.*, translations) apply. (See Cal. Code Regs., tit. 22, §§ 98101, 98211.)

Government Code section 11136 provides for an administrative hearing by a state agency to decide whether a violation of Government Code section 11135 has occurred. If the state agency determines that the local government has violated the statute, it is required to take action to "curtail" state funding in whole or in part to the local agency. (Gov. Code, § 11137.) In addition, a civil action may be brought in state court to enforce section 11135. (Gov. Code, § 11139.)

California Environmental Quality Act (CEQA)

Under CEQA, "public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects ...." (Pub. Res. Code, § 21002.) Human beings are an integral part of the "environment." An agency is required to find that a "project may have a 'significant effect on the environment'" if, among other things, "[t]he environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly[.]" (Pub. Res. Code, § 21083, subd. (b)(3); see also CEQA Guidelines,[2] § 15126.2 [noting that a project may cause a significant effect by bringing people to hazards].)

CEQA does not use the terms "fair treatment" or "environmental justice." Rather, CEQA centers on whether a project may have a significant effect on the physical environment. Still, as set out below, by following well-established CEQA principles, local governments can further environmental justice.

CEQA's Purposes

The importance of a healthy environment for all of California's residents is reflected in CEQA's purposes. In passing CEQA, the Legislature determined:

- "The maintenance of a quality environment for the people of this state now and in the future is a matter of statewide concern." (Pub. Res. Code, § 21000, subd. (a).)

- We must "identify any critical thresholds for the health and safety of the people of the state and take all coordinated actions necessary to prevent such thresholds from being reached." (*Id.* at subd. (d).)

---

[1] To support a finding that such concentration will not occur, the local government likely will need to identity candidate communities and assess their current burdens.

[2] The CEQA Guidelines (Cal. Code Regs., tit. 14, §§ 15000, et seq.) are available at http://ceres.ca.gov/ceqa/.

- "[M]ajor consideration [must be] given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian." (*Id.* at subd. (g).)

- We must "[t]ake all action necessary to provide the people of this state with clean air and water, enjoyment of aesthetic, natural, scenic, and historic environmental qualities, and freedom from excessive noise." (Pub. Res. Code, § 21001, subd. (b).)

Specific provisions of CEQA and its Guidelines require that local lead agencies consider how the environmental and public health burdens of a project might specially affect certain communities. Several examples follow.

Environmental Setting and Cumulative Impacts

There are a number of different types of projects that have the potential to cause physical impacts to low-income communities and communities of color. One example is a project that will emit pollution. Where a project will cause pollution, the relevant question under CEQA is whether the environmental effect of the pollution is significant. In making this determination, two long-standing CEQA considerations that may relate to environmental justice are relevant – setting and cumulative impacts.

It is well established that "[t]he significance of an activity depends upon the setting." (*Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 718 [citing CEQA Guidelines, § 15064, subd. (b)]; see also *id.* at 721; CEQA Guidelines, § 15300.2, subd. (a) [noting that availability of listed CEQA exceptions "are qualified by consideration of where the project is to be located – a project that is ordinarily insignificant in its impact on the environment may in a particularly sensitive environment be significant."]) For example, a proposed project's particulate emissions might not be significant if the project will be located far from populated areas, but may be significant if the project will be located in the air shed of a community whose residents may be particularly sensitive to this type of pollution, or already are experiencing higher-than-average asthma rates. A lead agency therefore should take special care to determine whether the project will expose "sensitive receptors" to pollution (see, e.g., CEQA Guidelines, App. G); if it will, the impacts of that pollution are more likely to be significant.[3]

In addition, CEQA requires a lead agency to consider whether a project's effects, while they might appear limited on their own, are "cumulatively considerable" and therefore significant. (Pub. Res. Code, § 21083, subd. (b)(3).) "'[C]umulatively considerable' means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future

[3] "[A] number of studies have reported increased sensitivity to pollution, for communities with low income levels, low education levels, and other biological and social factors. This combination of multiple pollutants and increased sensitivity in these communities can result in a higher cumulative pollution impact." Office of Environmental Health Hazard Assessment, *Cumulative Impacts: Building a Scientific Foundation* (Dec. 2010), Exec. Summary, p. ix, available at http://oehha.ca.gov/ej/cipa123110.html.

projects." (*Id.*) This requires a local lead agency to determine whether pollution from a proposed project will have significant effects on any nearby communities, when considered together with any pollution burdens those communities already are bearing, or may bear from probable future projects. Accordingly, the fact that an area already is polluted makes it *more likely* that any additional, unmitigated pollution will be significant. Where there already is a high pollution burden on a community, the "relevant question" is "whether any additional amount" of pollution "should be considered significant in light of the serious nature" of the existing problem. (*Hanford, supra*, 221 Cal.App.3d at 661; see also *Los Angeles Unified School Dist. v. City of Los Angeles* (1997) 58 Cal.App.4th 1019, 1025 [holding that "the relevant issue ... is not the relative amount of traffic noise resulting from the project when compared to existing traffic noise, but whether any additional amount of traffic noise should be considered significant in light of the serious nature of the traffic noise problem already existing around the schools."])

The Role of Social and Economic Impacts Under CEQA

Although CEQA focuses on impacts to the physical environment, economic and social effects may be relevant in determining significance under CEQA in two ways. (See CEQA Guidelines, §§ 15064, subd. (e), 15131.) First, as the CEQA Guidelines note, social or economic impacts may lead to physical changes to the environment that are significant. (*Id.* at §§ 15064, subd. (e), 15131, subd. (a).) To illustrate, if a proposed development project may cause economic harm to a community's existing businesses, and if that could in turn "result in business closures and physical deterioration" of that community, then the agency "should consider these problems to the extent that potential is demonstrated to be an indirect environmental effect of the proposed project." (See *Citizens for Quality Growth v. City of Mt. Shasta* (1988) 198 Cal.App.3d 433, 446.)

Second, the economic and social effects of a physical change to the environment may be considered in determining whether that physical change is significant. (*Id.* at §§ 15064, subd. (e), 15131, subd. (b).) The CEQA Guidelines illustrate: "For example, if the construction of a new freeway or rail line divides an existing community, the construction would be the physical change, but the social effect on the community would be the basis for determining that the effect would be significant." (*Id.* at § 15131, subd. (b); see also *id.* at § 15382 ["A social or economic change related to a physical change may be considered in determining whether the physical change is significant."])

Alternatives and Mitigation

CEQA's "substantive mandate" prohibits agencies from approving projects with significant environmental effects if there are feasible alternatives or mitigation measures that would substantially lessen or avoid those effects. (*Mountain Lion Foundation v. Fish and Game Commission* (1997) 16 Cal.4th 105, 134.) Where a local agency has determined that a project may cause significant impacts to a particular community or sensitive subgroup, the alternative and mitigation analyses should address ways to reduce or eliminate the project's impacts to that community or subgroup. (See CEQA Guidelines, § 15041, subd. (a) [noting need for "nexus" between required changes and project's impacts].)

Depending on the circumstances of the project, the local agency may be required to consider alternative project locations (see *Laurel Heights Improvement Assn. v. Regents of University of*

California (1988) 47 Cal.3d 376, 404) or alternative project designs (see *Citizens of Goleta Valley v. Board of Supervisors* (1988) 197 Cal.App.3d 1167, 1183) that could reduce or eliminate the effects of the project on the affected community.

The lead agency should discuss and develop mitigation in a process that is accessible to the public and the affected community. "Fundamentally, the development of mitigation measures, as envisioned by CEQA, is not meant to be a bilateral negotiation between a project proponent and the lead agency after project approval; but rather, an open process that also involves other interested agencies and the public." (*Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 93.) Further, "[m]itigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments." (CEQA Guidelines, § 15126.4, subd. (a)(2).)

As part of the enforcement process, "[i]n order to ensure that the mitigation measures and project revisions identified in the EIR or negative declaration are implemented," the local agency must also adopt a program for mitigation monitoring or reporting. (CEQA Guidelines, § 15097, subd. (a).) "The purpose of these [monitoring and reporting] requirements is to ensure that feasible mitigation measures will actually be implemented as a condition of development, and not merely adopted and then neglected or disregarded." (*Federation of Hillside and Canyon Assns. v. City of Los Angeles* (2000) 83 Cal.App.4th 1252, 1261.) Where a local agency adopts a monitoring or reporting program related to the mitigation of impacts to a particular community or sensitive subgroup, its monitoring and reporting necessarily should focus on data from that community or subgroup.

Transparency in Statements of Overriding Consideration

Under CEQA, a local government is charged with the important task of "determining whether and how a project should be approved," and must exercise its own best judgment to "balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian." (CEQA Guidelines, § 15021, subd. (d).) A local agency has discretion to approve a project even where, after application of all feasible mitigation, the project will have unavoidable adverse environmental impacts. (*Id.* at § 15093.) When the agency does so, however, it must be clear and transparent about the balance it has struck.

To satisfy CEQA's public information and informed decision making purposes, in making a statement of overriding considerations, the agency should clearly state not only the "specific economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits" that, in its view, warrant approval of the project, but also the project's "unavoidable adverse environmental effects[.]" (*Id.* at subd. (a).) If, for example, the benefits of the project will be enjoyed widely, but the environmental burdens of a project will be felt particularly by the neighboring communities, this should be set out plainly in the statement of overriding considerations.

* * * *

The Attorney General's Office appreciates the leadership role that local governments have played, and will continue to play, in ensuring that environmental justice is achieved for all of California's residents. Additional information about environmental justice may be found on the Attorney General's website at http://oag.ca.gov/environment.

LAW OFFICES OF
BEST BEST & KRIEGER LLP
3750 UNIVERSITY AVENUE, SUITE 400
P.O. BOX 1028
RIVERSIDE, CALIFORNIA 92502

PROOF OF SERVICE

At the time of service I was over 18 years of age and not a party to this action. My business address is 3390 University Avenue, 5th Floor, P.O. Box 1028, Riverside, California 92502. On February 8, 2013,0 I served the following document(s):

[PROPOSED] CONSENT JUDGMENT

☐ **By fax transmission.** Based on an agreement of the parties to accept service by fax transmission, I faxed the documents to the persons at the fax numbers listed below. No error was reported by the fax machine that I used. A copy of the record of the fax transmission, which I printed out, is attached.

☒ **By United States mail.** I enclosed the documents in a sealed envelope or package addressed to the persons at the addresses listed below (specify one):

☒ Placed the envelope for collection and mailing, following our ordinary business practices. I am readily familiar with this business's practice for collecting and processing correspondence for mailing. On the same day that correspondence is placed for collection and mailing, it is deposited in the ordinary course of business with the United States Postal Service, in a sealed envelope with postage fully prepaid.

☐ **By messenger service.** I served the documents by placing them in an envelope or package addressed to the persons at the addresses listed below and providing them to a professional messenger service for service. A Declaration of Messenger is attached.

☐ **By overnight delivery.** I enclosed the documents in an envelope or package provided by an overnight delivery carrier and addressed to the persons at the addresses listed below. I placed the envelope or package for collection and overnight delivery at an office or a regularly utilized drop box of the overnight delivery carrier.

SEE ATTACHED SERVICE LIST

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

Executed on February 8, 2013, at Riverside, California.

Lynda A. Byrd

27627 00003\6900673.2

LAW OFFICES OF
BEST BEST & KRIEGER LLP
3750 UNIVERSITY AVENUE, SUITE 400
P.O. BOX 1028
RIVERSIDE, CALIFORNIA 92502

SERVICE LIST

Raymond W. Johnson Kimberly Foy Johnson & Sedlack 26785 Camino Seco Temecula, CA 92590 Telephone: (951) 506-9925 Facsimile: (951) 506-9725	Attorneys for Petitioners, Center for Community Action & Environmental Justice
Pamela J. Walls, County Counsel Katherine A. Lind, Assistant County Counsel Michelle P. Clack, Deputy County Counsel Office Of The County Counsel County Of Riverside 3960 Orange Street, Suite 500 Riverside, CA 92501-3674 Telephone: (951) 955-6300 Facsimile: (951) 955-6322	Attorneys for Respondents, The County of Riverside
Peter M. Thorson Ginetta L. Giovinco Richards, Watson & Gershon 355 South Grand Avenue, 40th Floor Los Angeles, California 90071-3101 Telephone: (213) 626-8484 Facsimile: (213) 626-0078	Attorneys for Respondent and Real Party in Interest, City Of Jurupa
Sarah E. Morrison, Deputy Attorney General Office of the California Attorney General 300 S. Spring Street, Suite 1702 Los Angeles, CA 90013 Telephone: (213) 897-2640 Facsimile: (213) 897-2802	Attorneys for the People of the State of California

Exhibit G
SJVAPCD Guide for Assessing and Mitigating Air Quality Impact

GUIDE FOR ASSESSING AND MITIGATING AIR QUALITY IMPACTS

Prepared by
the Mobile Source/CEQA Section
of the Planning Division
of the San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726

January 10, 2002 revision
Adopted August 20, 1998

This document is an advisory document, that provides Lead Agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. Copies and updates are available from the SJVAPCD Planning Division at (559) 230-5800. Questions on content should be addressed to either the Mobile Source/ CEQA Section at (559) 230-5800 or the SJVAPCD CEQA representative at the regional office that covers the county in which the project is located.

David L. Crow – Executive Director/Air Pollution Control Officer
Mark Boese – Deputy Air Pollution Control Officer
Robert Dowell – Director of Planning
Richard Milhorn – Planning Manager

ACKNOWLEDGEMENTS

The principal authors of this document were:

- Dave Mitchell – Supervisor, Mobile Source / CEQA Section
- Joe O'Bannon – (former) Air Quality Planner, Southern Region
- Joan Merchen – Senior Air Quality Planner, Central Region

Significant contributions were also made by:

- Phil Jay – District Counsel
- Tracy Bettencourt – (former) Environmental Planner, Northern Region
- Cheryl Lesinski – (former) Environmental Planner, Central Region
- Dave Stagnaro – (former) Environmental Planner, Northern Region

GUIDE FOR ASSESSING AND MITIGATING AIR QUALITY IMPACTS

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION *1*

1.1 PURPOSE OF THIS DOCUMENT **1**

1.2 THE ENVIRONMENTAL REVIEW PROCESS **3**

1.3 DISTRICT'S ROLE IN CEQA **4**

1.4 REGIONAL OFFICES **5**

1.5 HOW TO USE THE GAMAQI **5**

1.6 RELATIONSHIP TO NEPA **8**

SECTION 2 – CONSULTING WITH THE SJVAPCD *9*

2.1 INTRODUCTION **9**

2.2 LEAD AGENCY CONSULTATION REQUIREMENT **9**

2.3 WHEN CONSULTATION IS REQUIRED **9**

2.3.1 Review Prior to Preparation of Environmental Document 10

2.3.2 Review After Completing the Environmental Document 11

2.4 DATA NEEDED FOR SJVAPCD REVIEW **11**

2.4.1 Informal Consultation 11

2.4.2 Negative Declarations 12

2.4.3 Draft EIRs 12

2.4.4 Response to Comments 13

2.5 SJVAPCD RESPONSIBILITIES FOR CONSULTATION **13**

2.5.1 Consulting Prior to Environmental Determination 13

2.5.2 Review of Proposed Negative Declarations and Draft EIRs 14

SECTION 3 – PRELIMINARY PROJECT REVIEW *15*

3.1 INTRODUCTION **15**

3.2 LEAD AGENCY ACTIONS PRIOR TO COMMENCING CEQA **15**

SECTION 4 – THRESHOLDS OF SIGNIFICANCE *21*

4.1 INTRODUCTION **21**

4.2 BASIS FOR THRESHOLDS OF SIGNIFICANCE **21**

4.3 THRESHOLDS OF SIGNIFICANCE **23**

4.3.1 Threshold of Significance for Project Construction Impacts 24

4.3.2 Thresholds of Significance for Impacts From Project Operations 25

SECTION 5 – ASSESSING AIR QUALITY IMPACTS ***30***

5.1 INTRODUCTION **31**

5.2 ANALYSIS OF PROJECTS REQUIRING SJVAPCD PERMITS **34**

5.3 QUANTITATIVE EMISSIONS ANALYSIS LEVEL **35**

5.4 ENVIRONMENTAL SETTING **41**

5.5 EVALUATING CONSTRUCTION EMISSIONS **44**

5.6 EVALUATING EMISSIONS FROM PROJECT OPERATIONS **45**

5.6.1 Calculating Area Source Emissions 46

5.6.2 Calculating Mobile Source Emissions 46

5.6.3 Estimating Carbon Monoxide Concentrations 48

5.7 EVALUATING ODOR IMPACTS **50**

5.8 EVALUATING IMPACTS OF HAZARDOUS AIR POLLUTANTS **51**

5.9 EVALUATING CUMULATIVE AIR QUALITY IMPACTS **52**

5.10 SPECIAL ANALYSIS REQUIREMENTS FOR GENERAL PLANS AND LARGE SPECIFIC PLANS **54**

SECTION 6 – MITIGATING AIR QUALITY IMPACTS ***55***

6.1 INTRODUCTION **55**

6.2 SELECTING APPROPRIATE MITIGATION MEASURES **56**

6.3 MITIGATING PLAN LEVEL AIR QUALITY IMPACTS **58**

6.4 SJVAPCD SUPPORT FOR LAND USE STRATEGIES **59**

6.4.1 Quantifying Plan Level Mitigation 62

6.5 MITIGATING PROJECT LEVEL IMPACTS **63**

6.5.1 Mitigating Construction Impacts 64

6.5.2 Mitigating Impacts from Project Operation 67

6.5.3 Quantifying Mitigation Measures for Project Operations 75

6.6 MITIGATING IMPACTS FROM HAZARDOUS AIR POLLUTANTS **79**

6.7 MITIGATING ODOR IMPACTS **79**

6.8 MITIGATION MONITORING AND REPORTING **80**

APPENDIX A – GLOSSARY AND ACRONYMS ***83***

APPENDIX B – SJVAPCD POINT OF CONTACT LIST ***93***

LIST OF FIGURES

Figure 1-1 – San Joaquin Valley Air Pollution Control District Boundaries ---------- 2

Figure 1-2 – Examples of Projects Requiring Air Quality Permits ---------- 7

Figure 5-1 – Air Quality Analysis Flow Chart - Operational Emissions ---------- 32

LIST OF TABLES

Table 4-1 – Ozone Precursor Emissions Thresholds for Project Operations ---------- 26

Table 4-2 – Project Screening Trigger Levels for Potential Odor Sources---------- 27

Table 4-3 – Thresholds of Significance for Toxic Air Contaminants ---------- 28

Table 5-1 – Project Analysis Requirements ---------- 37

Table 5-2 – Small Project Analysis Level (SPAL) in Vehicle Trips ---------- 38

Table 5-3 – Small Project Analysis Level (SPAL) by Project Type ---------- 38-40

Table 6-1 – Mitigation Measures by Project Type ---------- 57-58

Table 6-2 – Regulation VIII Control Measures for Construction Emissions of PM-10 ---------- 65

Table 6-3 – Enhanced & Additional Measures for Construction Emissions of PM-10---------- 66

Table 6-4 – Construction Equipment Mitigation Measures ---------- 67

Table 6-5 – Infrastructure-Based Mitigation Measures ---------- 69-71

Table 6-6 – Operational Mitigation Measures ---------- 71-75

Table 6-7 – Area Source Mitigation Measures---------- 78

SECTION 1 – INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) is an advisory document, that provides Lead Agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The GAMAQI contains the following components:

- SJVAPCD's role as a commenting agency or responsible agency (Section 2);
- Preliminary project review - actions Lead Agencies can take to reduce air quality impacts prior to beginning the California Environmental Quality Act (CEQA) process (Section 3);
- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact (Section 4);
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts (Section 5);
- Methods available to mitigate air quality impacts (Section 6);
- Information for use in air quality assessments and EIRs that will be updated more frequently such as air quality data, regulatory setting, climate, topography, etc. (Technical Document).

Authority to Comment. The San Joaquin Valley Air Pollution Control District (SJVAPCD), which is comprised of the San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare Counties and the Valley portion of Kern County (see Figure 1-1)[1], has jurisdiction over most air quality matters in the San Joaquin Valley Air Basin (SJVAB). The SJVAPCD is tasked with implementing certain programs and regulations required by the Federal Clean Air Act (FCAA) and the California Clean Air Act (CCAA). The SJVAPCD prepares plans to attain state and national ambient air quality standards. In order to accomplish its mandates the SJVAPCD maintains a staff of planners and technical personnel versed in the various aspects of air pollution control and analysis.

The SJVAPCD *1991 Air Quality Attainment Plan* (AQAP) includes a control measure for an enhanced CEQA review program. The program requires the SJVAPCD to provide technical assistance to Lead Agencies in addressing air quality issues in environmental

[1] This information and other information about the SJVAPCD's programs are also available on the District's Website at (http://www.valleyair.org)

Figure 1-1

San Joaquin Valley Air Pollution Control District Boundaries

documents and to comment on project air quality impacts. In addition, the SJVAPCD suggests mitigation measures to reduce air quality impacts of development projects.

The Air Pollution Problem. The SJVAB has one of the most severe air pollution problems in the State of California and the nation. Air pollution is hazardous to health, diminishes the production and quality of many agricultural crops, reduces visibility, degrades or soils materials, and damages native vegetation. State and national ambient air quality standards were created to protect the public health and welfare, and to minimize the other effects mentioned above. The standards address pollutants in the ambient air, the air that people breathe outside of buildings, as they go about their daily activities. The SJVAB does not meet the standards for ozone and respirable particulate matter (PM-10). In recent years the standard for carbon monoxide (CO) has not been exceeded in the SJVAB, however, background concentrations are still high enough for CO hot spots to be potential problems in urban areas with high levels of traffic congestion. Further information regarding these pollutants and the status of air quality in the SJVAB is provided throughout this document and the separate Technical Document.

Nearly all development projects in the San Joaquin Valley (SJV), from general plans to individual site plans, have the potential to generate pollutants that will worsen air quality or make it more difficult for state and national air quality attainment standards to be attained. Therefore, for most projects, it is necessary to evaluate air quality impacts to comply with CEQA. The GAMAQI is intended to help public agencies review and evaluate these impacts. A properly prepared CEQA document will inform decision-makers and the public about the air quality impacts of a project and facilitate a public dialogue regarding their implications. It will serve not only to protect the environment, but will also demonstrate to the public that it is being protected.

GAMAQI Limitations. The content of the GAMAQI is focused on the most frequently encountered land use projects. Projects not specifically addressed in terms of analysis methods and mitigation measures include, but are not limited to, highway construction, transportation plans, pipeline development, and dairy construction. The District currently makes recommendations for these types of projects on a case by case basis.

1.2 THE ENVIRONMENTAL REVIEW PROCESS

The California Legislature enacted CEQA in 1970 [Public Resources Code (PRC) §21000 *et seq.*].[2] CEQA requires public agencies (i.e., local, county, regional, and state government) to consider and disclose the environmental effects of their decisions to the public and governmental decision-makers. Further, it mandates that agencies implement feasible mitigation measures or alternatives that would mitigate significant adverse effects to the environment. Finally, CEQA provides a mechanism for disclosing to the public the

[2] In addition, the Secretary of Resources promulgated regulations, known as the State CEQA Guidelines, which provide detailed procedures that agencies must follow to implement CEQA. The CEQA Guidelines are contained in the California Code of Regulations (CCR), Title 14, Chapter 3, Sections 15000 *et seq*.

reasons why a governmental agency approved a project if significant environment effects are involved.

Perhaps the best-known application of CEQA is the requirement that a public agency prepare an Environmental Impact Report (EIR) whenever a project has the potential to create significant effects on the environment. The purpose of an EIR is "to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided"[3].

CEQA requires public agencies to address the full range of environmental issues, including water quality, noise, land use, natural resources, transportation, energy, human health, and air quality. The guidance that follows addresses air quality analyses under CEQA. However, it also has implications for analyses of human health, water quality, risks of upset, and other environmental areas related to air quality.

1.3 DISTRICT'S ROLE IN CEQA

For each project under CEQA, the SJVAPCD has one of three roles: Lead Agency, Responsible Agency, or a commenting agency.

Lead Agency. The SJVAPCD acts as a Lead Agency when it has principal responsibility to carry out or approve a project. This typically occurs when it develops rules, regulations, and air quality plans. The SJVAPCD may also become a Lead Agency for projects requiring SJVAPCD approval of discretionary air quality permits and not requiring any discretionary action from any other agency[4]. This may also occur when an environmental document prepared by another Lead Agency is inadequate for the SJVAPCD to act upon.

Responsible Agency. The SJVAPCD acts as a Responsible Agency when it has discretionary power over a project but does not have the principal authority to carry out the project. The SJVAPCD is often a Responsible Agency for development projects that require air pollution control permits. In this capacity, it considers the EIR or Negative Declaration prepared by the Lead Agency and reaches its own conclusions on whether and how to approve the project involved[5]. To ensure that the environmental document is adequate for its use, the SJVAPCD provides comments to the Lead Agency on its air quality analysis and mitigation measures, if applicable.[6] During the EIR process, CEQA provides that the SJVAPCD may comment at three points:

[3] PRC §21002.1
[4] The State CEQA Guidelines [CCR §15051(b)(1)] makes it clear that the Lead Agency will normally be the agency with general governmental powers, not an agency like an air district which is more limited in purpose.
[5] CCR §15096(a)
[6] The State CEQA Guidelines [CCR §15096(a)(2)(d)] states that when commenting on Draft EIRs and Negative Declarations, responsible agencies are limited to those project activities within the agency's area of expertise or which are required to be approved by the agency.

- informally on projects before the formal review process begins;
- in response to the Notice of Preparation that an EIR is being prepared;
- and when the draft EIR is circulated for public review.

To help public agencies and project applicants determine whether air quality permits are required for a project, the SJVAPCD has prepared a list (Figure 1-2) that identifies projects that often require air quality permits. These projects also may be sources of emissions classified as hazardous air pollutants that require screening and, potentially, health risk assessments by the SJVAPCD.

Commenting Agency. The SJVAPCD acts as commenting agency for any project that has the potential to impact air quality and for which it is not a lead or responsible agency.[7] To this end, it regularly provides comments to Lead Agencies that prepare environmental documents.

1.4 REGIONAL OFFICES

The SJVAPCD is officially divided into three regions: northern, central, and southern (see Figure 1-1). The Southern Region consists of Tulare County and the portion of Kern County in the SJVAB and is administered by an office in Bakersfield. The Central Region is composed of Fresno, Kings, and Madera Counties, with the office being located in Fresno. This office also serves as the main headquarters. Merced, Stanislaus, and San Joaquin Counties make up the Northern Region, with an office located in Modesto. **However, the Southern Region is responsible for CEQA activities in Kings County.** All Lead Agencies, consultants, project applicants, or other interested parties should contact the office in their region regarding the SJVAPCD's responsibilities as a Responsible or commenting agency (see Appendix B for contact information.)

1.5 HOW TO USE THE GAMAQI

The GAMAQI is intended for use by Lead Agencies and consultants preparing CEQA air quality documents. The document employs the following structure for easier use and long term utility:

- **Dated Information**. To the greatest extent feasible, information that may change quickly or which needs to be updated frequently is located in a separate Technical Document. Before using information from the technical document, the Lead Agency or consultant should contact the SJVAPCD CEQA staff in the appropriate

[7] CEQA Guidelines [CCR §15044] permits any person or entity that is not a responsible agency to comment to a Lead Agency on any environmental impact of a project.

regional office or the District web site at www.valleyair.org to determine the most up-to-date version.

The entire GAMAQI will be updated periodically as legislative, legal, and technical changes dictate. Updates will be provided in a three-ring binder format for insertion into your current GAMAQI.

Figure 1-2
Examples of Projects Requiring SJVAPCD Air Quality Permits

The SJVAPCD Rule 2010 states that "any person who plans to or does operate, construct, alter, or replace any source of emission of air contaminants" must obtain approval of the Air Pollution Control Officer and receive an Authority to Construct and a Permit to Operate.

Examples of air contaminant emitting equipment and processes include (but are not limited to):

- Agricultural products processing
- Bulk material handling
- Chemical blending, mixing, manufacturing, storage, etc.
- Combustion equipment (boilers, engines, heaters, incinerators, etc.)
- Metals etching, melting, plating, refining, etc.
- Plastics & fiberglass forming and manufacturing
- Petroleum production, manufacturing, storage, and distribution
- Rock & mineral mining and processing
- Solvent use (degreasing, dry-cleaning, etc.)
- Surface coating and preparation (painting, blasting, etc.)

Note: Equipment operated and installed without an Authority to Construct is subject to legal action and fines up to $25,000 for each day of violation.

To obtain assistance in determining if a project is subject to SJVAPCD permit and for information on procedures for obtaining an Authority to Construct, call the SJVAPCD's Small Business Assistance (SBA) Office in the regional District offices:

Northern Office SBA	(209) 557-6446
Central Office SBA	(559) 230-5888
Southern Office SBA	(661) 326-6969

- **Models.** There are a number of references to specific air quality models in the GAMAQI. These are the most current models available at the time the GAMAQI was prepared and are subject to change. The latest approved models should always be used for air quality analysis. If unsure about current models, modelers should contact the SJVAPCD CEQA staff.

- **Organization.** This document is organized to reflect the environmental review process for a Lead Agency. Because each section provides information on an

essential step in a CEQA air quality analysis process, the GAMAQI can be used as a reference resource at any step of the environmental review process.

- **Early Consultation at the Planning Counter.** One goal of the GAMAQI is to provide information to project proponents about air quality issues early in the planning process. Planners can use the information in this document and also the information provided in the SJVAPCD's *Air Quality Guidelines for General Plans* and the websites mentioned in Section 3.2 to encourage developers to consider air quality issues and minimize potential impacts before completing a project's scope or design.

- **District Support.** SJVAPCD CEQA representatives are available to answer questions about the guidance in this document and air quality-related questions at (559) 230-5800 in the Central Region office servicing Fresno and Madera Counties; (209) 557-6400 in the Northern Region office servicing Merced, Stanislaus, and San Joaquin Counties; and (661) 326-6900 in the Southern Region office servicing, Kings and Tulare Counties and the SJV portion of Kern County.

1.6 RELATIONSHIP TO NEPA

Some projects subject to CEQA may also require compliance with federal environmental law, namely the National Environmental Policy Act (NEPA). The air quality analyses prepared in accordance with the GAMAQI should be adequate in most cases to meet NEPA as well as CEQA requirements.

SECTION 2 – CONSULTING WITH THE SJVAPCD

2.1 INTRODUCTION

As noted in Section 1, the SJVAPCD can have one of three areas of responsibility under the CEQA: Lead Agency, Responsible Agency, and as a commenting agency. The SJVAPCD's specific responsibilities as a Lead Agency are addressed in a separate SJVAPCD document entitled *Environmental Review Guidelines*[8], which is available for review at any of the District's three regional offices or from the District's web site at www.valleyair.org.

This GAMAQI focuses on the SJVAPCD's expectations and responsibilities as a commenting agency. The GAMAQI also describes the special considerations required when the District is a Responsible Agency. This section addresses the general CEQA procedures that the SJVAPCD expects Lead Agencies to follow and its own responsibilities during the consultation process. This section lists occasions when the District requests to receive documents for review; however, this does not constitute a formal request since the GAMAQI is an advisory document.

2.2 LEAD AGENCY CONSULTATION REQUIREMENT

Most development projects in the San Joaquin Valley have the potential to impact air quality. Lead Agencies that should consult with the SJVAPCD thus consist of all public agencies in the SJVAB that undertake or have authority to approve discretionary projects within the boundaries of the District. These include, but are not limited to, the eight counties, 59 cities, Councils of Government, Transportation Planning Agencies, state and federal agencies, school districts, and special purpose districts such as water districts or community service districts. Any agency or other entity that is unsure of its responsibility to consult with the SJVAPCD should contact the nearest SJVAPCD regional office for information and assistance.

2.3 WHEN CONSULTATION IS REQUIRED

The SJVAPCD is available for consultation at any time in the project review process, but there are certain times when consultation is required. When the SJVAPCD has discretionary approval authority over a project for which another public agency is serving as Lead Agency, it is to be consulted as a Responsible Agency. When the SJVAPCD does not have any approval authority over a project, it is to be consulted as a commenting agency. CEQA requires or provides opportunities for consultation at various times during the environmental review process. These include opportunities for review prior to the

[8] Adopted by the Governing Board in August 2000.

preparation of the environmental document and during public review of the completed document.

2.3.1 Review Prior to Preparation of Environmental Document

CEQA provides for several opportunities for consultation prior to the preparation of an EIR or Negative Declaration. These opportunities are described below.

Prior to Determination to Proceed with a ND or an EIR. CEQA[9] provides that Lead Agencies must formally consult with Responsible Agencies prior to making a determination as to whether a Negative Declaration or an EIR is required for a project. This section also provides that a Lead Agency may informally consult with other agencies prior to formal consultation. This consultation is generally accomplished by the Lead Agency requesting information related to potential impacts and mitigation measures that the project may have upon the resource under each agency's jurisdiction. The SJVAPCD requests that it be consulted by Lead Agencies on all projects at this stage of the CEQA process[10].

Notice of Preparation. When a Lead Agency decides to prepare an EIR, it must consult with Responsible Agencies through a Notice of Preparation (NOP) of the EIR[11]. The NOP must be sent by registered mail or a similar method that can demonstrate that the required notice was mailed. When the SJVAPCD is a Responsible Agency, it must receive the NOP. Even though, for most projects the SJVAPCD is not a Responsible Agency, the SJVAPCD's NOP response can provide the Lead Agency important guidance regarding the scope of the environmental effects of their project on air quality. Therefore, the SJVAPCD requests that it receive all NOPs. If a Lead Agency is unsure as to whether the SJVAPCD is a Responsible Agency for a project, please contact the CEQA representative at the nearest SJVAPCD regional office.

Scoping Meetings. Scoping meetings to determine the scope and content of an EIR must be held if requested by a Lead Agency, a Responsible or Trustee Agency, or a project applicant. Any person or organization that will be concerned with the environmental effects of the project may be invited to a scoping meeting. The SJVAPCD requests that it be notified of all scoping meetings for EIRs for projects within its boundaries.

Early Consultation. CEQA encourages Lead Agencies to consult with any individual or agency that will be concerned with the environmental effects of the project prior to the completion of the Draft EIR or Negative Declaration. This is often done in conjunction with the NOP or scoping meetings. If the SJVAPCD is a Responsible Agency or just a commenting agency, it requests that during early consultation it be provided with an opportunity to comment on the air quality impacts of all projects within its boundaries.

[9] PRC §21080.3(a)
[10] PRC §21104 and §21153
[11] PRC §21080.4

2.3.2 Review after Completing the Environmental Document

CEQA Guidelines requires public review periods for completed proposed Negative Declarations[12] and Draft EIRs[13]. The SJVAPCD requests to be included in distribution of all completed environmental documents within its jurisdiction. CEQA Guidelines also requires that Lead Agencies respond to any comments made on Draft EIRs[14].

Review of Proposed Negative Declaration or Mitigated Negative Declaration. CEQA[15] requires that public notices to issue Negative Declarations be sent to any organization or individual that has so requested. The SJVAPCD realizes that it may not be necessary to review all Negative Declarations for projects on which it was consulted prior to their preparation. Therefore, in responding to consultation, the SJVAPCD will request copies of the Negative Declarations it wishes to review. In general, the SJVAPCD will request copies of Negative Declarations for larger projects for which it has recommended mitigation measures and for projects where the SJVAPCD did not have an opportunity to comment during early consultation.

Review and Comment on the Draft EIR. CEQA[16] also requires that public notices for draft EIRs be sent to any organization or individual that has so requested. In addition, CEQA Guidelines[17] requires Lead Agencies "consult with and request comments on" draft EIRs from both Responsible Agencies and other agencies "which exercise authority over resources which may be affected by the project." The SJVAPCD requests that all draft EIRs prepared for projects within its boundaries be sent to it for review and comment.

Response to Comments on Draft EIRs. CEQA[18] requires that a Lead Agency send a written response to the SJVAPCD on any comments it has made on a Draft EIR at least ten days prior to certifying the EIR.

2.4 DATA NEEDED FOR SJVAPCD REVIEW

2.4.1 Informal Consultation

SJVAPCD CEQA staff has been reviewing projects since the inception of the District in 1991, and in some SJV counties prior to unification. The data sent to the SJVAPCD for review prior to the preparation of an environmental document varies from one jurisdiction to another. In some cases, a copy of all information submitted by project applicants is sent. In others, only a project title or one paragraph description is sent.

[12] CCR §15073
[13] CCR §15087
[14] CCR §15088
[15] PRC §21092
[16] PRC §21092
[17] CCR §15086(a)
[18] PRC §21092.5

In order for the SJVAPCD to properly review a project for which an Initial Study has been conducted, Lead Agencies should send a complete project description and location (preferably including a map), site plans, and tentative tract or parcel maps, if applicable; and data relative to number of vehicles or trips associated with the project. At minimum, Lead Agencies should allow ten working days for the SJVAPCD to respond.

For all EIRs prepared for projects in the District, the SJVAPCD requests that it be sent the Notice of Preparation (NOP). The CEQA Guidelines[19] require that the NOP include, at minimum, a description of the project, project location, and the probable environmental effects of the project. The CEQA Guidelines[20] provides for a 30-day consultation period for NOPs.

2.4.2 Negative Declarations

The SJVAPCD needs all of the basic information required by CEQA Guidelines[21] in order to provide a thorough review. This includes a brief description of the project, including a commonly used name for the project, if any; the location of the project, preferably shown on a map; and the name of the project proponent. To help the SJVAPCD identify previously reviewed projects, this information should correspond to, or reference, the same information provided during the Initial Study consultation process. The Lead Agency should include a copy of the Initial Study that documents reasons to support the Negative Declaration. Finally, any mitigation measures included in the project to avoid potentially significant effects should be in the consultation packet.

If an air quality study is prepared for a project at the Initial Study level, it should be summarized and the results reported in the Initial Study and the entire air quality study should be provided to the SJVAPCD. All assumptions used in the modeling analysis for any project should be clearly stated.

2.4.3 Draft EIRs

The Draft EIR prepared for any project in the SJVAPCD should be sent to the appropriate SJVAPCD regional office for review and comment. Where an air quality study is prepared for a project, it should be summarized and the results reported in the Draft EIR and the entire air quality study should be included as an appendix or as a separate report. All assumptions used in the modeling analysis for any project should be clearly stated. When the Draft EIR includes air quality mitigation measures, the required mitigation monitoring and reporting should be included in or with the Draft EIR.

[19] CCR §15082
[20] CCR §15082(b)
[21] CCR §15071

2.4.4 Response to Comments

A Lead Agency's response to the SJVAPCD's comments on a Draft EIR may be in the form of the final EIR or may be a separate letter. The response should include the date, time, and location for when the Lead Agency proposes to certify the EIR.

2.5 SJVAPCD RESPONSIBILITIES FOR CONSULTATION

2.5.1 Consulting Prior to Environmental Determination

As noted in Section 1, the SJVAPCD is divided into three regions. The Northern Region consists of San Joaquin, Stanislaus, and Merced Counties. The Central Region (for the purpose of CEQA activities only) consists of Madera and Fresno Counties. The Southern Region (for the purpose of CEQA activities only) consists of Kings and Tulare Counties and the valley portion of Kern County. Addresses and telephone numbers for these offices are located in Appendix B and on the District's website (www.valleyair.org). Consultation requests should be sent to the SJVAPCD CEQA representative at the regional office that covers the county in which the project is located. If a Lead Agency is unsure of where consultation should occur, the central region office in Fresno may be contacted for additional information.

When the SJVAPCD receives a request for consultation, the following procedure will be used:

- Initially, SJVAPCD CEQA staff evaluates all requests for consultation to determine if there is a potential for significant adverse effects to air quality. Projects of concern will get further review.

- The SJVAPCD's policy is to respond to all projects of concern within the review period established by the Lead Agency. When it is unable to meet the stated deadlines, a staff member will notify the Lead Agency and request additional time or explain why the deadline cannot be met.

- For information related to the air quality setting in the SJVAB, the SJVAPCD will reference the most recent version of the Technical Document, by date.

- The SJVAPCD will indicate the appropriate Analysis Level for the project (see Section 5).

- For typical projects, the SJVAPCD will provide a description of potential impacts and mitigation measures.

- At the request of the applicant or Lead Agency, SJVAPCD staff will meet with the project proponents or Lead Agency staff to discuss the potential impacts and mitigation measures.

- For large or unusual projects, that may have a significant potential for air quality impacts, the SJVAPCD will request a meeting with the applicant or his representative to discuss the impacts and possible mitigation measures.

- The SJVAPCD will attend scoping meetings for EIRs, as far as time and work schedules permit and the projects have the potential to generate significant air quality impacts.

2.5.2 Review of Proposed Negative Declarations and Draft EIRs

The SJVAPCD will review Initial Studies/Negative Declarations and Draft EIRs for the following concerns:

- the accuracy of the air quality setting data;

- modeling assumptions, if applicable;

- whether air quality impacts are adequately described;

- the extent to which recommended mitigation measures or other mitigation measures determined by the project proponents are incorporated into the project; and

- whether the SJVAPCD agrees with the overall conclusions regarding impacts on air quality.

SECTION 3 – PRELIMINARY PROJECT REVIEW

3.1 INTRODUCTION

This section provides guidance regarding early consultation on air quality issues between project proponents and local governments. It is meant to assist Lead Agencies in addressing air quality issues at an early stage in the development review process.

3.2 LEAD AGENCY ACTIONS PRIOR TO COMMENCING CEQA

The SJVAPCD encourages local jurisdictions to address air quality issues as early as possible in the development review process. Local jurisdictions should work with applicants on issues such as potential land use conflicts (e.g., odors) and site design to encourage alternatives to the automobile and the use of clean-burning fireplaces. Addressing land use and site design issues while a proposed project is still in the conceptual stage increases opportunities to incorporate measures and desirable modifications to minimize air quality impacts. By the time a project enters the CEQA process, it is often more costly and time-consuming to redesign the project to incorporate mitigation measures. Lead Agency/applicant consultation may be achieved by including a formal step in the jurisdiction's development review procedures or simply by discussing air quality concerns at the appropriate local planning counter when a project proponent makes an initial contact regarding a proposed development. Regardless of the specific procedures a local jurisdiction employs, the objective should be to incorporate features benefiting air quality into a project before significant resources (public and private) have been devoted.

The following air quality considerations warrant particular attention during early consultation with project proponents:

1) land use and design measures to encourage alternatives to the automobile and conserve energy;

2) development design to eliminate or minimize the use of traditional wood-burning fireplaces;

3) land use conflicts and exposure of sensitive receptors to odors, toxics, and criteria pollutants; and

4) applicable SJVAPCD rules, regulations, and permit requirements.

Land Use and Design Considerations - Land use decisions are critical to air quality because land use patterns determine transportation needs, and motor vehicles are the largest single category of air pollution in the San Joaquin Valley. The location, intensity, and design of land use development projects significantly influence how people travel. For

example, land use strategies such as locating moderate or high-density development near transit nodes increase opportunities for residents/employees to use transit rather than drive their cars. Similarly, design considerations such as orienting a building entrance towards a sidewalk and/or transit stop increase the attractiveness of walking and transit as alternatives to driving. Some important land use and design strategies to consider include the following:

- Encourage the development of higher density housing and employment centers near existing and planned transit nodes.
- Encourage compact development featuring a mix of uses that locates residences near jobs and services.
- Provide neighborhood retail within or adjacent to large residential developments.
- Provide services, such as restaurants, banks, copy shops, post office, etc., within office parks and other large employment centers.
- Encourage infill of vacant and redevelopment sites.
- Ensure that the design of streets, sidewalks, and bike paths/routes within a development encourages walking and biking.
- Orient building entrances towards sidewalks and transit stops.
- Provide landscaping to reduce energy demand for cooling.
- Orient buildings to minimize energy required for heating and cooling.
- Encourage changes in zoning regulations to allow for upper story residential and/or office uses in neighborhood shopping areas.

Further information regarding land use and design strategies is provided in Section 6. Also, the SJVAPCD has prepared a guidance document on these issues entitled *Air Quality Guidelines for General Plans* (AQGGP). The AQGGP document provides guidance to local officials and staff on developing and implementing local policies and programs to improve air quality to be included in local jurisdictions' general plans.

In order to get ideas and concepts on what constitutes land use and design strategies that would be beneficial for air quality, SJVAPCD CEQA staff recommends visiting the following World Wide Web sites:

- The Center of Excellence for Sustainable Development (http://www.sustainable.doe.gov/)

- The Local Government Commission's Center for Livable Communities (http://www.lgc.org/clc/welcome.html)
- Walkable Communities, Inc. (http://www.walkable.org/)
- PLANetizen (http://www.planetizen.com/)

Lead Agency staff may also contact their appropriate SJVAPCD CEQA representative for assistance.

Development designs to eliminate or minimize the use of traditional wood-burning fireplaces – The traditional wood-burning fireplaces are assembled on site and integral to the structure of the house. They are masonry (usually brick and/or stone) in design and typically have large fixed openings (hearth) to the fire bed and have dampers above the combustion area in the chimney to limit room air and heat loss when the fireplace is not being used. These "open-hearth" fireplaces usually heat a room by radiation, with a significant fraction of the combustion heat lost in the exhaust gases and through fireplace walls. Moreover, some of the radiant heat entering the room goes toward warming the outside air that is pulled into the residence to make up for that drawn up the chimney. The net effect is that open-hearth fireplaces are usually inefficient heating devices. Indeed, in cases where combustion is poor, where the outside air is cold, or where the fire is allowed to smolder (thus drawing outside air into the residence without producing appreciable radiant heat energy), a net heat loss may occur in a residence using an open-hearth fireplace.

In addition, the inefficient combustion of an open-hearth fireplace means that significant quantities of unburned combustibles (emissions) are produced. Housing developments with many open-hearth "built-in" fireplaces could create a significant deleterious effect on the localized air quality. Conventional "older" wood stoves are almost as inefficient and polluting as the open-hearth fireplace. There are hundreds of chemical compounds in wood smoke, including many that are irritating and potentially cancer causing[22]. Fireplace/wood stove emissions also include respirable particulate matter (PM-10), carbon monoxide (CO), sulfur oxides (SOx), nitrogen oxides (NOx), and volatile organic compounds (VOC).

Breathing air containing wood smoke contributes to cardiovascular problems; lung diseases like asthma, emphysema, pneumonia, and bronchitis; irritations to the lungs, throat, sinuses, and eyes; headaches; and allergic reactions. Those with the greatest health risk from wood smoke include infants and children, pregnant women, and people with lung or heart disease[23].

[22] "Controlling Wood Smoke Pollution", Washington State Department of Ecology, October 1998 (FA-91-127, rev. 10/98)
[23] ibid.

However, fireplace and wood stove technology and products are readily available that can significantly reduce these emissions. For example, an EPA-Certified[24] wood stove emits about 40 to 60% less PM-10 and CO and over 65% less VOCs than the open-hearth fireplace. The lowest emissions are achieved using EPA-Certified "Pellet" Stoves[25] that emit 80 to 90% less PM-10 and CO than the open-hearth fireplace.

EPA-Certified wood stoves and pellet stoves can also be used in existing open-hearth fireplaces. They are essentially wood stoves designed to be installed or inserted into the fireplace firebox/hearth cavities. If properly installed, their performance is similar to that of their stove counterparts.

Over the last 10 years, the use of natural gas or liquefied petroleum gas (LPG) in place of cordwood has become widespread in fireplaces used for primary and supplemental heating purposes. Three types of gas units have the "fireplace look". They are gas fireplace inserts, decorative gas fireplaces, and gas fireplace heaters. All have negligible emissions, compared to cordwood fireplaces. Emissions are reduced nearly 100%. Gas fireplace inserts, like certified cordwood and pellet inserts, can be put into existing fireplaces.

Residential fuel combustion poses a localized health risk when trapped at ground level during winter weather conditions. According to the 1996 emissions inventory, residential fuel combustion contributed 12 tons of PM-10, 81 tons of CO, 0.3 tons of SOx, 6.7 tons of NOx, and 6.4 tons of VOCs per day in the winter.

A phone survey conducted for the District in November 1997 revealed that 31% of the San Joaquin Valley residents have one or more fireplaces or wood stoves in their home. Of those, two-thirds do not have a fireplace insert, and just under 3% burn only gas. This demonstrates that significant strides could be made in reducing the air quality and health impacts from fireplaces, while maintaining the ambience and aesthetics of a roaring fire in the fireplace.

Land Use Conflicts and Sensitive Receptors - The location of a development project is a major factor in determining whether it will result in localized air quality impacts. The potential for adverse air quality impacts increases as the distance between the source of emissions and members of the public decreases. Impacts on sensitive receptors are of particular concern. Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors.

[24] All wood heaters manufactured after July 1, 1988 and sold after July 1, 1990 had to meet Phase II certification as described in Code of Federal Regulations, Title 40, Volume 6, Part 60, Section 60.533.

[25] Pellet stoves are fueled with pellets of sawdust, wood products, and other biomass materials pressed into manageable shapes and sizes. These stoves have active air flow systems and unique grate designs to accommodate this type of fuel.

For each of the situations discussed below, the impacts generally are not limited only to sensitive receptors. *All* members of the population can be adversely affected by criteria pollutants, toxic air contaminants, odor, and dust and thus any consideration of potential air quality impacts should include all members of the population. This discussion focuses on sensitive receptors, however, because they are most vulnerable to the effects of air pollution.

Air quality problems arise when sources of air pollutants and sensitive receptors are located near one another. There are several types of land use conflicts that should be avoided:

- Development projects with sensitive receptors in close proximity to a congested intersection or roadway with high levels of emissions from motor vehicles. High concentrations of carbon monoxide, fine particulate matter, or toxic air contaminants are the most common concerns.

- Development projects with sensitive receptors close to an industrial source of toxic air contaminants.

- Development projects with sensitive receptors close to a source of odorous emissions. Although odors generally do not pose a health risk, they can be quite unpleasant and often lead to citizen complaints to the SJVAPCD and to local governments.

- Development projects with sensitive receptors close to a source of high levels of nuisance dust emissions.

Localized development-related air pollution impacts to sensitive receptors generally occur in one of two ways: 1) a (new) source of air pollutants is proposed to be located close to existing sensitive receptors, for example, an industrial facility is proposed for a site near a school; or 2) a (new) development project with sensitive receptors is proposed near an existing source of air pollutants, for example, a hospital is proposed for a site near a refinery.

Specific legislation has addressed these concerns. Two examples specifically addressed by law are:

- Section 42301.6 of the California Health and Safety Code (CH&SC) imparts certain requirements for the SJVAPCD's approval of permits for facilities that would have the potential to emit hazardous air pollutants that would be located within 1000 feet of a school, and

- Section 39003 of the Education Code and Section 21151.4 of the PRC requires Lead Agencies to not approve Negative Declarations or Environmental Impact Reports for any new school facilities which are located within ¼ mile of any potential source of hazardous air emissions unless certain requirements are met.

Preliminary consultation between project proponents and Lead Agency staff can avoid or minimize localized impacts to sensitive receptors. When evaluating whether a development proposal has the potential to result in localized impacts, Lead Agency staff need to consider the nature of the air pollutant emissions, the proximity between the emitting facility and sensitive receptors, the direction of prevailing winds, and local topography. Often, providing an adequate distance, or buffer zone, between the source of emissions and the receptor(s) will mitigate the problem in many cases. This underscores the importance of addressing these potential land use conflicts as early as possible in the development review process.

SECTION 4 – THRESHOLDS OF SIGNIFICANCE

4.1 INTRODUCTION

This section provides SJVAPCD recommended thresholds for determining whether projects have significant adverse air quality impacts as defined by CEQA. Projects demonstrated to have significant adverse impacts are required to mitigate impacts to levels considered less than significant or to prepare an EIR. The thresholds are advisory, but may be adopted administratively or formally by a governing body as recommended by the Governor's Office of Planning and Research (OPR) document *Thresholds of Significance: Criteria for Determining Environmental Significance*. The following gives the basis for the thresholds for all different types of air quality impacts.

4.2 BASIS FOR THRESHOLDS OF SIGNIFICANCE

The SJVAPCD used the OPR definitions of significant environmental effect as a basis to establish air quality Thresholds of Significance for the San Joaquin Valley. Section 15382 of the CEQA Guidelines defines "significant effect on the environment" as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including ... air."

The Air Quality Section of Appendix G of the CEQA Guidelines (Environmental Checklist Form) contains a list of effects that may be deemed potentially significant. These are:

a) Conflict with or obstruct implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project is non-attainment under applicable federal or state ambient air quality standards (including releasing emissions which exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

e) Create objectionable odors affecting a substantial number of people.

For some types of impacts, the criteria listed above are straight forward, but in other cases, they require interpretation. A violation of air quality standards can be predicted for pollutants that can be modeled for atmospheric concentration. This is the case for carbon monoxide for which violations can be predicted using a dispersion model. Ozone, however, is the product of a photochemical reaction that may occur many miles away from the

source of emissions. Although atmospheric ozone models exist, they are only sensitive enough to register changes caused by the largest projects. What is more important for determining ozone impacts is a project's contribution to existing violations of the ozone standard in the SJV. By comparing a project's ozone precursor emissions with emission levels considered important under state law, this impact can be evaluated. One such level is the stationary source emissions offset threshold required by the CCAA. Additionally, the most common measure of significance for toxic air contaminants is an increase in cancer risk based on exposure levels for the nearest sensitive receptor, while odor impacts can be judged significant based on the number of complaints expected for each type of odor producing process. These criteria are described in greater detail below.

While CEQA Guidelines[26] state that an ironclad definition of a significant effect is not possible because the significance of an effect may vary with the setting, the SJVAPCD has determined that the setting, as referred to in CEQA, can be defined for air quality. Under California state law[27], the SJVAB is defined as a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health. As such, the SJVAPCD resolves that significance thresholds established herein are based on scientific and factual data. Therefore, the SJVAPCD recommends that these thresholds be used by Lead Agencies in making a determination of significance. However, it is still recognized that the final determination of whether or not a project has a significant effect is ultimately within the purview of the Lead Agency pursuant to CEQA Guidelines[28].

Basis for Ozone Precursor Thresholds. The entire SJVAB often violates state and federal ozone ambient air quality standards. Therefore, emissions related to an individual project, if substantial, will contribute to the existing violations of the ozone standards. The SJVAPCD defines "substantial contribution" for ozone precursor emissions in terms of CCAA requirements[29]. The SJVAPCD's New and Modified Stationary Source Review Rule - Offset Requirements for nitrogen oxides (NOx) and volatile organic compounds (VOCs) (in this document, equivalent to reactive organic gases [ROG])[30] reflects the CCAA requirements. Rule 2201 sets emissions thresholds above which stationary pollution sources must offset all emissions down to the thresholds. The offset thresholds vary depending on the severity of the pollution problem in each air basin and the type of pollutant. Areas categorized as severe ozone nonattainment areas such as the SJVAB have lower thresholds than areas categorized as having only a moderate ozone problem. The SJVAPCD staff also researched and evaluated many significance thresholds established by other air quality management agencies in California and found that most agencies use the same approach. Although it may be argued that any increase in pollutant emissions in an area with a severe pollution problem may be significant, a reasonable threshold is still

[26] CCR §15064(b)
[27] California Health and Safety Codes (CH&SC) §41100
[28] CCR §15064 (c)
[29] CH&SC §40920
[30] SJVAPCD Rule 2201, §4.2.3

needed to avoid unnecessarily burdening every project with a requirement to prepare an EIR, which is clearly not intended by CEQA nor desired by the SJVAPCD.

CEQA requires that in evaluating the significance of a project's potential air quality impacts, the Lead Agency shall consider both primary (direct) and secondary (indirect) consequences[31]. Primary impacts include emissions from project construction and emissions from motor vehicles traveling to and from the facility once it is operational. An example of a secondary impact would be the emissions associated with growth that may be facilitated by the expansion of a wastewater treatment plant.

Basis for PM-10 Thresholds. The entire SJVAB is a serious nonattainment area for PM-10 and any addition to the current PM-10 problem could be considered significant. However, the SJVAPCD has established regulations governing various activities that contribute to the overall PM-10 problem. The SJVAPCD has adopted a set of PM-10 Fugitive Dust Rules collectively called Regulation VIII. Several components of Regulation VIII specifically address fugitive dust generated by construction related activities. Therefore, the SJVAPCD has determined that any determination of significance with respect to construction emissions should be based on a consideration of the control measures to be implemented. From the perspective of the SJVAPCD, compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 (as appropriate, depending on the size and location of the project site) will constitute sufficient mitigation to reduce PM-10 impacts to a level considered less-than-significant.

4.3 THRESHOLDS OF SIGNIFICANCE

This section describes and establishes the SJVAPCD's Thresholds of Significance. These thresholds are recommended for use by Lead Agencies when preparing Initial Studies. If, during the preparation of the Initial Study, the Lead Agency finds that any of the following thresholds may be exceeded and cannot be mitigated, then a determination of significant air quality impact must be made and an EIR is required.

The SJVAPCD identifies thresholds that separate a project's short-term emissions from its long-term emissions. The short-term emissions are mainly related to the construction phase of a project and are recognized to be short in duration. The long-term emissions are mainly related to the activities that will occur indefinitely as a result of project operations. In addition, CEQA[32] states that another condition that could establish a project as having a significant effect on the environment is effects that are considered "cumulatively considerable." Thresholds for project construction impacts, project operations, and cumulative impacts are discussed below.

[31] CCR §15064 (d)
[32] PRC §21083(b)

4.3.1 Threshold of Significance for Project Construction Impacts

Pollutants of Concern. A project's construction phase produces many types of emissions, but PM-10 is the pollutant of greatest concern.[33] PM-10 emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle exhaust. Construction-related emissions can cause substantial increases in localized concentrations of PM-10, as well as affecting PM-10 compliance with ambient air quality standards on a regional basis. Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces. Asbestos can also be of concern during demolition activity associated with construction. The use of diesel powered construction equipment produces ozone precursor emissions and combustion related particulate emissions. Large construction projects lasting many months may exceed the District's annual threshold for NOx emissions and could expose area residents to diesel particulate. Contact the SJVAPCD for analysis recommendations for large construction projects.

Qualitative Approach. The SJVAPCD's approach to CEQA analyses of construction PM-10 impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emissions (although a Lead Agency may elect to do so - see Section 5 of this document for guidance). PM-10 emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce PM-10 emissions from construction. The SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 (as appropriate, depending on the size and location of the project site) will constitute sufficient mitigation to reduce PM-10 impacts to a level considered less-than-significant.

Common Measures. All control measures listed in Table 6-2 (Regulation VIII Control Measures) are required for all construction sites by regulation. Table 6-3 lists additional measures that may be required due to sheer project size or proximity of the project to sensitive receptors. If all appropriate "enhanced control measures" in Table 6-3 will not be implemented for these very large or sensitive projects, then construction impacts would be considered significant (unless the Lead Agency provides a satisfactory detailed explanation as to why a specific measure is unnecessary). Table 6-3 also lists additional control measures (Optional Measures) that may be implemented if further emission reductions are deemed necessary by the Lead Agency.

[33] The SJVAPCD recognizes that construction equipment also emits carbon monoxide and ozone precursor emissions. However, the SJVAPCD has determined that these emissions may cause a significant air quality impact only in the cases of very large or very intense construction projects. The SJVAPCD will advise Lead Agencies on quantification procedures and significance on a case by case basis.

Demolition Asbestos Impacts. Project construction sometimes requires the demolition of existing buildings at the project site. Buildings often include materials containing asbestos. Airborne asbestos fibers pose a serious health threat if adequate control techniques are not carried out when the material is disturbed. The demolition, renovation, or removal of asbestos-containing materials is subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations as listed in the Code of Federal Regulations[34] requiring notification and inspection. Most demolitions and many renovations are subject to an asbestos inspection prior to start of activity. The SJVAPCD's Compliance Division in the appropriate region should be consulted prior to commencing any demolition or renovation of any building to determine inspection and compliance requirements. Strict compliance with existing asbestos regulations will normally prevent asbestos from being considered a significant adverse impact.

4.3.2 Thresholds of Significance for Impacts from Project Operations

The term "project operations" refers to the full range of activities that can or may generate pollutant emissions when the development is functioning in its intended use. For projects such as office parks, shopping centers, residential subdivisions, and other indirect sources, motor vehicles traveling to and from the projects represent the primary source of air pollutant emissions. For industrial projects and some commercial projects, equipment operation and manufacturing processes can be of greatest concern from an emissions standpoint. Significance thresholds discussed below address the impacts of these emission sources on local and regional air quality. Thresholds are also provided for other potential impacts related to project operations, such as odors and toxic air contaminants.

(Lead Agencies may refer to Section 5, for guidance on calculating emissions and determining whether significance thresholds for project operations may be exceeded, and thus whether more detailed air quality analysis may be needed.)

Ozone Precursor Emissions Threshold. Ozone precursor emissions from project operations should be compared to the thresholds provided in Table 4-1. Projects that emit ozone precursor air pollutants in excess of the levels in Table 4-1 will be considered to have a significant air quality impact.

Both direct and indirect emissions should be included when determining whether the project exceeds these thresholds. The following total emissions thresholds for air quality have been established by the SJVAPCD for project operations. Projects in the SJVAB with operation-related emissions that exceed these emission thresholds will be considered to have significant air quality impacts.

[34] 40CFR Part 61, Subpart M

Table 4-1
Ozone Precursor Emissions Thresholds
For Project Operations

Pollutant	Tons/yr.
ROG	10
NOx	10

Local Carbon Monoxide Concentrations Threshold. Estimated CO concentrations, as determined by an appropriate model, exceeding the California Ambient Air Quality Standard (CAAQS) of 9 parts per million (ppm) averaged over 8 hours and 20 ppm for 1 hour will be considered a significant impact.

Odor Impacts Threshold. While offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the SJVAPCD. Any project with the potential to frequently expose members of the public to objectionable odors will be deemed to have a significant impact. Odor impacts on residential areas and other sensitive receptors, such as hospitals, day-care centers, schools, etc., warrant the closest scrutiny, but consideration should also be given to other land uses where people may congregate, such as recreational facilities, worksites, and commercial areas. Analysis of potential odor impacts should be conducted for the following two situations:

- **Generators** – projects that would potentially generate odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate, *and*

- **Receivers** – residential or other sensitive receptor projects or other projects built for the intent of attracting people locating near existing odor sources.

The SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJV. These are presented in Table 4-2 along with a reasonable distance from the source where the degree of odors could possibly be significant.

A Lead Agency should use Table 4-2 to determine whether the proposed project, either as a generator or a receiver, would result in sensitive receptors being within the distances indicated in Table 4-2. In addition, recognizing that this list of facilities is not meant to be all-inclusive, the Lead Agency should evaluate facilities not included in the table or projects separated by greater distances than indicated in Table 4-2 if warranted by local conditions or special circumstances. If the proposed project would result in sensitive receptors being located closer than the screening level distances indicated in Table 4-2, a more detailed analysis, as described in Section 5, should be conducted.

Table 4-2
Project Screening Trigger Levels
For Potential Odor Sources

Type of Facility	Distance
Wastewater Treatment Facilities	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g. auto body shops)	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rendering Plant	1 mile

Because offensive odors rarely cause any physical harm and no requirements for their control are included in state or federal air quality regulations, the SJVAPCD has no rules or standards related to odor emissions, other than its nuisance rule[35]. Any actions related to odors are based on citizen complaints to local governments and the SJVAPCD. Lead Agencies can make a determination of significance based on a review of District complaint records as described in Section 5. For a project locating near an existing source of odors, the impact is potentially significant when the project site is at least as close as any other site that has already experienced significant odor problems related to the odor source. Significant odor problems are defined as:

- more than one confirmed complaint per year averaged over a three year period, or
- three unconfirmed complaints per year averaged over a three-year period.

For projects locating near a source of odors where there is currently no nearby development *and* for odor sources locating near existing receptors, the determination of significance should be based on the distance and frequency at which odor complaints from the public have occurred in the vicinity of a similar facility.

If a proposed project is determined to be a potentially significant odor source, mitigation measures should be required. For some projects, operational changes, add-on controls, or process changes, such as carbon absorption, incineration, or relocation of stacks/vents can reduce odorous emissions. In many cases, however, the most effective mitigation strategy

[35] Rule 4102 of the SJVAPCD's Rules and Regulations and the California Health and Safety Codes Section 41700.

is to provide a sufficient distance, or buffer zone, between the source and the receptor(s). Recent experience has shown that locating upwind from an odor source does not necessarily eliminate potential problems. Even places with reliable prevailing winds experience days with light and variable winds and days with winds opposite prevailing winds related to the passage of storms. Residents in these upwind areas while exposed less frequently may be more sensitive to the odors.

Hazardous Air Pollutants (HAPs). Any project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants would be deemed to have a potentially significant impact. This applies to receptors locating near existing sources of toxic air contaminants, as well as sources of toxic air contaminants locating near existing receptors.

Particular attention should be placed on either the location of a facility that has the potential to emit hazardous air pollutants near an existing school or the location of a new school site near facilities that have the potential to emit HAPs. Both scenarios have specific regulations that govern agency actions, as discussed in Section 3.

Proposed development projects that have the potential to expose the public to toxic air contaminants in excess of the following thresholds in Table 4-3 would be considered to have a significant air quality impact. These thresholds are based on the SJVAPCD's Risk Management Policy.

Table 4-3
Thresholds of Significance for Toxic Air Contaminants

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million.
- Ground-level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.

There are currently more than 900 substances classified as hazardous air pollutants by the ARB and USEPA. All projects requiring air quality permits from the SJVAPCD are evaluated for HAP emissions. Examples of projects requiring permits are provided in Figure 1-2. All such projects should be referred to the SJVAPCD as part of the CEQA review process.

Accidental Releases/Acutely Hazardous Air Emissions. The determination of significance for potential impacts from accidental releases of acutely hazardous air pollutants should be made in consultation with the local administering agency of the Risk Management Prevention Program. The county health department, Office of Emergency Services, or local fire department is usually the administering agency.

Cumulative Impacts. Any proposed project that would individually have a significant air quality impact (see Section 4.3.2 – Thresholds of Significance for Impacts from Project Operations) would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, HAPs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards. See also Section 5.9.

SECTION 5 – ASSESSING AIR QUALITY IMPACTS

5.1 INTRODUCTION

Section 4 presented the thresholds that the SJVAPCD has determined will have significant effects on air quality if exceeded. This section provides guidance on quantifying and evaluating whether a proposed project or plan[36] will exceed the thresholds. It also describes the level of detail necessary for air quality analyses with various types of projects and CEQA documents. Lead Agencies have wide latitude in the level of detail that they use to analyze and describe air quality impacts. The level of analysis presented in this document represents what the SJVAPCD has determined is both reasonable and defensible. A flowchart showing the air quality analysis process for potentially significant pollutants in the SJV except for PM-10 is provided in Figure 5-1.

CEQA Streamlining. The SJVAPCD encourages Lead Agencies to take advantage of streamlining opportunities offered by CEQA in assessing air quality impacts. The use of master EIRs, tiered EIRs, subsequent EIRs/Negative Declarations, etc. allows Lead Agencies to focus on the regional and general air quality impacts early in the process and allows them to address project specific impacts later in the process when project details are known.

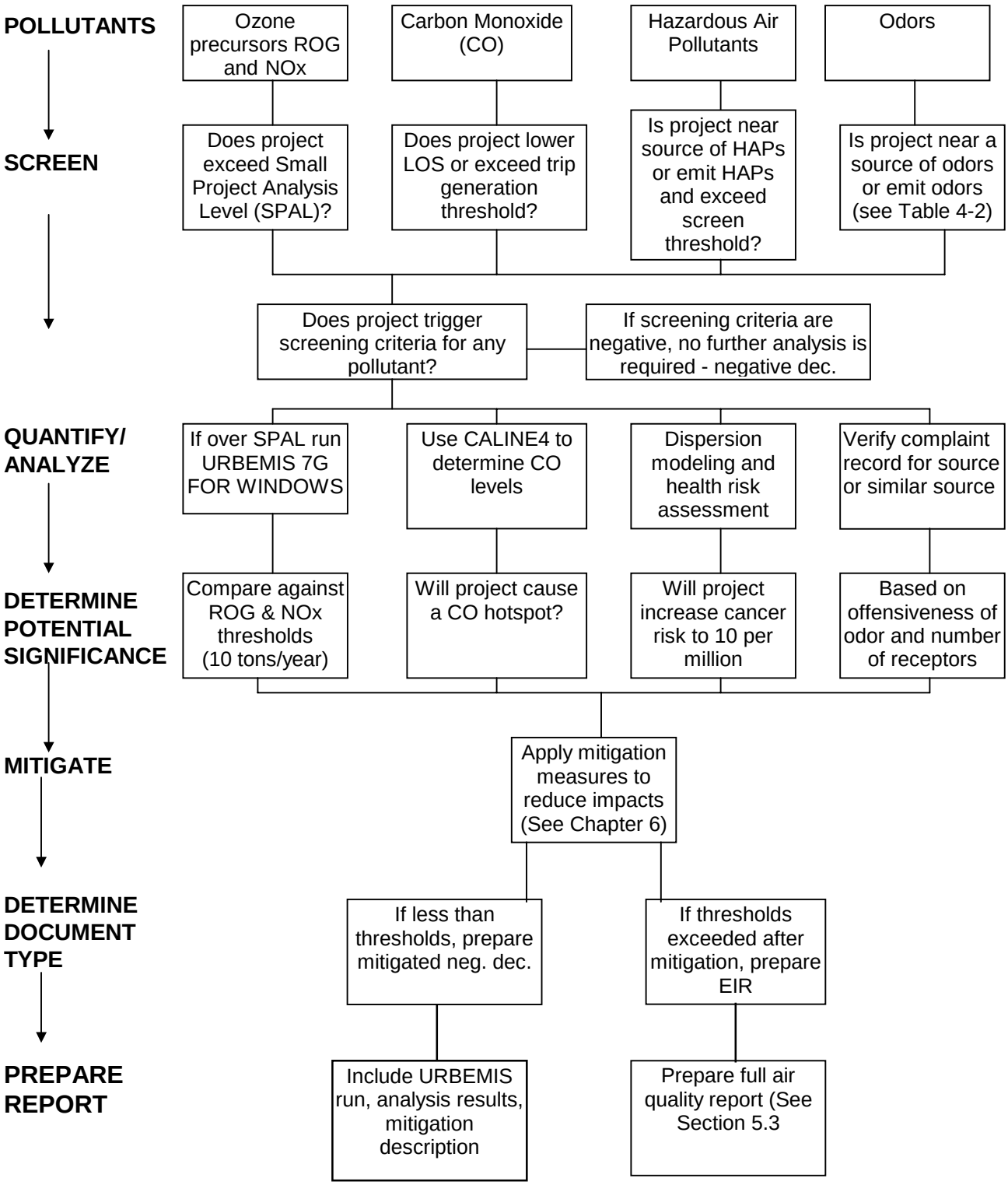
Analysis Levels by Project Size. This section describes a system devised by the SJVAPCD to identify the level of analysis appropriate for a project based on the size and type of the project. The SJVAPCD has pre-determined the size below which many commonly encountered projects will not exceed significance thresholds and still provide an adequate margin to account for site specific differences. Analyses for projects below this level will not need to quantify their emissions. Analyses for projects above the level need a cursory level of emissions quantification to determine if a project will or will not exceed significance thresholds. For projects obviously exceeding the thresholds, Lead Agencies need to prepare a full analysis appropriate for use in an EIR.

Components of a Full Air Quality Assessment. Guidance for completing the various components of a full air quality impact assessment is provided later in this section. The following information and procedures are described:

- Information that should be included on the project's environmental and regulatory setting;
- How to evaluate emissions from project construction;

[36] This section discusses how to evaluate the air quality impacts of development projects and plans. For the sake of brevity, this section generally refers only to "project(s)".

Figure 5-1
Air Quality Analysis Flow Chart
Operational Emissions



- Methods for calculating emissions from project operations, including:
  - mobile source (or "indirect") emissions;
  - localized carbon monoxide concentrations;
  - stationary source emissions; and
  - odor impacts.

- How to assess toxic air contaminants.

Analysis Methods for Special Projects. This section also describes analysis methods recommended for environmental documents for general plan updates, specific plans, and some general plan amendments. Unusual projects, and those not previously described, require consultation with the SJVAPCD to determine an appropriate analysis.

Projects Exempt from Environmental Review. Projects exempt from CEQA and projects proposing to adopt a previous environmental document should still be screened to determine if there are any significant impacts that have not been addressed. No discretionary project is exempt if new significant impacts are identified. In some cases, site specific impacts from odors, toxics, and carbon monoxide may only be identified when the precise use is proposed. Lead Agencies should review the screening criteria listed in this section when assessing the adequacy of previous environmental documents or determining the appropriateness of exempting a project.

Quantifying Project Emissions. Quantification is crucial for determining the air quality impacts of most pollutants. The basic method for calculating project emissions is to apply specific emission factors to sources of air pollutants whose magnitude and characteristics are either known or can be estimated. Emission factors may be defined as standardized relationships between particular sources of air pollution, such as motor vehicles or pieces of industrial equipment, and their air pollutant emissions. For example, emission factors for motor vehicles generally specify the amount (in grams) of certain air pollutants emitted, per mile traveled. This section references emission factors and quantification procedures for construction activities, motor vehicles, and stationary sources. Quantification of mobile sources impact is complex and would be difficult for agencies, applicants, and consultants to successfully calculate manually. For this reason, the District recommends the use of URBEMIS 7G for Windows[37] to quantify most project emissions.

This section also describes methods for evaluating air quality impacts that are not easily quantified, such as impacts associated with objectionable odors.

Once the impacts of a proposed project have been identified, the Lead Agency must determine whether or not the project would have a significant adverse impact on the

[37] URBEMIS 7G for Windows is the latest iteration of URBEMIS modeling program that is used to estimate emissions from motor vehicles associated with development projects. Version 7G for Windows also estimates emissions from area sources and includes estimated emissions reductions attributable to mitigation measures (listed in Tables 6-5 and 6-6).

environment. Significance criteria discussed in Section 4 of this GAMAQI should be used in making this determination. For any potentially significant impacts, mitigation measures must be incorporated into the project to reduce the impact(s), in so far as possible, to a level of less than significant. Section 6 provides guidance on selecting mitigation measures.

5.2 ANALYSIS OF PROJECTS REQUIRING SJVAPCD PERMITS

CEQA Guidelines[38] states a preference for the jurisdiction with the broadest authority to accomplish CEQA review when more than one public agency will be approving discretionary permits for a project. Frequently, projects requiring SJVAPCD permits must first obtain a land use approval from a city or county. In those cases, the SJVAPCD is a Responsible Agency and the city or county is the Lead Agency. If no other agencies have discretionary actions regarding the project, the District will take Lead Agency role. District processes as Lead Agency are detailed in the District's *Environmental Review Guidelines*.

CEQA also requires that the project description include a list of agencies that are expected to use the EIR in their decision-making, and a list of the approvals for which the EIR will be used[39]. If the project will require a permit from the SJVAPCD, this should be cited in the project description section of the EIR.

Many industrial projects and some commercial projects require SJVAPCD permits. (See Figure 1-2 for examples of projects requiring permits.) Lead Agencies must examine all reasonably foreseeable air quality impacts of these projects in their environmental documents. The analysis must address direct emissions from the permitted equipment or processes used at the site as well as any indirect emissions caused by motor vehicle trips, unpermitted stationary sources, or area sources related to the project. Generally, new permitted sources (emission units) emitting more than two pounds per day of NOx, and VOC must provide best available control technology, and all sources emitting more than the New Source Review Offset Thresholds must offset all emissions in excess of the thresholds. These sources thus cannot exceed the numeric thresholds of significance for ozone precursors.[40] Therefore, review of these projects should concentrate on their potential to generate local impacts such as hazardous air pollutants, odors, and pollutant hot spots. For more information on this topic, contact the SJVAPCD Small Business Assistance center in each region (see Appendix B).

Projects Exempt from SJVAPCD Permits. Stationary sources[41] that are exempt from SJVAPCD permit requirements because they fall below emission thresholds for permitting will normally not be considered to have a significant air quality impact from their permitted stationary equipment. However, the Lead Agency can, and should, make an

[38] CCR §15051(b)(1)
[39] CCR §15124(d)
[40] CCR §15064(i)
[41] Stationary sources are defined in SJVAPCD Rule 2201 as any building, structure, facility, or installation which emits, or may emit any affected pollutant directly or as a fugitive emission.

exception to this determination if special circumstances suggest that the emissions from any permitted or exempt source may cause a significant air quality impact. For example, if a source may emit objectionable odors, then odor impacts on nearby receptors should be considered a potentially significant air quality impact.

SJVAPCD assuming Lead Agency role. CEQA, generally, requires Responsible Agencies to use the environmental document prepared by the Lead Agency. However, CEQA Guidelines[42] list three occasions when a Responsible Agency must assume the Lead Agency role:

(1) The Lead Agency did not prepare any environmental documents for the project and the statute of limitations for challenging the project has elapsed;
(2) When a subsequent EIR is required and the Lead Agency has granted final approval of the project, and the statute of limitations has expired;
(3) The Lead Agency's environmental document is inadequate, and the Responsible Agency was not consulted, and the statute of limitations has expired.

In addition, there are occasions in which discretionary projects requiring SJVAPCD permit approval do not require discretionary approval from any other public agency. In these cases, the SJVAPCD would take on the duties of Lead Agency.

5.3 QUANTITATIVE EMISSIONS ANALYSIS LEVEL

This section describes the level of quantitative emissions analysis recommended for various sizes and types of land use projects. The SJVAPCD has established a three-tiered approach to determining significance related to a project's quantified ozone precursor emissions. Each tier or level requires a different degree of complexity of emissions calculation and modeling to determine air quality significance as described below. Table 5-1 summarizes the requirements for each level of analysis. Each level also requires the project to be analyzed for toxic air contaminants, hazardous materials, and odors. The potential for asbestos emissions must also be considered. For asbestos, size or complexity of the project does not matter. Any project that includes demolition or renovation of existing buildings needs to contact the SJVAPCD's Asbestos Coordinators at the appropriate SJVAPCD regional office.

Small Project Analysis Level (SPAL). The SJVAPCD pre-calculated the emissions on a large number and types of projects to identify the level at which they have no possibility of exceeding the emissions thresholds listed in Table 4-1. Table 5-2 provides this information in terms of vehicle trips required to exceed the SPAL threshold for five general land use categories[43]. Table 5-3 lists sizes of various specific development types meeting these criteria. Projects falling under these size thresholds qualify for what the SJVAPCD refers to as the Small Project Analysis Level (SPAL). No quantification of ozone precursor

[42] CCR §15052(a)
[43] Land use category descriptions are provided in the Institute of Transportation Engineers (ITE) Trip Generation report and in the URBEMIS 7G for Windows User's Guide.

emissions is needed for projects less than or equal to the sizes listed, however, other factors, such as toxic air contaminants, hazardous materials, asbestos, and odors still need to be analyzed. The SJVAPCD still wishes to review SPAL projects. Initial studies should note that the project is a SPAL project and provide a brief justification for the finding of no significant air quality impacts. For a multi-use project, if its combined trip generation rate exceeds the lowest applicable trip threshold from Table 5-2, an air quality analysis as described for the Cursory Analysis Level (CAL) should be prepared.

Note that even if a project is on the SPAL list, it does not relieve the Lead Agency from assessing a project for other potential significant air quality impacts. Some industrial and commercial projects may have impacts related to toxic air contaminants, hazardous materials, or odors. Projects containing sensitive receptors such as residential subdivisions, schools, hospitals, and so on must be assessed for exposure to pollutants from existing or planned industrial and commercial development. Any project that includes demolition or renovation of existing buildings needs to contact the SJVAPCD's Asbestos Coordinators at the appropriate SJVAPCD regional office.

When a project falls under the SPAL, the Lead Agency should use the information in the initial study checklist, or whatever format used, to justify a finding of less than significant air quality impacts. The initial study should also verify that no sensitive receptors would be exposed to substantial pollutant concentrations as a result of the project.

Table 5-1
Project Analysis Requirements

Analysis Level	Analysis Requirements
Small Project Analysis Level (SPAL)	• Verify project qualifies as a SPAL project (Table 5-2, 5-3). • Examine area surrounding project site for sources of toxic air contaminants, hazardous materials, and odors. • If industrial or commercial; verify that project is not a source of toxic air contaminants, hazardous materials, and odors. • Mitigate cumulative impacts with measures appropriate for the site. • If demolition or renovation of existing buildings, contact the District for asbestos requirements.
Cursory Analysis Level (CAL)	• Conduct URBEMIS 7G for Windows[44] model run. • Screen project for CO impact[45]; run CALINE4[46] if required. • Perform screening analysis of potential toxics, hazardous materials, and odor impacts if near a potential source or if project is a potential source of these pollutants. • If demolition or renovation of existing buildings, contact the District for asbestos requirements. • Identify mitigation measures and quantify with URBEMIS 7G for Windows when feasible. • If project is identified as potentially significant using the above screening methods, prepare full analysis.
Full Analysis Level (FAL)	• Conduct URBEMIS 7G for Windows model run for projects. • Conduct Direct Travel Impact Model (DTIM)[47] model run for large plans when a transportation model is available. • Screen project for CO impact/run CALINE4 if required • Perform screening analysis for potential toxics, hazardous materials, and odors. • If project is identified as a potentially significant source of toxic or hazardous pollutants, prepare a health risk assessment.

[44] URBEMIS for Windows is available on ARB's website (http://www.arb.ca.gov/urbemis7/urbemis7.htm)

[45] The SJVAPCD recommends using the Transportation Project-Level Carbon Monoxide Protocol (CO Protocol) developed by UC Davis in December 1997. The program deals with project-level air quality analysis needed for federal conformity determinations, NEPA, and CEQA. The CO Protocol is available on Caltrans' website (http://www.dot.ca.gov/hq/env/air/extsoft.htm).

[46] CALINE4 (CAlifornia LINE Source Dispersion Model), is the standard modeling program used by Caltrans to assess air quality impacts near transportation facilities, in the rare cases when the screening procedures of the CO Protocol fail. It is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. The SJVAPCD recommends the use of CL4 (Version 1.31). CL4 is a user interface designed to work with the CO Protocol, and can only be used for CO analysis. The program requires Windows 95/NT or higher and is available on Caltrans' website (http://www.dot.ca.gov/hq/env/air/extsoft.htm).

	• Prepare an air quality report containing: ▪ existing air quality conditions; ▪ analysis of project air quality impacts; mitigation measures; and ▪ results of modeling as technical appendices.

Table 5-2
Small Project Analysis Level (SPAL) in Vehicle Trips

Land Use Category	Project Size[48]
Residential Housing	1,453 trips/day
Commercial	1,673 trips/day
Office	1,628 trips/day
Institutional	1,707 trips/day
Industrial	1,506 trips/day

Table 5-3 (a)
Small Project Analysis Level (SPAL) by Project Type

Land Use Category	Project Size
Housing	
Single Family	152 Units
Apartments, Low Rise	220 Units
Apartments, High Rise	345 Units
Condominiums, General	270 Units
Condominiums, High Rise	335 Units
Mobile Homes	330 Units
Retirement Community	460 Units

[47] The Direct Travel Impact Model (DTIM) was developed by Caltrans in the late 1970's and is used in the State of California to calculate amounts of air pollutant emitted from motor vehicles and fuel consumption. The DTIM analysis is based on travel data produced by the Regional Transportation Model and on emission factors from the EMFAC Model. Some jurisdictions use the mobile emission inventory model MVEI7G when DTIM is not available. MVEI7G is available from the California Air Resources Board at www.arb.ca.gov/msei/mvei/mvei.htm.

[48] The project size numbers, and the trip generation numbers in Tables 5-2 and 5-3 were generated with URBEMIS 7G for Windows using default settings and are based on 90 percent of the ozone precursor emission thresholds. For definitions of land use categories listed above, see the URBEMIS 7G for Windows User's Guide or the latest edition of the Institute of Transportation Engineers, Trip Generation Manual.

Table 5-3 (b)
Small Project Analysis Level (SPAL) by Project Type

Land Use Category	Project Size
Office	
General Office Building	110,000 ft^2
Office Park	106,000 ft^2
Government (Civic Center)	57,000 ft^2
Government Office Building	23,000 ft^2
Medical Office Building	52,000 ft^2

Table 5-3 (c)
Small Project Analysis Level (SPAL) by Project Type

Land Use Category	Project Size
Retail	
Free Standing Discount Store	61,000 ft^2
Regional Shopping Center<57,000	11,000 ft^2
Discount Club Store	40,000 ft^2
Supermarket	9,000 ft^2
Convenience Market (w/o gas pumps)	2,000 ft^2
Convenience Market (w/ gas pumps)	2,000 ft^2
Gasoline/Service Station	10 pumps
Quality Restaurant	20,000 ft^2
Restaurant (high turnover sit-down)	9,000 ft^2
Fast Food Restaurant	2,000 ft^2
Day Care Center	22,000 ft^2
Bank (w/ drive-through)	10,000 ft^2
Racquet/Health Club	44,000 ft^2
Hotel	200 Units
Motel	170 Units

Table 5-3 (d)
Small Project Analysis Level (SPAL) by Project Type

Land Use Category	Project Size
Industrial [49]	
General Light Industry	510,000 ft^2
Heavy Industry	920,000 ft^2
Industrial Park	370,000 ft^2
Manufacturing	400,000 ft^2

Table 5-3 (e)
Small Project Analysis Level (SPAL) by Project Type

Land Use Category	Project Size
Institutional	
Hospital	78,000 ft^2
Elementary School	1875 students
Junior High School	1680 students
High School	1325 students
Junior College (2 year)	1100 students
University/College (4 year)	716 students
Place of Worship	48,000 ft^2

Cursory Analysis Level (CAL). Projects above the SPAL and most multi-use projects require a cursory air quality analysis to determine if they will exceed air quality significance thresholds after mitigation. A cursory analysis includes emission quantification, preliminary CO screening, and qualitative analysis of potential construction, toxics, and odor impacts. The SJVAPCD recommends using the URBEMIS 7G for Windows program to calculate project area source and mobile source emissions and for identifying mitigation measures to reduce impacts.

If a project has over a five year projected build-out, analyses should be done for the final build-out year (using the nearest default year in URBEMIS) and one intermediate year (using the URBEMIS default year nearest to the midpoint of projected build-out of the project). URBEMIS 7G for Windows provides the following default years: 2000, 2001, 2002, 2003, 2004, 2005, 2010, 2015, and 2020. If projected emissions exceed thresholds for any analysis year, the impact is considered to be significant and a full analysis is required.

[49] The SPAL levels for industrial sources are based only on indirect source emissions. Emissions from SJVAPCD regulated stationary sources are not included.

If there is a possibility that the project will result in a substantial increase in traffic congestion, it should be screened for potential CO hot spots using the CO Protocol[50] described in section 5.6.3 of this document. The area around the project site should be examined for the presence of potential toxic pollution sources and odor sources. When analyzing industrial projects, the impacts of potential toxic emissions and odors on any sensitive receptors near the project site must be identified. Applicants for any project that includes demolition or renovation of existing buildings need to contact the SJVAPCD's Asbestos Coordinators at the appropriate SJVAPCD regional office.

The SJVAPCD recommends that the results of the cursory analysis be presented in an air quality report that would be included in the environmental documentation supporting the negative declaration. The air quality report should include a brief air quality setting, the emissions analysis results, results of other air analyses, and a description of mitigation measures used to reduce the project's emissions. Provide either full documentation of calculations with justification of mitigation measures used when using manual method of quantification or an URBEMIS 7G for Windows detailed printout with descriptions of any modifications to URBEMIS 7G for Windows defaults (with justification for reduction amount).

Full Analysis Level (FAL). If the cursory analysis demonstrates that projected emissions from a project will be greater than the SJVAPCD's thresholds after mitigation or the project is of such magnitude that the ozone precursor thresholds would be obviously exceeded, a full analysis should be prepared. A full analysis will consist of the information applicable to the cursory analysis plus a thorough discussion of the air quality impacts and air quality environmental setting, as described in Section 5.4 of this document. Projects found to exceed CO screening thresholds may also require CO hotspot analysis using the CALINE4 dispersion model[51]. Projects containing toxic emission sources and those projects potentially exposed to toxic emissions may require a toxics risk assessment. Risk assessments require dispersion modeling to determine cancer risk for the nearest exposed individual. Procedures for addressing toxic air contaminants and hazardous air pollutants are found later in this section.

5.4 ENVIRONMENTAL SETTING

One purpose of CEQA is to publicly disclose all environmental effects of a project, so the public is informed, and decision-makers make decisions based on a thorough understanding of a project's impacts. Information such as environmental setting, existing air quality conditions, regulatory setting, etc. are important in fulfilling this "spirit" of CEQA. The public deserves to understand the air quality implications of all projects approved in this air basin.

[50] See footnote 45
[51] Available at Caltrans' website (http://www.dot.ca.gov/hq/env/air/extsoft.htm)

Setting for Full Analysis Level (FAL) Projects. Lead Agencies should prepare a full air quality analysis for all projects determined to either obviously exceed SJVAPCD thresholds for significant air quality impacts or found to exceed the thresholds during cursory analysis and that cannot mitigate air quality impacts to less than significant levels. A Full Analysis Level report should contain the information described above for a Cursory Analysis Level report plus the environmental setting information described below.

- **Climate and Topography**. Provide a description of the influence of climate and topography on a project's impacts on local and regional air quality. A sample description of the SJVAB's climate and topography is located in the Technical Document and may be used as a basis in EIRs prepared for any project in the SJVAPCD.

- **Regulatory Environment**. Describe the regulatory requirements in the SJVAPCD. A sample description of the regulatory environment is located in the Technical Document. EIRs or MNDs with a full analysis should use this information.

- **Prevention of Significant Deterioration (PSD) Consideration.** The analysis should place special emphasis on air quality resources that are rare or unique to the region and would be affected by the project[52]. Regulatory requirements identify areas that are pristine and classified as Class I airsheds. These airsheds are subject to specific standards, e.g. Prevention of Significant Deterioration[53] requirements. Within the SJVAPCD, the Kings Canyon and Sequoia National Parks and Ansel Adams, Kaiser, John Muir, and Domeland Wilderness Areas are Class I areas. Any project proposed in the vicinity of one of these areas should note its proximity to a Class I area in the description of the project setting.

- **Air Quality Standards.** Identify state and federal AAQS for all criteria pollutants. Provide the air quality attainment status for the criteria pollutants. This data can be found in the Technical Document.

- **Ambient Air Quality.** Summarize ambient air quality, including data for at least the last three years from the air quality monitoring station(s) closest to the project site. The setting should also include basin-wide data for ozone given its regional characteristics. A sample description of existing air quality conditions is located in the Technical Document. The Technical Document also provides ambient air quality monitoring data. A Lead Agency should follow the sample format, utilizing data from the nearest monitoring station(s) as appropriate.

- **Existing Emissions.** Describe any existing emissions from the project site, if applicable. Existing emissions can be quantified using URBEMIS 7G for Windows or

[52] CCR §15125 (a)
[53] Code of Federal Regulations (40CFR 52.21)

with manual methods described later in this section. Include any SJVAPCD permitted stationary sources of emissions that are being eliminated.

- **Sensitive Receptors.** Identify any sensitive receptors located near the project site. For CEQA purposes, a sensitive receptor is generically defined as a location where human populations, especially children, seniors, and sick persons are found, and there is reasonable expectation of continuous human exposure according to the averaging period for the AAQS (e.g., 24-hour, 8-hour, 1-hour). These typically include residences, hospitals, and schools. Locations of sensitive receptors may or may not correspond with the location of the maximum off-site concentration. The location of sensitive receptors should be explained in terms that demonstrate the relationship between the project site and potential air quality impacts (e.g., proximity, topography, or upwind or downwind location).

  The analysis should also identify reasonably foreseeable sensitive receptors. This would include future receptors if development is pending, as well as potential receptors that could reasonably be sited nearby based on permitted zoning or land use designations. Land uses in the vicinity of the project site should be extensively described in the Land Use Section of an EIR. If no sensitive receptors are in the project vicinity, the Land Use Section may be referenced with an appropriate reference to the lack of sensitive receptors. If sensitive receptors are in the project vicinity, the Land Use Section may also be referenced, but the description of any sensitive receptors should be expanded upon as necessary for air quality impact analysis purposes.

- **Sources of Air Pollutants in Project Vicinity.** Identify sources of air pollutants on or near the project site. The description of existing air pollution sources should include criteria pollutants, toxic air contaminants, and nuisance emissions such as odors and dust. More detailed information regarding existing emissions, including emissions of odors and toxic air contaminants, may be obtained by contacting the SJVAPCD.

- **Transportation System.** Describe the transportation system serving the project site. Discuss traffic conditions, including traffic volumes and levels of service; transit service; and other relevant transportation facilities such as bicycle facilities, shuttle services, telecommuting centers, etc. The discussion of the existing transportation system should describe both current conditions and future conditions with the project. Much of this information may be located in the Traffic and Circulation section of the EIR (or Initial Study). Many EIR traffic and circulation sections, however, do not adequately describe bicycle facilities, telecommuting centers, and other alternative transportation forms. The traffic and circulation information may be referenced and/or summarized, but any additional information relative to non-motorized trip reduction alternatives not discussed should be described as necessary and appropriate for the project in the air quality setting.

5.5 EVALUATING CONSTRUCTION EMISSIONS

The SJVAPCD recommends separating emissions occurring in the construction phase of a project from emissions occurring in the operational phase for analysis purposes. The reason for this separation is that construction produces only temporary impacts while the operational phase will produce emissions indefinitely into the future. Although construction activities can produce substantial emissions and can represent a significant air quality impact, the effect is not permanent.

Types of Construction Emissions. Construction-related emissions come from a variety of activities including:

1) grading, excavation, road building, and other earth moving activities;

2) travel by construction equipment, especially on unpaved surfaces;

3) exhaust from construction equipment;

4) architectural coatings; and

5) asphalt paving.

Demolition and renovation of buildings also generate PM-10 emissions, and is of particular concern if the building(s) contain any asbestos-bearing materials[54]. Off-road construction equipment is often diesel powered and can be a substantial source of NOx emissions.

Evaluating PM-10 Emissions from Construction. PM-10 emissions from construction activity can vary considerably depending on factors such as the level of activity, the specific operations taking place, and weather and soil conditions. The SJVAPCD emphasizes implementation of effective and comprehensive control measures rather than detailed quantification of construction emissions. The SJVAPCD recommends that Lead Agencies consider the size of the construction area and the nature of the activities that will occur, and require the implementation of all feasible control measures (as indicated in Table 6-3).

PM-10 Emission Quantification. If a Lead Agency elects to quantify construction emissions, URBEMIS 7G for Windows can be used to quantify PM-10 emissions associated with grading and earthmoving. Manual calculation methods using generalized emission factors are available. Those wishing to manually calculate construction emissions should refer to the URBEMIS 7G for Windows Users Guide[55] or a report prepared under

[54] A CAL-OSHA qualified asbestos survey of the existing structure is required, prior to any renovation or demolition activity. If you have any questions concerning asbestos related requirements, please contact the SJVAPCD Asbestos Coordinator at the appropriate SJVAPCD Regional office (see Appendix B).

[55] Copies of URBEMIS 7G for Windows Users Guide and program can be obtained from ARB's website (http://www.arb.ca.gov/urbemis7/urbemis7.htm)

contract to the South Coast Air Quality Management District titled *Improvement of Specific Emission Factors (BACM Project No. 1), Final Report* by Midwest Research Institute, March 29, 1996. These factors may be used at a Lead Agency's discretion. The California Air Resources Board (ARB) indicates that these numbers will be incorporated into the U.S. Environmental Protection Agency's (EPA's) emission factors document Compilation of Air Pollutant Factors (AP-42).

Quantifying Demolition Emissions. Project construction sometimes involves the demolition of existing buildings. Demolition also produces PM-10 emissions. PM-10 emissions from demolition activities may be estimated using URBEMIS 7G for Windows. However, the Lead Agency can also manually quantify PM-10 emissions from demolition using the following emission factor: 0.00042 lbs. PM-10 per cubic feet of building volume.[56]

An important note is that buildings often include building materials containing asbestos. Airborne asbestos fibers pose a serious health threat if adequate control techniques are not carried out when the material is disturbed. The demolition or renovation of asbestos-containing building materials is subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations as listed in the Code of Federal Regulations[57] requiring notification and inspection. Most demolitions and many renovations are subject to a CAL-OSHA Certified asbestos inspection prior to start of activity. The SJVAPCD's Asbestos Coordinator in the appropriate region should be consulted prior to commencing demolition or renovation of any building to determine inspection and compliance requirements.

Analyzing ROG and NOx Emissions from Construction Equipment. Very large construction projects may exceed the annual thresholds for ROG and NOx emissions. The SJVAPCD will recommend quantification methods for these projects on a case by case basis. In some cases, URBEMIS 7G for Windows may be used to estimate the emissions. Complex projects may require the use of specific emission factors available from the SJVAPCD.

5.6 EVALUATING EMISSIONS FROM PROJECT OPERATIONS

Project operations refer to activities that will occur at a project site when construction is complete and the site has been occupied with its intended use. Emissions from project operations can be divided into three main categories: indirect sources; area sources; and stationary sources. Indirect sources are defined as any building, facility, structure, or property that attracts or generates mobile source activity (autos and trucks). This includes shopping centers, employment sites, schools, housing developments, etc. Area sources are sources that individually emit small quantities of air pollutants, but which cumulatively may represent significant quantities of emissions. Water heaters, fireplaces, wood heaters,

[56] South Coast Air Quality Management District, *CEQA Air Quality Handbook*, April 1993.
[57] 40CFR Part 61, Subpart M

lawn maintenance equipment, and application of paints and lacquers are examples of area source emissions. Stationary or point sources are equipment or devices operating at industrial and commercial facilities that directly emit air pollutants. Examples of facilities with stationary sources include manufacturing plants, oil refineries, sand and gravel operations, print shops, and gasoline stations.

Air quality impact assessments should evaluate all three categories of emissions when determining impacts from project operations. This section describes methods recommended by the SJVAPCD to accomplish this task. In addition, this section discusses procedures for evaluating impacts related to odor problems, emissions of toxic air contaminants, and accidental releases of hazardous/toxic materials

5.6.1 Calculating Area Source Emissions

The SJVAPCD recommends that URBEMIS 7G for Windows be used to calculate area source emissions. The program allows you to estimate area-source emissions for natural gas fuel consumption from space and water heating, wood stove and fireplace combustion emissions, landscape maintenance equipment, and consumer products. Consumer products, includes only reactive organic compound emissions released through the use of products such as hair sprays and deodorants. Due to the seasonal nature of fireplace and wood stove emissions, they should not be used in determining if a project will exceed ozone precursor thresholds.

The URBEMIS 7G for Windows program provides default assumptions for evaluating area source emissions for projects in the San Joaquin Valley. When the Lead Agency or consultant uses values other than default values, the air quality report should justify the assumptions.

5.6.2 Calculating Mobile Source Emissions

As noted above, virtually all land use development projects result in indirect source emissions due to the motor vehicle trips generated by the project. The following discussion describes how to calculate these emissions.

URBEMIS 7G for Windows. The SJVAPCD recommends using the program URBEMIS 7G for Windows for calculating indirect emissions from most development projects. The exceptions are general plan updates, large specific plans, and large general plan amendments, for which the analysis methods are described later in this section. URBEMIS 7G for Windows provides a reasonable estimate of project emissions considering the complexity of the factors affecting mobile source emissions. URBEMIS 7G for Windows can be run on any Windows™ 3.x/9x (it will not currently work with Windows NT). URBEMIS 7G for Windows uses EMFAC7G emission factors and Institute of Transportation Engineers (ITE) and San Diego Association of Governments trip generation rates. The program provides default values for all modeling parameters. Some of the

parameters are specific to several regions within California, including the San Joaquin Valley. However, where project-specific values for parameters, including trip generation, trip length, trip speed, vehicle fleet mix, percentage of cold starts, and temperature, are available they should be used. The source(s) of any project-specific data should be described and fully supported. The user may use the default values if project specific values are not available.

URBEMIS 7G for Windows calculates emissions of reactive organic gases (ROG), nitrogen oxides (NOx), carbon monoxide (CO) and respirable particulate matter (PM-10) and provides results either in pounds per day (summer or winter) or tons per year. Whereas the SJVAPCD's Thresholds of Significance are in tons per year, the District recommends any URBEMIS 7G for Windows' air quality analysis report be submitted in tons per year.

Because URBEMIS 7G for Windows includes more current emission factors (EMFAC7G), as well as other improvements, older versions of URBEMIS should not be used to estimate mobile source emissions. A new version of URBEMIS using EMFAC2000/2001 emission factors is under development. The SJVAPCD recommends using the newest version available. Consult the SJVAPCD web site or contact a SJVAPCD CEQA representative to determine the current version.

- **URBEMIS 7G for Windows - Mobile Source Emission Factors.** The source of emission factors for most California motor vehicle emission models is the ARB program EMFAC. EMFAC calculates vehicle emissions based on average emissions per each vehicle type (light duty passenger cars, light duty trucks, medium duty trucks, heavy-duty diesel, etc.), vehicle speed, starting conditions, temperature, year, and other factors. EMFAC generates an output in grams per mile of the various pollutants. The output can then be used in other models such as URBEMIS and DTIM or in manual calculations to arrive at project level emissions. ARB periodically revises EMFAC. At the time of this writing, the most current version is EMFAC7G.

- **URBEMIS 7G for Windows - Default Assumptions for Emission Calculations.** Calculations of mobile source emissions are dependent on a large number of variables, **but there are several that are critical**. These variables are trip length, average speed, and trip generation rates. Another variable, vehicle fleet mix, is important for projects that may have a larger or smaller share of truck traffic than average. URBEMIS 7G for Windows contains default values for these variables, but they are very general. The defaults may be used; however, the SJVAPCD encourages the use of project specific data whenever available. Typically, this information can be found in the results of project specific traffic studies. Often, shopping center developers have trip generation data and trip length estimates based on data collected from similar centers within the city or region that are superior to default values. When the Lead Agency or consultant uses other than default values, the air quality report should justify the assumptions.

- **URBEMIS 7G for Windows - Accounting for Internal Trips.** Transportation analyses for projects consisting of two or more land uses often adjust the number of anticipated

new vehicle trips to account for internal trips. These adjustments (or "capture rates") reflect the fact that some trips at multi-use projects will occur internally to the project. As a result, the total number of new vehicle trips associated with the project would be less than the sum of the trips expected from all of the individual land uses. URBEMIS 7G for Windows contains a new component that accounts for internal trips and allows the user to change assumptions. Traffic studies for such projects may be used to identify internal trip capture rates. The air quality analysis should include a clear explanation of all capture rate assumptions unless the URBEMIS 7G for Windows default numbers are used.

- **URBEMIS 7G for Windows - Accounting for Pass-by Trips.** Traffic studies for commercial projects often distinguish between primary trips and pass-by and diverted linked trips.[58] The air quality analysis for such projects may include emission reductions from pass-by and diverted linked trips. The emissions from these trips will be lower than for primary trips (due to shorter trip lengths), so emissions are less. URBEMIS 7G for Windows contains a component that accounts for these emissions. Adjustments can be made to trip length and cold start/hot start assumptions for pass-by and diverted linked trips. Assumptions regarding pass-by and diverted linked trips should be clearly identified and the underlying rationale explained.

Manual Calculations. Mobile source emissions associated with land use development may also be calculated manually. Manual calculation, however, is not recommended by the SJVAPCD. Never the less, if the Lead Agency or applicant wishes to manually calculate such emissions, a methodology is available from the Bay Area Air Quality Management District[59]. For this manual calculation, it is necessary to provide the following inputs: trip generation rate, average trip length and emission factors (varying by average vehicle speed and analysis year). The Lead Agency or applicant should provide, for review by the SJVAPCD, thorough documentation and justification for all assumptions used in manual calculation.

5.6.3 Estimating Carbon Monoxide Concentrations

Emissions and ambient concentrations of carbon monoxide have decreased greatly in recent years. These improvements are due largely to the introduction of lower emitting motor vehicles and cleaner burning fuels. The last exceedance of either the state or national CO standard recorded at any of the SJVAB's monitoring stations was in 1991. At present, all areas within the SJVAPCD have attained the federal CO standard and are attainment or unclassified for the state CO standard.

[58] Primary trips are trips made specifically to visit a particular facility. Pass-by trips are trips made as intermediate stops on the way to a primary trip destination. Diverted linked trips are trips attracted from roadways near a facility, but which require a diversion from the roadway to another roadway to access the facility.

[59] Bay Area Air Quality Management District can be reached at (415) 771-6000 or http://www.baaqmd.gov/.

Reasons for CO Analysis. Despite the progress and success in achieving CO standards, localized CO concentrations still warrant concern in the SJV and should still be assessed in environmental documents. The reasons for this are twofold. First, state and federal laws require the SJVAB to attain and **maintain** ambient air quality standards. The SJVAPCD must ensure that increased motor vehicle use and congestion do not nullify the great strides that have been made with respect to ambient concentrations of CO. Secondly, the SJVAPCD must safeguard against localized high concentrations of CO that may expose nearby sensitive receptors but not be recorded at monitoring sites. Because elevated CO concentrations are often localized, heavy traffic volumes and congestion can lead to high levels of CO, or "hotspots", while concentrations at the closest air quality monitoring station may be below state and federal standards.

Determining Significance of CO Impacts.

- **Preliminary Screening.** Due to the fact that increased CO concentrations are usually associated with roadways that are congested and with heavy traffic volume, the District has established that preliminary screening can be used to determine with fair certainty that the effect a project has on any given intersection would not cause a potential CO hotspot. Therefore, the District has established that if neither of the following criteria are met at all intersections affected by the developmental project, the project can be said to have no potential to create a violation of the CO standard:

  - A traffic study for the project indicates that the Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or

  - A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at more or more intersections in the project vicinity.

  If either of the above criteria can be associated with any intersection affected by the project, the applicant/consultant would need to conduct a CO Protocol Analysis to determine significance.

- **CO Protocol Analysis.** Even if the two above criteria are met, the project's influence on any given intersection may still not create a violation of the CO health standard thereby showing a significant effect on the air quality of the area. Prior to conducting a full CO air quality model, the effect of the project can still be determined to be less-than-significant by conducting an analysis using a protocol developed by the Institute of Transportation Studies at University of California, Davis[60] entitled Transportation Project-Level Carbon Monoxide Protocol. This is a project-level protocol for use by agencies to evaluate the potential local level CO impacts of a project. If the results of this analysis demonstrate no potential for significance, the Lead Agency should include

[60] Copies of the Protocol can be obtained by calling the Institute of Transportation Studies at UC Davis at (916) 752-6548 or on Caltrans' Air Quality website at http://www.dot.ca.gov/hq/env/air/extsoft.htm

a description of the Protocol Analysis results in a report to the District. If the results demonstrate that the project will potentially have a significant effect on any intersection, the Lead Agency should conduct a CO dispersion modeling study such as CALINE4[61].

- **Using CALINE4.** The SJVAPCD recommends using the CALINE4 dispersion model to estimate local CO concentrations resulting from motor vehicle emissions. CALINE4 was developed by Caltrans and is available from Caltrans and the SJVAPCD regional offices.

  The estimated CO concentrations from CALINE4 runs should be compared to state and federal CO standards to determine whether the project would have a significant air quality impact. If the results indicate CO concentrations below the standards, then no further CO analysis is required. If the results predict concentrations above the standards, the Lead Agency should make a finding of a significant impact unless mitigation measures can be implemented that reduce concentrations to meet the standards. The effectiveness of any proposed mitigation measure(s) should be quantified by estimating the effects of the measure(s) on traffic volumes and/or speeds, and then remodeling CO concentrations with CALINE4.

  The Lead Agency or consultant should check with Caltrans and the local Regional Transportation Planning Agency[62] to determine if CO modeling has already been accomplished for intersections impacted by the project. CO modeling may have been done for a highway expansion or plan amendment that includes the project.

5.7 EVALUATING ODOR IMPACTS

An analysis of potential odor impacts should be conducted for both of the following situations: 1) a potential source of objectionable odors is proposed for a location near existing sensitive receptors, *and* 2) sensitive receptors are proposed to be located near an existing source of objectionable odors. Section 4 of this GAMAQI discusses thresholds of significance for odor impacts.

Basis for Evaluating Odor Impacts. The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptor(s). Therefore, to the extent feasible, the analysis of potential odor impacts should be based on SJVAPCD's experience and data regarding similar facilities in similar settings. Lead Agencies should contact the SJVAPCD's Compliance Division for information regarding specific facilities and categories of facilities, and associated odor complaint records. It is also necessary to

[61] Also available on Caltrans' Air Quality website at http://www.dot.ca.gov/hq/env/air/extsoft.htm
[62] A list of local Regional Transportation Agency's addresses and phone numbers are included in the Technical Document.

contact the local county Environmental Health Department to identify odor complaints filed with those agencies.

Criteria for Detailed Odor Analysis. The Lead Agency should prepare a more detailed analysis for any project that would result in an odor source and sensitive receptors being located closer to one another than the distances indicated in Table 4-2. When projects trigger the screening level distances in Table 4-2, the Lead Agency or consultant should contact the SJVAPCD's Compliance Division for information regarding odor complaints. For projects involving a new receptor being located near an existing odor source(s), the SJVAPCD's Compliance Division at the appropriate regional office should be contacted. The Compliance Division will provide information on odor complaints logged for the facility(ies) for the previous three years. Odor complaints should be mapped in relation to the odor source to establish a general boundary of any existing impacts.[63] The location of the proposed project should be identified.

For projects involving new receptors locating near an existing odor source where there is currently no nearby development and for new odor sources locating near existing receptors, the analysis should be based on a review of odor complaints for similar facilities.

In assessing potential odor impacts, consideration also should be given to local meteorological conditions, particularly the intensity and direction of prevailing winds. Local meteorological data can be obtained from the Internet at the National Weather Service at Hanford's web site. This can be found at: http://nimbo.wrh.noaa.gov/hanford/. As stated in Section 4, prevailing wind does not eliminate the possibility of significant odor impacts in upwind areas. The Lead Agency should evaluate the type of odor source and whether it is particularly objectionable to people.

5.8 EVALUATING IMPACTS OF HAZARDOUS AIR POLLUTANTS

The SJVAPCD limits emissions of and public exposure to hazardous air pollutants (HAPs)[64] through a number of programs. The potential for HAP emissions from new and modified stationary sources is reviewed by the SJVAPCD's Permit Services Division which implements the SJVAPCD's Risk Management Policy via the SJVAPCD's permitting process for stationary sources. Examples of sources requiring SJVAPCD permits are listed in Figure 1-2. HAP emissions from existing sources are limited by:

1) SJVAPCD adoption and enforcement of rules aimed at specific types of sources known to emit high levels of HAPs;

[63]Due to confidentiality requirements regarding odor complaints, the name of the complainant, date of complaint, and specific address of the complainant will not be provided. Location will be identified only by block.

[64]HAPs are also referred to in some documents and/or sources as HAZs or as Toxic Air Contaminants (TACs).

2) implementation of the Air Toxics "Hot Spots" (AB 2588) Program; and
3) implementation of the federal Title III Toxics program.

Procedures for Evaluating HAPs. When evaluating potential impacts related to HAPs, Lead Agencies should consider both of the following situations:

1) a new or modified source of HAPs is proposed for a location near an existing residential area or other sensitive receptor, and
2) a residential development or other sensitive receptor is proposed for a site near an existing source of HAPs.

For the first scenario, a source of HAPs proposed near receptors, the Lead Agency should consult with the SJVAPCD's CEQA Section for information regarding anticipated HAP emissions, potential health impacts, and control measures. Preparation of the environmental document should be closely coordinated with the SJVAPCD review of the facility's permit application when timing allows.

For the second scenario, sensitive receptors locating near sources of HAPs, the Lead Agency should consult with the SJVAPCD's CEQA Section to review information gathered pursuant to the AB 2588 Program[65]. As discussed in Section 4, the District's policies and regulations for implementing AB 2588 designate facilities as significant when they have a carcinogenic risk in excess of 10 in one million or a non-cancer risk Hazard Index of greater than one (if prescribed so by California's Office of Environmental Health Hazard Assessment).

The SJVAPCD is prioritizing these facilities based on the quantity and toxicity of the emissions, and their proximity to areas where the public may be exposed. Facilities put in the significant risk category are required to prepare a comprehensive, facility-wide health risk assessment. The Lead Agency should review the comprehensive health risk assessments for facilities subject to AB 2588 on file at the SJVAPCD offices. For facilities that risk assessments have been conducted, these assessments may be used to identify an area around the facility within which individuals would be exposed to cancer or non-cancer risks that would be identified as significant impacts. For facilities for which risk assessments have not been conducted, the SJVAPCD's Permit Services Section should be consulted to determine whether location of nearby sensitive receptors would alter the status of the facility with respect to AB 2588 (that is, cause the facility to become "high priority" and therefore trigger a risk assessment requirement).

5.9 EVALUATING CUMULATIVE AIR QUALITY IMPACTS

CEQA defines cumulative impacts as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant

[65] Air Toxics "Hot Spots" Information and Assessment Act of 1987

projects[66]. An adequate cumulative impact analysis considers a project over time and in conjunction with other related past, present, and reasonably foreseeable future projects whose impacts might compound or interrelate with those of the project being assessed. The following describes SJVAPCD recommended procedures for fulfilling these requirements.

Evaluating Cumulative Ozone Impacts. Ozone impacts are the result of the cumulative emissions from numerous sources in the region and transport from outside the region. Ozone is formed in chemical reactions involving ROG, NOx, and sunlight. All but the largest individual sources emit ROG and NOx in amounts too small to have a measurable effect on ambient ozone concentrations by themselves. However, when all sources throughout the region are combined, they result in severe ozone problems. Lead Agencies should use the quantification methods described in Section 4 to determine if ROG or NOx emissions exceed SJVAPCD thresholds.

Evaluating Cumulative PM-10 Impacts. PM-10 has a similar cumulative regional emphasis when particulates are entrained into the atmosphere and build to unhealthful levels over time. PM-10, however, has the potential to cause significant local problems during periods of dry conditions accompanied by high winds, and during periods of heavy earth disturbing activities. PM-10 may have cumulative local impacts, if for example, several unrelated grading or earth moving projects are underway simultaneously at nearby sites. The SJVAPCD does not currently recommend a quantitative analysis of PM-10 emissions. For cumulative analysis, Lead Agencies should examine the potential PM-10 exposure to sensitive receptors near the project site from earth disturbing activities from the current project and any nearby projects that may occur at the same time. If it appears that the level of activity may cause an adverse impact, the Lead Agency should require the enhanced dust control measures listed in Section 6 to reduce the impact to less than significant levels.

Evaluating Cumulative CO Impacts. Cumulative carbon monoxide impacts are accounted for in the CO hotspot analysis described earlier in this section. The CALINE4 model uses background concentrations that include CO contributions from other sources. Traffic levels used in the model should include all reasonably foreseeable projects that will contribute traffic to the intersections and road segments being analyzed.

Evaluating Cumulative Hazardous Air Pollutant (HAP) Impacts. Cumulative analysis for HAPs focuses on local impacts on sensitive receptors. A single source of HAPs may be insignificant, but when combined with emissions from neighboring sources could expose sensitive receptors to significant pollutant levels. Cumulative analysis of HAPs can be accomplished by identifying all sources of these pollutants near the project site and using a dispersion model to determine exposure levels from the combined emissions of all sources. The SJVAPCD recommends a radius of 1 mile for HAP screening. Dispersion modeling, if indicated by initial screening, should include existing sources, the project, and any reasonably foreseeable projects.

[66] CCR §15355

5.10 SPECIAL ANALYSIS REQUIREMENTS FOR GENERAL PLANS AND LARGE SPECIFIC PLANS

Very large projects present unique challenges for assessing air quality impacts. General plans and large specific plans often cover 20 years or more development. These plans nearly always include a full range of land uses and densities to accommodate all types of new development. Although they identify land uses, typically a number of different uses are permitted by a single designation. The implication of this is that project level modeling is not effective except for the smallest, slowest growing communities. In addition, impacts tend to be regional in scope.

General plan updates and large specific plans nearly always require the Lead Agency to prepare an EIR. Because of the San Joaquin Valley's nonattainment status and the cumulative impacts of growth on air quality, these plans almost always have significant, unavoidable adverse air quality impacts. The analysis described for the Full Analysis Level (FAL) covers most requirements with the following exceptions:

Modeling for Large Projects. Modeling for general plans and large specific plans will vary depending on the size of the community and the scope of the changes proposed in the plans. The SJVAPCD recommends that communities that have a working transportation model use DTIM to estimate ozone precursor emissions. To the extent possible, the modeling assumptions used should be consistent with runs accomplished for demonstrating Transportation Conformity. The ARB mobile emission inventory model MVEI7G can be used in place of DTIM in jurisdictions that do not have access to DTIM. Results of a traffic study, assuming one is prepared, should be used to identify intersections and corridors requiring CO hot spot analysis. Locations predicted by the traffic model to experience high levels of traffic congestion should be modeled using the dispersion model CALINE4. The URBEMIS 7G for Windows program should only be used for minor general plan updates/amendments and small specific plans with a limited number of different uses.

Manual Quantification Methods. Communities without access to a transportation model may estimate increases in motor vehicle related ozone precursor emissions with manual calculations. A per capita emission factor based on average vehicle use and composite vehicle fleet emissions can be multiplied by the projected population increase accommodated by the plan. Similarly, a per capita or per dwelling unit emission factors can be used to quantify area source emissions (i.e., natural gas combustion for heating, and landscape maintenance equipment, etc.). The URBEMIS 7G for Windows area source component may be used for area source emissions. Although most small SJV communities do not experience traffic congestion to the extent that would cause a CO hot spot, CALINE4 may be used if the screening criteria listed in Section 5.5 are triggered.

SECTION 6 – MITIGATING AIR QUALITY IMPACTS

6.1 INTRODUCTION

CEQA requires Lead Agencies to mitigate or avoid significant environmental impacts associated with discretionary projects[67]. Environmental documents for projects that have any significant environmental impacts must identify feasible mitigation measures or alternatives to reduce the impacts below a level of significance. If after the identification of all feasible mitigation measures, a project is still deemed to have significant environmental impacts, the Lead Agency can approve a project, but must adopt a Statement of Overriding Consideration[68] to explain why further mitigation measures are not feasible and why approval of a project with significant unavoidable impacts is warranted. This section describes what the SJVAPCD considers to be feasible mitigation in light of existing regulations and research. The SJVAPCD recognizes that the final determination of feasibility will fall to the Lead Agency.

Section Organization. This section is organized as follows: First, it describes the feasible measures available for Lead Agencies to mitigate or eliminate air quality impacts. After identifying the measures, guidance is provided for evaluating their effectiveness. The section starts with large-scale, plan level mitigation and then moves to project level mitigation. The project level discussion is organized by the type of impact being mitigated:

- Mitigating Construction Impacts;
- Mitigating Impacts of Motor Vehicle Use Related to Projects;
- Mitigating Impacts from Area Sources;
- Mitigating Impacts from Hazardous Air Pollutants;
- Mitigating Odor Impacts.

Reason for Air Quality Mitigation. In addition to CEQA requirements, mitigation of impacts is needed to achieve federal and state air quality standards. All incremental emission sources, including those associated with land development, must be mitigated to the greatest extent possible in order to achieve and maintain ambient air quality standards.

[67] PRC §21002.1(b)
[68] CCR §15093

6.2 SELECTING APPROPRIATE MITIGATION MEASURES

Mitigation Measure Criteria. Air quality mitigation measures must, by definition, go beyond existing regulations. Regulatory programs are in place at the federal, state, and air district level to reduce air pollutant emissions from nearly all sources, yet they are not always sufficient to eliminate all air quality impacts. For example, the ARB motor vehicle program has dramatically reduced average tailpipe emissions from the vehicle fleet. However, motor vehicle emissions will be a major source of SJV pollution problems in the foreseeable future due to growth in the number of vehicles and in miles traveled.

The SJVAPCD advocates the following criteria for selecting appropriate air quality mitigation measures:

Criteria required by CEQA:

- Mitigation shall be enforceable by permit conditions, legally binding agreements, or other measures[69];
- Mitigation measures shall be capable of being monitored and enforced;

Recommended criteria:

- Mitigation measures should coincide with the level and timing of an impact;
- The agency responsible should have adequate resources to implement the mitigation;
- Mitigation measures should be carried out within a reasonable period. Mitigation measures taking more than five years should contain interim targets;
- Mitigation measure benefits should be quantified when methods acceptable to the SJVAPCD are available.

Selecting mitigation measures appropriate for a particular project can be a complex task. The complexity arises from several factors. CEQA applies to a wide variety of projects. Complete general plan updates covering thousands of acres are discretionary projects and so are parcel maps and even site plans in some jurisdictions. The general plan often only identifies the eventual use of a parcel of land in vague terms. The site plan review may occur too late in the process and affect too small of an area to allow effective mitigation measures to be identified. In addition, differences in conditions at a site greatly influence the effectiveness of mitigation measures. The overall approach recommended by the SJVAPCD is to use policy statements, design standards, and community-wide programs at the general plan/specific plan level, and site specific measures when the site specific uses are proposed.

Table 6-1 lists mitigation strategies by project type. The list illustrates the level of specificity needed at each phase of the development approval process.

[69] PRC §21081.6

Table 6-1
Mitigation Measures By Project Type

Project	Impact	Mitigation
General plan updates, large specific plans, new towns	Regional ozone impact, PM-10 impact, CO hot spots, toxic air emissions, odors	. Adopt air quality element/general plan air quality policies/specific plan policies . Adopt Air Quality Mitigation Fee Program[70] . Fund TCM[71] program: transit, bicycle, pedestrian, traffic flow improvements, transportation system management, rideshare, telecommuting, video-conferencing, etc. . Adopt air quality enhancing design guidelines/standards . Designate pedestrian/transit oriented development areas on general plan/specific plan/ planned development land use maps . Adopt ordinance limiting woodburning appliances/fireplace installations[72] . Fugitive dust regulation enforcement coordinated with SJVAPCD . Energy efficiency incentive programs . Local alternative fuels programs . Coordinate location of land uses to separate odor generators and sensitive receptors
General plan amendments, small specific plans, and some zone changes	Potential regional ozone impact, cumulative impacts, CO hot spots, toxic air emissions, odors	. Apply general plan policies, local ordinances, and programs from above to the project site or adopt similar site specific programs . Restrict residential traditional wood fireplaces, install natural gas fireplaces or inserts . Provide pedestrian/transit oriented project design . Contribute to Air Quality Mitigation Fee Fund . Contribute towards TCM implementation programs . Commit to on-site improvements; bikeways, transit infrastructure, pedestrian enhancements . Provide traffic flow improvements for areas impacted by the project

[70] The City of Stockton and the City of Turlock have adopted air quality mitigation fee programs
[71] Transportation Control Measures (TCMs) are programs and actions that are established for the purpose of reducing mobile source emission levels, through reducing the activity level of vehicles.
[72] Ordinances related to residential heating should emphasize elimination of fireplaces in new residences or requiring natural gas heating, rather than wood heating devices. Natural gas fired fireplaces can reduce emissions of PM-10 and CO as much as 99%, when compared to traditional open-hearth wood fireplaces. If wood heating is necessary, EPA certified pellet stoves/inserts are preferred over fireplaces or even conventional wood stoves. An EPA certified pellet stove/insert could reduce emissions of PM-10 and CO as much as 88%, when compared to traditional open-hearth wood fireplaces.

Table 6-1
Mitigation Measures by Project Type (cont.)

Project	Impact	Mitigation
Tentative maps, site plans, conditional use permits	Cumulative ozone impacts, CO, toxic air emissions, odors	. Apply general plan policies and local ordinances and programs from above to the project site . Pedestrian/Transit oriented site design . Provide on-site improvement: bikeways, transit infrastructure, pedestrian enhancements . Contribute to Air Quality Mitigation Fee Fund . Contribute to TCM implementation . Energy conservation measures above and beyond requirements . Require residences to install natural gas fireplaces or inserts in lieu of traditional open-hearth wood fireplaces[73] . Pay for fleet vehicle conversions to alternative fuels

6.3 MITIGATING PLAN LEVEL AIR QUALITY IMPACTS

Agencies preparing new or updated plans for their communities have special responsibilities for mitigating air quality impacts. Large scale plans and policy documents often set the pattern of new development for the next twenty or more years. Land use patterns can be laid out in ways that produce more or less air pollution. Policies can be set in motion that encourage or discourage air quality friendly development. The SJVAPCD encourages local agencies to view their general plans, community plans, and specific plans as opportunities to improve the Valley's air quality.

Policy as Air Quality Mitigation. The SJVAPCD's *Air Quality Guidelines for General Plans (*AQGGP) sets forth goals, policies, and implementation strategies for use in land use planning documents. The document provides seventy-seven policies that directly and indirectly benefit air quality. Its emphasis is on cities and counties developing a comprehensive approach to air quality that targets new growth areas, redevelopment areas, and programs that reach the entire community. The general plan is the "constitution" for local development, and, as such, provides a framework for deciding the way development will occur.

The SJVAPCD recommends that cities and counties incorporate as many air quality policies from the AQGGP as possible into their general plans, community plans, and specific plans to ensure that development occurs in ways that produce fewer air quality

[73] See note, previous page

impacts. To the extent that cities and counties can implement policies that make their communities more transit-, bicycle-, and pedestrian-friendly, and avoid land use conflicts that lead to toxics and nuisance problems, they can minimize the need to mitigate air quality impacts of individual development proposals. The strategies recommended by the AQGGP are summarized as follows:

- A commitment to determine and mitigate project level and cumulative air quality impacts under the California Environmental Quality Act (CEQA);
- A commitment to integrate land use plans, transportation plans, and air quality plans;
- A commitment to plan land uses in ways that support a multi-modal transportation system;
- A commitment to take local action to support programs that reduce congestion and vehicle trips;
- A commitment to plan land uses to minimize exposure to toxic air pollutant emissions from industrial and other sources;
- A commitment to reduce particulate emissions from sources under local jurisdiction;
- A commitment of support for Air District and public utility programs to reduce emissions from energy consumption and area sources (water heaters, woodstoves, fireplaces, barbecues, etc.).

Policy will do nothing to improve air quality unless it is effectively implemented. Policies promoting land use and design measures are most effective if implemented community-wide, or even at the subregional, level. Issues such as allowable land use densities, mixing of land uses, street standards, parking requirements, etc. are most appropriately addressed throughout the entire community or sub-region. Implementing mechanisms such as zoning ordinances, parking standards, and design guidelines, may need to be revised to address these issues. Implementation of these strategies on an individual project basis can still be beneficial, even absent a community-wide strategy, but the benefits will be greater if implemented broadly.

6.4 SJVAPCD SUPPORT FOR LAND USE STRATEGIES

By far the largest air quality impact of plan implementation is related to growth in motor vehicle use. Typically, motor vehicle emissions account for 90 percent or more of total emissions attributable to new commercial and residential projects. This being the case, mitigation measures should emphasize strategies that reduce growth in this emission source. There are four primary ways to reduce motor vehicle emissions:

1) Shift travel from single-occupant automobiles to less-polluting or non-polluting modes such as transit, carpools, bicycling, and walking;

2) Eliminate the need for trips and reduce the distances traveled through the design, mix, and location of land uses and roads;

3) Change to vehicles using cleaner burning fuels; and

4) Improve traffic flow.[74]

There is increasing recognition that land use pattern and site design are critical to the success of measures implementing the first two strategies.

Why Land Use Strategies Work. Factors important for influencing travel mode selection and trip generation include the location, intensity, configuration, and design of land uses. Land use patterns typical of post-World War II developments have contributed to increased reliance on the automobile and therefore greater pollutant emissions. Characteristics that contribute to automobile dependency include: low residential and commercial densities, segregated land uses, and street and site design guided solely by the needs for automobile access. Traditional neighborhood designs, development patterns, and densities common before World War II have been found to generate fewer vehicle trips and miles traveled. New development patterns referred to as "neo-traditional" designs utilize many of the features of pre-World War II development integrated with current practices and preferences to attain a variety of transportation and other benefits.

Recent studies comparing trip generation and miles traveled in traditional neighborhood developments and current development patterns have shown substantial differences. Cervero's study[75] of Bay Area neighborhoods showed an overall 10 percent higher share of non-work trips by foot, bicycle, or transit in a mixed-use, pedestrian-oriented neighborhood when compared with a low density suburban neighborhood. Some of the factors thought to be responsible for this difference are described below.

- Residential and commercial developments must be of sufficient density to support transit service.

- Neighborhoods must be sufficiently "compact" to encourage walking and biking for errands, socializing, etc.

[74] Measures that improve traffic flow usually reduce local carbon monoxide levels and reactive organic gases; however, oxides of nitrogen emissions can increase with the greater vehicle speeds and traffic volume allowed by the flow improvement.

[75] Cervero, Robert and Radisch, Carolyn, *Travel Choices in Pedestrian Versus Automobile Oriented Neighborhoods*, Working Paper 644, Institute of Urban and Regional Development, University of California, Berkeley, July 1995.

- Houses, jobs, and services should be located close enough together to allow walking and biking for at least some trips.

- The circulation network and the design of individual streets should provide a safe and attractive environment for bicyclists and pedestrians.

- The designs of individual development projects should provide direct, safe, and attractive pedestrian access to transit stops and nearby development.

- The community should have a rough balance between the number of jobs and the number of employed residents.

Benefits of Incremental Improvements. Solutions do not necessarily have to occur on a grand scale. Incremental improvements can be made by actions as simple as including a neighborhood commercial center within a residential development, locating a child care center near a transit station, placing parking behind a commercial building, or providing sidewalks and benches in new subdivisions or commercial development. The SJVAPCD strongly encourages Lead Agencies and project proponents to take advantage of every opportunity to make development projects more pedestrian-, bicycle-, and transit-friendly.

Air Quality Design Guidelines. The SJVAPCD encourages cities and counties to adopt air quality friendly design guidelines as part of a general plan implementation strategy. Most current design practices can be improved upon. The SJVAPCD recommends the following websites to get ideas and concepts on what constitutes land use and design strategies that would be beneficial for air quality:

- The Center of Excellence for Sustainable Development (http://www.sustainable.doe.gov/)
- The Local Government Commission's Center for Livable Communities (http://www.lgc.org/clc/welcome.html)
- Walkable Communities, Inc. (http://www.walkable.org/)
- PLANetizen (http://216.103.50.149/planetizen/)

Design guidelines can be voluntary suggestions for developers or they can be standards adopted by ordinance that must be followed. The choice is up to the local jurisdiction. Numerous examples of design guidelines with air quality benefits are also available from California communities including Sacramento, San Diego, Modesto, and Merced. Contact the regional SJVAPCD CEQA representative for more information on design guidelines.

Other Benefits of Land Use Strategies. Improved coordination of land use and transportation planning and greater emphasis on making communities more transit-, bicycle- and pedestrian-friendly can reduce reliance on the automobile for all kinds of trips: trips to work, shopping, school, recreation, and personal business. Such strategies can result in many other benefits to the community as well, such as reduced traffic congestion,

energy conservation, preservation of open space, improved water quality (fewer contaminants in urban run-off), and more attractive, cohesive communities.

Transportation-Related Land Use Strategies. A study released by the ARB in June 1995 may be especially useful to Lead Agencies considering land use strategies to reduce air pollutant emissions. The report, prepared by JHK & Associates, is titled *Transportation-Related Land Use Strategies to Minimize Motor Vehicle Emissions: An Indirect Source Research Study*. Following are a number of land use strategies that the report explains can reduce motor vehicle use and emissions:

- Provide pedestrian facilities;
- Increase density near transit corridors;
- Increase density near transit stations;
- Encourage mixed-use development;
- Encourage infill and densification;
- Develop concentrated activity centers;
- Strengthen downtowns;
- Develop interconnected street network; and
- Provide strategic parking facilities.

The report provides estimates of the measures' effectiveness in reducing vehicle use and emissions in various types of communities (urban, suburban, and exurban). The estimated ranges of effectiveness are based on data from California communities. It is hoped that by identifying ranges of effectiveness for the land use measures, local officials will be able to set performance goals (e.g., vehicle trips or emissions per household) for their communities. The report recommends combinations of strategies to achieve the performance goals, and provides guidance on implementation mechanisms. One of the study's findings is that although it is difficult to quantify reductions in vehicle use and emissions from individual strategies applied at specific sites, combinations of strategies implemented community-wide can achieve significant reductions in vehicle use and emissions. The report is available from ARB's Transportation Strategies Group.

Reducing Land Use Conflicts. Land use considerations also can reduce air quality problems not related to motor vehicle use. By separating residential areas and other sensitive receptors from sources of odors, dust, and toxic air contaminants, health and nuisance impacts can be minimized. Buffer zones should always be provided between sensitive receptors and sources of odors, dust, and toxics.

6.4.1 Quantifying Plan Level Mitigation

Quantifying plan level mitigation measures is difficult, but possible. The most effective method to calculate mobile source reductions would be to use a mode split traffic model to show the difference in trips, vehicle miles traveled and emissions based on projected

increases in carpooling, transit, bicycling, and walking. Other regional traffic models without mode-split capability could be used by applying a straight trip or vehicle miles traveled (VMT) reduction percentage estimate to the modeling results. The emissions calculations for the different scenarios can be done with Caltrans' DTIM or ARB's MVEI7G.

The potential change in mode split, trips, and VMT is dependent on a number of factors. The extent of new development in transit and pedestrian oriented patterns, and the timing of buildout of the land uses and transportation system, are critical factors. As a community is built in these new patterns over time, a greater share of the population will be capable of using alternatives to the automobile. However, transportation infrastructure such as light rail will only become feasible when population and jobs-density at both ends of the line are high enough to produce reasonable ridership. So, in the early years, transit mode share would likely remain low, and in later years when the rail system comes on line, transit share would improve rapidly. On the other hand, pedestrian and bicycle trips are often shorter neighborhood trips. The benefits of pedestrian and bicycle-oriented development would therefore be realized when the neighborhood builds out. Since neighborhood commercial and institutional development that will attract pedestrian and bicycle trips typically follow residential construction, these mode shares will also be low in the early phases of development.

The benefits of community programs to reduce area source emissions from sources such as residential water and space heating, landscape maintenance, and woodburning can be quantified based on population growth projections and estimates of penetration of the programs. Emission factors for the standard equipment and devices and for less polluting alternatives can then be used to calculate emissions under the different scenarios. The URBEMIS 7G for Windows area source component contains many of these emission factors as well as mitigation measures quantified in terms of percent reduction.

The quantification methods for land use strategies and area source measures require the use of judgment in developing assumptions. As with any attempt to predict human behavior, absolute accuracy is not possible. Long term monitoring of program effectiveness is needed to enable course corrections should strategies be found less effective than predicted.

6.5 MITIGATING PROJECT LEVEL IMPACTS

For this discussion, the SJVAPCD considers a "project" to be a development proposal that is generally well defined as to final use and project design. However, there is no definitive line between plan and project. For example, in some cases, a developer will file a general plan amendment, zone change, and subdivision map or site plan simultaneously. In other cases, the general plan amendment is filed first and the other actions are filed later pending approval of the plan amendment. Some specific plans provide a high level of design detail and some land use approvals for individual parcels provide few details of the final use.

This being the case, mitigation measures for each project are best identified on a project by project basis.

This section provides separate discussions on mitigating temporary construction emissions and on indefinite operational emissions. The impacts during these two phases are quite different and so call for different mitigation solutions.

6.5.1 Mitigating Construction Impacts

Although the impacts from construction related air pollutant emissions are temporary in duration, such emissions can still represent a significant air quality impact. In some cases, construction impacts may represent the largest air quality impact associated with a proposed project. Construction activities such as grading, excavation, and travel on unpaved surfaces can generate substantial amounts of dust, and can lead to elevated concentrations of PM-10. Emissions from construction equipment engines also can contribute to elevated concentrations of PM-10 and CO, as well as increased emissions of ozone precursors.

Fugitive Dust Control Measures. Control measures for construction emissions of PM-10 are listed in Tables 6-2 and 6-3. Table 6-2 summarizes the requirements of a series of SJVAPCD rules known collectively as Regulation VIII. The purpose of Regulation VIII is to reduce the amount of PM-10 entrained into the atmosphere as a result of emissions generated from anthropogenic (man-made) fugitive dust sources. Compliance with Regulation VIII does not constitute mitigation because it is already required by law. Table 6-3 contains Enhanced and Additional Control Measures that will provide a greater degree of PM-10 reduction than Regulation VIII. The SJVAPCD will recommend these enhanced and additional measures when project conditions warrant; e.g. potential for impacting sensitive receptors, construction sites of significant size, or any other conditions that may justify additional emission reductions.

As noted previously in Section 4, the SJVAPCD does not require Lead Agencies to provide detailed quantification of construction emissions. Occasionally, some major construction projects such as large scale pipelines, water projects, mining projects, etc., will require quantification. Similarly, Lead Agencies need not quantify emission reductions from construction-related mitigation measures. The SJVAPCD's recommended approach to mitigating construction emissions focuses on a consideration of whether all feasible control measures are being implemented. (See Section 4 for further information.) If a Lead Agency chooses to quantify the effect of construction-related mitigation measures, the Lead Agency should use the construction emissions module in URBEMIS 7G for Windows or emission factors from the EPA's Compilation of Air Pollution Emission Factors (AP-42).

Table 6-2
Regulation VIII Control Measures for Construction Emissions of PM-10

Regulation VIII Control Measures. - The following controls are required to be implemented at all construction sites. (Includes changes effective May 15, 2002)
. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. . All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant. . All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. . With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition. . When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. . All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. *(The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)* . Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant. . Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. . Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

Table 6-3
Enhanced and Additional Control Measures for Construction Emissions of PM-10

Enhanced Control Measures. - The following measures should be implemented at construction sites when required to mitigate significant PM-10 impacts (note, these measures are to be implemented in addition to Regulation VIII requirements):
. Limit traffic speeds on unpaved roads to 15 mph; and . Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.
Additional Control Measures. - The following control measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions:
. Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site; . Install wind breaks at windward side(s) of construction areas; . Suspend excavation and grading activity when winds exceed 20 mph; and* . Limit area subject to excavation, grading, and other construction activity at any one time. * Regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.

Mitigating Emissions from Construction Equipment. The discussion of construction impacts and mitigation measures in these Guidelines focuses primarily on PM-10 emissions from fugitive dust sources. However, Lead Agencies seeking to reduce emissions from construction equipment exhaust should also consider the mitigation measures in Table 6-4. The SJVAPCD recognizes that these measures are difficult to implement due to poor availability of alternative fueled equipment and the challenge of monitoring these activities. New control devices are expected to soon be available that can substantially reduce PM and NOx emissions from diesel engines. Manufacturers are developing PM oxidation catalysts and NOx adsorbers that will be sold as retrofit kits and as original equipment. This new technology requires the use of ultra low-sulfur diesel (15 ppm) to be effective.

Table 6-4
Construction Equipment Mitigation Measures

Emission Source	Mitigation Measure
Heavy duty equipment (scrapers, graders, trenchers, earth movers, etc.)	• Use of alternative fueled or catalyst equipped diesel construction equipment • Minimize idling time (e.g., 10 minute maximum) • Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use • Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set) • Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing of construction activity during the peak-hour of vehicular traffic on adjacent roadways • Implement activity management (e.g. rescheduling activities to reduce short-term impacts)

6.5.2 Mitigating Impacts from Project Operation

Air quality impacts from project operations are caused by motor vehicle use related to the project, and by combustion of fuels for space heating, cooking, and landscape maintenance. In the case of industrial projects, the impacts are caused by all of the above sources and by the operation of polluting equipment, devices, and processes used in manufacturing. Mitigation measures identified by the SJVAPCD to reduce operational air quality impacts are listed and discussed below.

Mitigating Impacts from Motor Vehicles. Several general approaches can be taken to reduce emissions from motor vehicles:

- Reduce vehicle trips. These measures reduce air pollutant emissions by entirely eliminating some of the vehicle trips associated with a project. An example is the provision of bicycle facilities to encourage bicycle use instead of driving.

- Reduce vehicle miles traveled. These measures reduce emissions by reducing the length of vehicle trips associated with a project. An example is satellite offices/telecommuting centers provided to reduce the length of employee commute trips.

- Use of low emission vehicles. These measures do not aim to reduce trips or VMT, but rather promote the use of fuels that are less polluting than gasoline or diesel. Examples

are the conversion of a vehicle fleet to operate on compressed natural gas and the purchase of an electric vehicle.

- Improve traffic flows/reduce congestion. These measures reduce emissions by reducing traffic congestion and/or reducing stops and starts. This allows vehicles to operate at steady and moderate speeds, and thus lowers pollution per mile traveled. An example is timing the traffic signals on an arterial to facilitate uninterrupted travel.

- Support measures. These measures may not directly reduce emissions, but rather support and facilitate other emission reduction strategies. An example is a guaranteed ride home program implemented at a worksite in order to encourage employees to use commute alternatives by allaying concerns over being without a vehicle in case of emergency.

The SJVAPCD recommends that Lead Agencies use each of the above categories of measures where appropriate. However, caution should be used when selecting some types of measures. In general, measures that reduce vehicle trips entirely achieve the greatest emission reductions. This is because vehicle emissions are highest during the first several miles of a trip. Measures to reduce VMT are most effective when the trips reduced are long so that the cold start emissions are less important. PM-10 emissions receive the most benefit by reducing VMT. This is because PM-10 emissions (due to entrained road dust) are more directly correlated to VMT. Traffic flow improvements may be beneficial to CO and ROG levels if congestion is a major factor, but may cause NOx to increase with speed and greater volume of traffic.

Tables 6-5 and 6-6 list mitigation measures to reduce motor vehicle use. The measures listed are also found in the URBEMIS 7G for Windows Mobile Source Mitigation Component. The measures in Tables 6-5 (a) through (d) present infrastructure-based mitigation measures and are organized by the transportation mode that the measure is intended to support. Tables 6-6 (a) through (f) provide operational measures that are usually implemented by employers.

Table 6-5 (a)
Transit Infrastructure-Based Mitigation Measures

Mitigation Measures[76]	Supporting Factors to Enhance Effectiveness
Provide transit enhancing infrastructure that includes: transit shelters, benches, etc.; street lighting; route signs and displays; and/or bus turnouts/bulbs	. Type of transit service (heavy rail, light rail, bus) - rail attracts more riders . Distance from home to transit station and transit station to work - ridership 2-4 times higher within ½ mile . Density of land use - higher densities provide greater ridership . Mix of uses at either end of transit trip - mixed use increases transit use . Pedestrian accessibility to transit system

Table 6-5 (b)
VMT Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide park and ride lots and/or satellite telecommuting centers	. Distance to employment centers - long commute attracts park and ride users and telecommuters . Degree of congestion on routes to employment centers . Availability of high occupant vehicle (HOV) lanes, express transit, rail, rideshare incentives . Type of employers - information based jobs have higher telecommuting potential

[76] All employer-based measures must be implemented voluntarily. SB 437 (Lewis) prohibits local agencies from requiring employer-based trip reduction programs. However, if an applicant elects to undertake these measures to reduce air quality and traffic impacts, credit should still apply to the project.

Table 6-5 (c)
Pedestrian Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide pedestrian enhancing infrastructure that includes: sidewalks and pedestrian paths; direct pedestrian connections; street trees to shade sidewalks; pedestrian safety designs/ infrastructure; street furniture and artwork; street lighting; and/or pedestrian signalization and signage	. Degree of sidewalk/path coverage within walking distance . Mixture of uses to attract pedestrians within walking distance . Pedestrian circulation provides direct access (streets interconnected/pedestrian shortcuts) . Degree of street tree coverage along most used routes . Street system designed to enhance pedestrian safety (traffic calming, signalization, separation from traffic, limited curb cuts[77], etc.) . Pedestrian routes provide safety from crime (eyes on the street, high activity levels, lack of gangs) . Walking routes to important destinations provide visual interest for pedestrians

[77] Curb cuts are ramps or driveways that cross sidewalks to get vehicles from main roadway to parking area. May be of concern due to the potential to conflict with pedestrian or bicycle traffic.

Table 6-5 (d)
Bicycle Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide bicycle enhancing infrastructure that includes: bikeways/ paths connecting to a bikeway system; secure bicycle parking; and/or employee lockers and showers	. Degree area within bicycling distance (5 miles max.) is served by interconnected bikeways . Degree area within bicycling distance has wide paved shoulders and limited curb cuts[78] . Speed limits on routes to frequent destinations - low speed limits enhance cycling . Presence of college or university within cycling distance . Mixture of uses that attract bicyclists within cycling distance . Availability of bicycle parking within cycling distance - communities with bike parking ordinance tend to have high availability

Table 6-6 (a)
Rideshare Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Implement carpool/ vanpool program e.g., carpool ridematching for employees, assistance with vanpool formation, provision of vanpool vehicles, etc.	. Employer provides support measures such as carpool/vanpool subsidies, preferential parking, guaranteed ride home program, etc. . Coordinate with regional ridesharing organizations, e.g., Commute Connection, Central Valley Ridesharing, Kern Rideshare [79] . Multiple smaller worksites coordinate programs . Limited parking supply and/or implementation of parking fees or parking cash-out

[78] See note previous page
[79] Contact your local CEQA representative for identification and contact information of appropriate regional ridesharing organization

Table 6-6 (b)
Services Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide on-site shops and services for employees, such as cafeteria, bank/ ATM, dry cleaners, convenience market, etc.	• Sufficient number of employees at worksite, or cooperation among multiple worksites • Safe, direct pedestrian access between employment and retail areas • Jurisdiction provides density bonuses, other incentives to encourage mixed land uses
Provide on-site child care, or contribute to off-site child care within walking distance	• Sufficient number of employees at worksite, or cooperation among multiple worksites

Table 6-6 (c)
Shuttle Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Establish mid-day shuttle service from worksite to food service establishments/ commercial areas	• Sufficient number of employees at worksite, or cooperation among multiple worksites • Commercial area located within 3 miles • Frequent, scheduled service during lunch hours • Coordination among multiple employers, e.g., at business parks • Provide commute shuttle to transit station, use same vehicle for mid-day shuttle
Provide shuttle service to transit stations/multimodal centers	• Major transit facility/multimodal center located within 3 miles of project • Transit use incentives for employees, e.g., on-site distribution of passes, subsidized transit passes, etc. • Frequent, scheduled service during peak commute periods • Coordination among multiple employers, e.g., at business parks • Free or subsidized service • Provide mid-day shuttle to commercial areas, use same vehicle for commute shuttle

Table 6-6 (d)
Parking Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide preferential parking (e.g., near building entrance, sheltered area, etc.) for carpool and vanpool vehicles	. Most effective if parking supply is limited and/or located far from building entrance
Implement parking fees for single occupancy vehicle commuters	. Reduced or waived fees for carpools and vanpools . Complemented by transit, ridesharing programs, other commute alternatives . Revenues used to support commute alternatives . Provisions in place to avoid off-site parking spillover
Implement parking cash-out program for employees (i.e., non-driving employees receive transportation allowance equivalent to value of subsidized parking)	. Complemented by transit, ridesharing programs, other commute alternatives . Implement at worksites not subject to state parking cash-out requirements . Tax benefits if travel allowance offered as transit/ridesharing subsidy . Provisions in place to avoid off-site parking spillover

Table 6-6 (e)
Transit Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide transit incentives	. Transit use incentives for employees, e.g., on-site distribution of passes, subsidized transit passes, etc. . Transit route maps and schedules posted at worksite . Design and locate buildings to facilitate transit access, e.g., locate building entrances near transit stops, eliminate building setbacks, etc.

Table 6-6 (f)
Other Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Implement compressed work week schedule (e.g., 4/40, 9/80)	• Consult with employees prior to program implementation
Implement home-based telecommuting program	• Participation increased if employer provides/assists with provision of equipment (modem, computer, etc.) • Especially effective if employee commute trips are long

6.5.3 Quantifying Mitigation Measures for Project Operations

The effectiveness of proposed mitigation measures should be quantified when feasible. Because the measures' effectiveness will depend greatly on the specific characteristics of the project and its setting, this quantification should be based on a project-specific analysis. The SJVAPCD recommends using the URBEMIS 7G for Windows mitigation component to estimate trip and vehicle miles traveled (VMT) reductions for most projects. However, if a traffic model containing mode split analysis capability is used to calculate trip generation for use in URBEMIS 7G for Windows, the mitigation quantification component should not be used. The URBEMIS 7G for Windows mitigation component would double count part of the trip reduction estimates already credited to other transportation modes in the mode split model. This may also occur if trip generation numbers used in URBEMIS 7G for Windows are derived from a local traffic study. In this case, the trip generation numbers may already reflect the benefit of measures and infrastructure in place in the community.

When a mode split model or local traffic study is used, estimates of mitigation measure effectiveness will require closer analysis. Guidance on performing this analysis and several cautionary notes regarding estimating the effectiveness of mitigation measures are provided below:

⇒ **Clearly explain the assumptions underlying the environmental document's analysis of mitigation measures' effectiveness.** The analysis should specifically describe the mitigation measure, identify the source(s) of air pollutants that are expected to be affected by the measure, clearly explain how and to what extent the measure will affect the source(s), and identify the basis for the estimate (empirical observations, computer modeling, case studies, etc.). Critical assumptions should be linked to the mitigation monitoring and reporting program. For example, if the environmental analysis for a commercial development assumes that 20% of employees will carpool to work, then such an objective should be included in the

mitigation monitoring and reporting program as a test of whether the measure is being implemented.

⇒ **Be specific regarding implementation of mitigation measures.** The environmental document should describe each mitigation measure in detail, identify who is responsible for implementing the measure, and clearly explain how and when the measure will be implemented. Methods for assessing the measure's effectiveness once it is in place, and possible triggers for additional mitigation if necessary, are also desirable. This level of detail regarding mitigation measure implementation frequently is not addressed until the preparation of the mitigation monitoring and reporting program, which often takes place very late in the environmental review process. In order to reliably assess the effectiveness and feasibility of mitigation measures, however, the SJVAPCD determines that it necessary to consider the specifics of mitigation measure implementation as early in the environmental review process as possible.

⇒ **Avoid double counting the effect of proposed mitigation measures.** The project description and assumptions underlying the analysis of project impacts should be carefully considered when estimating the effect of mitigation measures. If certain conditions or behavior are assumed in the impact analysis, then credit may not be claimed when proposing mitigation measures. For example, if the traffic and air quality analyses for a proposed project assume that a certain percentage of people will access the project by transit or bicycle, then any credit claimed for transit- or bicycle-related mitigation must clearly demonstrate effectiveness above and beyond the mode split assumed in the impact analysis.

In some cases, it simply may not be possible to quantify the effect of proposed mitigation measures. It may be that the specific conditions surrounding a particular project are so unique as to render extrapolation from other examples unreliable. A proposed measure may be innovative, with little precedent. The combined effects of a package of measures may be too difficult to quantify. While a certain degree of professional judgment is usually involved in estimating the effectiveness of mitigation measures, excessively speculative estimates should be avoided. If the Lead Agency cannot quantify mitigation effectiveness with a reasonable degree of certainty, the environmental document should at least address effectiveness qualitatively. If the Lead Agency makes a finding that non-quantified mitigation measures reduce an impact to a level of insignificance, the document should provide a detailed justification of that conclusion.

Using URBEMIS 7G for Windows to Quantify Emission Reductions. URBEMIS is a computer program that can be used to estimate emissions associated with land use development projects in California, such as residential neighborhoods, shopping centers, office buildings, etc. URBEMIS stands for "Urban Emissions Model". The newest version (URBEMIS 7G for Windows) contains a component that will quantify emissions reductions achieved when projects include mitigation measures. A brief overview of the

mitigation component is provided below. For complete instructions, see the URBEMIS 7G for Windows User's Guide[80].

The URBEMIS 7G for Windows mitigation component allows the program user to select mitigation measures from three sub-components. These are construction measures, area source measures, and mobile source measures. The user selects measures appropriate for the project and the model automatically compiles a percent reduction for each pollutant. The reduction efficiencies can be modified for the construction and area source components, but the report generated will indicate that non-default values were used. The SJVAPCD requires the user to provide justification when reduction efficiencies are changed.

URBEMIS Mobile Source Mitigation Component. The mobile source component is the most complex of the three sub-components. The program requires the user to select environmental conditions of the area surrounding the project to determine the effectiveness of the measures and to give credit for conditions surrounding the project site. Credit is provided for conditions in the surrounding environment that are beyond control of the project proponent (i.e. transit service, regional bikeways, complimentary uses within walking distance) that will have the effect of reducing trips or miles traveled by residents or users of the project.

The mobile source mitigation component should only be used with default trip generation rates. The reduction percentages are based on a comparison with average trip generation rates from the ITE Trip Generation Manual. If other trip generation rates are used that account for alternative modes and trip reduction programs, the program will double credit the reduction percentages.

Area Source Component. The area source component will allow the user to generate estimates of area source emissions using default assumptions programmed into the model. Users with detailed information regarding area sources for a given project will be able to modify the default values to more accurately predict expected emissions. Whether using default assumptions or project specific data, URBEMIS 7G for Windows will generate a report listing all of the assumptions used to estimate area source emissions.

Area source mitigation measures are listed in Table 6-7.

Optional Construction Emissions Component. The construction emissions component allows the user to generate estimates of PM-10, ROG, NOx, and CO that occur as a result of demolition, grading, and building construction.

[80] Available from ARB's website at http://www.arb.ca.gov/urbemis7/urbemis7.htm

Table 6-7
Area Source Mitigation Measures

Emission Source	Mitigation
Residential Water Heaters	. Use solar or low-emission water heaters (beyond Rule 4902) . Use central water heaters
Residential Energy Efficiency	. Orient buildings to take advantage of solar heating and natural cooling and use passive solar designs . Increase wall and attic insulation beyond Title 24 requirements
Commercial Water Heaters	. Use solar or low-emission water heaters . Use central water heating systems
Commercial Energy Efficiency	. Orient buildings to take advantage of solar heating and natural cooling and use passive solar designs . Increase wall and attic insulation beyond Title 24 requirements
Industrial Heating	. Orient buildings to take advantage of solar heating and natural cooling and use passive solar designs
Landscape Maintenance	. Provide electric maintenance equipment
Residential Heating	. Eliminate or limit the amount of traditional fireplaces installed (i.e. natural gas fireplaces/inserts or at least EPA certified wood stoves or inserts instead of open hearth fireplaces)

The URBEMIS 7G for Windows user will have the option of "turning off" this component if he/she wishes. If the construction emissions component is not used, then URBEMIS 7G for Windows will print a statement in the report that the "No Construction Emissions" option was selected.

If the construction emissions component is used, then either default or project specific options are available. As with the components described above, URBEMIS 7G for Windows will print out a list of assumptions used.

6.6 MITIGATING IMPACTS FROM HAZARDOUS AIR POLLUTANTS

Specific mitigation measures should be identified and considered for those projects that may release toxic or hazardous air pollutants to the atmosphere in amounts that may be injurious to nearby populations. Such mitigation measures should consider both routine and non-routine toxic air pollutant releases. Mitigation measures may involve handling, storage, and disposal methods that minimize release of the subject substances to the atmosphere. In some cases, air pollution control devices or process operation modifications can be employed. Furthermore, facilities that may release toxic or hazardous substances to the atmosphere should not be located adjacent to sensitive receptors such as residences, schools, day-care centers, extended-care facilities, and hospitals.

Lead Agencies should also be aware that many facilities such as dry cleaners and gasoline stations produce toxic emissions, but under most circumstances, existing controls reduce impacts to less than significant levels. Therefore, it would not be appropriate to automatically reject such facilities just because they are near a sensitive receptor. More detailed analysis to determine the potential risk and feasible control measures may be appropriate in these cases. Facilities and equipment that require permits from the SJVAPCD are screened for risks from toxic emissions and those exceeding thresholds (see Section 4.3.2) are subject to detailed health risk assessments. Projects exceeding deminimus levels are required to install Toxic Best Available Control Technology (T-BACT) to reduce risks to below significance. If a significant impact remains after T-BACT is implemented, the permit may not be issued unless it meets the discretionary approval criteria of the SJVAPCD Risk Management Policy for Permitting New and Modified Sources.

Projects where significant numbers of diesel powered vehicles will be operating such as truck stops, transit centers, and warehousing may create risks from toxic diesel particulate emissions. These facilities and vehicles are not subject to SJVAPCD permit and so may need mitigation measures adopted by the Lead Agency to reduce this impact. Measures such as limiting idling, electrifying truck stops to power truck auxiliary equipment, use of diesel particulate filters, and use of alternative fuel heavy-duty trucks have been required by some jurisdictions.

6.7 MITIGATING ODOR IMPACTS

Appendix G (Environmental Checklist Form) of the state CEQA Guidelines specifies that the Lead Agency determines whether a project would “create of objectionable odors affecting a substantial number of people.”

Projects that have a significant odor impact because they place sources of odors and members of the public near each other should establish a buffer zone to reduce odor impacts to a less than significant level. The dimensions of the buffer zone must ensure that the encroaching project does not expose the public to nuisance levels of odorous emissions.

In establishing the appropriate dimensions of the buffer zone, the Lead Agency should consider actions currently being taken at the facility to control odors, as well as any future actions to which the facility is firmly committed. A safety margin also should be considered in establishing a buffer zone to allow for future expansion of operations at the source of the odors.

In order to reduce the dimensions of the buffer zone, add-on control devices (e.g. filters or incinerators) and/or process modifications implemented at the source of the odors may be feasible, depending on the specific nature of the facility. Lead Agencies should consult the SJVAPCD's Compliance Division for further information regarding add-on controls and process modifications to control odors. Odor mitigation measures that are targeted at the *receptors* (e.g. residential areas) that rely on sealing buildings, filtering air, or disclosure statements are not appropriate mitigation measures to be used in place of buffer zones or technical controls.

6.8 MITIGATION MONITORING AND REPORTING

CEQA requires that when a public agency makes findings that changes or alterations have been incorporated into the project which mitigate or avoid the significant effects identified in an EIR, or an MND, the agency must also adopt a program for reporting and monitoring mitigation measures that were adopted or made conditions of project approval[81]. This requirement is intended to assure that mitigation measures included in a certified EIR or MND are indeed implemented. Monitoring for the measures recommended in this document is best accomplished by the agency with land use approval. A Mitigation Monitoring and Reporting Program should include the following components:

- a description of each mitigation measure adopted by the Lead Agency;
- the party responsible for implementing each mitigation measure;
- a schedule for the implementation of each mitigation measure;
- the agency or entity responsible for monitoring mitigation measure implementation;
- criteria for assessing whether each measure has been implemented;
- enforcement mechanism(s).

Most of the mitigation measures described in this section are implemented during project construction. Monitoring of these measures is typically accomplished as conditions of approval of the subdivision map or site plan. On site measures, such as street trees and high efficiency heating and cooling systems are verified during building inspection prior to

[81] PRC §21081.6

occupancy. Off-site measures or contributions to city/county operated air quality mitigation fee programs may require the applicant to prove completion prior to issuing building permits.

APPENDIX A – GLOSSARY AND ACRONYMS

Air Basin - An area of the state designated by the ARB pursuant to Subdivision (a) of Section 39606 of the CH&SC.

Air Monitoring - The periodic or continuous sampling and analysis of air pollutants in ambient air or from individual pollutant sources.

Air Pollutants - Substances that are foreign to the atmosphere or are present in the natural atmosphere to the extent that they may result in adverse effects on humans, animals, vegetation, and/or materials.

Air Pollution Control Officer (APCO) - The executive officer of the District appointed by the Governing Board. The APCO is the approving authority for permits issued by the District, and therefore is the decision-making body for CEQA purposes for these approvals.

Alternative Fuels - Fuels such as methanol, ethanol, natural gas, and liquid petroleum gas that are cleaner burning and contribute to the attainment of ARB's emission standards.

Ambient Air - Air occurring at a particular time and place outside of structures. Often used interchangeably with outdoor air.

Anthropogenic - Relating to or influenced by the impact of man on nature.

APCD (Air Pollution Control District) - A county agency with authority to regulate stationary sources of air pollution (such as refineries, manufacturing facilities, and power plants) within a given county, and governed by a District Air Pollution Control Board composed of the elected county supervisors. (Compare AQMD and Unified District)

AQAP (Air Quality Attainment Plan) - A plan prepared by a APCD/AQMD designated as a nonattainment area, to comply with the California Clean Air Act for purpose of meeting the requirements of the California Ambient Air Quality Standards.

AQMD (Air Quality Management District) - A group of counties or portions of counties with authority to regulate stationary sources of air pollution within the region and governed by a regional air pollution control board comprised mostly of elected officials from within the region. An AQMD is established by state legislation. (Compare APCD and Unified District)

ARB (California Air Resources Board) - California's lead air quality agency consisting of an eleven-member Governor-appointed board fully responsible for motor vehicle pollution control, and having oversight authority over California's air pollution management program.

Area Sources - Also known as "area-wide" sources, these include multiple stationary emission sources such as water heaters, gas furnaces, fireplaces, and wood stoves that are individually small but can be significant when combined in vast numbers. The CCAA requires districts to include these area sources in the AQMPs.

Attainment - Achieving and maintaining the ambient air quality standards (both state and federal) for a given standard.

Attainment Area - An area that is in compliance with the National and/or California Ambient Air Quality Standards.

CAAQS (California Ambient Air Quality Standards) - Specified concentrations and durations of air pollutants, recommended by the California Department of Health Services and adopted into regulation by the Air Resources Board, which relate the intensity and composition of air pollution to undesirable effects. CAAQS are the standard that must be met per the requirements of the California Clean Air Act.

CALINE4 - CAlifornia LINE Source Dispersion Model, is the standard modeling program used by Caltrans to assess air quality impacts near transportation facilities, in the rare cases when the screening procedures of the CO Protocol fail. It is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway.

CCAA (California Clean Air Act) - A California law passed in 1988 that provides the basis for air quality planning and regulation independent of federal regulations, and which establishes new authority for attaining and maintaining California's air quality standards by the earliest practicable date. A major element of the Act is the requirement that local APCDs/AQMDs in violation of the CAAQS must prepare attainment plans that identify air quality problems, causes, trends, and actions to be taken for attainment.

CEQA (California Environmental Quality Act) - A state law intended to protect the environment of California. It is codified in Sections 21000 through 21177 of the Public Resources Code. CEQA establishes mandatory ways by which governmental (public agency) decision-makers are informed about the potential significant environmental effects of proposed projects. CEQA also mandates the identification of ways to avoid or significantly reduce damage to the environment. After preliminary review or the completion of an Initial Study, the Lead Agency may decide to prepare an Environmental Impact Report (EIR) for a project. An EIR is an informational document used to inform public agency decision-makers and the public of the significant effects of a project. The EIR also identifies possible ways

to eliminate or minimize the significant effects and describes reasonable alternatives to the project. A recent court decision has determined that both alternatives and mitigation measures must be discussed in the EIR.

CEQA Guidelines - Regulations prepared for the State Secretary for Resources to be followed by all state and local agencies in California in the implementation of CEQA, beginning at Sec. 15000, California Code of Regulations.

CEQA Statutes - California Environmental Quality Act, as amended, beginning at Section 21000 of the Public Resources Code.

CH&SC - California Health and Safety Code. Division 26 of the CH&SC was enacted by legislature in order that the public interest is "safeguarded by an intensive, coordinated state, regional, and local effort to protect and enhance the ambient air quality of the state[82]".

CO (Carbon Monoxide) - A colorless, odorless gas resulting from the incomplete combustion of fossil fuels. Over 80% of the CO emitted in urban areas is contributed by motor vehicles. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. CO is a criteria air pollutant.

CO Protocol (Transportation Project-Level Carbon Monoxide Protocol) – A protocol developed by UC Davis in December 1997 that deals the with project-level air quality analysis needed for federal conformity determinations, NEPA, and CEQA. The Protocol is the standard method for project-level air quality analysis by Caltrans.

Concentration - The amount of an air pollutant present in a unit sample, usually measured in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

Criteria Air Pollutant - An air pollutant for which acceptable levels of exposure can be determined and for which a federal or state Ambient Air Quality Standard has been set. Examples include: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM-10 (see individual pollutant definitions).

District - The San Joaquin Valley Air Pollution Control District is a unified air pollution control district as defined by the Health and Safety Code Section 40150. The District is comprised of the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the San Joaquin Valley portion of Kern County. *See also SJVAPCD.*

DTIM - Direct Travel Impact Model - A model developed by Caltrans in the late 1970's and is used in the State of California to calculate amounts of air pollutant emitted from

[82] CH&SC §39001

motor vehicles and fuel consumption. The DTIM analysis is based on travel data produced by the Regional Transportation Model and on emission factors from the EMFAC Model.

EIR - Environmental Impact Report is a detailed statement prepared under CEQA describing and analyzing the significant effects of a project and discussing ways to mitigate or avoid the effects[83].

EIS - Environmental Impact Statement is an environmental impact document prepared pursuant to the National Environmental Policy Act (NEPA). NEPA applies to projects carried out, financed, or approved by federal agencies[84].

Emissions Inventory - An estimate of the quantity of pollutants emitted into the atmosphere over a specific period such as a day or a year. Considerations that go into the inventory include type and location of sources, the processes involved, and the level of activity.

EMFAC - An ARB program that is the source of emissions factors for most California motor vehicle emissions models.

Emission Standard - the maximum amount of a pollutant that is permitted to be discharged from a polluting source such as an automobile or smoke stack.

EPA (US Environmental Protection Agency) - the federal agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

EPA-Certified Wood Stoves – The EPA has promulgated New Source Performance Standards for wood heaters, which establish threshold particulate emission rates for wood heaters to be certified. Since 1992, only certified wood heaters can be sold in the United States. Certified wood stoves must be labeled according to procedures specified by the EPA. Wood stoves, cordwood fireplace inserts, and some pellet stoves/inserts must pass through the EPA certification process. Fireplaces themselves are exempt from EPA certification.

FCAA (Federal Clean Air Act) - Federal law passed in 1970 and amended in 1977 and 1990 that sets primary and secondary National Ambient Air Quality Standards for major air pollutants and thus forms the basis for the national air pollution control effort.

Fireplaces (open hearth) – Fireplaces are used primarily for aesthetic effects and secondarily for supplemental heating. Wood is the most common fuel for fireplaces. Conventional fireplaces are either manufactured metal (referred to as

[83] CCR §15362
[84] CCR §15220

zero-clearance or factory-built fireplaces) or masonry (generally brick and/or stone, assembled on site, and integral to a structure) design. Both have large fixed openings to the fire bed (sometimes called "open-hearth"). Fireplaces usually heat a room by radiation, and are considered inefficient heating devices with a significant fraction of the combustion heat lost in the exhaust gases and through fireplace walls. Inserts can be used to increase the heating potential and decrease emissions *(see Fireplace Inserts)*

Fireplace Inserts – Open-hearth fireplaces have large fixed openings to the fire bed. EPA-certified and pellet wood stoves can be designed as inserts to be installed into existing fireplace firebox/hearth cavities. If properly installed, their performance is similar to their stove counterparts. In addition, gas fireplace inserts can be installed directly into existing fireplaces, reducing the particulate emissions by almost 100%.

High occupant vehicle (HOV) lanes - the operation of reserving one or more lanes on a freeway for exclusive use of only vehicles with more than one occupant. Usually used in areas with heavy congestion to encourage carpooling.

Hydrocarbon - any of a large number of compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air as a result of fossil fuel combustion and fuel volatilization, and are a major contributor to smog.

Indirect Source - facilities, buildings, structures, properties, and/or roads which, through their construction to operation indirectly contributes to air pollution. This includes projects and facilities that attract or generate mobile sources activity (autos and trucks) such as shopping centers, employment sites, schools, and housing developments, that result in the emissions of any regulated pollutant.

Mitigated Negative Declaration (MND) - A negative declaration prepared for a project when the initial study has identified potentially significant effects on the environment, but (1) revisions in the project plans or proposals made by, or agreed to by, the applicant before the proposed negative declaration and initial study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur, and (2) there is no substantial evidence in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment [PRC §21064.5].

Mitigation - Measures taken to avoid or reduce a significant effect including:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

- Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.

- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

- Compensating for the impact by replacing or providing substitute resources or environments [CCR §15370].

NAAQS (National Ambient Air Quality Standards) - are standards set by the USEPA for the maximum levels of air pollutants that can exist in the ambient air without unacceptable effects on human health or the public welfare.

Natural Gas Fireplaces – Natural gas fireplaces are designed for new construction and can be either decorative gas fireplaces or gas fireplace heaters. Both produce practically no particulate emissions. Gas fireplace heaters are more sophisticated than decorative gas fireplaces, as they are designed for efficiency whereas decorative gas fireplaces are designed more for flame presentation aesthetics. Existing fireplaces can be converted to natural gas also by installing a gas fireplace insert *(see Fireplace Inserts).*

NSR (New Source Review) - the mechanism to assure that new and modified stationary sources will not interfere with the attainment or maintenance of any ambient air quality standard, or prevent reasonable further progress towards the attainment or maintenance of any ambient air quality standard. A program used in a nonattainment area to permit or site new permit or site new industrial facilities or modifications to existing industrial facilities that emit nonattainment criteria air pollutants. The two major requirements of NSR are Best Available Control Technology and Offsets.

Negative Declaration - A written statement briefly describing the reasons that a proposed project will not have a significant effect on the environment and does not require the preparation of an environmental impact report [PRC §21064].

Nonattainment Area - an area identified by the EPA and/or ARB as not meeting either NAAQS or CAAQS standards for a given pollutant.

Ozone - a pungent, pale, blue, reactive toxic gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

Ozone Precursors - compounds such as hydrocarbons and oxides of nitrogen, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, the principal component of smog.

Pedestrian Oriented Development (POD) - any of a number of design strategies that emphasize pedestrian access over automobile access. They typically provide pedestrian amenities such as sidewalks, street trees, commercial at street frontage, safe street crossings, etc.

Pellet Stoves – Pellet stoves and pellet-stove inserts are fueled with pellets of sawdust, wood products, or other biomass materials pressed into manageable shapes and sizes. These stoves have active air flow systems and unique grate design to accommodate this type of fuel. Other than natural gas fireplaces and inserts, the pellet stove/insert is the most thermally, and emissions, efficient of all residential wood heating apparatus.

PM-10 (Respirable Particulate Matter) - a major air pollutant consisting of solid or liquid matter such as soot, dust, aerosols, fumes and mists less than 10 microns in size (one micron = 1/1,000,000 meter = 0.00003937 inch). PM-10 causes visibility reduction and adverse health effects, and is a criteria air pollutant.

Project - An activity that may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following:

- An activity directly undertaken by a public agency.
- An activity undertaken by a person that is supported, in whole or in part, through contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies.
- An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies [PRC §21065].

ROG (Reactive Organic Gas) - hydrocarbon compounds which are reactive and may contribute to the formation of smog. Also sometimes referred to as non-methane organic compounds and VOCs.

SIP (State Implementation Plan) - a document prepared by each state describing existing air quality conditions and measures that will be taken to attain and maintain National Ambient Air Quality Standards. In California, districts prepare nonattainment area plans to be included in the state's SIP.

Significant Effect on the Environment - A phrase used to indicate that an environmental effect of a project is at a level requiring the detailed analysis of an EIR and that the effect is severe enough to consider disapproving or changing the project to avoid the effect. The terms "significant effect" and "significant impact" are interchangeable under CEQA [CCR §15382].

State CEQA Guidelines - See CEQA Guidelines

Transit Oriented Development (TOD) - mixed use neighborhoods, up to 160 acres in size, which are developed around a transit stop and core commercial area. The entire TOD must be within an average of 2,000-foot walking distance of a transit stop. Secondary areas of lower density housing, schools, parks, and commercial and employment uses surround TODs for up to one mile.

Unified District - two or more contiguous counties may merge their county districts into one unified district. A unified district is formed by action of the member counties. The San Joaquin Valley Air Pollution Control District is a Unified District. *(See also APCD and AQMD)*

URBEMIS 7G for Windows - URBEMIS is a computer program that can be used to estimate emissions associated with land use development projects in California, such as residential neighborhoods, shopping centers, office buildings, etc. URBEMIS stands for "URBan EMISsions Model." URBEMIS 7G for Windows, Version 5.1.0 is the latest version. It is written specifically to run in the Windows 95/98 environment.

Volatile Organic Compounds (VOCs) - any organic compound containing at least one carbon atom except for specific exempt compounds found to be non-photochemically reactive. In this document, VOC is synonymous with ROG.

Wood Stoves – Wood stoves are enclosed wood heaters that control burning or burn time by restricting the amount of air that can be used for combustion. They are commonly used in residences as space heaters. Conventional wood stoves do not have any emission reduction technology or design feature and, in most cases, were manufactured before July 1, 1986. Current sales of wood stoves must be certified to 1990 EPA emission standards and will include either catalytic or noncatalytic emission reduction technology.

Acronyms

ADT - average daily trips
AQAP - Air Quality Attainment Plan
AQGGP - Air Quality Guidelines for General Plans
ARB - Air Resources Board (also CARB)
CAAQS - California Ambient Air Quality Standard
CAL - Cursory Analysis Level
CCAA - California Clean Air Act
CCR - California Code of Regulations
CEQA - California Environmental Quality Act
CFC - chlorofluorocarbons
CFR - Code of Federal Regulations
CH&SC – California Health and Safety Code
CO - carbon monoxide
DAQ - Designs for Air Quality
DTIM - Direct Travel Impact Model
EIR - Environmental Impact Report
EPA - United States Environmental Protection Agency
FAL - Full Analysis Level
FCAA - Federal Clean Air Act
FCAAA - Federal Clean Air Act Amendments of 1990
FIP - Federal Implementation Plan
GAMAQI - Guide for Assessing and Mitigating Air Quality Impacts
HAP - hazardous air pollutant
ISR - indirect source review
ITE - Institution of Transportation Engineers
LOS - level of service
MEI - Maximally Exposed Individual
MND - Mitigated Negative Declaration
NAAQS - National Ambient Air Quality Standard
NEPA - National Environmental Policy Act

NESHAP - National Emission Standards for Hazardous Air Pollutants
NOx - oxides of nitrogen
NOP - Notice of Preparation
PM-10 - respirable particulate matter of 10 microns in diameter or less
PRC - Public Resources Code
ROG - reactive organic gases
SJV - San Joaquin Valley
SJVAB - San Joaquin Valley Air Basin
SJVAPCD- San Joaquin Valley Air Pollution Control District
SOx - oxides of sulfur
SPAL - Small Projects Analysis Level
TCM - transportation control measures
USEPA - United States Environmental Protection Agency
VMT - vehicle miles traveled
VOC volatile organic compounds *(see ROG)*

APPENDIX B – SJVAPCD POINT OF CONTACT LIST

Northern Region Office– Modesto (209) 557-6400
4230 Kiernan Ave., Suite 130 FAX (209) 557-6475
Modesto, CA 95356

Central Region Office – Fresno (559) 230-6000
1990 E. Gettysburg Avenue FAX (559) 230-6061
Fresno, CA 93726

Southern Region Office – Bakersfield (661) 326-6900
2700 "M" St., Suite 275 FAX (661) 326-6975
Bakersfield, CA 93301

District website – http://www.valleyair.org

PLANNING DIVISION

Air Quality Elements/General Plan (559) 230-5800

CEQA Commenting/Impact Assessment
– Northern Region *(Merced, Stanislaus, and San Joaquin Counties)* (209) 557-6470
– Central Region *(Fresno and Madera Counties)* (559) 230-5800
– Southern Region *(Tulare and **Kings** County and a portion of Kern County)* (661) 326-6980

Public Information/Education (559) 230-5850

PERMIT SERVICES DIVISION

Small Business Assistance
– Northern Region *(Merced, Stanislaus, and San Joaquin Counties)* (209) 557-6446
– Central Region *(Fresno, **Kings**, and Madera Counties)* (559) 230-5888
– Southern Region *(Tulare County and a portion of Kern County)* (661) 326-6969

Air Toxics/Hazardous Air Pollutants (559) 230-5900

COMPLIANCE DIVISION

Regulation VIII - Fugitive Dust Control (559) 230-5950

Asbestos Coordinator
– Northern Region *(Merced, Stanislaus, and San Joaquin Counties)* (209) 557-6400
– Central Region *(Fresno, **Kings**, and Madera Counties)* (559) 230-5950
– Southern Region *(Tulare County and a portion of Kern County)* (661) 326-6900

Exhibit H
AQGGP Excerpt Pgs 75 – 172

IV. POLICY ANALYSIS AND AIR QUALITY BENEFITS

Introduction

No later than one year after the first housing revisions to take place after January 1, 2004, cities and counties in the San Joaquin Valley Air Basin are required to amend their general plans to include goals, policies, and feasible implementation strategies to improve air quality, and these amendments should be submitted to the District at least 45 days prior to the adoption of those amendments (California Government Code Section 65302.1). The District has 30 days to return comments and advice. Cities and counties are encouraged to use the ideas presented in this section to develop their own goals and policies in their general plan amendments. Goals and policies in this section have direct and indirect air quality benefits, and they address a very broad range of planning and air quality issues facing the San Joaquin Valley. The list of goals and policies is extensive, but it is not intended to cover all possible policy solutions to air quality problems. The policy language is in no way mandatory. Cities and counties are encouraged to use the ideas presented here to develop their own goals and policies in their general plans.

This section is divided into three components. The first component consists of goals and policies suitable for use in separate air quality elements, chapters, or sections of the general plan. The second component contains goals and policies for use primarily in land use elements. The third component provides goals and policies that may be used in circulation elements. Goals and policies from the last two components could be used in a separate air quality element, but cities and counties should be alert for potential inconsistencies with existing land use and circulation elements.

Section Format

- Suggested Goals and Policies for Separate Air Quality Elements, Chapters, or Sections
- Suggested Goals and Policies for Land Use Elements
- Suggested Goals and Policies for Circulation Elements

The supporting information for the goals and policies is provided under four headings: Implementation Strategies, Air Quality Benefits, Programs in Operation, and Resources. A description of each of these areas is provided below.

Implementation strategies provide guidance and ideas for implementing the goals and policies presented in the Air Quality Guidelines. They are intended to clarify the intent of the specific policy and in some cases provide specific implementation examples.

Format for Goals and Policies Sections	
• **Issues**	**Statement of the problem to be addressed**
• **Goals**	**Overall outcome desired**
• **Objectives**	**Specific outcome desired**
• **Policies**	**Statement of direction or commitment to take action**
• **Implementation Strategies**	**Action ideas to carry out policies**
• **Air Quality Benefits**	**Benefits in terms of trip reduction or emissions reduction**
• **Programs in Operation**	**Examples of existing programs implementing the policies**
• **Resources**	**Where to go for more information**

The Air Quality Benefits sections provide the rationale for the goals and policies. Where available, reductions in air pollutant emissions or vehicle use that may be achieved by implementing the policies are provided. In many cases, groups of policies are part of the same strategy such as transit/pedestrian-oriented design. For those policies, specific reductions are provided for the policy promoting the adoption of the strategy. The policies that support or enhance the strategy refer back to the strategy policy. It should be noted, however, that a complete foundation for every policy on the basis of existing information is not possible at this time. For these policies, an explanation of the theory behind the proposed measure is provided. The information included under Air Quality Benefits has been assembled from a review of existing technical reports, studies, surveys and data published by various public agencies and private researchers. No original studies were conducted for this report.

The last two sections provide examples and resources that planners can draw on when developing an air quality program. The Programs in Operation sections provide examples where similar programs or policies have been

adopted or implemented. The Resource sections provide references where more detailed information may be obtained and provide points of contact at agencies that have adopted similar programs.

Immediately following the goals and policies is a section describing the overall air quality benefits possible with adoption and aggressive implementation of air quality policies in the general plan. It provides a brief description of the results of research on the effect of land use patterns on motor vehicle use. Also provided is an estimate of "before AQE implementation" and "after AQE implementation" emissions inventories for one Valley county. This information is provided as a tool to aid local jurisdictions in illustrating the potential benefits of adopting an air quality element.

The Air Quality Guidelines should be viewed as a flexible resource upon which to justify and implement air quality goals and policies. The District will periodically update the Guidelines as new information and control technologies emerge. It is the District's belief, however, that the information, materials, and tools contained in the Guidelines provide sufficient grounds to encourage the adoption of appropriate air quality goals and policies that can help a city or county meet the air quality requirements of AB 170 and California Government Code Section 65302.1.

Groups of policies include lists of additional resources that may be useful in developing and implementing land use policies. One resource that applies generally to all the policies in this section is the EPA's 2001 document, *Improving Air Quality Through Land Use Activities*, available at <http://www.epa.gov/otaq/transp/trancont/r01001.pdf>. This guidance describes links between EPA policies and land use activities that encourage travel patterns and choices that reduce vehicle miles of travel and, consequently, reduce emissions from motor vehicles in communities. Five characteristics of urban form that influence travel and air quality are summarized below. Another general resource is the ARB's *Air Quality and Land Use Handbook: A Community Health Perspective*, which was adopted in April 2005 and is available online at <http://www.arb.ca.gov/ch/aqhandbook.htm>. In this guidance document, ARB recommends siting distances between sources of pollution, like high traffic area and refineries, and sensitive land uses based on data showing that the localized air pollution exposures can be reduced by as much as 80% with the recommended separation.

Appendix A provides a separate list of each goal, objective, and policy without the implementation strategies and air quality benefits. This appendix is intended for those wishing to view or to use only the air quality goals and policies.

SUGGESTED GOALS AND POLICIES FOR SEPARATE AIR QUALITY ELEMENTS, CHAPTERS, OR SECTIONS

The goals and policies in this section are those most appropriate to include in a separate air quality element, chapter, or section. These are air quality specific policies that most cities or counties can use without major modifications to their existing general plan elements.

Principles for Air Quality Elements, Chapters, or Sections

The Air District strongly encourages cities and counties of the San Joaquin Valley to:

- Determine air quality impacts of development proposed in their jurisdiction and mitigate those impacts to the maximum extent feasible
- Cooperate with the District, neighboring jurisdictions, and other agencies to reduce air quality impacts
- Ensure that land use and transportation plans are fully integrated and consider air quality
- Work to educate the public on land use, transportation, and air quality issues
- Implement air quality programs for public facilities and operations that are a model for the private sector
- Develop programs and take actions to implement Transportation Control Measures
- Plan land uses to avoid industrial/residential air pollution conflicts
- Reduce PM10 emissions from sources under their jurisdiction or control
- Develop programs to reduce emissions from residential and commercial area sources such as woodburning, energy use, and other and equipment use

COMMUNICATION, COOPERATION, AND COORDINATION

Issue:

Air pollution is a complex problem. All levels of government are responsible for solving some portion of the problem. Often, the responsibilities of one level of government overlap with another. In order to develop effective programs and reduce pollution emissions, effective communication, cooperation, and coordination are vital.

Goal 1: **Effective communication, cooperation, and coordination in developing and operating community and regional air quality programs.**

ENVIRONMENTAL ASSESSMENT

Issue:

The environmental assessment process required under the California Environmental Quality Act (CEQA) is by far the most important tool for local government to communicate with other agencies and the public on the air quality impacts of development within a community. Strong and consistent application of CEQA can make a significant difference in project level air quality impacts.

Objective 1a To accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in this City/County.

Policy 1 The City/County of _____ shall determine project air quality impacts using analysis methods and significance thresholds recommended by the District.

Note: The District has prepared guidelines that provide standard criteria for determining significant environmental effects, that provide a uniform method of calculating project emissions, and that will provide standard mitigation measures to reduce air quality impacts. The District now has adopted thresholds of significance and recommends analysis methods described in the District guidance manual, Guide for Assessing and Mitigating Air Quality Impacts*.*

Projects analyzed in sufficient detail to determine air quality impacts in an EIR (Environmental Impact Report) or negative declaration could be exempt from further analysis during subsequent discretionary approvals such as zone changes or subdivision maps. For projects where insufficient details were known at the time the EIR was prepared, the analysis should be focused on specific impacts not previously addressed.

Implementation Strategy:

Ensure that development projects are submitted to the District for CEQA comments and review of air quality analysis.

Train staff planners preparing CEQA documents on how to use the Guide for Assessing and Mitigating Air Quality Impacts *guidance manual.*

Policy 2 The City/County of _____ shall ensure that air quality impacts identified during CEQA review are consistently and fairly mitigated.

Implementation Strategy:

Require projects to comply with appropriate mitigation measures recommended by the District and described in its Guide for Assessing and Mitigating Air Quality Impacts *guidance manual or with alternative mitigation measures proposed by the applicant and approved by the District.*

Policy 3 The City/County of _____ shall ensure all air quality mitigation measures are feasible, implementable, and cost effective.

Implementation Strategy:

Consult with the District regarding the effectiveness of mitigation measures proposed by the applicant. When using measures from the District list of suggested measures, consider site-specific factors that that may make a measure infeasible.

Policy 4 The City/County of _____ shall identify the cumulative transportation and air quality impacts of all general plan amendments approved during the previous year.

Note: This may be in form of the Annual General Plan Status Report recommended by the Governor's Office of Planning and Research in the General Plan Guidelines. This information will assist the District in predicting long term indirect source impacts and could also be used in the mandatory report required by the Congestion Management Program.

Implementation Strategy:

Develop a system that tracks changes in land use by traffic analysis zone. Work with the District to perform air emissions modeling on the cumulative land use changes.

Policy 5 The City/County of _____ shall reduce the air quality impacts of development projects that may be insignificant by themselves, but cumulatively are significant.

Implementation Strategy:

Small residential and commercial projects usually do not cause significant air quality impacts, but when a number of small, unrelated projects are developed in an area, they produce a cumulative impact. These impacts may be addressed in specific plans that set development standards and require mitigation for the plan area. They may also be addressed by local ordinances that institutionalize mitigation measures, making them applicable to all projects regardless of size.

Policy 6 The City/County of _____ shall encourage innovative mitigation measures to reduce air quality impacts by coordinating with the District, project applicants, and other interested parties.

Implementation Strategy:

Innovative measures can be identified during a pre-application consultation process and during city/county staff/applicant negotiation over CEQA mitigation.

Air Quality Benefits:

The policies in this section address the requirements of CEQA to identify and reduce the environmental impacts of development projects. By implementing these policies, cities and counties will be fulfilling their responsibilities for determining short term and long-term air quality impacts and for using all feasible measures to reduce those impacts. Reducing air quality impacts means finding ways for projects to cause less pollutant emissions, and that is the primary goal of the Air Quality Guidelines.

CEQA allows each jurisdiction to determine within certain guidelines what is a "significant environmental effect" and what is "feasible mitigation." This has led to situations where one jurisdiction requires an EIR and substantial mitigation while a neighboring jurisdiction requires limited environmental review and limited mitigation for a similar project. If all jurisdictions implement Policies 1 and 2, it would create a level playing field for jurisdictions throughout the San Joaquin Valley. Air quality issues created locally have a regional effect, and air pollution does not respect political boundaries. Policies 1 and 2 would ensure that all projects would be subject to the same air quality analysis requirements and would mitigate project emissions to the

same extent. By raising all projects to the same high standard, it would ensure that jurisdictions within the region are not using less-stringent standards. Where jurisdictions are using less-stringent standards, there is the potential to emit more pollutants due to their lax standards. Consequently, fewer pollutants would be emitted when all projects use the same high standards.

The purpose of Policy 3 is to ensure that all mitigation measures are appropriate. To do this, the lead agency must consider the individual circumstances of each project site when requiring mitigation. An example of an inappropriate mitigation measure would be one requiring a bus shelter for a project not on an existing or planned bus route. The primary benefits of this policy are economic. Resources wasted on ineffective mitigation measures are resources lost for use on measures that are effective in reducing emissions.

Air pollution is a regional problem that is affected by the cumulative land use decisions of every city and county in the San Joaquin Valley. Policy 4 would enable a local jurisdiction to more accurately predict the cumulative air quality impacts of general plan build out, and would allow the District to predict impacts for the entire Valley. This information is vital for determining the emission reductions that will be needed to attain state and federal air quality standards.

Policy 5 is intended to encourage cities and counties to mitigate emissions from small sources that are minor when looked at in isolation, but become large when examined cumulatively. It is usually easier to mitigate emissions from larger projects because of economies of scale; however, small projects can provide on-site measures that will encourage people to use alternatives to motor vehicles and to reduce area-wide source emissions. The implementation of mitigation measures through local or county ordinances would require that mitigation measures be implemented regardless of whether the project contributes insignificant air quality impacts. This would ensure that all mitigation is applied to all projects regardless of project size and minimizes air quality impacts.

Policy 6 recognizes that the person or business affected by a mitigation measure is often best at identifying the most cost effective solutions. By allowing the developer to propose new and innovative solutions, you tap creativity driven by the developer's economic self-interest. Further, soliciting the input of interested parties will help to create a dialogue between all parties and identify mitigation measures that may have been overlooked. Once new mitigation measures are proven, their use throughout the air basin will improve air quality and reduce compliance costs.

Programs in Operation:

Numerous air districts within the state have developed environmental guidance manuals that provide guidance in the determination of significance of air quality impacts, establish emissions thresholds for project review, and set project analysis requirements to comply with CEQA. Examples of air districts that have environmental guidance manuals include the Bay Area Air Quality Management District (BAAQMD), Sacramento Metropolitan Air Quality Management District (SMAQMD), and the South Coast Air Quality Management District (SCAQMD).

The District has implemented an enhanced CEQA review program. The District has assigned staff to comment on discretionary development projects with the potential for significant adverse air quality impacts submitted by cities and counties. They have developed a list of suggested air quality measures for use by lead agencies. The District adopted the *Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI)* guidance manual on August 20, 1998 and has undergone subsequent revisions. The document provides guidance for addressing air quality in environmental documents within the District. District staff also reviews air quality analyses for accuracy.

Resources:

District maintains CEQA staff at to comment on environmental documents and to answer air quality questions. The phone number is (559) 230-5800.

The District's *Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI*) provides guidance to local government, project applicants, and consultants in analyzing air quality impacts of development projects and in meeting the requirements of the CEQA review process. Guidance in determining significance of air quality impacts, emissions thresholds for project review, project analysis requirements to comply with CEQA, and recommended mitigation measures to help minimize air quality impacts are included within the *GAMAQI*. The *GAMAQI* is available from the District at (559) 230-5800 and <www.valleyair.org/transportation/ceqa_guidance_documents.htm>.

COORDINATION/COOPERATION

Issue:

Coordination and cooperation are embraced by all, but we seldom achieve effective coordination and cooperation in government programs. Competitive and adversarial relationships common between many cities and counties and with outside agencies have proven counterproductive. Working together for a

common interest can multiply the resources available to accomplish air quality goals.

Objective 1b To coordinate local air quality programs with regional programs and those of neighboring jurisdictions.

Policy 7 The City/County of _____ shall work with neighboring jurisdictions and affected agencies to address cross-jurisdictional and regional transportation and air quality issues.

Note: The term neighboring jurisdiction generally refers to the county or to cities sharing a sphere of influence boundary. The extent of regional impact and consultation depends on the scope of the project.

Implementation Strategies:

Create an environment that allows and encourages staff members to keep up with activities in neighboring jurisdictions and regional agencies. This may be accomplished by sending representatives to appropriate meetings, by contacting counterparts in other agencies when developing programs, and, most importantly, by active participation in regional programs.

Planning agencies should develop internal procedures to ensure that all affected jurisdictions and agencies are notified of development proposals in accordance with state law. When another agency notifies your agency of a pending project, you should be examining air quality related issues, such as the following:

- *Congestion on roads in your jurisdiction from increased traffic caused by the project*
- *Effects on the viability of transit and pedestrian-oriented developments in your area (i.e., approval of a low density development on the same transit corridor as your transit-oriented development could reduce the ability of the transit provider to provide reasonable headways)*
- *Failure of the other jurisdiction to require the construction of a segment of a bikeway planned in the regional bikeway plan*
- *Proposed circulation amendments that may restrict traffic flow to or from your jurisdiction or that increase urban sprawl*

- *Proposed project may preclude or minimize the effectiveness of transit and pedestrian-oriented development/programs*

Policy 8 The City/County of _____ shall consult with the District during CEQA review for discretionary projects with the potential for causing adverse air quality impacts.

Note: The District will meet with project proponents to conduct a pre-application review to discuss air quality review/mitigation requirements when requested.

Implementation Strategy:

Ensure that the District is on the distribution list for all CEQA documents.

Conduct a pre-application air quality review to identify issues or problems that might require redesigning or major alterations of the project. The District may also review formal air quality impact analyses submitted by the applicant for adequacy. This will ensure that the environmental document bases its conclusions on accurate information.

Policy 9 The City/County of _____ shall coordinate with other jurisdictions and other regional agencies in the San Joaquin Valley to establish parallel air quality programs and implementation measures (trip reduction ordinances, indirect source programs, etc.).

Implementation Strategy:

Work with the Councils of Governments on programs implementing transportation control measures to reduce vehicle trips (VT) and vehicle miles traveled (VMT).

Work with the County or neighboring cities and counties to ensure programs are complimentary.

Be involved in the rule development process. Provide representation on air quality steering and advisory committees.

Discussion: This policy seeks to promote a level playing field for all jurisdictions in the Valley. Also, large regional employers prefer uniform programs so compliance is the same at all employment sites.

Policy 10 The City/County of _____ shall work to reach an equitable tax sharing arrangement with the city/county to avoid the fiscalization of land use decisions.

Implementation Strategy:

Develop a joint powers agreement or other legal instrument to provide an incentive for counties to discourage urban commercial development in unincorporated areas and promote urban infill and redevelopment projects.

Policy 11 The City/County of _____ shall support investment in cost-effective multi-use modeling and geographic information system technology.

Implementation Strategies:

Join a GIS users group. Identify systems being developed by other agencies that coincide with your agencies needs and propose a joint venture. Participate in Valley-wide GIS projects.

Air Quality Benefits:

The policies included under Objective 1b recognize that air quality problems are both local and regional, and that that air pollution does not respect political boundaries. These policies highlight the need for cross-jurisdictional planning and environmental review of proposed developments to ensure that each jurisdiction has before it all materials necessary to make responsible planning decisions. Intercity/county coordination and cooperation of planning efforts will streamline the region-wide air quality improvement efforts of the District, as well as the regional efforts of other agencies that may indirectly affect air quality in the Valley.

Policies 7 through 9 provide a general framework encouraging coordination between jurisdictions within the region and between the jurisdictions and the District. Coordination between the regional jurisdictions and the District will ensure all are working toward the same goal of minimizing air quality impacts and that the actions of one jurisdiction does not negatively affect the air quality in another jurisdiction or negate the air quality benefits made by another jurisdiction.

Policy 10 provides a commitment for cities and counties to cooperate in developing tax-sharing arrangements to reduce the temptation of approving discontinuous commercial development in unincorporated areas. The loss of revenues from other sources due to Proposition 13, economic recessions,

and state funding cutbacks have led to extreme competition for sales tax dollars between cities and counties. This competition can lead to urban sprawl, increased vehicle miles traveled, and the inability to provide efficient transit service. By minimizing commercial development within unincorporated areas and promoting urban infill and redevelopment projects, VT and VMT are reduced. In addition, transit, pedestrian, and bike modes of transportation are more accessible and feasible in concentrated development projects, further reducing VT and VMT.

Adoption of Policy 11 would enable a systematic, jurisdiction-wide approach to determining the quantitative impacts of a particular land use, transportation, or air quality planning decision. Geographic Information Systems (GIS) facilitate a jurisdiction-wide approach and can serve as a clearinghouse on information regarding all proposed projects in the jurisdiction's sphere of influence.

GISs help accurately forecast potential impacts on public infrastructure and thereby avoid constructing excess capacity in roads, sewers and water systems. They can also ensure that new development projects contribute a fair amount to the cost of new infrastructure. Air quality benefits are derived from the enhanced ability to determine long-term air quality impacts of development and the appropriate mitigation to reduce impacts.

Cooperation and coordination reduce emissions by allowing air quality programs to be implemented more rapidly and by creating more effective programs. Air quality impacts that are identified during the project review process can be mitigated to reduce pollutant emissions.

Programs in Operation:

The District has staff available to meet with applicants, consultants, and city/county staff to discuss air quality analysis and mitigation requirements for CEQA documents. This can be at the pre-application phase or at any time during the CEQA process. Similar programs are in effect in most larger air districts, such as Ventura County, the Bay Area Air Quality Management District (BAAQMD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), and the South Coast Air Quality Management District (SCAQMD).

Kern County and the City of Bakersfield jointly adopted a general plan for the Bakersfield Metropolitan Area. Procedures and memoranda of understanding were developed for joint adoption of general plan amendments and for plan implementation.

The Councils of Governments in the San Joaquin Valley have entered into a memorandum of understanding to implement valley-wide transportation control measures.

Jurisdictions throughout the nation are implementing GIS. As GIS hardware and software has become less expensive and easier to use, even small cities are finding that GIS is viable. Many jurisdictions and individual agencies are pursuing GIS in the Valley. Assessors Offices, Planning Departments, School Districts, Public Utilities, and others are developing systems or have systems in place. The San Joaquin Valley Geographic Information Systems Council and Interdisciplinary Spatial Information Systems Center provide GIS data for the Valley region.

Statewide, there are many resources available for GIS information. Data are available from the California GIS Council, California Bureau of Land Management, California Spatial Information Library, California Environmental Information Catalog, and the California Environmental Resources Evaluation System. Each of these resources are available online and provide links to other data sources.

Resources:

City of Bakersfield Consolidated Plan 2005, City of Bakersfield Department of Economic and Community Development, Planning Division. <http://www.ci.bakersfield.ca.us/edcd/library/ConPlan2005/toc.htm>.

South Coast Air Quality Management District (SCAQMD). Information on obtaining the CEQA Air Quality Handbook is available from the SCAQMD at <http://www.aqmd.gov/ceqa/hdbk.html>. The SCAQMD is developing the "Air Quality Analysis Guidance Handbook" to replace the CEQA Air Quality Handbook.

San Joaquin Valley Geographic Information Systems Council, <http://www.sjvgis.org>.

Interdisciplinary Spatial Information Systems Center, <http://www.isis.csufresno.edu>.

California GIS Council, <http://www.gis.ca.gov/council/index.epl>.

California Bureau of Land Management, <http://www.ca.blm.gov/gis>.

California Spatial Information Library, <http://www.gis.ca.gov/index.epl>.

California Environmental Information Catalog, <http://ceres.ca.gov >.

California Environmental Resources Evaluation System, <http://gis.ca.gov/catalog>.

INTEGRATED PLANNING

Issue:

In the past, transportation planning emphasized the construction of new roadway capacity to reduce congestion and to meet the needs of planned development. Air quality legislation now mandates all transportation plans to consider air quality. This new emphasis requires our land use and transportation plans to create patterns of development and transportation infrastructure that reduce the need for new capacity and improve air quality.

Objective 1c To integrate land use planning, transportation planning, and air quality planning to make the most efficient use of public resources and to create a healthier and more livable environment.

Policy 12 The City/County of _____ shall consider air quality when planning the land uses and transportation systems to accommodate the expected growth in this community.

Implementation Strategy:

Develop coordinated land use and transportation plans to meet federal, state, and local air quality requirements.

Ensure that land uses proposed in general plan updates and general plan amendments are supported by a multi-modal transportation system and that the land uses themselves support the development of the transportation system.

Policy 13 All City/County submittals of transportation improvement projects to be included in regional transportation plans (RTP, RTIP, CMP, etc.) shall be consistent with the air quality goals and policies of the General Plan.

Implementation Strategies:

Analyze project submittals for consistency. Examples of inconsistent projects are a road widening project that does not consider transit, bicycling, and pedestrian needs along the route or an intersection signalization project that does not involve the installation of signal actuators that can be activated by bicyclists or pedestrians.

Discussion: This policy attempts to tie the regional transportation planning process back to the general plan. The concept behind this policy is that projects funded by the RTIP and other processes have a profound impact on where development will take place and what its composition will be. The city or county should not assume that transportation facilities needed to support general plan build-out will be built unless they are included in the RTP.

Policy 14 The City/County of _____ shall consult with transit providers to determine project impacts on long range transit plans and ensure that impacts are mitigated.

Implementation Strategy:

Work with transit providers to develop long range transit plans based on land use plans supportive of future transit service.

Consult with transit providers during the CEQA process to determine the fiscal impacts of development projects on the transit system and develop funding sources to mitigate those impacts.

Policy 15 The City/County of _____ shall work with the Housing Authority, transit providers, and developers to encourage the construction of low income housing developments that use transit-oriented and pedestrian-oriented design principles.

Implementation Strategy:

Assign a lead agency to pursue grants for planning and constructing a low-income transit-oriented development. Community development departments are logical candidates for this task.

Potential funding sources for project design and construction are Federal Highway funds, transit funds, and housing program funds. Local government would primarily be involved in locating the best project site and in streamlining and assisting in the permit process.

Policy 16 The City/County of _____ shall work with Caltrans and the Regional Transportation Planning Agency to minimize

the air quality, mobility, and social impacts of large scale transportation projects on existing neighborhoods.

Implementation Strategies:

Use existing rail right of ways where feasible.

Provide safe pedestrian and bicycle connections between neighborhoods and shopping areas when they become separated by new rail or freeway projects.

Air Quality Benefits:

Policies in this section emphasize a commitment to truly integrate the transportation requirements planned in the Circulation Element and the land uses planned in the Land Use Element with air quality policies presented in this document. Integrated planning leads to transportation systems that support all modes of transportation and land use patterns that encourage the use of alternative modes. Effective implementation of a fully integrated plan can achieve trip reductions on the order of 10 to 23 percent (ARB 1993) and commensurate air quality benefits.

Projects such as those proposed by Policy 15 would allow people who can least afford car ownership with reasonable options to meet their mobility needs. Providing access to transit will increase employment options for low-income residents and could lead to the retirement of high emitting older vehicles. It is estimated that mixed-use and higher density strategies can achieve a 10 to 30 percent reduction in per-household vehicle travel and related emissions at the neighborhood or community level, while multi-modal transportation systems can reduce regional vehicle travel and associated emissions by 5 to 15 percent (ARB 1997). Further, a combination of TOD and high levels of transit service can increase the use of transit within a neighborhood by 20 to 40 percent (Caltrans 2002).

Policy 16 recognizes that major transportation projects can severely impact existing development. Measures to maintain neighborhood links can minimize increases in trips and vehicle miles traveled.

Programs in Operation:

The State of Oregon Land, Conservation, and Development Commission adopted a Transportation Planning Rule. This rule mandates local governments to consider air quality and mobility in land use decisions and requires local jurisdictions to adopt ordinances to make new development more bicycle, pedestrian, and transit friendly (SDAPCD 1998). The goal of the Transportation Planning Rule is to “promote the development of safe,

convenient and economic transportation systems that are designed to reduce reliance on the automobile so that the air pollution, traffic and other livability problems faced by urban areas in other parts of the country might be avoided…containing urban development; reducing the cost of public services; protecting farm and forest land; reducing air, water, and noise pollution; conserving energy, and reducing emissions of greenhouse gases that contribute to global climate change."

The San Diego Association of Governments has sponsored seminars and workshops, such as "Building Livable Communities," in coordination with cities and neighborhoods in the region. The League of Women Voters and the San Diego Section of the American Planning Association have held similar workshops on an occasional basis.

In 2002, Caltrans released the results of the "Statewide Transit-Oriented Development Study," which is available at <http://www.dot.ca.gov/hq/MassTrans/tod.htm>. The study defines, describes, and examines the implementation of transit-oriented development.

The Federal Highways administration (FHWA) funded Transportation, Community, and System Preservation (TCSP) project, "Creating Transportation Option in the San Joaquin Valley Through Improved Land Use Patterns," built on previous work of the Growth Alternatives Alliance. The project promoted principles of efficient land use in urban areas, livable communities emphasizing pedestrian and transit-oriented design, and protecting productive farmland. Accomplishments of the TCSP project include smart growth publications, Smart Growth Zoning Code and livable communities workshops held at many San Joaquin Valley locations.

EDUCATION

Issue:

Without the understanding and support of the general public, local air quality programs cannot be expected to achieve the desired results. Programs to educate the public on air quality issues are a vital component of a successful air quality program.

Objective 1d To educate the public on the impact of individual transportation, lifestyle, and land use decisions on air quality.

Policy 17 The City/County of _____ shall work to improve the public's understanding of the land use, transportation, and air quality link.

Implementation Strategy:

Planning agencies should assist in educating developers and the public on the benefits of pedestrian and transit friendly development and should participate in local programs that can reduce vehicle trips and miles traveled.

Methods of educating developers and the public on the benefits of pedestrian and transit friendly development include conducting public meetings, workshops, seminars, and providing consultation opportunities for developers. In addition, it is recommended that planning agencies, working with the ARB, District, and the local school districts, develop educational materials regarding air quality, the impact of air quality on people, plants, and animals, and measures that help to improve air quality. These materials would be presented within the curriculum of the local school districts.

Policy 18 The City/County of _____ shall encourage local public and private groups that provide air quality education programs.

Implementation Strategy:

Form a community-wide public/private air quality organization to promote education programs.

Work with the Farm Bureau, the University of California Extension Studies, and farm organizations on educational programs.

Air Quality Benefits:

Public education can be an effective tool for implementing air quality programs. More importantly, public education can lead to changes in travel behavior and mode choice decisions that reduce emissions and improve air quality.

The theory behind air quality public education programs is that if each individual is made aware of the air quality impacts of his/her activities, then that individual is more likely to choose the option that pollutes less. The Bay Area Air Quality Management District credits its high profile "Spare the Air" campaign with reducing NOx levels by 1.776 tons per day on “Spare the Air” days. In addition, the campaign has reduced ROG by 1.86 tons and PM10 by 0.4 tons (Globe Research & Analysis 2003).

Cities and counties can educate developers and the public on land use patterns and site designs that reduce motor vehicle trips and improve air quality. Planning agencies can provide developers, engineers, and designers with information that promotes transit, pedestrian, and bicycle friendly designs. Planning agencies can participate in the professional development programs of associations such as the California Council of Civil Engineers, the American Planning Association, and the Building Industry Association. By working directly with the people designing the projects, air quality design principles are more likely to be incorporated into the projects submitted to cities and counties.

Programs in Operation:

The District conducts extensive air quality public information programs in the Valley. The programs cover the Valley's air quality issues, the sources of pollution, and District air quality rules and regulations. They also focus on what individuals can do to improve air quality. The media used in outreach efforts include brochures (both English- and Spanish-language), news releases to Valley-wide media outlets, public service announcements on radio and television, a Clean Air Kids Calendar, a speakers bureau that is available to speak on an array of air pollution topics, and information on the District's website. The District has prepared brochures on specific rule implementation, such as residential woodburning and trip reduction, and has developed Spare the Air, a program designed to inform employers and the public about air quality in the Valley and how the public can help to improve it. The District places a special focus on youth education through the development of special materials and presentations aimed at students in grades K-12.

In April of 1998, the Growth Alternatives Alliance, a consortium made of the Fresno Business Council, American Farmland Trust, Fresno County Farm Bureau, Building Industry Association of the San Joaquin Valley, and Fresno Chamber of Commerce, published A Landscape of Choice: Strategies for Improving Patterns of Community Growth. The Alliance is committed to protecting vital natural resources, improving the quality of life, and supporting the growth of better communities within Fresno County.

Resources:

The District employs a Public Information staff to administer the District's public education program. District staff is available to assist cities and counties with starting their programs. The Public Information staff may be reached at (559) 230-5800 at the District's central office.

Spare the Air, the District's program to inform and educate the public regarding air quality and pollution prevention is available online at <http://www.valleyair.org/sta/staidx.htm>.

A Landscape of Choice: Strategies for Improving Patterns of Community Growth. Available from the American Farmland Trust, 1949 Fifth Street, Suite #101 Davis, CA 95616. Available online at <http://www.farmlandinfo.org>. A follow-up publication, Livable Neighborhood Development – Implementation Guideline to a Landscape of Choice, provides more specific strategies. Both are available from the Fresno Business Council at Fig Garden Financial Center, 5250 N. Palm, Suite 300, Fresno, CA 93704-2217. <http://www.fresnobc.org>.

Rideshare programs are operating throughout the Valley. These programs encourage all methods of reducing motor vehicle trips, not just ridesharing.

PUBLIC FACILITIES/OPERATIONS

Issues:

City and county governments are often the largest employers in a jurisdiction, and they often operate large vehicle fleets. Local governments should take a leadership role in implementing employer-based trip reduction and fleet operator programs to reduce their own emissions and to provide a model for the private sector.

Objective 1e For public facilities and operations to provide a model for the private sector in implementing air quality programs.

Policy 19 City/County Departments shall take the lead in implementing innovative employer-based trip reduction programs for their employees.

Implementation Strategy:

Ensure that employment contracts negotiated with unions are flexible and allow workers to participate in programs that reduce commute trips.

City/County Departments should work to encourage and implement trip reduction programs to reduce staff commute trips. Examples of trip reduction programs include:

- *Department-sponsored carpooling efforts and rideshare programs*
- *Reimbursement or subsidizing of transit costs for employees*
- *Incentives for employees who use alternative means of transportation (biking, walking, carpooling, etc.)*
- *Preferred parking locations for carpool/rideshare users*

Policy 20 City/County fleet vehicle operators shall replace or convert conventional fuel vehicles with clean fuel vehicles as rapidly as feasible.

Implementation Strategy:

Budget for clean fuel vehicles in long range capital expenditure plans.

Participate in the San Joaquin Valley Clean Cities Coalition to identify fleet vehicle purchase opportunities and shared infrastructure investment opportunities.

Incorporate infrastructure to facilitate the conversion to and use of clean-fuel vehicles. For example, locate L/CNG refueling stations for clean fuel vehicles in convenient and multiple locations to enable convenient and easy refuel of vehicles.

Policy 21 The City/County of _____ shall support the use of teleconferencing in lieu of employee travel to conferences and meetings when feasible.

Implementation Strategy:

With the expansion of technology capabilities, teleconferencing is a readily available and accessible option for many agencies, companies, and individuals. Video and web-based conferencing options are also viable means of meeting and conferencing. Interested public agencies should invest in infrastructure that would allow for telephone, video, and web-based conferencing options. Possible alternatives include the development of a multi-user teleconferencing center, installation of telephone, video, and web-based conferencing technology at existing facilities, and the upgrade of equipment at City/County offices. Use commercial teleconferencing facilities if they are cost competitive considering travel costs and employee time savings.

Policy 22 The City/County of _____ shall encourage departments to set up telecommuting programs as part of their trip reduction strategies.

Implementation Strategy:

Identify positions where telecommuting is feasible. Start a pilot program for the most promising positions with employee volunteers.

Air Quality Benefits:

Policy 19 would encourage City/County Departments to implement innovative trip reduction programs. By encouraging employees to use alternative means of transportation, the number of commute trips generated by City/County workers could be reduced, which would have a beneficial impact on regional air quality.

Policy 20 encourages public vehicle fleet operators to retrofit or replace their conventionally fueled vehicles with cleaner burning fuel systems and vehicles. EPA data suggests that vehicles powered by compressed natural gas (CNG) emit 90 to 97% less carbon monoxide (CO), 25% less carbon dioxide (CO_2), 35 to 60% less oxides of nitrogen (NOx), and 50 to 75% less non-methane hydrocarbon emissions relative to conventional gasoline-powered vehicles, and little to no particulate matter (EPA 2002). Providing infrastructure to conveniently refuel and park clean fuel vehicles will provide incentives for the continued use of these vehicles.

The development of telephone, video, and web-based conferencing technology, as encouraged by Policy 21, would enable government employees and other users to avoid motor vehicle and air travel to meetings. State of the art telephone, video, and web-based conferencing technology can provide two-way, interactive video, audio, and data transmission. Although this technology cannot totally replace face-to-face meetings, it can be effective for many meetings. Telephone, video, and web-based conferencing technology can be very cost-effective for organizations that travel frequently to the same destinations. Money saved from travel expenses can pay the cost of the equipment and any associated charges.

Policy 22 encourages local government agencies to develop telecommuting programs. Telecommuting can be quite effective in reducing vehicle trips and miles traveled by some categories of public employees. Employees could work at home or at a neighborhood telecommuting center. Programs could allow employees to work full time or part time at the remote work site depending on the needs of the job. Because of the relatively short commute distances for most Valley public employees, one would expect limited use of telecommuting centers. Telecommuting centers are most appropriate to serve areas with many long distance commuters and areas with serious traffic congestion. See also the air quality benefits associated with Policy 24.

Programs in Operation:

The District has purchased and plans to continue purchasing hybrid electric-gasoline vehicles, which are considered super ultra low emission vehicles (SULEVs) and advanced technology partial zero emissions vehicles (ATPZEVs), as part of its fleet.

The Los Angeles County Metropolitan Transportation Authority (MTA) is the third largest bus fleet in the nation, and it currently has the largest compressed natural gas (CNG) fleet in the nation with over 1,900 CNG buses in operation, representing over 80% of MTA's fleet. The Golden Empire Transit District (GET) in the Bakersfield Metropolitan area has an active fleet of 79 buses, of which 41 are powered by compressed natural gas, as of 2004.

The U.S. Department of Energy honored the City of Fresno with the City Fleet of the Year award as part of the 2005 Clean Cities National partner Awards program in May 2005. Fresno built a liquefied natural gas (LNG) fueling station and replaced 69 refuse-hauling diesel trucks with LNG-fueled trucks, bring the city in compliance with state regulations five years ahead of schedule.

With the expansion of technology capabilities, teleconferencing is a readily available and accessible option for many agencies, companies, and individuals. Pacific Bell has installed video teleconferencing equipment in several of their major offices in California. Employees in their Fresno office have been able to eliminate some of their trips to Sacramento for staff meetings by teleconferencing.

The District has installed a video teleconferencing system that has been in use for many years. The system has proven successful in saving both money and time, as well as greatly reducing vehicle miles traveled by staff and meeting attendees.

The California State University system has teleconferencing facilities at several campuses, including Sacramento, Bakersfield, Chico, Stanislaus, and Fresno.

Several California cities as well as cities in other states are experimenting with telecommuting to reduce vehicle trips. Telecommuting centers have been established in Ontario, Thousand Oaks, Sherman Oaks, Van Nuys, suburbs of Sacramento, Long Beach, Modesto, San Bernardino, and other cities in California.

Resources:

"Telecommuting - A Handbook to Help You Set Up a Program at Your Company," is an extensive guide to telecommuting prepared by the California Department of Transportation in cooperation with the U.S. Department of Transportation, Federal Highway Administration. A list of the primary author's other publications on telecommuting can be found at <http://www.joannepratt.com/publications.htm>. Local rideshare agencies can provide additional information on implementing telecommuting programs.

Canadian Telework Association/InnoVisions Canada maintains a website with extensive information and guidance regarding telecommuting. Their website is <http://www.ivc.ca>.

CONGESTION MANAGEMENT/TRANSPORTATION CONTROL MEASURES

Issue:

State and federal legislation requires local governments to include strategies to increase the efficiency of transportation infrastructure and to reduce vehicle trips in their transportation plans. Cities and counties can support these strategies by requiring developers to include infrastructure that reduces congestion or trips.

Goal 2: **Reduce traffic congestion and vehicle trips through more efficient infrastructure and support for trip reduction programs.**

Issue:

Transportation control measures (TCMs) are most effective when infrastructure is in place that supports alternative transportation modes. This would include community-wide transportation improvements and on-site improvements at individual worksites and businesses.

Objective 2a To ensure that new development provides the facilities and programs that improve the effectiveness of transportation control measures and congestion management programs.

Policy 23 The City/County of _____ shall consider measures to increase the capacity of the existing road network prior to constructing more capacity (additional lanes, new freeways, etc.).

Implementation Strategies:

Measures that may be included in local and regional transportation plans and capital improvement plans that may increase the capacity and reduce congestion on existing roads include the following:

- *Establish an integrated and synchronized traffic signal network for major thoroughfares to assure smooth-flowing traffic through intersections and to minimize congestion through maintenance of stable traffic flow at intersections*
- *Convert congested streets to one-way couplets where feasible*
- *Modify intersections using turn restrictions, channelization, etc. where necessary and feasible*
- *Redirect truck traffic during peak hours*
- *Construct bus turnouts to remove buses from traveled lanes during passenger loading and unloading*
- *Use freeway ramp metering to promote smoother traffic flow*

Policy 24 The City/County of _____ shall work with employers and developers to provide employees and residents with attractive, affordable transportation alternatives.

Implementation Strategies:

Through zoning ordinance or other means, require new development to provide on-site facilities that encourage employees to use alternative transportation modes as air quality and transportation mitigation measures. Some examples include:

- *Showers and lockers provided in office buildings*
- *Safe and secure bicycle parking areas*
- *On-site employee cafeterias and eating areas*
- *Convenient access to transit waiting areas from offices*

The city or county can provide reduced parking requirements as an incentive for projects to incorporate measures proven to reduce employee commute trips or customer trips.

Some methods employers may use to encourage trip reduction and increased Average Vehicle Ridership include rideshare matching, transit subsidies, vanpool subsidies, flexible work schedules, compressed work weeks, telecommuting, shuttle services, parking management, guaranteed ride home, and

provide preferential or subsidized parking for ride-sharing vehicles.

Reduce parking for businesses that implement strong trip reduction programs.

Encourage employers to provide preferential or subsidized parking for ride-sharing vehicles.

Developers can provide the land use patterns and site designs that increase commuters' ability to walk, bicycle, or use transit to get to work.

Policy 25 The City/County of _____ shall work to establish public/private partnerships to develop satellite and neighborhood work centers for telecommuting.

Note: This policy is best suited for communities with significant numbers of information based workers who currently commute long distances for employment.

Implementation Strategies:

Develop public/private partnerships with long distance commuter-based major employers. Telecommuting centers are generally compatible with mixed-use, pedestrian-oriented, and transit-oriented neighborhood commercial areas.

Identify and provide information and incentives for employer development and participation in telecommuting programs.

Policy 26 The City/County of _____ shall encourage the development of state of the art communication infrastructure linked to the rest of the world.

Implementation Strategies:

Support changes to the State Uniform Building Code to require new homes and businesses to be wired with fiber-optic cables or to require wiring conduits with easy access and adequate capacity to allow for efficient retrofitting. Encourage the development of video-teleconferencing facilities.

Air Quality Benefits:

The policies in this section are intended to provide support for local congestion management and transportation control measure programs. Congestion management programs (CMP) are mandated by state law for urbanized counties with metropolitan areas with 50,000 or more residents. Transportation control measures (TCMs) are required for the San Joaquin Valley by the CCAA and were a part of the mobile source strategy in the District's 1991 Air Quality Attainment Plan. Since their development, these TCMs have been further evaluated and refined by the District. A more detailed description of congestion management programs and the TCM program planned for the San Joaquin Valley is provided in Section III.

TCMs are strategies to reduce emissions by reducing motor vehicle trips, vehicle miles traveled, and idling. They accomplish this by encouraging people to drive less. The ability and willingness of people to drive less is highly dependent on cost, convenience, and comfort of the alternatives to driving alone. Policies throughout this document encourage new development to be constructed in ways that encourage the use of alternative modes of travel. The policies in this section provide some specific actions that can enhance the long-range effectiveness of TCMs.

One of the purposes of congestion management programs is to improve system efficiency by implementing measures that will increase the capacity of the existing system with a minimum of capital improvements. Adopting Policy 23 would place a similar provision in the general plan. The intent of the policy is to make the most efficient use of existing transportation infrastructure by reducing travel demand and by improving traffic flow.

Policy 24 provides a basis for improving transportation options from new and existing development. One way to improve these options would be to provide infrastructure that encourages people to use alternative modes of transportation or to rideshare. This infrastructure could be required as CEQA mitigation or by local ordinance. Providing infrastructure such as cafeterias, showers, lockers, bike lockers, transit shelters, pedestrian amenities, etc. is much easier at the time of initial construction than it is to retrofit them later. Although providing this type of infrastructure does not guarantee that people will change their travel habits, it does eliminate many of the negative factors people consider when choosing their mode of travel.

Policy 25 encourages cities and counties to form public/private partnerships to provide telecommuting centers to mitigate transportation and air quality impacts. Telecommuting centers provide office space in a neighborhood or at a remote site so that employees can avoid commuting to the main office. The main air quality benefits of these centers are due to reduced vehicle miles traveled and reduced congestion en route to the main worksite. In addition to

the air quality benefits, employees can improve their quality of life by increasing time available for their families. Employers can benefit from reduced facility costs and increased productivity (Caltrans). When telecommuting centers are near to residential development, some employees will be within walking or bicycling distance of work and will have a greater potential to use transit to get to work.

Policy 25 is intended for areas where significant numbers of long distance commuters are expected to reside. These areas can provide enough potential users of the centers to make them feasible. As telecommunication technology improves, more jobs will have the potential to be performed at locations remote from the main office. This will result in greater reliance on telecommuting and fewer trips and miles traveled.

A comparison of the travel behavior and personal vehicle emissions of participants in the State of California Telecommuting Pilot Project, first planned in 1985 and finalized in 1990, indicated a 27% reduction in the number of personal vehicle trips, a 77% decrease in vehicle-miles traveled (VMT), and 39% (and 4%) decreases in the number of cold (and hot) engine starts. These decreases in travel translate into emissions reductions of: 48% for Total Organic Gases (TOG), 64% for Carbon Monoxide (CO), 69% for Nitrogen Oxides (NOx), and 78% for Particulate Matter (PM). An analysis of the number of trips and VMT partitioned into commute-related and non-commute-related purposes revealed that non-commute trips increased by 0.5 trips per person-day on average, and non-commute VMT decreased by 5.3 miles (Institute of Transportation Studies, 1996).

Telecommunications technologies are changing the way we work, shop, and conduct personal business. Information is becoming decentralized. This eliminates the need for people to position themselves close to a large mainframe computer or paper files at a centralized location to work. Services such as video rental may become obsolete as technologies offering movies and shows on demand increase in popularity and become more affordable. These technologies eliminate many needs to travel and so eliminate the motor vehicle emissions associated with that travel. Policy 26 is a commitment on the part of local government to bring state of the art telecommunications capabilities to their communities.

Local government can encourage the installation of fiber-optic cable in homes and businesses. Fiber optics are necessary to carry the massive amounts of information required to achieve true interactive voice, data, and image transmission. By placing this capability in the homes and businesses being constructed today, it will be just a matter of turning on a switch rather than a total rewiring effort.

As with most of the other policies in this document, the air quality benefits are long term and incremental. Most transportation control measures apply to existing activities and businesses. This means that when TCMs are initially adopted, the businesses and activities affected will receive limited benefit from new infrastructure. However, as new development proceeds, an increasing percentage of businesses and activities will benefit.

One of the primary intents of air quality elements or policies is to increase the effectiveness of TCMs. Developing land use patterns and transportation infrastructure supportive of alternative modes of transportation can make a dramatic difference in the success of the Transportation Control Measure Program. The District *Amended 2002 and 2005 Rate of Progress Plans for San Joaquin Valley Ozone* estimates that TCMs will be responsible for reducing NOx emissions by 1.5 tons per day (District 2002).

Programs in Operation:

TCMs have been implemented by many local jurisdictions in the San Francisco Bay area and Los Angeles area. The most common measures are employer based commute trip reduction programs. Transportation system measures to reduce congestion, such as signal synchronization and channeling of traffic, are accomplished in most cities and counties in the Valley and other metropolitan areas of California.

In September 1997, the Guaranteed Ride Home program started in Ventura County, providing rides home to persons who use public transit, carpool, or vanpool to get to work or to a job training program in Ventura County who have an emergency, childcare problem, or unanticipated overtime. The program was created to encourage persons to use the bus, train, a carpool, or vanpool by providing a safety net for a ride home in case of emergency. Persons registered in the program will have a free taxi ride or rental car provided, depending on the distance involved. There is no fee for the service to either the individual or employer. Over the first two years, 8,500 individuals and 140 employers have registered, and 260 free rides (226 taxi rides, 34 car rentals) have been provided (American Public Transportation Association, American Public Transit Association 1999).

Since 1993, the Los Angeles County's Telecommuting Program has provided more than 5,000 county employees an alternative way of working without the long commute to work. The home-based telecommuting program allows employees to work from their homes, and the program currently accounts for 98 percent of the county's teleworkers. The telework exchange program option places telecommuters at near-home workstations in other county or city offices. Two telebusiness centers provide a total of 60 workstations for use by public and private employees who live in the Antelope Valley and wish to eliminate the two-hour drive to downtown Los Angeles. The centers have

become self-funded through usage fees charged to client telecommuters or their employees, and facility exchange agreements allow participants to utilize stations at no cost. The county also allows for emergency or short-term telecommuting in the event of natural disasters or public transit strikes (Beardslee 1997).

Resources:

Cities and counties can obtain information about TCMs and congestion management program requirements from their Regional Transportation Planning Agency and from the District, Mobile and Transportation Section.

Ventura County Guaranteed Ride Home Program, Ventura County Transportation Commission (VCTC) 950 County Square Drive Suite 207, Ventura, CA 93003. <http://www.goventura.org/home/index.asp?page=9>.

Los Angeles County's Telecommuting Program, Chief Administrative Office – Office of Workplace Programs, Los Angeles County, 500 W. Temple St., Rm. 526, Los Angeles, CA 90012.

TOXIC AND HAZARDOUS EMISSIONS

Issues:

Past siting decisions for industrial and residential development have created conflicts where none should have existed, raising public concern over exposure to toxic and hazardous emissions. Providing appropriate areas for all types of development can minimize conflicts and promote economic growth.

Goal 3: **Minimize exposure of the public to toxic air pollutant emissions and noxious odors from industrial, manufacturing, and processing facilities.**

Objective 3a To provide adequate sites for industrial development while minimizing the health risks to people resulting from industrial toxic or hazardous air pollutant emissions.

Policy 27 The City/County of _____ shall require residential development projects and projects categorized as sensitive receptors to be located an adequate distance from existing and potential sources toxic emissions such as freeways, major arterials, industrial sites, and hazardous material locations.

Note: This policy is intended to protect existing residential development and other sensitive receptors from conflicts with new industrial development. The types of businesses that are categorized as point sources are often incompatible with residential uses for a number of reasons, including noise, truck traffic, visual concerns, and air quality. These are not the types of businesses encouraged for mixed-use developments or for commercial/office activity centers where we would expect more people to walk to work. The policy recognizes that businesses that are point sources are vital to the economy of the San Joaquin Valley and will be built, but that cities and counties must use care in planning their sites to avoid conflicts.

Implementation Strategies:

Consult with the District to identify sources of toxic air emissions and determine the need for and requirements of a health risk assessment for the proposed development. Consult with project proponents during the pre-application review process to avoid inappropriate uses at affected sites and during the environmental review process for general plan amendments and general plan updates.

Use District stationary source and air toxics location data in a geographic information system. A valley-wide GIS system that could contain this information is being considered now in the early planning phase.

Policy 28 The City/County of _____ shall require new air pollution point sources such as, but not limited to, industrial, manufacturing, and processing facilities to be located an adequate distance from residential areas and other sensitive receptors.

Implementation Strategies:

Require project proponents to prepare health risk assessments in accordance with District recommended procedures as part of environmental review when the proposed industrial process has associated air toxic emissions that have been designated by the state as a toxic air contaminant or, similarly, by the federal government as a hazardous air pollutant.

Designate adequate industrial land in areas downwind and well separated from sensitive uses. Designate non-sensitive land

uses for areas surrounding industrial sites. Protect vacant industrial sites from encroachment by residential or other sensitive uses through appropriate zoning.

Air Quality Benefits:

The policies in this section focus on adequately separating people from industrial processes that emit toxic and hazardous emissions. Although the best way to reduce exposure to these emissions is through source reduction, that program is the responsibility of the District. The role of cities and counties is to plan the arrangement of land uses to minimize exposure. If properly implemented, the policies in this section will help minimize the health risks associated with exposure to toxic air contaminant and hazardous air contaminant pollutant emissions.

Although emissions of criteria pollutants are not reduced by the policies in this section, the real and perceived benefits to the community can be significant. The public often places higher importance on the potential for industrial toxic emissions to cause small increases in the risk of cancer and birth defects than it does on the long term chronic effects of high ozone, CO, PM10, and PM2.5 levels. The policies in this section, if properly implemented, will help minimize the health risks associated with exposure to toxic air contaminant and hazardous air pollutant emissions.

Land use decisions can also raise or lower the potential for acute toxic incidents from accidental chemical spills and gas releases. Industries using and storing extremely hazardous materials should also be located well away from concentrations of people. Programs to manage hazardous materials and to reduce the potential of acute toxic incidents are usually the responsibility of local fire departments.

By protecting industry from encroachment by residential development, local government can help to foster economic growth. Proper planning can avoid industrial/residential conflicts, reducing the potential for litigation and nuisance complaints. This can help communities to retain or attract industrial development.

Programs in Operation:

The District has implemented a comprehensive toxics program. The District's mandates are from AB 1807 Tanner Air Toxics Act, AB 2588 Air Toxics "Hot Spots" Information and Assessment Act, AB 3205 Toxic Emissions Near Schools, SB 1731 "Hot Spots" Risk Reduction Mandates, the Federal Clean Air Act Amendments Title III, and other laws. These bills require inventories, public notification, health risk assessments, and risk reduction under certain circumstances.

The District's Public Notification Procedures Document, mandated by AB 2588, includes procedures that place requirements on certain sources of toxic emissions and on the District. Facilities with theoretical risks greater than specified significance thresholds for which there are no receptors within the impacted area at the present time are deemed potentially significant. An example is an existing chemical manufacturing plant with no development nearby. Under the notification procedures, the District will notify all landowners and land use agencies within the impacted area that there is a source of toxic emissions in the vicinity. This will allow decision makers to take this information into account when making land use decisions involving new sensitive uses. The procedures also require the operator of a potentially significant source to notify the District within 60 days after a receptor locates within the area impacted by the source. An example is the construction of a residential subdivision near an existing source of toxic emissions like a refinery or a chemical plant. This triggers requirements for the toxic source to submit emissions data, prepare a health risk assessment, and for facilities that pose a significant risk to implement measures to reduce emissions.

Through the District's internal referral process, District CEQA staff may send development projects that have potential toxic emissions to Toxic Assessment staff for review and comment. The Toxics Assessment staff may identify projects that require health risk assessments and other actions mandated by state and federal law.

Resources:

The District's Air Toxics Program can provide information regarding this program. (559) 230-5900. <http://www.valleyair.org>.

The ARB's *Air Quality and Land Use Handbook: A Community Health Perspective*, was adopted in April 2005 and is available online at <http://www.arb.ca.gov/ch/aqhandbook.htm>. It provides suggested siting distances between sensitive land uses and sources of toxic air contaminants.

FUGITIVE DUST/PM10

Issues:

Levels of PM10 (particulate matter less than 10 microns in diameter) exceed state and federal health based standards. The San Joaquin Valley is classified as a serious nonattainment area for PM10 under the federal criteria. Because of this classification, the District is subject to a series of federal mandates aimed at achieving the federal ambient air quality standards. These include adoption of contingency measures and implementation of Best

Available Control Measures (BACM). Control efforts for sources under the jurisdiction of cities and counties can significantly reduce these emissions. The District adopted the *2003 PM10 Plan* on June 19, 2003 to meet federal requirements. The *2003 PM10 Plan* was amended on December 18, 2003 and May 19, 2005, and the District is currently working on the *2006 PM10 Plan*, due to the EPA March 31, 2006.

Goal 4: **Reduce particulate emissions from sources under the jurisdiction of the city/county.**

Objective 4a To reduce emissions of PM10 and other particulates with local control potential.

Policy 29 The City/County of _____ shall work with the District to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible.

Implementation Strategies:

The City/County should include PM10 control measures as conditions of approval for subdivision maps, site plans, and grading permits. This will assist in implementing and enforcing the District's fugitive dust regulation (Regulation VIII, Fugitive PM10 Prohibitions). District rules implementing Regulation VIII were amended in 2001 and again in 2004; see <http://www.valleyair.org/rules/1ruleslist.htm#reg8> for the current version.

The City/County should inform developers of the requirements of the District's Regulation VIII when they apply for a grading permit. Coordinate fugitive dust enforcement actions with the District.

Use strategies to minimize soil disturbances including:

- *Minimize vegetation removal required for fire prevention to the extent compatible with public safety considerations. Utilize alternatives to discing, such as mowing, to the extent feasible. Where vegetation removal is required for aesthetic or property maintenance purposes, encourage or require alternatives to discing*
- *Strongly encourage subdivision designs and site planning which uses landform grading in hillside areas and minimizes grading*

- *Condition grading permits to require that graded areas be stabilized from the completion of grading to commencement of construction*

Policy 30 The City/County of _____ shall require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.

Implementation Strategy:

Include paving requirements as part of the development standards of the Zoning Ordinance or Subdivision Ordinance.

Policy 31 The City/County of _____ shall reduce PM10 emissions from City/County maintained roads to the maximum extent feasible.

Implementation Strategies:

Develop plans and funding sources to pave heavily used unpaved roads.

Develop a street cleaning program aimed at removing heavy silt loadings from roadways that result from sources such as storm water runoff and construction sites.

Pave shoulders and pave or landscape medians. Curb and gutter installation may provide additional benefits where paving is contiguous to the curb.

Air Quality Benefits:

Relatively simple measures can reduce PM10 emissions from construction activities by 20 to 74 percent. Periodically applying water to construction sites can reduce PM10 emissions by 50 percent. (Monterey Bay Unified Air Pollution Control District (MBUAPCD) 2002). Planting and maintaining vegetation in disturbed areas as soon as possible can greatly reduce PM10 emissions between 5 and 99%, based on planting plan (MBUAPCD 2002). Paving dirt roads and parking areas is very expensive, but is also very effective. The US EPA estimates that paving construction roads and access roads can reduce PM10 emissions by over 90 percent.

The MBUAPCD has summarized the effectiveness of various PM10 control measures. Table 4-1 provides a summary of this information.

Because of the San Joaquin Valley air basin's classification as a serious nonattainment area, the District prepared a *Serious PM10 Nonattainment Area Plan*. The plan included more stringent Best Available Control Measures (BACM). The District adopted a *2003 PM10 Plan* on June 19, 2003. The air quality goals, projections, and BACM of the *2003 PM10 Plan* are based upon the progress of previous PM10 plans, updated PM10 emissions inventories, and current state and federal standards.

The District estimates that the paving of unpaved surfaces (Policy 30) can reduce PM10 emissions from this source by up to 90% (District 1991). Because the paving of all unpaved roads in the Valley is infeasible, Policy 31 is directed at roads that would likely receive heavy vehicular use. Other dust control measures for unpaved roads are also available, including preventing soil transport from areas adjacent to paved roadways by installing curbing or automatic truck and wheel washers, applying water, mechanical stabilization (i.e., compaction), chemical stabilization, limiting speeds or vehicular weight, and covering of unpaved roadways with gravel.

Policy 31 also requires cities and counties to reduce PM10 emissions from paved roadways. One way this can be accomplished is via a street sweeping/cleaning program. Street sweeping in places with high silt loadings can be effective. District Regulation VIII (Fugitive PM10 Prohibitions) contains requirements for local jurisdictions to pave unpaved public roads and unpaved shoulders, street-sweeping program requirements, and post-event street clean-up guidelines (See Rule 8061, Paved and Unpaved Roads). Local jurisdictions should expeditiously implement these requirements and are encouraged to implement similar or superior programs appropriate for their areas of responsibility. The SCAQMD South Coast Air Quality Management District (SCAQMD) has an adopted rule that requires the inclusion of alternative fueled street sweepers (see SCAQMD Rule 1186.1, Less Polluting Sweepers). As technology improves and new street sweeper models are certified as PM10-efficient, local jurisdictions should work closely with the District to determine the best method and equipment.

Cities and counties play a crucial role in obtaining PM10 reductions. PM10 measures may be required as CEQA mitigation, and mitigation measures are usually monitored by local agencies. Most local roads are under the jurisdiction of local governments, so programs to reduce emissions from paved and unpaved roads will be the responsibility of local governments. Control of PM10 emissions from construction activities can be most effectively enforced when the District and local jurisdictions work cooperatively.

Table 4-1 Sample Mitigation for Construction Activities and Emission Reduction Efficiencies

Mitigation Measures	Source Category	Effectiveness	Source
Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure.	Fugitive emissions from active, unpaved construction areas	50%	U.S. EPA, "AP-42, Vol. I." Pg 11.2.4-1.
Prohibit all grading activities during periods of high wind (over 15 mph).	Grading emissions	Reduces potential for exceedance	SCAQMD, "SIP for PM10 in the Coachella Valley" 1990. Pg 5-15
Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).	Wind erosion from inactive areas	Up to 80%	U.S. EPA, "AP-42, Vol. I." Pg. 11.2.4-1.
Apply non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations	Wind erosion from inactive areas	Up to 80%	U.S. EPA, "AP-42, Vol. I." Pg. 11.2.4-1.
Haul trucks shall maintain at least 2'0" of freeboard.	Spills from haul trucks	90%	MBUAPCD
Cover all trucks hauling dirt, sand, or loose materials.	Spills from haul trucks	90%	MBUAPCD
Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land	Wind erosion from inactive areas	4% (15% for mature trees)	SCAQMD, "SIP for PM10 in the Coachella Valley" 1990. Pg 5-15
Plant vegetative ground cover in disturbed areas as soon as possible.	Wind erosion from inactive areas	5%-99% (based on planting plan)	SCAQMD, "SIP for PM10 in the Coachella Valley" 1990. Pg 5-15
Cover inactive storage piles.	Wind erosion from storage piles	Up to 90%	U.S. EPA "AP-42, Vol. I." Page 11.2.3-4)
Install wheel washers at the entrance to construction sites for all exiting trucks.	On-road entrained PM10	50%	SCAQMD, "SIP for PM10 in the Coachella Valley" 1990. Pg 4-11
Pave all roads at construction sites.	On-road entrained PM10	90%	SCAQMD, "SIP for PM10 in the Coachella Valley" 1990. Pg 4-12
Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours.	All emissions	Minimizes nuisance levels	MBUAPCD
Limit the area under construction at any one time.	Fugitive emissions from active, unpaved construction areas	71 lb/acre/day	MBUAPCD based on U.S. EPA "AP-42," Vol. I

Note: These effectiveness estimates are not additive within a source category (i.e., the benefit of 2 or more mitigation measures that address the same source of emissions would not be the sum of both measures).
Source: Monterey Bay Unified Air Pollution Control District 2002.

Disturbed, non-stabilized farmland coupled with wind events has resulted in severe episodes of blowing dust that have reduced visibility to zero along Valley highways. Programs to stabilize disturbed farmland, for example, through the planting of ground cover, could greatly reduce the possibility of tragic accidents on our highways, reduce the spread of valley fever spores, and prevent exceedances of PM10. On-field agricultural uses are not subject to the requirements of the District's Regulation VIII but are subject to Rule 4550, the District's Conservation Management Practice (CMP) Program, which is one of the key control strategies in the 2003 PM10 Plan.

Rule 4550 was designed to reduce fugitive PM10 emissions from agricultural operations, both on and off fields. Rule 4550 contains the administrative procedures for implementing CMPs in the San Joaquin Valley Air Basin. Rule 3190 provides a mechanism to allow the District to collect fees from the affected agricultural sources to offset the District's administrative and compliance costs of the CMP Program. The CMPs available for grower implementation are included in a CMP list and are described in a CMP Handbook made available to the affected sources.

Programs in Operation:

Most jurisdictions in the San Joaquin Valley now require some level of dust/PM10 control. Some cities have adopted dust control ordinances. Some cities and counties condition grading permits with dust control measures. A number of cities and counties require dust/PM10 control as CEQA mitigation.

Resources:

The District, Planning Department, PM10 Section can provide copies of draft PM10 Rules and further information on PM10 control measures. These can be found at <http://www.valleyair.org/Air_Quality_Plans/AQ_plans_PM.htm>. The Planning Department can be reached at (559) 230-5800.

ENERGY

Issues:

Natural gas burning appliances used for space heating, water heating, and cooking are a sizable source of NOx emissions. Our consumption of electricity also causes pollutant emissions from the operation of power plants fueled by fossil fuels. Local efforts to reduce energy consumption can save consumers money and improve air quality. Furthermore, according to the California Energy Commission, transportation represents about 50 percent of the total energy use statewide (California) (Caltrans 2002 and CEC 2001). California's 22 million automobiles consume more than 13 billion gallons of

gasoline. If current trends continue, gasoline use is projected to increase by approximately 40% from 2000 to 2020 (Caltrans 2002 and CEC 2000).

Goal 5: Reduce emissions related to energy consumption and area sources.

Issue:

Simple and cost-effective designs, technologies, and methods are available to achieve energy savings and reduce air pollutant emissions.

Objective 5a To encourage the use of energy conservation features and low-emission equipment for all new residential and commercial development.

Policy 32 The City/County of _____ shall work with the local energy providers and developers on voluntary incentive-based programs to encourage the use of energy efficient designs and equipment.

Implementation Strategies:

Encourage the incorporation of energy conservation features in the design of all new construction and the installation of conservation devices in existing developments.

Encourage energy audits of existing structures, identifying levels of existing energy use and potential conservation measures.

Encourage the use of passive design concepts that make use of the natural climate to increase energy efficiency.

Encourage new development not to preclude the use of solar energy systems by uses and buildings on adjacent properties.

Incorporate the most energy-efficient design consistent with a reasonable rate of return and the recognition of the environmental benefits of energy conservation for all local government facilities and equipment.

Perform an energy audit of existing public buildings within five years and retrofit where cost-effective.

Develop an energy management system for public buildings.

Policy 33 The City/County of _____ shall cooperate with the local building industry, utilities and the District to promote enhanced energy conservation standards for new construction.

Implementation Strategy:

Work with the California Energy Commission (CEC) and local utilities to identify areas of the existing state standards that can be enhanced most cost-effectively.

Policy 34 The City/County of _____ shall encourage new residential, commercial, and industrial development to reduce air quality impacts from area sources and from energy consumption.

Note: Area sources include small stationary equipment such as water heaters, fireplaces, barbecues, and gardening equipment. These sources are small individually, but collectively they are significant because of their large numbers and widespread use.

Implementation Strategies:

Support the use of weatherization programs for existing residential units and businesses.

Examine the possibility of requiring the installation of supplemental solar water heaters for new residential units.

Support future District incentives and regulations to reduce emissions from swimming pool heaters.

Encourage the use of solar water and pool heaters, and energy efficient lighting.

Encourage developers to orient housing units and landscape building sites to maximize solar heating and cooling.

Encourage the installation of energy efficient fireplaces and wood stoves in lieu of normal open-hearth fireplaces.

Provide natural gas lines or electrical outlets to backyards to encourage the use of natural gas or electric barbecues, and electric gardening equipment.

Support the use of electric vehicles, such as golf carts, where appropriate. Provide electric recharge facilities for electric vehicles.

Air Quality Benefits:

Local programs to increase energy efficiency can reduce demand for electricity by 10 to 40 percent beyond levels expected from state mandated programs (CEC 1993). Reducing the demand for electricity will reduce pollutant emissions from fossil fuel power plants. Reducing home and commercial uses of natural gas for space and water heating will reduce NOx emissions by an amount proportional to the energy savings.

Local programs can target both new and existing development. Programs targeted at retrofitting existing residences and businesses can achieve the greatest reductions in energy use. This is because 75 percent of the homes built in California were built prior to adoption of efficiency standards. Programs to go beyond state energy efficiency standards or to better enforce the existing standards for new construction can improve energy efficiency by 11 percent or more (CEC 1993).

Energy conservation also provides economic benefits to the community. Every dollar not spent by local residents on energy is available for spending on other goods and services in the community.

Recent improvements in electric powered gardening equipment provide inexpensive and less-polluting alternatives to gasoline-powered equipment. Using a gasoline-powered mower for one hour emits as much pollution as 40 late-model cars operating for the same period of time. New electric models are cordless and rechargeable and are easier to operate and maintain than gasoline powered equipment. The ARB estimates that using electric powered mowers instead of gasoline mowers decreases emissions 70-fold even after taking into account the electric power plant emissions (Green Consumer 1993).

Lighting is the single largest component of commercial energy consumption. The EPA estimates that if energy-efficient lighting were used wherever cost-effective, then electricity consumption nationwide would be reduced 10%, and power plant emissions of air pollutants such as SO_2 and NOx would be reduced by 4 to 7%.

Programs in Operation:

The Pacific Gas & Electric Company (PG&E) has several commercial new construction energy efficiency programs available to owners, developers and contractors. For example, Savings by Design pays cash incentives to

commercial, industrial, and agricultural customers to encourage energy-efficient design and construction.

Resources:

The California Energy Commission's Energy Aware Planning Guide provides an extensive discussion of local programs to reduce energy consumption and related air pollution. It includes general plan policy language, implementation ideas, environmental benefits, programs in operation, and resources. It is available at <http://www.energy.ca.gov/reports/energy_aware_guide.html>.

California Energy Commission, Energy Efficiency and Demand Analysis Division, 1516 9th Street, MS-25, Sacramento, CA 95814. <http://www.energy.ca.gov/efficiency/index.html>

IDEAS Program Manager, City of San Jose, Office of Environmental Management, 777 N. First Street, Suite 450, San Jose, CA 95112.

Information on PG&E incentive programs may be obtained from local PG&E offices, <http://www.pge.com/biz/rebates/>.

SUGGESTED GOALS AND POLICIES FOR LAND USE ELEMENTS

This section provides policies that are best suited for the land use element of the general plan. These policies, if adopted, would affect the future development patterns of the community and as such require close examination by each community to determine their acceptability. If a jurisdiction decides to use these policies in a separate air quality element, care should be exercised to avoid conflicts with the land use element. Cities and counties in the San Joaquin Valley are required by California Government Code to include air quality considerations in the development of their General Plans. In general, to encourage land use strategies that promote alternatives to single occupancy vehicle travel, local governments may use zoning and subdivision regulations, monetary incentives (tax breaks, impact fee adjustments), or non-monetary incentives (such as accelerated permit processing or reduced parking requirements).

Principles for Land Use Planning for Improved Air Quality

The Air District strongly encourages cities and counties of San Joaquin Valley to:

- Plan land use patterns that will encourage people to walk, bicycle, or use public transit for a significant number of their daily trips
  - Use comprehensive community plans and specific plans to ensure development is cohesive and well connected by alternative transportation modes
  - Adopt transit-oriented or pedestrian-oriented design guidelines and designate areas appropriate for these designs in the general plan
  - Encourage higher density development in proximity to frequently used services and transportation facilities

- Develop in a compact, efficient form to minimize vehicle miles traveled and to improve the effectiveness of alternatives to the automobile
  - Use the control of public services to direct growth to the most appropriate locations
  - Encourage infill of vacant land and redevelopment sites

- Promote project site designs and subdivision street and lot designs that encourage walking, bicycling, and transit use
  - Adopt design guidelines and standards promoting designs that encourage alternative transportation modes
  - Require certain sites to be designed to allow convenient access by transit, bicycle, and walking.

LAND USE, TRANSPORTATION AND AIR QUALITY

Issue:

Motor vehicle use has historically been a major cause of exceedances of state and federal ozone and carbon monoxide standards in the San Joaquin Valley. The land use pattern and transportation system developed over the last 50 years has led to ever increasing vehicle trips and vehicle miles traveled. New ways of developing the land and meeting our mobility needs are necessary to reverse this trend and to improve our air quality.

Goal 6: **Reduce motor vehicle trips and vehicle miles traveled and increase average vehicle ridership (AVR).**

Note: Policies in this section are divided into two main categories: land use and transportation infrastructure. Land use policies show a commitment to design future development in ways that encourage alternative modes of transportation and make the most efficient use of land available for development to reduce trips and miles traveled. Transportation infrastructure policies demonstrate the commitment to design and construct our transportation system in ways that promote the use of alternative transportation modes.

LAND USE: LAND USE PATTERN

The term "land use pattern" refers to the distribution of land uses in a geographic area. It includes factors such as the density of population, housing, and jobs, and the mix of uses (proximity of housing, commercial, industrial, public facilities to one another). The general plan represents the community's vision of its future land use pattern.

Issues:

Existing land use patterns in most urban areas in the San Joaquin Valley are not conducive to walking, cycling, and transit use. Many office developments have low employment densities and are often isolated from commercial services, forcing people to drive rather than walk to restaurants during the lunch hour or to complete errands. High-density residential projects often have little if any commercial development nearby or discourage pedestrian access to commercial uses with block walls and large parking lots. The most common single-family lot size of 6,000 to 10,000 square feet leads to population densities too low to support frequent and direct transit service. The predominant suburban development patterns force all local trips for

shopping, recreation, school, as well as commute trips onto the arterial street system. This leads to ever wider, more congested arterial streets that in turn discourage people from walking or cycling to even nearby destinations.

Objective 6a To create a land use pattern that will encourage people to walk, bicycle, or use public transit for a significant number of their daily trips.

Policy 35 The City/County of _____ shall consider air quality and mobility when reviewing any proposed change to the land use pattern of this community.

Implementation Strategy:

Incorporate the review of air quality and mobility issues in the discretionary review process. This step could be part of the CEQA process established by the jurisdiction.

Identify areas best suited to development in terms of air quality and transportation impacts and direct growth to those areas.

Air Quality Benefits:

Adopting this policy provides a strong commitment to air quality. Placing a high priority on air quality can ensure that the following policies are strongly enforced.

Programs in Operation:

The CEQA process requires that air quality be address during the environmental review. California Government Code Section 65302.1 requires cities and counties in the San Joaquin Valley to amend appropriate elements of general plans to include data and analysis, comprehensive goals, policies, and feasible implementation strategies to improve air quality no later than one year after the first housing element revisions that occur after January 1, 2004. The next revision for Fresno and Kern Counties is June 30, 2008. The next revision for Stanislaus, San Joaquin, Merced, Kings, Tulare, and Madera Counties is June 20, 2009.

Policy 36 The City/County of _____ shall encourage projects proposing pedestrian or transit-oriented designs (TOD) at suitable locations. A TOD is defined as a

"Moderate to higher-density development, located within an easy walk of a major transit stop,

generally with a mix of residential, employment and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new construction or redevelopment of one or more buildings whose design and orientation facilitate transit use." (Caltrans 2002)

Implementation Strategies:

Develop Transit/Pedestrian-Oriented Design Guidelines. Identify and designate appropriate sites for this development pattern during general plan updates and when developers propose general plan amendments.

Prepare a specific plan or community plan for new development areas. Incorporate design guidelines and standards into the specific plan.

Note: Implementation of this policy would be a major part of a comprehensive land use, transportation, and air quality strategy. Most of the following land use policies support the concepts and principles of transit and pedestrian-oriented design.

Resources:

County of Sacramento, Transit-Oriented Design Guidelines, Sacramento County Planning and Community Development Department, 827 7th Street, Room 240, Sacramento, CA 95814.

City of San Diego, Transit-Oriented Design Guidelines, City of San Diego, Planning Department

San Diego Air Pollution Control District Tools for Reducing Vehicle Trips Through Land Use Design: Increasing Bicycling, Walking, and Transit Use in the San Diego Region. This document provides guidance and resource for municipalities, citizen groups, and planning practitioners to use in reducing vehicle trips and preserving other scarce resources through the land use planning process. Available from the San Diego Air Pollution Control District, 9150 Chesapeake Avenue, San Diego, CA 92123.

The San Bernardino document referred to above can be purchased from The Planning Center, 1300 Dove Street, Suite 100, Newport Beach, CA 92660.

Policy 37 The City/County of _____ shall work to preserve and enhance existing neighborhoods and commercial districts having transit and pedestrian-oriented designs.

Implementation Strategy:

Pursue redevelopment projects to improve the image of pedestrian-oriented neighborhoods and shopping districts (pedestrian amenities, street trees, transit facilities, etc.).

Air Quality Benefits:

A comprehensive transit/pedestrian-oriented program achieves air quality benefits by creating an environment conducive to the use of alternative modes of transportation. It is estimated that mixed-use and higher density strategies can achieve a 10 to 30 percent reduction in per-household vehicle travel and related emissions at the neighborhood or community level, while multi-modal transportation systems can reduce regional vehicle travel and associated emissions by 5 to 15 percent (ARB 1997). A Further, a combination of TOD and high levels of transit service can increase the use of transit within a neighborhood by 20 to 40% (Caltrans 2002). In addition, as these strategies are implemented throughout a community, potential reductions in site-specific travel also become greater. A fully implemented transit/pedestrian-oriented policy combines all the strategies listed by the ARB and could be expected to achieve similar reductions. More discussion on land use factors affecting choice of travel mode is provided in Section III.

Programs in Operation:

Within San Diego, the Uptown District is a pedestrian-oriented, mixed-use development combining a 140,000 square foot retail/office center, a 3,000 square foot community center, and 320 attached multi-family residential units.

The County of San Bernardino in cooperation with a number of cities within that County have prepared a document entitled Land Use, Transportation and Air Quality, A Manual for Planning Practitioners, San Bernardino Air Quality Plan. This document provides design examples and development principles for reducing mobile source emissions. The document is organized by development density and provides trip reducing tools and applications for each density.

The San Diego Air Pollution Control District has prepared a document entitled Tools for Reducing Vehicle Trips Through Land Use Design: Increasing Bicycling, Walking, and Transit Use in the San Diego Region. This document provides guidance and resource for municipalities, citizen groups, and

planning practitioners to use in reducing vehicle trips and preserving other scarce resources through the land use planning process.

Local Government Commission in partnership with the District has prepared Visual Tools to Encourage Compact Development and Walkable Streets in the San Joaquin Valley. The tools are two interactive visual presentations to increase the awareness of San Joaquin Valley local government staff, local policymakers, developers, and residents to the environmental, health, fiscal and aesthetic benefits for compact development, narrow street design and traffic calming.

Village Homes (Figure 4-1) in the City of Davis is a planned unit development of single-family homes, apartments, a community center and office building on a 60-acre site. Davis is located fourteen miles west of the state's capital city, Sacramento. Village Homes features solar water and space heating, natural cooling systems, agricultural areas and greenbelts, cooperative maintenance of common areas, a well-used bicycle and pedestrian path network, and a natural drainage system. The project serves as a national model for environmentally sustainable development, energy-conserving planning, architecture and engineering, and community planning. Energy consumption is one-third to one-half lower than that of neighboring developments.

The concept plan for a major intersection in Citrus Heights, California, an older suburb of Sacramento, offers an innovative solution for repairing the suburbs by creating a mixed-use urban village. The plan proposes to take one of the busiest intersections in Sacramento County underground and, over a twenty-five year period, reclaim the area with office space, housing, open space, retail and transit using regional transportation funds.

Figure 4-1 Village Homes, Davis, California

Resources:

County of Sacramento, Transit-Oriented Design Guidelines, Sacramento County Planning and Community Development Department, 827 7th Street, Room 240, Sacramento, CA 95814.

City of San Diego, Transit-Oriented Design Guidelines, City of San Diego, Planning Department

Local Government Commission and San Joaquin Valley Unified Air Pollution Control

District, Visual Tools to Encourage Compact Development and Walkable Streets in the San Joaquin Valley. Available from the Local Government Commission, 1414 K. Street, Suite 600, Sacramento, CA 95814-3966.

San Diego Air Pollution Control District Tools for Reducing Vehicle Trips Through Land Use Design: Increasing Bicycling, Walking, and Transit Use in the San Diego Region. This document provides guidance and resource for municipalities, citizen groups, and planning practitioners to use in reducing vehicle trips and preserving other scarce resources through the land use planning process. Available from the San Diego Air Pollution Control District, 9150 Chesapeake Avenue, San Diego, CA 92123.

The San Bernardino document referred to above can be obtained from The Planning Center, 1300 Dove Street, Suite 100, Newport Beach, CA 92660.

Policy 38 The City/County of _____ shall plan areas within 1/4 mile of locations identified as transit hubs and commercial centers for higher density development.

Implementation Strategy:

Amend the General Plan and the Zoning Ordinance to designate high-density land uses in areas planned for transit hubs and commercial centers.

Highest density development should be located closest to transit stops and routes

Zone for higher densities in transit corridors

Decrease parking requirements along major transit corridors

Consult with transit providers to determine which transit corridors should be emphasized in planning surrounding land uses

Air Quality Benefits:

Developing high-density residential and commercial uses within walking distance of transit facilities increases the number of potential transit users. With an adequate pool of transit riders, more frequent service becomes feasible. This in turn increases the convenience of the transit option for more people (ARB 1993). The ARB found that significantly increasing walking and transit opportunities along with strategically located moderated to high density development and transit could achieve an annual reduction in VMT of

between 20-30 percent (ARB 1995). It is estimated that people living within 1/4 mile of a transit stop or station are nearly three times more likely to use transit than those who live between 1/4 and 2 miles from a station. In addition, residents living within 2 miles of a transit station are nearly four times more likely to use transit for commuting than those who live greater than 2 miles from a station (ARB 1997). Also see Policy 35.

Programs in Operation:

Similar policies have been adopted in numerous California jurisdictions including Pleasanton, Costa Mesa, Folsom, San Diego, Davis, and Sacramento County. Also see Policy 36 and Policy 38.

Resources:

See Policy 36

Policy 39 The City/County of _____ shall encourage higher housing densities in areas served by the full range of urban services.

Implementation Strategies:

Designate high and medium-density housing at sites within walking distance of transit, neighborhood commercial services during general plan updates and developer initiated general plan amendments.

Establish minimum housing densities for areas around existing and planned transit nodes.

Award density bonuses for projects furthering transit or pedestrian-oriented amenities

Encourage developers to take advantage of density bonus provisions of the Zoning Ordinance for projects located around transit hubs or nodes on existing or planned transit corridors.

Air Quality Benefits:

Policies 37 and 38 are density strategies for improving air quality. A worldwide survey of travel patterns in 32 major cities found that gasoline consumption was reduced 25 to 30 percent for each doubling of population density (Kenworthy and Newman 1990), while the average annual rate of vehicle travel per person tends to be reduced between 25 and 30% for each

doubling of density (ARB 1997). A study of two Chicago area transit systems indicated that a 24 to 50% increase in transit boardings was associated with a doubling in employment densities near transit stations, while a doubling of residential and employment densities could be associated with a 66% increase in rail boardings (Caltrans 2002). To obtain the greatest trip reduction potential, high-density housing should be oriented to take advantage of public transportation and commercial services within walking distance. California's Density Bonus Law requires local governments to grant 25% density bonus for low income, very-low income, and senior housing, while another state law allows jurisdictions to grant a 25% density bonus for developers of housing within a half-mile of transit stations.

Strategies to increase density must be pursued with caution. Apartment projects adjacent to existing residential development frequently arouse fierce neighborhood opposition. Although traffic generated per dwelling unit is significantly less, the greater number of units may still have adverse traffic impacts. Efforts must be made to inform and educate the public regarding the development of increased density land uses. The ability of public facilities to absorb increased demand for services must also be considered. Strong design standards for multi-family projects can help overcome neighborhood opposition. Requiring project designs that fit into the neighborhood and are attractive promote acceptance.

Another important factor is public safety. High-density housing has gained a negative reputation as a breeding ground for crime. There are proven designs and layouts that can make higher densities safer and attractive.

High-density development should be viewed as a resource to be used to reduce dependence on the private automobile. All large cities in the Valley and some small cities construct significant numbers of high-density housing units; however, most of the units are placed in locations that make residents automobile dependent. Maximizing the number of units within 1/4 mile of public transit and frequently needed goods and services while orienting the development to make walking a pleasant experience will significantly reduce vehicle trips.

Programs in Operation:

The Model Zoning Regulations for the Tri-County Metropolitan Transportation District of Oregon (Portland metropolitan region) provide good examples of zoning regulations that emphasize these planning principles, while the Urban Growth Management Function Plan provides a framework and requirements for regional planning throughout the Portland Metropolitan area. The San Diego Association of Governments approved a Land Use Distribution Element in 1995 that encouraged local governments to specify minimum densities for new development and infill; encourage a mix of land uses; ensure good

pedestrian access; and provide interconnected local circulation systems especially in the vicinity of rail transit stations and major bus corridors. It was also suggested within the Element were that housing and services to meet the needs of a portion of employees be included in the design of major employment centers. In addition, the Element establishes "access standards" that define maximum acceptable travel times for work, shopping, and service-related trips by 2010. In urban areas, these standards are provided for trips made by both transit and automobiles. The City of San Diego has incorporated the Transit-Oriented Design Guidelines into several specific plans and has also revised its zoning code.

Also see Policy 36.

Resources:

See Policy 36

Policy 40 The City/County of _____ shall encourage mixed-use developments that provide commercial services such as day care centers, restaurants, banks, and stores near employment centers.

Implementation Strategies:

Create a mixed-use zone district. Tailor the allowed uses to those best suited for a pedestrian environment.

Designate mixed-use areas during general plan updates.

Air Quality Benefits:

An appropriate mix of land uses at a destination provides people arriving by transit, carpool, or vanpool with a range of activities within walking distance from their point of arrival. Mixed-uses reduce the need to make separate trips to obtain frequently needed goods and services (TRI-MET 1993). The clustering of land uses may reduce vehicle trip generation by up to 45% for residential uses and 65% for non-residential uses (ARB 1997). Also see Policy 35.

Programs in Operation:

The Municipality of Metropolitan Seattle (METRO) encourages jurisdictions within the Puget Sound region to use varied planning tools, such as planned unit developments, floating zoning, incentive zoning, zoning overlays, and

land banking to provide flexibility in their land use planning efforts (METRO 1987).

Portland Metro's Urban Growth Management Function Plan provides a framework and requirements for regional planning throughout the Portland Metropolitan area.

The San Diego Association of Governments have adopted the Land Use Distribution Element, as well as the Congestion Management Plan and Congestion Management System to slow the growth of traffic congestion in the region, and the Regional Energy Plan, which seeks to reduce the dependence on outside energy sources.

Many older areas in the City of Sacramento successfully mix commercial, office and residential uses. These neighborhoods continue to be desirable and vibrant places to live and work.

Resources:

The Mixed-use Development Handbook (Urban Land Institute, 2003) provides examples of mixed-use developments and discusses full range of development issues. ULI, 1025 Thomas Jefferson St., NW Suite 500 West Washington, DC 20007. Available for purchase at <http://www.uli.org/AM/Template.cfm?Section=Search&Template=/Ecommerce/ProductDisplay.cfm&ProductID=636>.

San Diego Air Pollution Control District Tools for Reducing Vehicle Trips Through Land Use Design: Increasing Bicycling, Walking, and Transit Use in the San Diego Region. This document provides guidance and resource for municipalities, citizen groups, and planning practitioners to use in reducing vehicle trips and preserving other scarce resources through the land use planning process. Available from the San Diego Air Pollution Control District, 9150 Chesapeake Avenue, San Diego, CA 92123.

Building Livable Communities with Transit. A Policymaker's Guide to Transit-Oriented Development. This document provides guidance, tools, and examples of transit oriented development. Available from the Local Government Commission, 1414 K St, Suite 600, Sacramento, CA 95814. <http://www.lgc.org/freepub/land_use/articles/buildcomm.html>.

Also see Policy 36.

Policy 41 The City/County of _____ shall promote the downtown (or village centers) as the primary pedestrian-oriented, commercial and financial center(s) in the city/community.

Implementation Strategies:

Designate a central core of the city for high-density and mixed-use development. Discourage high intensity office and commercial uses from locating outside of designated centers or downtown.

Provide financial incentives and density bonuses to entice development within the designated central core of the city.

Cities with declining downtown areas should consider recycling underutilized and abandoned uses with new uses that compliment the area. Avoid designating competing uses on the edge of the city and in unincorporated areas.

Air Quality Benefits:

A healthy downtown business district provides a concentration of activities that increase potential transit use for commute trips and, in some cases, shopping trips. High employment densities help support retail and service businesses, allowing people working downtown to walk for daytime errands and lunch trips. In a study of employee travel, mixing of uses increased the use of nearby facilities by 9% in suburban areas and over 30% in the downtown (ARB 1995).

A survey of suburban office workers found that about half left their building during the day. In an area with mixed-use high-density development and pedestrian facilities, 25 percent of the trips were made on foot, compared to 6 percent in a more homogenous, sprawling area (CEC 1993). A study of a major mixed-use suburban activity center found a 7% transit usage and that 25% of midday trips were walk trips, which is significantly higher than typical suburban centers which had 1% transit and 16% midday walk trips (ARB 1995).

A village center can be the focus of community activity, providing a variety of complimentary destinations within walking or cycling distance of village residences. The Uptown District in San Diego is estimated to result in a reduced rate of driving and associated motor vehicle emissions of about 20% per household annually, compared to typical vehicle travel from the same number of housing units in a lower density and more auto-oriented urban pattern. It is also estimated that the Uptown District results in annual air

pollution savings of about 2.75 tons of reactive organic gas (ROG) and oxides of nitrogen (NOx) per year.

The Crossings development in Mountainview is estimated to result in a reduced rate of driving and associated motor vehicle emissions of about 10% per household annually, compared to typical vehicle travel from the same number of housing units in a lower density and more auto-oriented urban pattern. It is also estimated that The Crossings results in an annual air pollution savings of about 3 tons of reactive organic gas (ROG) and oxides of nitrogen (NOx) per year (ARB 1997).

Programs in Operation:

The City of Orlando, Florida has implemented a similar policy of providing density bonuses for development in their downtown. Most cities in the San Joaquin Valley have policies and programs to support or revitalize their downtown areas.

Development within San Diego's Uptown District has established a pedestrian-oriented, mixed-use development combining a 140,000-square-foot retail/office center, a 3,000-square-foot community center, and 320 attached multi-family residential units. As noted above, it is estimated that the Uptown District results in an annual air pollution savings of about 2.75 tons of reactive organic gas and oxides of nitrogen per year.

The City of Sacramento has been engaged in a program to recycle outmoded industrial areas adjacent to downtown with new office, commercial, and public facilities and providing access to these areas by light rail.

The Metropolitan Bakersfield General Plan promotes a centers concept with downtown as the primary center and several suburban centers based on educational institutions and business centers. The Downtown Association of Fresno, funded in part by the Redevelopment Agency of the City of Fresno, is working to improve, promote, and develop the historic Central Business District. California's Main Street Program has 39 cities participating in a four-point framework of organization, promotion, design, and economic restructuring to redefine participants as the hearts of the communities.

Resources:

"Putting the Urb in the Suburbs: Many Places are Deciding they Need A Real Center After All," *Planning*, June 1997

National Main Street Center, a project of the National Trust for Historic Preservation that supports commercial district revitalization through historic

preservation and economic development. 1785 Massachusetts Avenue, N.W., Washington, DC 20036. Available online at <http://www.mainst.org>.

California Main Street Program, a program of the Office of Historic Preservation. <http://www.californiamainstreet.ca.gov>.

Redevelopment Agency, City of Fresno. <http://www.fresno.gov/vision2010/>.

"Smart growth zoning codes: A resource guide." Local Government Commission, Steve Tracy. Spring 2003. Available for purchase at <http://www2.lgc.org/bookstore/detail.cfm?itemId=34>.

Policy 42 The City/County of _____ shall plan adequate neighborhood commercial shopping areas to serve new residential development.

Note: Neighborhood commercial has different meanings in different jurisdictions. For the purposes of this document, neighborhood commercial includes shops and services now found in supermarket- anchored shopping centers as well as convenience retail found in small strip malls.

Implementation Strategy:

Designate commercial areas during general plan updates and when developers initiate general plan amendments.

Provide materials on successful mixed-use developments to project applicants in areas designated for commercial land uses. Such materials could include the TOD Design Guidelines prepared for Sacramento County (1990).

Adopt zoning regulations that permit upper story residential uses in neighborhood shopping areas. These upper story uses can include residential and office. The City of San Diego Tools for Reducing Vehicle Trips Through Land Use Design (1998) provides a good example of this type of community design.

Air Quality Benefits:

Nationwide, 45 percent of all vehicle trips are for shopping or personal business and the average length is approximately 10 miles (U.S. Department of Transportation 1999 and 2001). By providing the most frequently needed products and services close to residences and by providing direct, safe, and interesting pedestrian or bicycle routes to the commercial area, vehicle travel

can be reduced. Surveys conducted in five US cities indicated that 70 percent of people surveyed would be willing to walk or bicycle for personal business and shopping trips if the trips were reduced to 1/2 mile in length and bicycle paths and pedestrian walkways were provided (CEC 1993).

Programs in Operation:

See Policy 36

Resources:

See Policy 36

Policy 43 The City/County of _____ shall encourage subdivision designs that provide neighborhood parks in proximity to activity centers such as schools, libraries and community centers.

Implementation Strategy:

Designate park sites during general plan updates and when processing large general plan amendments. Require developers to dedicate park sites at the most advantageous locations as a condition of approval of subdivision maps.

Prepare comprehensive community plans or specific plans designating community amenities at sites that are accessible by walking and bicycling.

Air Quality Benefits:

Public parks are often the primary pedestrian amenity for a community or neighborhood. The foot traffic and socializing created by the parks can carry over to adjacent or nearby public and commercial uses. The design and location of the park is very important to its usefulness as a pedestrian destination and activity center. Parks should be visually accessible from the neighborhood and frequently used to encourage a feeling of ownership (Weissman 1992).

Programs in Operation:

See Policy 36

Resources:

See Policy 36

Policy 44 The City/County of _____ shall work closely with school districts to help them choose school site locations that allow students to safely walk or bicycle from their homes.

Implementation Strategies:

When specific plans or subdivisions propose school sites for dedication, accept only sites that allow students to safely walk or bicycle to school.

Incorporate school sites into larger neighborhood activity centers, which could include parks, day care facilities, and neighborhood commercial uses.

Air Quality Benefits:

Schools are important centers of community activity and generate numerous trips. Siting and access considerations can make a significant difference in the number of students who would walk or bicycle to school. The same principles of pedestrian friendly design apply to children as they do to adults; however, safety considerations take on greater importance.

Programs in Operation:

The City of Modesto's Village-1 Specific Plan designates all school sites in the plan. The sites emphasize pedestrian and bicycle access.

Laguna West, Transit-Oriented Development, Sacramento County.

For residential and mixed-use developments, Portland Metro's Urban Growth Management Function Plan calls for new local street plans that encourage pedestrian and bicycle travel by providing short, direct public right-of-way routes to connect residential uses with nearby existing and planned commercial services, schools, parks and other neighborhood facilities.

Resources:

The City of San Diego TOD Design Guidelines (1992) provide a good example of this community design principle. Information on this and other TOD areas in California is available at <http://transitorienteddevelopment.dot.ca.gov/Profiles/TOD%20Summaries.pdf>.

See Policy 36.

Policy 45 The City/County of _____ shall plan park and ride lots at suitable locations serving long distance and local commuters.

Implementation Strategies:

Work with Caltrans and the Public Works Department to identify suitable sites. Designate sites on the general plan land use and circulation plans. Consider funding of the park and ride lots as mitigation during CEQA review of residential development projects.

Coordinate with appropriate transportation agencies and major employers to establish express buses and vanpools to increase the patronage of park and ride lots.

Allow developers to reach agreements with auto-oriented shopping center owners to use commercial parking lots as park and ride lots and multimodal transfer sites.

Air Quality Benefits:

The maximum benefits from this policy are achieved by targeting long distance commuters. This is because of the problem of cold start emissions from home to the park and ride lot and back. Park and ride lots for local commuters only achieve significant emission reductions when the route to the destination is heavily congested. See Section III of this document for a more detailed discussion of mobile source emission characteristics.

Park and ride lots in both downtown fringe areas and suburban areas both have fairly minimal trip reduction potential, mainly because there are limited markets for such facilities in the Valley. Fringe parking in the downtown might prevent short trips to different destinations within the downtown area, and this would help localized air quality. But trips to even the largest downtown in the Valley represent only a few percent of total trips made, and fringe parking would eliminate only a fraction of these. Park and ride lots in suburban communities may have moderate effectiveness in intercepting outbound commute trips, thereby eliminating significant VMT but relatively few trips, since most carpoolers would drive to the park and ride lot (EPA 1990). An analysis conducted for this document concludes that San Joaquin Valley communities can reduce trips by 0.5 to 1.5 percent through the use of park and ride lots (TJKM 1993).

Programs in Operation:

Many Valley metropolitan areas have park and ride lots in place.

Resources:

Caltrans District 6, P.O. Box 12616 Fresno, CA 93778-2616.
<http://www.dot.ca.gov/dist6/>

Policy 46 The City/County of _____ shall plan for multi-modal transfer sites that incorporate auto parking areas, bike parking, transit, pedestrian and bicycle paths, and park and ride pick-up points.

Implementation Strategies:

Identify locations where transportation systems converge and designate the area as a potential multi-modal transfer site in the general plan.

Apply for funding to construct a multi-modal transfer station. Sources for funding include Federal Highway funds and transit funds.

Air Quality Benefits:

Providing multi-modal transfer sites increases transit's convenience and eliminates cold starts by people who are able to walk or bicycle to the transit stop instead of driving. The best transit system in North America, located in the City of Toronto achieves a 31 percent mode split during commute hours (Kenworthy 1991). In 2000, 1.4% of Kern County workers over age 16 used public transportation, and 18.4% carpooled. 1.7% of Fresno County workers over age 16 used public transport, and 16.7% carpooled (US Census Bureau 2003).

Programs in Operation:

Many of the Bay Area Rapid Transit System's (BART) stations are connected to a bus system and provide bicycle and pedestrian amenities. The cities of Walnut Creek and Pleasant Hill have prepared a specific plan focusing development in a 125-acre area around the Pleasant Hill BART station. Residents of apartments in the plan area use BART for as many as 40 percent of their commute trips (Weissman 1992).

The Portland Metropolitan's TriMet transit service provides a interconnected light-rail and bus services that incorporate park-and-ride lots, auto parking

areas, and pedestrian, bicycle, and transit-oriented high density. It is estimated that Portland's emphasis on TOD-style communities throughout the region has resulted in a 7% decrease in VMT, 5% increase in transit use, and 10% increase in walking trips, and it is estimated that pedestrian travel accounts for 16% of all trips (Caltrans 2002).

Resources:

See Policy 36

San Diego Air Pollution Control District, Tools for Reducing Vehicle Trips Through Land Use Design: Increasing Bicycling, Walking, and Transit Use in the San Diego Region. This document provides guidance and resource for municipalities, citizen groups, and planning practitioners to use in reducing vehicle trips and preserving other scarce resources through the land use planning process. Available from the San Diego Air Pollution Control District, 9150 Chesapeake Avenue, San Diego, CA 92123.

Policy 47 The City/County of _____ shall encourage the development of pedestrian-oriented shopping areas within walking distance of high-density residential neighborhoods.

Note: Commercial development projects near existing residential areas require greater attention to design details to minimize neighborhood opposition.

Implementation Strategies:

Require residential development projects to designate neighborhood commercial areas where appropriate during the general plan amendment process. Re-zone vacant sites in existing high-density areas and areas being redeveloped.

Support organizations that work toward improving the commercial viability of the shopping area, such as local merchants associations and improvement districts.

Plan for city or neighborhood districts with distinct identities and which mesh with the urban fabric. See Figure 4-2.

Air Quality Benefits:

See Policy 42

Programs in Operation:

See Policy 36

Resources:

See Policy 36

Figure 4-2 Pedestrian-oriented Shopping Area in Santa Clara

Policy 48 The City/County of _____ shall protect pedestrian-oriented commercial areas from development that is incompatible in design, scale or use.

Implementation Strategy:

Utilize neighborhood commercial and major/regional commercial zone districts at appropriate locations.

Avoid designating competing commercial uses, especially in automobile oriented strip malls, within one mile of the pedestrian or transit-oriented commercial area.

Encourage all development to incorporate pedestrian- or transit-oriented design and work with the developer, transit agency, and other appropriate parties in the design and approval of development

Policy 49 The City/County of _____ shall discourage new regional auto-oriented commercial uses (such as volume discount stores, auto dealerships and large scale car repair) within areas designated as mixed-use, transit-oriented or pedestrian-oriented.

Implementation Strategy:

Modify the zoning ordinance to include an Auto-Oriented Commercial Zone District. Adopt a mixed-use or transit/pedestrian-oriented commercial zone district that defines the uses that are appropriate for these areas.

Note: Small- scale car repair businesses may be an appropriate neighborhood use in some areas since patrons may drop off their vehicles and walk home or use transit to get to work. The term "mixed-use" refers to urban design strategies that place compatible retail or office uses near to or sometimes in the same building as residential uses. An example is ground floor commercial with residences above. Another example is high or medium density residential adjacent to service retail, public amenities, and office uses.

Policy 50 The City/County of _____ shall encourage regional shopping malls/centers at sites capable of support by a full range of transportation options.

Note: For the purposes of this document, regional centers are retail uses that draw most of their customers on a community wide or regional basis as opposed to drawing them from the immediate surrounding neighborhoods.

Implementation Strategy:

Identify sites with access by freeway or major arterial and potential for light rail access. The site could be a regional transit hub and major pedestrian-oriented activity center to increase transit mode share.

Air Quality Benefits:

Policies 47 and 48 protect commercial areas intended to serve pedestrian and transit-oriented areas from inappropriate development. Allowing auto-oriented commercial uses and high traffic generating uses like regional shopping centers in neighborhood areas reduces the walkable destinations available to the residents. Air quality benefits are derived from the extent that residents would shop on foot or by bicycle when compared with the use of these modes in conventional areas. See Policy 35 for benefits of pedestrian and transit-oriented development.

Policy 49 encourages cities and counties to locate regional shopping centers at sites that can or will be well served by different transportation modes.

Regional malls and centers are major traffic generators. Every effort must be made to identify sites with good motor vehicle access to avoid traffic congestion and with good transit, bicycle, and pedestrian access to reduce total vehicle trips.

Programs in Operation:

See Policy 36

Resources:

See Policy 36

LAND USE: COMPACT DEVELOPMENT

The policies in this section represent several different approaches to achieving more compact development patterns. These approaches are used in many Valley general plans. The District strongly encourages cities and counties to promote compact development; however, we recognize that each community will have different concerns and may use different strategies.

Issues:

Sprawling, low-density development, and discontiguous development discourage the use of alternative transportation modes and increases travel distances. Infrastructure costs and most environmental impacts are less when development is more compact.

Objective 6b To plan development in a way that makes the most efficient use of the land and thereby causes the least possible impacts to the environment.

Policy 51 The City/County of _____ shall provide for an orderly outward expansion of new urban development so that it is contiguous with existing development, allows for the incremental expansion of infrastructure and public services, and minimizes impacts on the environment.

Implementation Strategies:

Identify areas that can be most efficiently served and cause the fewest environmental impacts and designate those areas for development during major general plan updates.

Ensure that new development finances the full cost of expanding public infrastructure and services to provide an economic incentive for incremental expansion.

Do not consider projects requiring general plan amendments contiguous when they are only adjacent to large vacant parcels designated for urban development.

Policy 52 The City/County of _____ shall encourage infill of vacant parcels.

Implementation Strategies:

Avoid designating more land for urban development when suitable infill parcels are available.

Support projects that infill vacant areas and areas contiguous on at least one side to a developed area.

Encourage growth to occur in and around activity centers, transportation nodes, underutilized infrastructure systems, and redevelopment areas.

Accommodate infill development within existing urban areas as a priority over urban expansion.

Work with landowners to re-designate vacant lands suitable for higher densities or for transit/pedestrian-oriented developments during general plan updates and periodic reviews.

Conduct a survey of vacant lands as part of the general plan update. Develop criteria for determining appropriate sites.

Policy 53 The City/County of _____ shall encourage infill and redevelopment projects within an urban area that will improve the effectiveness of the transit system and will not adversely affect existing development.

Implementation Strategies:

Encourage projects that increase pedestrian activity and mixed-uses.

Encourage commercial uses that are complimentary to urban employment centers.

Strategically locate high-density development to provide good transit access.

Policy 54 The City/County of _____ shall adopt a reasonable urban limit line/urban growth boundary and commit to providing public services only within the urban area.

Note: Urban limit lines and growth boundaries are controversial. If adopted with inadequate land to accommodate projected growth, they may make housing less affordable. Without the cooperation of neighboring jurisdictions, urban limit lines/growth boundaries will be ineffective in promoting compact development.

Implementation Strategy:

Identify potential growth areas and areas to be protected from development during general plans updates.

Work with developers of projects within and adjacent to the urban limit line to purchase development rights from the owner of the adjacent land outside the urban limit line.

Policy 55 The City/County of _____ shall expand public services incrementally to serve contiguous development and will discourage the formation of small sewer and water systems serving fringe urban development.

Implementation Strategy:

Require new developments to extend sewer and water lines from existing systems or to be in conformance with a master sewer and water plan.

Air Quality Benefits:

The ability of compact development to reduce air pollutant emissions is based on two assumptions. First, distances traveled will be lower in compact areas than for sprawling or leapfrog development. Second, by providing the right mix of uses in closer proximity, more trips will be accomplished by transit, on foot, or by bicycle.

The policies in this section use several different strategies to encourage compact development and to discourage discontiguous or sprawling development. The following describes the strategies for each policy or group of related policies.

Policy 50 and 54 promote incremental growth on the urban fringe. By discouraging discontiguous development, the urban fabric is maintained, trip distances are shorter, and infrastructure costs are minimized.

Policies 51 and 52 encourage the development of infill areas or redevelopment areas at densities that are high enough to support effective transit service. The strategic placement of higher densities can also provide frequently needed commercial services within walking distance for more people. The Institute of Transportation Engineers (ITE) suggests that residential densities of 7 to 8 dwelling units per acre and 8 to 20 million square feet of non-residential development are needed to support transit service of one bus every half hour, while residential densities greater than 9 dwelling units per acre and 35 to 50 million square feet of non-residential development are needed to support light rail transit with feeder buses (ARB 1993). Various studies have found that areas with higher overall densities tend to have higher rates of transit use and walking. The results of a study of five neighborhoods in California indicate that there is a significant connection between neighborhood characteristics and residents' travel behavior. In the mixed-use, higher density neighborhoods with good transit service, rates of walking and transit use were found to be three to four times higher than those of standard suburban areas. Residents of these mixed-use, higher density neighborhoods also drove for 10 to 30 percent fewer trips. Areas developed as transit or pedestrian-oriented developments can generate 21 percent less trips than traditional low-density residential development (1000 Friends 1993).

Policies 53, and 54 use local government's control of public services such as sewer and water systems as a tool to direct growth where it is best for air quality and for the community. Limiting sewer and water hookups has been widely used in California to limit growth. Although there is little interest in limiting growth in the San Joaquin Valley, there is widespread interest in directing growth away from prime farmland, and sensitive natural habitat. By defining the future urban areas with an urban limit line or by designating urban service areas that avoid prime farmland and sensitive natural habitats, cities can promote compact development. As part of the overall strategy, it is important for counties to avoid approving urban projects just outside the city's sphere of influence. This can undermine the integrity of the urban limit line and result in sprawling, inefficient development.

Most jurisdictions have adopted urban service areas. The problem is that the boundaries are frequently and routinely amended. The city or county should adopt and enforce strong policies that require certain conditions to be met before service areas may be expanded. Some cities and counties approve urban development projects outside the urban service area as long as the developer pays all costs of providing public services. Under some circumstances, developers are willing to pay the costs of extending services

rather long distances or will develop their own water and sewer systems to take advantage of less expensive land. Decision makers must look beyond just dollar costs. They must consider costs to air quality and to the fabric of the entire community when considering development projects for approval.

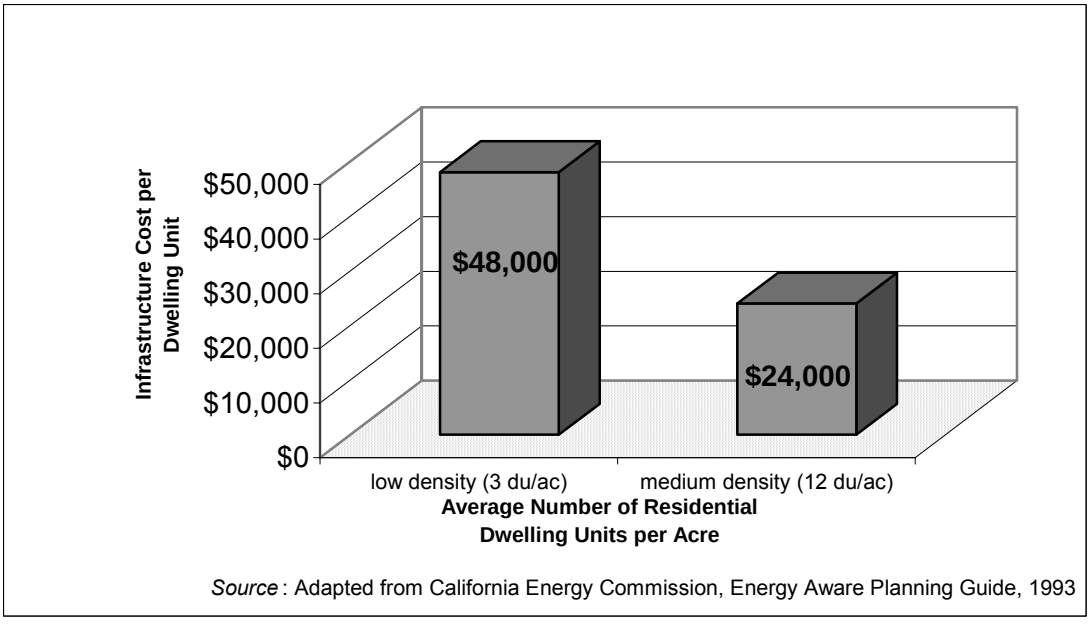
The air quality benefits of compact development cannot be looked at in isolation. It is one of the key components in developing pedestrian and transit-oriented communities. Compact development by itself will not significantly reduce vehicle trips and miles traveled if no transit facilities or pedestrian amenities exist. Conversely, effective transit facilities cannot be provided unless the community is developed in a compact manner. In addition, compact development can provide significant cost savings to local government and developers. Figure 4-3 shows the infrastructure costs in relation to residential densities. Units in areas with densities of 12 units per acres are substantially less costly to serve than residential densities of 3 units per acre.

Programs in Operation:

The City of Davis and the City of Woodland have adopted urban limit lines with a permanent band of open space between the two communities (Weissman 1992).

Contra Costa County has adopted an ordinance requiring 65 percent of the land in the county to be preserved for agriculture, open space, wetlands, parks and other non-urban uses. The ordinance is implemented by establishing urban limit lines beyond which there will be no growth (Weissman 1992).

Figure 4-3 Infrastructure costs and Residential Density



Source: Adapted from California Energy Commission, Energy Aware Planning Guide, 1993

Resources:

Land Use Strategies for More Livable Places, by Steve Weissman and Judy Corbett provides numerous examples of communities implementing strategies to promote compact, livable development.

LAND USE: SITE DESIGNS

For the purposes of this document, the term site design applies to individual subdivisions, multi-family developments, and commercial and industrial site plans. It also includes architectural features of buildings and landscapes.

Issues:

Most places in the Valley are designed to provide the most direct and convenient access by car at the exclusion of other modes of transportation. It is possible to design sites in ways that encourage less- polluting transportation modes and still support access by motor vehicle.

Objective 6c To promote site designs that encourage walking, cycling, and transit use.

Policy 56 The City/County of _____ shall encourage project sites designed to increase the convenience, safety and comfort of people using transit, walking or cycling.

Implementation Strategy:

Prepare Transit-Oriented Design (TOD) or Pedestrian-Oriented Design (POD) Guidelines to help staff planners and developers identify measures that can create a pedestrian and transit-friendly community.

Adopt air quality design standards as part of the zoning ordinance. Design standards must be general enough to apply under all but the most unusual circumstances to avoid the need for numerous zone variances and modifications. Some design measures like sidewalk widths and landscaping requirements are very appropriate for design standards. Design measures dealing with parking lot designs and building facades may be better left as guidelines because of site to site-to-site differences.

Policy 57 The City/County of _____ shall require an air quality/transportation design analysis for projects exceeding District CEQA significance thresholds.

Note: The design analysis should be prepared by a civil engineer, architect, or urban designer familiar with design measures that can reduce trips. It could be part of the traffic study normally required for large development projects.

This policy is intended to apply to large projects such as regional shopping centers and large subdivisions. Projects consistent with adopted city/county design guidelines or with a previously reviewed specific plan or community plan could be exempt.

Implementation Strategy:

Require the developer to submit a design analysis with the commercial site plan or subdivision map. The analysis could describe the design measures proposed for the site. The site plan or map could show the location and extent of any design features.
Some specific design features include:

- *Subdivision street and lot designs that promote pedestrian, bicycle, and transit use*
- *The location and type of transit improvements such as shelters and bus turn-outs*
- *Pedestrian access improvements and amenities (sidewalks, benches, water fountains, landscaping, etc.)*
- *Parking lot designs that enhance rather than detract from pedestrian access*
- *The location and type of bicycle improvements (bicycle parking/lockers, relation to bike paths or routes serving the site)*

Policy 58 The City/County of _____ shall review all subdivision street and lot designs, commercial site plans, and multi-family site plans to identify design changes that can improve access by transit, bicycle, and walking.

Note: This policy could apply to projects of all sizes. The review would be done by local planners or by a design review committee.

Figure 4-4 A canopy of trees encourages walking

Implementation Strategy:

Modify design review procedures to cover features that affect access and internal circulation by alternative transportation modes. Develop design guidelines that illustrate preferred designs.

Just a few examples of design measures that could be recommended during design review include:

- *Intra-development designs that incorporate integrated street patterns rather than the "pod" design, which limits ingress and egress options to the development and restricts traffic to a limited number of arterials*
- *Primary ground floor commercial building entrances must orient to plazas, parks, or pedestrian-oriented streets, not to interior blocks or parking lots*
- *Promote the use of trees and plants in travelway landscaping and residences*
- *Building facades should be varied and articulated to provide visual interest to pedestrians*
- *Street trees should be spaced no further than 30 feet on center in planter strips or tree wells. Tree species should be selected to create a unified image for the street and provide an effective canopy (see Figure 4-4)*
- *Sidewalks must provide an unobstructed path at least five feet wide. Larger sidewalk dimensions (up to 10 feet) are desirable in core commercial areas where pedestrian activity will be greatest*

Policy 59 The City/County of _____ shall require all development projects proposed within 2,000 feet of an existing or planned light rail transit, commuter rail, express bus, or transit corridor stop, to incorporate site design measures that enhance the efficiency of the transit system.

Implementation Strategy:

Identify all transit facilities on the Circulation Element Map. Analyze existing land use patterns and constraints around transit facilities to identify appropriate design measures.

Air Quality Benefits:

The design and layout of individual development projects is critical to the success of the entire land use, transportation, and air quality strategy. By providing destinations where people feel comfortable walking (as in Figure 4-5), where access to transit is convenient, and where bicycles can be safely ridden and parked, the effectiveness of all other programs to reduce trips and improve air quality will be much greater.

The first policy in this section states the overall requirement for future development to be designed to encourage walking, cycling, and transit use. The other policies provide the methods and situations where the design requirements would apply. Policy 56 establishes size and type thresholds for design review. Policy 57 promotes an internal review of plans to identify features that can enhance the use of alternative modes. Policy 58 identifies sites where the city or county would require special transit-oriented design criteria.

One source of evidence for the impact of urban design on trip generation and VMT is provided by a study that compared VMT in different Bay Area communities (Parker 1995). The study used actual VMT measurements as well as a 1981 regional transportation survey. One overall finding was that a doubling in overall density is generally associated with 20 to 30 percent fewer VMT per household (Parker 1995). Some of the areas with higher densities also provided frequently used commercial services within walking distance, eliminating many of these vehicle trips.

Figure 4-5 Pedestrian-oriented Neighborhood

The Land Use, Transportation, and Air Quality (LUTRAQ) study in the Portland, Oregon metropolitan area

estimates that individual transit-oriented developments will generate 21 percent fewer trips than conventional single family developments and commercial uses (1000 Friends 1993). However, the amount of trip reduction directly attributable to site design measures was not separately addressed.

Programs in Operation:

The cities of San Diego, Sacramento, and Portland, Oregon have all prepared design guidelines that encourage and enhance transit, pedestrian, and bicycle travel. These guidelines incorporate "neo-traditional" design principles that take the best planning practices from 50 to 100 years ago and apply them to new development.

Village Homes in Davis, California provides an example of a bicycle and pedestrian-oriented subdivision. Street access is narrow and somewhat limited and bicycle and pedestrian paths offer the shortest routes to neighborhood destinations such as the school and community center. Many of the houses face bike paths. This provides a sense of safety for the riders and keeps the public spaces in view of the community to prevent crime and vandalism (Weissman 1992). Figure 4-6 illustrates this concept.

Figure 4-6 Village Homes, Davis, California
Source: Local Government Commission

Resources:

Planning and Design for Transit, March 1993, Tri-County Metropolitan Transit District of Oregon (TRI-MET), 4012 S.E. 17th Avenue, Portland, Oregon 97202. This 200-page document provides a comprehensive guide to designs and land use patterns supportive of transit. You may order copies by accessing <http://www.trimet.org/>.

Energy Aware Planning Guide, January 1993, California Energy Commission. This document contains extensive sections on design measures to reduce vehicle trips, miles traveled, and energy consumption. Available at <http://www.energy.ca.gov/reports/energy_aware_guide.html>.

The City of San Diego has adopted Transit-Oriented Development Design Guidelines. This document, prepared by Calthorpe Associates, provides thorough discussions and illustrations of design techniques that encourage transit use, walking and bicycling.

SUGGESTED GOALS AND POLICIES FOR CIRCULATION ELEMENTS

The goals and policies in this section are most appropriate for Circulation Elements of the general plan. They provide ways to plan for the transportation needs of the community that can improve air quality.

Principles for Planning Transportation Systems for Improved Air Quality

The Air District strongly encourages cities and counties of the San Joaquin Valley to:

- Plan and construct an innovative, multi-modal transportation system to meet mobility needs and improve air quality
- Plan and construct transit improvements at appropriate locations
- Plan and construct a comprehensive system of bikeways and pedestrian paths
- Determine the feasibility of light rail or other fixed guideway systems and protect appropriate right of ways
- Work to improve intercity and commuter rail service in the Valley
- Promote the Valley route for the high speed rail corridor

Note: The District recognizes that the type of transportation system is dependent on the size of the community. The above principles are directed at communities currently or projected to be of adequate size to support these systems.

TRANSPORTATION INFRASTRUCTURE

Issues:

The transportation infrastructure developed in the San Joaquin Valley supports the automobile at the expense of other modes of transportation. Placing emphasis on transit, bicycling, and pedestrian infrastructure is vital to relieve pressure from the traditional roadway system and improve air quality. The existing transit systems in the Valley serve only small numbers of commuters (approximately one percent of work trips). Transit systems must be improved to provide shorter waits between buses, competitive trip speeds and better network coverage. In the long term, transit systems should expand beyond buses to light rail or even personal rapid transit systems to accommodate the transportation needs of the projected 4.96 million San

Joaquin Valley inhabitants (by the year 2020) (ARB Population and Vehicle Trends Report 2004).

Objective 6d To develop innovative transportation systems that incorporate alternative transportation modes into the system designs.

Policy 60 The City/County of _____ shall plan for a multi-modal transportation system that meets the mobility needs of the community and improves air quality.

Implementation Strategies:

Ensure that updates to the Circulation Element and submittals of regional transportation improvement projects to the Regional Transportation Planning Agency reflect designs and facilities that support a multi-modal system.

Coordinate with transportation providers, planners, agencies, and organizations to develop a complete range of innovative, practicable and cost-effective options. Some options to consider are:

- *Strategic placement and orientation of new transportation or improved facilities*
- *Flexible zoning such as Transportation Overlay Zones to allow for multi-modal coordination*
- *Services using smaller, efficient vehicles to serve low-density areas (jitneys can run on fixed or flexible routes and can use vehicles similar to airport shuttles or smaller)*
- *Personal Rapid Transit (PRT) systems for fixed route systems connecting large activity centers*
- *High Occupancy Vehicle (HOV) lanes or bus only lanes and transit-ways*
- *Congestion pricing measures such as toll roads with electronic toll collection and billing*

Policy 61 The City/County of _____ shall vigorously pursue and use state and federal funds earmarked for bicycle and transit improvements.

Implementation Strategy:

Ensure that Regional Transportation Improvement Plans include alternative transportation mode projects best suited to the community.

Provide information resources, referrals, and guidance on state and federal funding for alternative transportation improvements to developers, employers, and community involvement organizations.

Policy 62 The City/County of _____ shall encourage the consolidation of transit services within the metropolitan area to maximize the efficiency of transit services while minimizing costs.

Note: This policy would also apply to small transit providers serving special groups like seniors or veterans and to adjacent or nearby cities that act as a single metropolitan area. Consolidating these services can increase ridership per vehicle and reduce miles traveled.

Implementation Strategy:

Include transit consolidation plans in Regional Transportation Plans.

Policy 63 The City/County of _____ shall ensure to the extent feasible that pedestrian, bicycle, and automobile connections are maintained in existing neighborhoods affected by transportation and other development projects.

Implementation Strategy:

Construct pedestrian bridges and under crossings where appropriate.

Ensure vehicle overpasses and underpasses are constructed at appropriate locations to provide reasonable connections between services and residences.

Include maintenance or improvement requirements for pedestrian, bicycle, and automobile connections as part of the development standards of the Zoning Ordinance or Subdivision Ordinance.

Include the maintenance or modification of existing pedestrian, bicycle, and automobile connections as a part of Building Permit requirements.

Air Quality Benefits:

Providing an innovative, multi-modal transportation system benefits air quality in two ways. First, by providing fast, safe, and convenient alternatives to the personal automobile, the number of vehicle trips would ill be reduced. Second, because these options increase the efficiency of the entire system, congestion related emissions would be reduced or avoided.

Policy 60 is an overall commitment to developing an efficient transportation system. The economic vitality and future air quality of the Valley will be determined in part by current transportation planning efforts. With the federal ISTEA and state congestion management legislation, transportation plans must support alternatives to the single-occupant automobile. In addition, most jurisdictions are unable to identify funding sources to address all projected road and highway capacity needs. This means that local jurisdictions must identify ways of increasing the capacity of existing roadways and ways of reducing travel demand in order to avoid gridlock and degraded air quality.

Policy 61 states a community's commitment to use available funding for transit, bicycle and pedestrian projects. Because of matching funds requirements for many state and federal transportation funding programs, some jurisdictions do not pursue these sources. The conformity requirements of the federal FCAA amendments and Intermodal Surface Transportation Efficiency Act (ISTEA) may force jurisdictions to spend their transit and bicycle money in order to qualify for highway money. The tendency so far has been for cities and counties to spend funds on congestion relieving roadway improvements such as signalization. Without a change in funding priorities to support alternative modes of transportation, significant changes in mode shares are unlikely.

Policy 62 provides a method to increase the effectiveness of transit resources already available. By consolidating services, it is possible to avoid duplication routes and to increase ridership per vehicle.

Policy 63 is intended to address the need for both retention and creation of pedestrian, bicycle, and automobile connections between areas divided by large-scale transportation projects, or implementation of non-transportation focused development projects.

The Sacramento Regional Transit District’s multi-modal transportation system includes bus routes and light rail that covers a 418 square-mile service area and is serviced by 76 electrically-powered light rail vehicles, 258 buses powered by compressed natural gas, and 17 shuttle vans. There are bike racks on the buses and the trains, and 15 light rail stations have bike lockers (SRTD 2005). San Francisco’s system is also multi-modal.

TRANSPORTATION INFRASTRUCTURE: TRANSIT

Policy 64 The City/County of _____ shall require transit improvements at sites deemed appropriate and necessary by the Transportation Department and the transit provider and consistent with long-range transit plans.

Note: Transit improvements should be considered the same as other roadway improvements such as curb, gutter, sidewalks, etc., now provided by developers. Transit improvements should be viewed as an extension of roadway improvements, especially in light of the multi-modal emphasis of all new transportation plans.

Implementation Strategy:

Identify transit improvement needs during CEQA review. Require dedication of sites and improvements as CEQA mitigation. Include dedication requirement as a condition of approval of the subdivision map.

Policy 65 The City/County of _____ shall work with Caltrans and transit providers to identify park and ride sites with convenient access to public transit.

Implementation Strategy:

Identify appropriate sites during general plan updates, and review of specific plans and major general plan amendments.

Policy 66 The City/County of _____ shall design all arterial and collector streets planned as transit routes to allow the efficient operation of public transit.

Implementation Strategy:

Work with transit providers to develop a comprehensive long range transit plan that is parallel with the general plan. Revise street and road design standards to include bus turn-out designs and passenger loading area designs.

Air Quality Benefits:

The policies in this section deal exclusively with transit infrastructure in support of bus service. The policies support roadway improvements that

increase the speed and safety of bus operations and they support passenger loading facilities that improve the convenience and comfort of people waiting for the bus. Both of these actions will tend to increase transit ridership, thereby reducing overall vehicle trips and miles traveled.

A study conducted by Shapiro, Hassett, and Arnold (2002) found that moving a person a given distance by public transportation produces about five percent as much carbon dioxide, about eight percent as much VOCs, and about half as much NOx and CO_2 as moving a person the same distance by private vehicle.

Policy 64 provides a mechanism for cities and counties to reserve the road right of way and land needed for bus turnouts and to construct transit facilities. Bus turnouts remove the buses from the travel lane so that other vehicle traffic is not impeded. This can minimize congestion related emissions. By planning bus turnouts in advance, surrounding development can be designed to benefit from proximity to transit instead of being negatively impacted by the location of the facilities.

Policy 65 encourages cities and counties to locate park and ride lots in places with convenient access to transit. Convenient access is critical in influencing people to choose transit as a commute option. The transit loading area should be close to the park and ride lot and should provide pedestrian amenities to increase the comfort of people waiting.

Park and ride lots that are part of a multi-modal transportation hub can increase the level of activity at the site and improve security. Multi-modal hubs provide better connections with destinations within the community and increase the possibility and probability of using transit.

Park and ride lots can be effective in reducing emissions; however, the trips from home to the park and ride lot and back generate emissions that must be accounted for. Because of the problem of cold start emissions, vehicles produce much of their pollution towards the beginning of the trip (see Section III). Personal vehicle trips avoided by using park and ride must be longer trips to offset the cold start emissions that are still occurring on the commute to the park and ride lot. Growing numbers of people are commuting long distances between Valley cities and to destinations outside the Valley. Park and ride lots can reduce the number of personal vehicles used for long commute trips.

One must also consider the level of congestion en route to the ultimate destination when determining if park and ride lots will benefit air quality. Areas with high levels of congestion may have localized carbon monoxide (CO) problems. It may be beneficial to provide park and ride lots in these areas even though the two legs of the trip may create a net emissions increase for other pollutants such as ROG and NOx.

Policy 66 requires arterial and collector streets to be designed to accommodate buses. These design measures could include bus only lanes, driver actuated signals, bus turnouts, and bus loading areas. These measures allow buses to improve their average speeds and to reduce conflicts with automobile traffic. Buses in most Valley locations have a large time disadvantage compared to automobile travel. Measures to reduce this disparity will improve transit's viability.

These policies are only components of a comprehensive transit-oriented strategy. Their effectiveness in reducing vehicle trips and miles traveled is dependent on the level of commitment and success in implementing a transit-oriented development strategy. A study conducted in the Portland, Oregon metropolitan area estimates that individual transit-oriented developments will generate 5 percent fewer vehicle trips than conventional single-family developments and commercial uses (Cambridge Systematics et al. 1996).

Programs in Operation:

The City of Portland, Oregon has developed one of the most accommodating and efficient transit systems in the country. Downtown Portland combines frequent service, convenient bus stops and dedicated bus lanes to achieve high transit ridership.

The Southern California Association of Governments has information and maps of park and ride facilities in Los Angeles, Ventura, Riverside, Orange County, and San Bernardino.

Resources:

Southern California Association of Governments. <http://www.scag.ca.gov/parkride.htm>.

See Resources section for Policies 57 through 60.

TRANSPORTATION INFRASTRUCTURE: BICYCLE AND PEDESTRIAN FACILITIES

Policy 67 The City/County of _____ shall ensure that a comprehensive system of bikeways and pedestrian paths is planned and constructed in accordance with an adopted City/County plan.

Implementation Strategies:

To maximize bicycle use the following actions may be included in street design standards, subdivision ordinances or zoning ordinances:

- *The bikeways should be part of a network that connects major destination points within the community*
- *Provide separate bike paths in areas where motor vehicle speed or volume make on-street bike lanes unsafe or unpleasant to use*
- *Using lower speed limits will enable on-roads cyclists to share the roads with motorists*
- *Provide automatic traffic signal actuators imbedded in the roadway or provide manual signal actuators where cyclists may reach them without leaving the roadway*
- *Provide bicycle paths along greenbelts, linear parks, public easements, and drainage reserved as open space*
- *Provide bicycle and pedestrian bridge crossings for freeways and waterways*
- *Provide adequate paved shoulder on arterial and collectors to keep cyclists and motorist separate*
- *Do not allow on street parking on roadways designated with bike lanes whenever possible*

On-site improvements that can increase bicycle use include:

- *Provide bike racks or enclosed and locked bicycle storage at major activity centers and office and commercial establishments*
- *Provide employee showers, lockers, and dressing areas at employment sites*

Policy 68 The City/County of _____ shall ensure that regional and commuter bikeways are extended to serve new development consistent with the adopted bikeway plan.

Implementation Strategy:

Identify all planned and existing regional and commuter bikeways in a comprehensive bikeways plan. Use targeted state and federal funds along with developer contributions to fund the system.

Policy 69 The City/County of _____ shall ensure that upgrades to existing roads (widening, curb and gutter, etc.) include

bicycle and pedestrian improvements in their plans and implementation where appropriate.

Implementation Strategy:

Through zoning or other means, require bicycle lanes on larger streets.

Through zoning or other means, require pedestrian pathways between existing developments fitting certain criteria to existing and planned transit or multimodal facilities.

Compare Public Works/Roads Department's improvement plans with bikeways plans and ensure they match.

Policy 70 The City/County of _____ shall require new major activity centers, office and commercial development to provide secure bicycle storage and parking facilities.

Note: Consider the type of use when establishing bicycle parking standards. Some uses have limited potential for bicycle use and should have lower parking requirements.

Implementation Strategy:

Change the Zoning Ordinance Special Development Standards to require bicycle storage facilities. Require bicycle facilities as CEQA mitigation measures.

Consider reducing motor vehicle parking standards to acknowledge development with good multi-modal access and facilities.

Policy 71 The City/County of _____ shall preserve abandoned railroad right of ways with no potential for use as light rail lines for use as bikeways and pedestrian paths when feasible.

Implementation Strategy:

Identify potential paths during general plan updates and when the railroad proposes to abandon their right of way.

Air Quality Benefits:

Bicycling is the most efficient form of transportation ever devised. The amount of energy consumed per mile is less than any form of locomotion, including walking. The air quality benefits of bicycling are obvious. The bicycle is a zero exhaust vehicle.

The policies in this section attempt to create "bicycle-friendly" transportation infrastructure. The basic premise underlying these policies is that providing a safe, interconnected system of bikeways and routes will result in greater bicycle use. In Davis, California, which is known as the most bicycle-oriented city in the State, more than 80% of all collector and arterial streets within the city have bike lanes or bike paths (City of Davis 2001).

Although many Valley communities have systems of bikeways and bike lanes, their current use is limited; bicycling accounted for approximately 0.8% of work trips in the City of Fresno in 2000 (2000 Census). The most important factors limiting greater use are lack of continuity and safety considerations. Bicycle routes usually are not continuous. Many routes have unsafe bottlenecks at intersections to accommodate left and right turn lanes. Some routes narrow to one foot wide in places or periodically disappear and reappear. Many traffic signals cannot be actuated by bicyclists without leaving the roadway to press the pedestrian crossing actuator. All but the most serious bicyclists are discouraged by these conditions.

Policy 67 requires the city or county to plan and construct a comprehensive bicycle system. This will be difficult in developed areas, but is very practical for new areas. Nearly all cities in the Valley predict rapid growth. If long-range transportation and land use plans include bicycle facilities, much larger mode shares for bicycles are feasible as build out progresses.

Policy 68 provides a commitment to extend bikeways to serve new development. This commitment must be followed up by developing funding sources to maintain the integrity of the bikeways system.

Roads that are good bicycle routes are frequently made unusable when the road is widened or when intersections are modified. Policy 69 encourages cities and counties to design roadway improvements that include bicycle use. This is where adequate long range transportation planning is critical. Roadways should be planned to their ultimate width from the start. Retrofitting to add improvements invariably results in less than ideal driving conditions and less safe bicycling.

Policy 70 concentrates on making the end of the bicycle trip more convenient. Providing a safe place to lock bicycles eliminates one more reason that people choose not to ride.

Under some conditions, separate bikeways are preferable to sharing the road with motor vehicles. Policy 71 encourages the use of abandoned rail right of ways to provide a low cost place to construct separate bikeways. Ideally, the right of way should connect with commuter destinations or other segments of the comprehensive bikeways system.

The policies in this section are appropriate for all sizes of cities, but are especially effective for small and medium-sized cities. Smaller cities have shorter travel distances to a greater number of destinations, and usually have less traffic and congestion than large cities. This increases bicycle safety.

A rough calculation of the valley-wide emission reduction potential for ROG and CO for just a one percent increase in bicycling mode share for all trips produces the following results:

- ROG - 4.77 tons/day
- CO - 22.27 tons/day

These calculations are based on the 2001 Base Year Inventories for ROG and CO for the San Joaquin Valley (California Air Resources Board 2003). The calculations assume that a one percent increase in the bicycle mode share corresponds to a one percent decrease in on-road mobile emissions.

Programs in Operation:

The City of Davis fully integrates bicycles into the transportation system. The City offers an extensive system of bike lanes, bicycle parking facilities, and slow speed limits on most city streets. According to the 2000 Census, 15% of commuters in the City of Davis bicycle.

The City of Visalia adopted a comprehensive bikeways plan. The plan calls for expansion of the current system of bikeways and provides standards for constructing bike facilities. Visalia provides an example of what a medium-sized city can do to encourage bicycling.

Resources:

Guide to Bicycle Project and Program Funding in California Second Edition, February 2002; California Bicycle Coalition and Planning and the Conservation League Foundation. <http://www.calbike.org/fed.htm>.

Bicycle Friendly Cities: Key Ingredients for Success and Selecting and Designating Bicycle Routes: A Handbook; National Center for Bicycling and Walking, 1506 21st St. NW, Suite 200, Washington DC20036.

A Citizen's Guide to Transportation Policy and Planning 2002; 1000 Friends of Oregon and the Oregon Transportation Reform Advocates Network, 534 SW Third Avenue, Suite 300, Portland, OR 97234. <www.bikewalk.org>.

City of Davis Comprehensive Bicycle Plan. City of Davis. 2001. <http://www.city.davis.ca.us/pw/pdfs/01bikeplan.pdf>.

Guide to the Development of Bicycle Facilities, 1999; American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St, NW, Suite 249, Washington, DC 20001.

National Center for Biking and Walking has information on how to help create neighborhoods and communities where people walk and bicycle trough land use planning, safety, and more. <www.bikewalk.org>

Rails Trails: An Acquisition and Organizing Manual for Converting Rails into Trails; Rails-to-Trails Conservancy, 1400 16th St NW, Washington, DC 20036. <www.railtrails.org>.

A Guide to Transportation Enhancements, June 1999; Rails to Trails Coalition and the Federal Highway Administration, 400 Seventh St SW HEPN-50, Washington DC 20590. <www.fhwa.dot.gov>.

TRANSPORTATION INFRASTRUCTURE: LIGHT RAIL/COMMUTER RAIL

Policy 72 The City/County of _____ shall identify potential light rail corridors during major general plan updates and take action to protect the right of way from incompatible development.

Implementation Strategy:

Work with Caltrans and the Regional Transportation Planning Agency to prepare a comprehensive light rail study. Identify the best routes and develop a community consensus for those routes. Ensure that the general plan designates densities and land use patterns that make light rail feasible.

Policy 73 The City/County of _____ shall preserve specific existing railroad right of ways that have the potential to be used as light rail lines.

Implementation Strategy:

Identify light rail routes during general plan updates and during Regional Transportation Plan preparation.

Policy 74 The City/County of _____ shall support the use of suitable freeway and expressway right of ways for light rail.

Implementation Strategy:

Plan light rail routes in the Circulation Element and Regional Transportation Improvement Plans.

Policy 75 The City/County of _____ shall plan the area around new commuter and mainline rail stations to provide convenient and safe pedestrian and bicycle access, and connections to the transit system.

Implementation Strategy:

Identify potential rail stations during general plan updates and designate the surrounding area for pedestrian or transit-oriented development.

Air Quality Benefits:

New rail systems have a smooth, quiet ride and relatively high average speeds. High speed rail systems, one of which is being considered to run through the Valley, can rival air travel for speed and convenience. Several cities in the Valley are considering light rail in their long range transportation plans. The air quality benefits of rail depend on the extent to which they reduce motor vehicles trips and miles traveled.

Implementing the policies in this section will result in the conditions needed to make light rail feasible in the Valley and will allow the most effective use of the planned high speed rail system. A well-used light rail or high speed commuter rail system can absorb a large number of vehicle trips that would otherwise be made by more polluting motor vehicles. Light rail in heavily congested corridors can help reduce congestion related emissions and also can reduce trips when people walk or bicycle to the transit station. High speed rail targets long distance commuters, tourists and business travelers who would normally travel by private car or by air. Rail travel uses less energy and emits fewer pollutants per passenger than cars.

Policies 72, 73, and 74 require cities and counties to identify and preserve light rail corridors. By identifying the corridors early, the odds of actual construction of the system are greatly improved. This is because of two factors that impact feasibility. First, by identifying the corridor you can plan the land uses along the corridor to provide a maximum number of people within walking distance of the transit stations. Second, it is much easier to design a roadway that reserves a portion for the rail line instead of retrofitting a light rail line on an existing street.

Policy 75 promotes multi-modal access to potential rail stations. People arriving at the station by bus, bicycle, or walking avoid a cold start and the running emissions that would have occurred had they driven their cars to the stations.

Programs in Operation:

The cities of Los Angeles, San Diego, San Jose, and Sacramento have light rail systems that have exceeded ridership goals and have proven to be a viable commute alternative for many people.

In November 2004, Denver voters approved a $4.7 billion expansion of the city's rail system; the largest such project in the country, the measure will add 120 (Paulson 2005).

Resources:

Sacramento Regional Transit, PO Box 2110, Sacramento, CA 95812-2110. <www.sacrt.com>.

San Diego Association of Governments. <www.sandag.org>.

Santa Clara Valley Transportation Authority. <http://www.vta.org/services/light_rail_overview.html>.

California Rail News published by the California Rail Foundation and the Train Riders Association of California, 926 J Street, Suite 612, Sacramento, CA 95814. This publication discusses issues facing all forms of transit. <http://www.calrailnews.com/>.

ANALYSIS OF AIR QUALITY BENEFITS OF IMPLEMENTING AIR QUALITY GOALS AND POLICIES

An extensive review of the literature on the effect of land use decisions on transportation and air quality accomplished for this project found a broad consensus that significant long-term emissions reductions are possible by

changing our development practices. The best evidence comes from studies that compare differences in travel behavior in various types of developed areas. These studies have clearly shown that land use patterns favorable to walking, bicycling, and transit use produce less vehicle trips and less emissions. The studies do their best to identify variables responsible for the differences, but it is not possible to develop a precise formula that will apply to any every site anywhere. The emission reduction estimates quoted in this document should be viewed as what is possible. Individual cities and counties may achieve higher or lower reductions depending on local circumstances. A discussion of the travel and trip reduction studies we found most useful and convincing is provided below.

Results of the Literature Search

Perhaps the most widely used source of trip statistics is the Institute of Transportation Engineers (ITE), Trip Generation Manual. The trip generation factors provided in this manual are used in many transportation models, and also in models predicting mobile source air pollutant emissions from development projects. The manual uses travel surveys conducted nationwide to develop trip generation estimates. The ITE manual (6th Edition) lists the single family residential rate as 10 trips per day, and the rate for high density residences as 6 trips per day. This is a 40 percent difference in trips between single family residences and high density residences such as apartments. The surveys do not address the characteristics of sites studied to determine why people living in apartments make less trips than people living in single-family residences.

More detailed travel survey information is available from the U.S. Department of Transportation, *Our Nation's 1995 Nationwide Personal Transportation Study Early Results Report*, *November 1996 Summary of Travel Trends*, *1995 Nationwide Personal Transportation Survey*, and the *2001 National Household Travel Survey*, which is available at <http://nhts.ornl.gov/2001/index.shtml>. These studies examine travel behaviors and factors influencing transit use, such as distance to public transit in influencing transit use. These study and summary documents showed that 10.3 percent of people living within 1/4 mile of transit used public transit to get to work. Only 3.8 percent of people living between 1/4 and 2 miles of a transit station used transit and less than 1 percent living more than 2 miles away used transit to get to work. This information supports the concept of locating the maximum number of people close to transit.

Another widely used source of travel behavior information is the Bay Area Travel Survey published by the Metropolitan Transportation Commission. Studies conducted in California, New York, Washington, Canada, Australia, Europe, and Asia have found that as density increases, the average annual rate of vehicle travel decreases, with each doubling of density resulting in a

reduction of 25 to 30 percent (Cervero 1994, Holtclaw 1990, Holtzclaw 1994, Deakin, Harvey & Skkabordonis 1981, Newman and Kenworthy 1989 in California Air Resources Board 1997).

In an October 2004 memorandum on URBEMIS 2002 mitigation measures, Nelson\Nygaard Consulting summarized literature linking residential density and travel behavior. They found that there is a significant, quantifiable relationship between residential density and automobile use, with a threshold value of 25-30 units per acre below which the travel impacts of increased density are particularly large (Nelson\Nygaard 2004). They also found that higher densities are most beneficial to transit ridership in mixed-use areas.

Effectiveness of Air Quality Goals and Policies

A sub-consultant for this project, TJKM Transportation Consultants, analyzed the literature to arrive at potential reductions in vehicle trips, vehicle miles, and vehicle hours in the types of communities found in the San Joaquin Valley. The consultant relied heavily on studies of the effectiveness of transportation control measures (TCMs). TCMs are defined in the CCAA as "any strategy to reduce vehicle trips, vehicle miles traveled, vehicle idling, or traffic congestion." This broad definition would include the land use measures promoted by the policies of this document.

TCMs are normally thought to apply to existing development rather than new development; however, the land use pattern and transportation infrastructure can enhance the effectiveness of TCMs. The consultant used a 20 to 25 year planning horizon to estimate the long-term effectiveness of TCMs. With population predicted to nearly double in the San Joaquin Valley during that period, close to 50 percent of the Valley's developed land could be developed in ways that support TCMs.

The results of this analysis are presented in Table 4-2. The table provides a range of effectiveness for each measure in each of five different community types found in the San Joaquin Valley. The most important categories for this discussion are Transportation Infrastructure Changes and Urban Design. The consultant predicts trip reductions from 0 to 2 percent and VMT reductions of 0 to 2.5 percent for transportation infrastructure changes. Urban design measures can achieve reductions of 0 to 15 percent. The percentage reductions for each category in this table are not always additive, but rather are "either-or" levels of effectiveness.

A more detailed analysis of TCM effectiveness in the San Joaquin Valley was recently completed. The Councils of Government from the San Joaquin Valley led an effort to quantify the benefits of TCMs proposed for implementation in the Valley. The TCMs are being proposed in order to comply with congestion management legislation and with the District's various

Table 4-2 Effectiveness of TCMs by Area Type – Percent Reductions

Transportation Control Measures	Small Agricultural Town	Diversified Agricultural Towns		Urban/Suburb	
		Bedroom	Non-Bedroom	Bedroom	Non-Bedroom
TRANSPORTATION INFRASTRUCTURE CHANGES					
Traffic Flow Improvements[2]	0.0	0.0	0.0	0.0	0.0
Bicycling Program	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.5 - 1.0
Park and Ride Lots: Fringe Area	N.A	N.A	Minimal	N.A	trips: 0.5-1.0
Park and Ride Lots: Suburban Area		trips: 0.5 - 1.5		trips: 0.5 - 1.5	trips: 0.5-1.5
HOV lanes	Generally Applicable only in Inter-regional corridors				
TRANSIT INFRASTRUCTURE					
Rapid Rail/ Support Facilities	N.A	N.A	N.A	N.A	0.0 - 1.0
Public Transit	<0.5	<0.5	<0.5	<0.5	0.5 - 2.0
Passenger Rail/ Support Facilities	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	1.0 - 2.0
PRIVATE SECTOR -BASED					
Non-employer Trip Reduction Program	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0
Fleet Operators Program[3]	0.0	0.0	0.0	0.0	0.0
Employee Focus					
Rideshare Program	0.0 - 3.0	0.0 - 4.0	0.0 - 4.0	0.0 - 4.0	0.5 – 5.0
Trip Reduction Program (Mandatory)	1.0 - 5.0	1.0-5.0	1.0 - 5.0	1.0 - 5.0	2.5 – 7.5
Telecommunication	1.0 - 5.0	3.0 – 6.0	2.0 – 5.0	3.0 - 6.0	4.0 – 8.0
Alternative Work Schedules	2.5 - 7.5	4.0 - 8.0	2.5 - 7.5	4.0 - 8.0	5.0 – 10.0
PARKING/ROADWAY MANAGEMENT/PRICING					
Parking Management: Supply Limit	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	0.0 - 1.0	1.0 - 5.0
Parking Management: Increased Price	0.0 - 5.0	0.0 - 5.0	0.0 - 5.0	0.0 – 5.0	2.5 - 7.5
Market-based Trip Reduction Program	1.0 - 3.0	2.5 - 7.5	2.5 - 7.5	2.5 – 7.5	5.0 – 10.0
URBAN DESIGN					
Job/Housing Balance	VMT: 0.0 - 5.0	VMT: 2.5 - 7.5	VMT: 2.5 - 7.5	VMT: 2.5 - 7.5	VMT: 2.5 - 7.5
Urban Villages	0.0 - 10.0	5.0 - 15.0	5.0 - 15.0	5.0 - 15.0	5.0 - 15.0

[1] Range of potential percent reduction in locally generated VMT and trip (per capita) – assumes 20-25 year planning horizon.

[2] Air quality Improvements stem from travel time improvement.

[3] Air quality improvements stem from use of alternative fuels.

plans. The reductions presented in Table 4-2 are similar to those predicted by the study.

A review was conducted of various TOD projects within the State to identify representative TOD projects that may be built within the SJVAB. Potential emissions and emission reductions resulting directly from the incorporation of TOD features into the project design were then calculated using the URBEMIS2002 model.

URBEMIS is a computer program that can be used to estimate emissions associated with land use development projects in California, such as residential neighborhoods, shopping centers, office buildings; area sources such as gas appliances, wood stoves, fireplaces and landscape maintenance equipment; and construction projects. URBEMIS stands for "Urban Emissions Model." It is a free software program maintained by California Air Districts, and it is available online at <http://www.arb.ca.gov/planning/urbemis/urbemis2002/urbemis2002.htm>.

URBEMIS2002 uses the Institute of Transportation Engineers' Trip Generation Manual version 6.0 along with ARB's vehicle emissions model, EMFAC2002, to calculate motor vehicle emissions. Other components can be used to estimate:

- Construction emissions associated with new development and redevelopment
- Air quality benefits of construction-related mitigation measures
- Emissions from "area sources," such as gas appliances, wood stoves, fireplaces, and landscape maintenance equipment
- Screening level analysis
- Air quality benefits of mitigation measures for area sources

URBEMIS2002 includes several other capabilities related to travel and vehicle emissions. It provides an option to minimize the "double-counting" of trips in mixed-use projects that include residential and non-residential land uses. It also standardizes the estimation of "pass-by" trips (stops made on the way to other destinations). The "Mobile Source Mitigation Component" allows users to estimate the potential vehicle travel and emission reduction benefits of a number of land use and transportation-related strategies, both within the project site and the surrounding area including: pedestrian and bicycle features; public transit facilities and service; the design and mix of land uses; on-site services; and other measures, such as telecommuting and alternative work schedules.

URBEMIS is periodically upgraded to address new information and data.

Table 4-3 summarizes the results of URBEMIS modeling. The data presented in Table 4-3 are development-specific emissions for TOD and non-TOD developments, as well as emissions from a typical single family suburban residence. The emissions reductions resulting from the incorporation of TOD features into the project design are also indicated. The emissions data presented in Table 4-3 are daily emissions per residence. When these emissions are applied to a large development project, emissions reductions can be substantial. For example, the daily emission reduction for NOx generated from a project similar to Moffet Park in Sunnyvale is 26 pounds per day per 100 residential units.

Table 4-3 Summary of Emissions Reductions per 100 Housing Units from Various TOD Projects

TOD Project	ROG (lbs./day)	NO_X (lbs./day)	CO (lbs./day)	PM10 (lbs./day)
Typical Suburban Development	**18**	**22**	**229**	**17**
Aspen Neighborhood, West Davis				
Non-TOD design emissions	8	8	93	6
TOD design emissions	7	7	74	5
Emissions reductions	**1**	**1**	**19**	**1**
Moffet Park, Sunnyvale				
Non-TOD design emissions	14	15	162	12
TOD design emissions	12	12	136	9
Emissions reductions	**2**	**3**	**26**	**3**
Hollywood/Highland, Los Angeles				
Non-TOD design emissions	24	30	324	23
TOD design emissions	21	23	259	18
Emissions reductions	**3**	**7**	**65**	**5**
Rio Vista West, San Diego				
Non-TOD design emissions	9	11	110	8
TOD design emissions	8	8	90	6
Emissions reductions	**1**	**3**	**20**	**2**

County and City Emissions Inventories

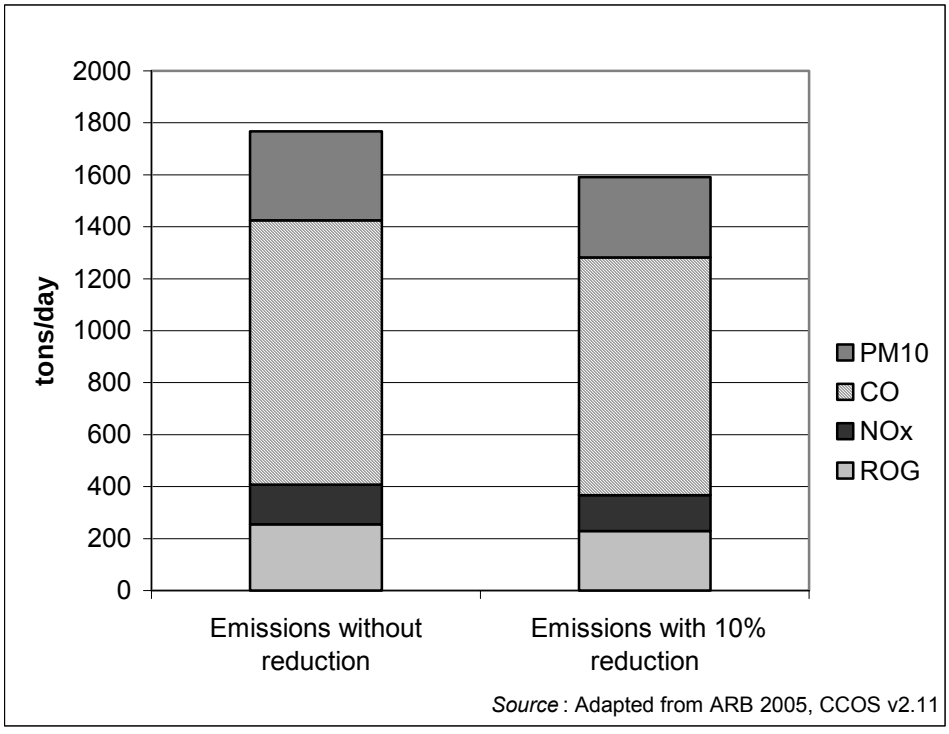
Past plans like the LUTRAQ transportation model in Oregon and the California Energy Commission publication, Energy Aware Planning Guide (CEC 1993), estimate a 10% minimum reduction in number of trips and energy usage, respectively. The results in applying a similar, modest 10%

reduction in emissions to the emissions forecast for 2020 is shown in Figure 4-7, which illustrates the total emissions of ROG, NOx, CO, and PM10 for all sources with and without a 10% reduction in the 2020 forecast. Though the tons/day of emissions that can be saved with a 10% reduction in emissions may seem small, it amounts to approximately 64,500 tons/year fewer emissions than without a 10% reduction.

The emission reductions estimates may seem small, but they are also significant when compared with individual stationary sources. Reductions achieved with the implementation of air quality goals and policies may help relieve some of the burden on stationary sources like manufacturing plants that contribute to economic growth in the San Joaquin Valley.

It is important to keep in mind that as time goes on, the benefits of the policies accumulate. Every year, a greater percentage of the developed area will be in a pedestrian or transit friendly pattern. The sooner a program is implemented, the sooner significant benefits will be seen.

Figure 4-7 Combined Emissions from area-wide, on-road mobile (gasoline and diesel), and other mobile sources



Source: Adapted from ARB 2005, CCOS v2.11

SECTION IV REFERENCES:

American Public Transportation Association and the American Public Transit Association. "Access-to-work Best Practices Survey Summary Report, Part 2." October 1999. <www.apta.com>.

American Society of Civil Engineers. "Transportation Planning and Air Quality." *Bay Area Air Quality Management District, Air Currents*. April 1993.

Beardslee, Peggy. "Is Your County Ready for Teleworking?" *County News Online*. National Association of Counties: Washington DC. November 24, 1997.

California Air Resources Board, Office of Air Quality and Transportation Planning. *The Land Use-Air Quality Linkage: How Land Use and Transportation Affect Air Quality*. 1997 Edition. Available at <http://www.arb.ca.gov/ch/programs/link97.pdf>.

California Air Resources Board. "Population and Vehicle Trends Report." Available at <http://www.arb.ca.gov/app/emsinv/trends/ems_trends.php>. Last updated 2004.

California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. 2005. Available at <http://www.arb.ca.gov/ch/landuse.htm>.

California Air Resources Board, Transportation-Related Land Use Strategies to Minimize Motor Vehicle Emissions: An Indirect Source Research Study. 1995

California Air Resources Board. 2005 CCOS v 2.11 data. Available at <http://www.arb.ca.gov/app/emsinv/ccos/fcemssumcat_cc211.php>.

California Department of Transportation, Final Report, Statewide Transit-Oriented Development Study, Factors for Success in California, September 2002.

California Energy Commission, Energy Aware Planning Guide, January 1993.

California Energy Commission, California Energy Outlook, Volume II Transportation Energy Systems, Staff Report, August 2000.

California Energy Commission, "California Energy Facts", January 18, 2001.

Cambridge Systematics, et al, Making the Land Use Transportation Air Quality Connection: Analysis of Alternatives. Volume 5, May 1996.

Environmental Protection Agency, Clean Alternative Fuels: Compressed Natural Gas (EPA420-F-00-033). March 2002.

Globe Research & Analysis. Prepared for the Bay Area Air Quality Management District. 2003.

Holtzclaw, John, Ph.D., for the Sierra Club. "Explaining Urban Density and Transit Impacts on Auto Use," a report to the California Energy Commission. January 1990.

Holtzclaw, John. *How Compact Neighborhoods Affect Modal Choice – Two Examples*. Available at <www.sierraclub.org/sprawl/articles/modal.asp>

Institute of Transportation Studies, UC Davis (Brett E. Koenig, Dennis K. Henderson, and Patricia L. Mokhtarian), "The Travel and Emissions Impacts of Telecommuting for the State of California Telecommuting Pilot Project." *Transportation Research*. February 1, 1996.

Monterey Bay Unified Air Pollution Control District. "CEQA Air Quality Guidelines," Monterey, CA. 2002.

Nelson\Nygaard Consulting Associates. "Memorandum: Final recommendations for URBEMIS 2002 Mitigation Measures." October 10, 2004.

Paulson, Amanda. "From transit to sushi to arts funding, Denver reinvents itself," *Christian Science Monitor*. April 15, 2005. Available at <http://www.csmonitor.com/2005/0415/p01s02-ussc.html>.

Rodier, Caroline J. "A review of the representation of induced highway travel in current travel and land use models," submitted to Transportation Research Board. July 2004. <http://www.its.ucdavis.edu/publications/2004/UCD-ITS-RR-04-28.pdf>.

San Diego Air Pollution Control District, "Tools for Reducing Vehicle Trips Through Land Use Design: Increasing Bicycling, Walking, and Transit Use in the San Diego Region." 1998.

San Joaquin Valley Unified Air Pollution Control District, *Draft PM10 Nonattainment Area Plan*. September 23, 1991.

San Joaquin Valley Air Pollution Control District. *Amended 2002 and 2005 Rate of Progress Plan for San Joaquin Valley Ozone.* 2002.

Shapiro, Robert J.; Hassett, and Arnold, Frank S. "Conserving Energy and Preserving the Environment: The Role of Public Transportation" *American Public Transportation* web site. July 2002 (Accessed June 2005) Available at <http://www.publictransportation.org/reports/energy.asp>.

Sterngold, Arthur. "The Economic Impact and Feasibility Game." *Planning*. American Planning Association. pp. 32-34. February 2005.

US Census Bureau. "California: 2000: Summary Social, Economic, and Housing Characteristics (PHC-2-6)," March 2003.

US Department of Transportation. "Summary of Travel Trends: 1995 Nationwide Personal Transportation Survey." 1999.

Weissman, Steve and Corbett, Judy. " Land Use Strategies for More Livable Places," The Local Government Commission: Sacramento. May 1, 1992.

Williams, John, "The Bicycle Advocate's Action Kit, Bicycle Federation of America," Washington DC. 1993.

Exhibit I
Ruling on Petitions for Writ of Mandate

FILED
Clerk of the Superior Court
DEC 03 2012
By: _____ Deputy

FILED
Clerk of the Superior Court
DEC 03 2012
By: A. Taylor, Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF SAN DIEGO

CLEVELAND NAT'L FOREST FOUNDATION, et al.,

Petitioners,

v.

SAN DIEGO ASS'N OF GOVERNMENTS,

Respondent;

And CONSOLIDATED CASE and COMPLAINT IN INTERVENTION BY the ATTORNEY GENERAL OF CALIFORNIA

Case No. 2011-00101593

RULING ON PETITIONS FOR WRIT OF MANDATE

Judge: Timothy B. Taylor
Dept.: 72

Hearing: November 30, 2012

1. Overview and Procedural History.

In this CEQA case, the petitioners and the Attorney General claim SANDAG abused its discretion when it decided to certify an EIR and adopt a Regional Transportation Plan (RTP) which for the first time included a "Sustainable Communities Strategy" (SCS) ostensibly designed to meet a greenhouse gas emission reduction target as required by Senate Bill 375, Stats. 2008, Ch. 728. The parties agree this is the first RTP in California to be adopted following the 2008 legislation [AR2075; AR 04465], but they fundamentally disagree about the reach and requirements of that statute as it interfaces with the requirements of CEQA. No court has heretofore interpreted SB 375; the RTP/SCS at issue is meant to provide a blueprint for transportation planning for the next

40 years; and entities like SANDAG up and down the State are looking for guidance from this case regarding how to implement SB 375 in the context of an EIR. Thus, this court is but a way station in the life of this case, which is clearly headed for appellate review regardless of the outcome at the trial level. The case arises against a backdrop of intense scientific and political debate over what one counsel referred to as the signal issue of our time: global climate change.

Petitioners Cleveland Nat'l Forest Foundation ("Cleveland") and the Center for Biological Diversity ("CBD") filed the petition on November 28, 2011. The case was assigned to Judge Hayes, but Cleveland challenged her and the case was reassigned. Petitioners CREED-21 and the Affordable Housing Coalition ("AHC") filed a substantially similar petition, also on November 28, 2011 (ROA 42). This case, No. 2011-00101660, was initially assigned to another department, but the parties later stipulated to (and the court ordered) consolidation with the low-numbered case (ROA 41).

Cleveland and CBD filed an amended petition on 1/23/12, adding the Sierra Club as a petitioner (ROA 17). The AG sought and obtained leave to intervene on 1/25/12, and filed her petition in intervention the same day on behalf of the People (ROA 22-25).

At a CMC on 2/24/12, the parties advised the court that the Administrative Record in this case exceeds 10,000 pages in length (as it turned out, it is over 30,000 pages). In light of this, the court adopted a party-proposed briefing schedule, granted relief from brief page limits imposed by the Rules of Court, and set the matter for a merits hearing (ROA 38). SANDAG subsequently filed answers to both the Cleveland/CBD/Sierra Club amended petition and the CREED-21/AHC petition (ROA 48, 49). SANDAG also filed its answer to the AG's petition in intervention.

The Administrative Record, which is contained on a CD, was lodged on June 27 (ROA 53), having been certified by SANDAG on May 3 (ROA 45). Joint excerpts are contained in two binders, which were lodged 10/25/12. On November 19, the parties lodged a "Corrected Joint Appendix" (ROA 80); but by this time, the court had done the lion's share of its review using the joint excerpts lodged in October.

The briefing has been extensive, and as will be explained below, might have been even more extensive. On June 27, the AG filed an opening brief, an amended opening brief, and (a few days later) an errata to the amended opening brief (ROA 52, 56). Also on June 27, CREED-21/AHC filed their opening brief (ROA 54), and Cleveland/CBD/Sierra Club filed their opening brief (ROA 55). This was a total of 81 pages of briefing (not counting the AG's amendments and corrections). On Sept. 10, SANDAG filed its responsive briefs: one in response to the AG's amended brief (ROA 62), and a second in response to the Cleveland and CREED-21 briefs (ROA 61). This was a total of 95 pages of briefing.

On September 25, 2012, the court had the unpleasant experience of denying several requests for leave to file *amicus* briefs. ROA 68. Respondents recruited several *amici*

who spent time and energy preparing extensive briefs. See ROA 59, 64. The parties and the proposed *amici* appeared on September 25 to ask the court to allow the filing of these briefs, and to set a briefing schedule for joinders and responses thereto. The court was constrained to exercise its discretion to deny all such requests; it explained its decision in two ways. First, the court is aware of its limited role here: to ensure a complete record, and to provide the parties with a timely decision so that the case may proceed promptly to appellate review. The court was concerned that allowing *amicus* briefing, joinders and responses would retard rather than advance the latter goal (particularly given that the trial court's decision will not affect the others statewide with an interest in this topic, but rather only the parties – and then only for the limited period between the decision set forth below and the issuing of a learned opinion from the 4th DCA, Div. 1).

Second, and in a related vein, the court noted that Brobdingnagian budget cuts recently suffered by the Judicial Branch have caused the San Diego Superior Court to lay off hundreds of staff, stop providing court reporters in civil cases, restrict office hours, and, most recently, close a county-wide total of seven civil independent calendar courtrooms (with a consequent re-distribution of the caseload among the "surviving" departments). Again, the court was concerned that 100+ pages of additional briefing (on top of the lengthy party/intervenor briefs) could not be properly addressed by the court in a timely fashion, given these harsh fiscal and workload realities. Fortunately, the work done by *amici* will not have been wasted; they remain free to polish their briefs in light of this court's decision and seek leave to file them as the case proceeds to review before courts with broader authority.

Finally, reply briefing was filed by the AG on October 12; petitioners filed their consolidated reply that same day (ROA 72, 73). This was an additional 50 pages of briefing. The court has reviewed the opening, opposition and reply briefing, as well as the Administrative Record and the Supplement thereto filed October 22 (ROA 74).

The court notes that the briefing was accompanied by lodgments of non-California authorities. The court asks the parties to forebear from routinely lodging copies of federal or foreign authorities in the future. These are ordinarily available to the court on Westlaw. Counsel are encouraged to review the Summer 2011 amendments to CRC 3.1113(i) in this regard. The former rule made such lodgments mandatory; the current rule permits judicial discretion in this area. The court will advise counsel if it needs a lodgment of a non-California authority. Many trees will be saved if counsel will honor this request. Also, recent budget cuts imposed on the court make the clerk time for the handling of these lodgments quite problematic.

On November 16, 2012, the court published a lengthy tentative ruling. The court did so early, in order to facilitate counsel's preparation in light of the intervening Thanksgiving holiday. The court entertained well-prepared and very thoughtful argument on November 30 from Mr. Seymour on behalf of SANDAG, Mr. Selmi on behalf of petitioners, and by Mr. Patterson and Ms. Durbin on behalf of the AG. Petitioners and the AG used a Powerpoint presentation, which the court marked as Ex. 1 to the hearing for record purposes. Following argument, the court took the matter under submission. The court

now renders its decision. Record references below are to the excerpts lodged by the parties in October, except where stated. The court notes that, near the end of her comments during the 1 hour 45 minute hearing, Ms. Durbin requested a Statement of Decision. This is not required, as there was no "trial" of this matter as contemplated by CCP section 632. There was no testimony or cross examination; the matter proceeded, as most if not all CEQA cases do, in the manner of a complex motion argument. The court hopes that the following discussion will be deemed by the parties and the reviewing court to be an adequate specification of the grounds for non-compliance as required by Pub. Res. Code section 21005(c), and an adequate setting forth of the court's decision and the reasons therefor.

2. Overview of the CEQA Process.

A. The Court's Role in CEQA Cases.

In *Mira Mar Mobile Community v. City of Oceanside,* 119 Cal.App.4th 477, 486 (2004) (*Mira Mar Mobile Community*), the court explained that "[i]n a mandate proceeding to review an agency's decision for compliance with CEQA, [courts] review the administrative record *de novo* [citation], focusing on the adequacy and completeness of the EIR and whether it reflects a good faith effort at full disclosure. [Citation.] [The court's] role is to determine whether the challenged EIR is sufficient as an information document, not whether its ultimate conclusions are correct. [Citation.]" An EIR is presumed adequate. Pub. Res. Code § 21167.3, subd. (a).

Courts review an agency's action under CEQA for a prejudicial abuse of discretion. Pub. Res. Code § 21168.5. "Abuse of discretion is established if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence." *Id.;* see *Mira Mar Mobile Community, supra,* 119 Cal.App.4th at 486; *County of San Diego v. Grossmont-Cuyamaca Community College Dist.* ("*Grossmont*"), 141 Cal. App. 4th 86, 96 (2006)(same).

In defining the term "substantial evidence," the CEQA Guidelines state: " 'Substantial evidence' ... means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made ... is to be determined by examining the whole record before the lead agency. Argument, speculation, unsubstantiated opinion[,] narrative [or] evidence which is clearly erroneous or inaccurate ... does not constitute substantial evidence." CEQA Guidelines, § 15384(a). "In applying the substantial evidence standard, [courts] resolve all reasonable doubts in favor of the administrative finding and decision. [Citation.]" *Mira Mar Mobile Community, supra,* 119 Cal.App.4th at 486; *Grossmont, supra,* 141 Cal. App. 4th at 96.

Although the lead agency's factual determinations are subject to the foregoing deferential rules of review, questions of interpretation or application of the requirements of CEQA are matters of law. While judges may not substitute their judgment for that of the decision

makers, they must ensure strict compliance with the procedures and mandates of the statute. *Grossmont, supra*, 141 Cal. App. 4th at 96.

B. The Three Steps of CEQA.

CEQA establishes "a three-tiered process to ensure that public agencies inform their decisions with environmental considerations." *Banker's Hill, et al v. City of San Diego*, 139 Cal. App. 4th 249, 257 (2006)("*Banker's Hill*"); see also CEQA Guidelines, § 15002(k)(describing three-step process).

First Step in the CEQA Process.

The first step "is jurisdictional, requiring that an agency conduct a preliminary review in order to determine whether CEQA applies to a proposed activity." *Banker's Hill, supra,* 139 Cal. App. 4th at 257; see also Guidelines, § 15060. The Guidelines give the agency 30 days to conduct this preliminary review. (Guidelines, § 15060.) The agency must first determine if the activity in question amounts to a "project." *Muzzy Ranch Co. v. Solano County Airport Land Use Com.* (2007) 41 Cal.4th 372, 380. "A CEQA ...project falls into one of three categories of activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment (§ 21065.)" *Sunset Sky Ranch Pilots Assn. v. County of Sacramento* (2009) 47 Cal.4th 902, 907.

As part of the preliminary review, the public agency must also determine the application of any statutory exemptions or categorical exemptions that would exempt the proposed project from further review under CEQA. See Guidelines, § 15282 (listing statutory exemptions); Guidelines, §§ 15300–15333 (listing 33 classes of categorical exemptions). The categorical exemptions are contained in the Guidelines and are formulated by the Secretary under authority conferred by CEQA section 21084(a). If, as a result of preliminary review, "the agency finds the project is exempt from CEQA under any of the stated exemptions, no further environmental review is necessary. The agency may prepare and file a notice of exemption, citing the relevant section of the Guidelines and including a brief 'statement of reasons to support the finding.' " *Banker's Hill, supra*, 139 Cal.App.4th at 258, citing Guidelines, §§ 15061(d), 15062(a)(3).

Second Step in the CEQA Process.

If the project does not fall within an exemption, the agency proceeds to the second step of the process and conducts an initial study to determine if the project *may* have a significant effect on the environment. (Guidelines, § 15063.) If, based on the initial study, the public agency determines that "there is substantial evidence, in light of the whole record ... that the project may have a significant effect on the environment, an environmental impact report [(EIR)] shall be prepared." [CEQA, § 21080(d).] On the other hand, if the initial study demonstrates that the project "would not have a significant effect on the environment," either because "[t]here is no substantial evidence, in light of whole record" to that effect or the revisions to the project would avoid such an effect, the

agency makes a "negative declaration," briefly describing the basis for its conclusion. (CEQA, § 21080(c)(1); see Guidelines, § 15063(b)(2); *Banker's Hill, supra*, 139 Cal.App.4th at 259.)

The Guidelines and case law further define the standard that an agency uses to determine whether to issue a negative declaration. "[I]f a lead agency is presented with a *fair argument* that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect." (Guidelines, § 15064(f)(1), italics added.) This formulation of the standard for determining whether to issue a negative declaration is often referred to as the "fair argument" standard. See *Laurel Heights Improvement Assn. v. Regents of University of California,* 6 Cal.4th 1112, 1134–1135 (1993). Under the fair argument standard, a project "may" have a significant effect whenever there is a "reasonable possibility" that a significant effect will occur. *No Oil v. City of Los Angeles*, 13 Cal.3d 68, 83-84 (1974). Substantial evidence, for purposes of the fair argument standard, includes "fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact." § 21080, subd. (e)(1). Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate or erroneous, or evidence of social or economic impacts unrelated to physical impacts on the environment. § 21080, subd. (e)(2).

If the initial study reveals no substantial evidence that the project may have a significant environmental effect, the agency may adopt a negative declaration. Pub. Res. Code § 21080, subd. (c)(2); Guidelines, § 15070, subd. (b); *Grand Terrace, supra,* 160 Cal.App.4th at 1331; *Save the Plastic Bag Coalition v. City of Manhattan Beach*, 52 Cal. 4th 155, 175 (2011)(holding common sense is part of the substantial evidence analysis). "Alternatively, if there is no substantial evidence of any net significant environmental effect in light of revisions in the project that would mitigate any potentially significant effects, the agency may adopt [an MND]. [Citation.] [An MND] is one in which '(1) the proposed conditions "avoid the effects or mitigate the effects to a point where *clearly* no significant effect on the environment would occur, *and* (2) there is *no substantial evidence* in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment." (§ 21064.5 . . . .)' [Citations.]" *Grand Terrace, supra,* at 1331-1332. The MND allows the project to go forward subject to the mitigating measures. Pub. Res. Code §§ 21064.5, 21080, subd. (c); see *Grand Terrace, supra,* 160 Cal. App. 4th at 1331.

Third Step in the CEQA Process.

If no negative declaration is issued, the preparation of an EIR is the third and final step in the CEQA process. *Banker's Hill, supra*, 139 Cal. App. 4th at 259; Guidelines, §§ 15063(b)(1), 15080; CEQA, §§ 21100, 21151.

C. The Environmental Impact Report.

Central to CEQA is the EIR, which has as its purpose informing the public and government officials of the environmental consequences of decisions before they are made. [Citation.] "An EIR must be prepared on any 'project' a local agency intends to approve or carry out which 'may have a significant effect on the environment.' Pub. Res. Code §§ 21100, 21151; Guidelines, § 15002, subd. (f)(1). The term 'project' is broadly defined and includes any activities which have a potential for resulting in a physical change in the environment, directly or ultimately. Pub Res. Code § 21065; Guidelines, §§ 15002, subd. (d), 15378, subd. (a); [Citation].) The definition encompasses a wide spectrum, ranging from the adoption of a general plan, which is by its nature tentative and subject to change, to activities with a more immediate impact, such as the issuance of a conditional use permit for a site-specific development proposal." *CREED v. City of San Diego*, 134 Cal. App. 4th 598, 604 (2005).

"To accommodate this diversity, the Guidelines describe several types of EIR's, which may be tailored to different situations. The most common is the project EIR, which examines the environmental impacts of a specific development project. (Guidelines, § 15161.) A quite different type is the program EIR, which 'may be prepared on a series of actions that can be characterized as one large project and are related either: (1) Geographically, (2) As logical parts in the chain of contemplated actions, (3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or (4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.'" Guidelines, § 15168, subd. (a); *CREED, supra*, 134 Cal. App. 4th at 605. As the court held in *CREED*, a program EIR may serve as the EIR for a subsequently proposed project only to the extent it contemplates and adequately analyzes the potential environmental impacts of the project. *CREED, supra,* 134 Cal. App. 4th at 615.

The EIR at issue in this case is of the latter variety, a program EIR. Cleveland/CBD/ Sierra Club accuse SANDAG of attempting to use the "programmatic" nature of the EIR as an invalid attempt to excuse it from fully analyzing the health impacts of the RTP. [ROA 55 at 15] The AG joins in this criticism. [ROA 52 at 29]

Under CEQA, an EIR is presumed adequate (Pub. Resources Code, § 21167.3), and the plaintiff in a CEQA action has the burden of proving otherwise. (*Preserve Wild Santee v. City of Santee*, 210 Cal. App. 4th 260, 275 (4th DCA Div. 1 Oct. 19, 2012, internal quotation marks omitted), quoting *Concerned Citizens of South Central L.A. v. Los Angeles Unified School Dist.* (1994) 24 Cal.App.4th 826, 836.) Courts review an agency's determinations and decisions for abuse of discretion. An agency abuses its discretion when it fails to proceed in a manner required by law or there is not substantial evidence to support its determination or decision. [§§ 21168, 21168.5; *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 426-427 (2007) ("*Vineyard*")]. "Judicial review of these two types of error differs significantly: While [courts] determine de novo whether the agency has employed the correct procedures, 'scrupulously enforc[ing] all legislatively mandated CEQA

requirements' [citation], [courts] accord greater deference to the agency's substantive factual conclusions." (*Vineyard, supra*, 40 Cal. 4th at 435.)

Consequently, in reviewing an EIR for CEQA compliance, courts adjust "scrutiny to the nature of the alleged defect, depending on whether the claim is predominantly one of improper procedure or a dispute over the facts." (*Vineyard, supra*, 40 Cal.4th at 435.) For example, where a petitioner claims an agency failed to include required information in its environmental analysis, the court's task is to determine whether the agency failed to proceed in the manner prescribed by CEQA. Conversely, where a petitioner challenges an agency's conclusion that a project's adverse environmental effects are adequately mitigated, courts review the agency's conclusion for substantial evidence. (*Vineyard, supra*, 40 Cal. 4th at 435.)

4. Issues Raised in This Case.

SANDAG is a council of local governments, and is one of 18 Metropolitan Planning Organizations ("MPO") in California. Each MPO is charged under law with the development of the region's RTP, which must be updated every four years. SANDAG began its work in April of 2010, released drafts of the RTP/SCS for public comment on 4/22/11, and released the draft EIR for public comment on June 7, 2011 [AR225-1580]. Petitioners and the AG's office criticized the drafts. [AR4430, 12696-12699, 17972-75, 18053-55] The final EIR was released on October 18, 2011 [AR1969-3401], and was certified after a public hearing on October 28, 2011. Inasmuch as the petitions were filed on November 28, there is no issue in this case regarding the timeliness of the legal challenges to the EIR. Nor are any issues raised by SANDAG with regard to exhaustion of administrative remedies or standing.

There is substantial overlap in the attacks on the EIR leveled by petitioners and the AG. Both sets of petitioners assert that the EIR fails to adequately analyze air quality impacts [ROA 54 at 3-6; ROA 55 at 12-20]. The AG joins in this assertion [ROA 52 at 7-29]. Both petitioners add that the EIR failed to analyze a reasonable range of alternatives [ROA 54 at 6; ROA 55 at 38].

CREED-21/AHC's brief focuses on the failure of the EIR to properly analyze air quality impacts in two specific areas: greenhouse gas emissions and sensitive receptors [ROA 54 at 4-6]. The Cleveland/CBD/Sierra Club brief carefully analyzes the deficiencies of the EIR in relation to greenhouse gas emissions (ROA 55 at part III), while the AG provides extensive discussion on both sensitive receptors and greenhouse gas emissions [ROA 52 at 14-18 and 22-29]. The Cleveland/CBD/Sierra Club brief raises several other issues which neither the AG nor CREED-21/AHC discuss in any detail (mass transit ridership, agricultural land, growth-inducing impacts, parking management, etc.).

5. Ruling.

The court finds that the real focal point of this controversy is whether the EIR is in conformance with a series of state policies enunciated by the legislative and executive branches since 2005 relating to greenhouse gases. Governor Schwarzenegger issued, in

2005, Executive Order S-03-05, which for the first time set a state goal of reducing greenhouse gas emissions. This Executive Order gave rise to the Global Warming Solutions Act of 2006 (AB 32), which is codified at H&S Code section 38500 *et seq.* Section 38550 provides:

"By January 1, 2008, the [Air Resources Board] shall, after one or more public workshops, with public notice, and an opportunity for all interested parties to comment, determine what the statewide greenhouse gas emissions level was in 1990, and approve in a public hearing, a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020. In order to ensure the most accurate determination feasible, the state board shall evaluate the best available scientific, technological, and economic information on greenhouse gas emissions to determine the 1990 level of greenhouse gas emissions."

It is undisputed that the ARB has established greenhouse gas targets for the SANDAG region for 2020 and 2035.

In 2008, the Legislature passed SB 375, which amended both the Public Resources Code and the Government Code in several respects. In section 1 of the statute, the Legislature found and declared:

"(a) The transportation sector contributes over 40 percent of the greenhouse gas emissions in the State of California; automobiles and light trucks alone contribute almost 30 percent. The transportation sector is the single largest contributor of greenhouse gases of any sector.

(b) In 2006, the Legislature passed and the Governor signed Assembly Bill 32 (Chapter 488 of the Statutes of 2006; hereafter AB 32), which requires the State of California to reduce its greenhouse gas emissions to 1990 levels no later than 2020. According to the State Air Resources Board, in 1990 greenhouse gas emissions from automobiles and light trucks were 108 million metric tons, but by 2004 these emissions had increased to 135 million metric tons.

(c) Greenhouse gas emissions from automobiles and light trucks can be substantially reduced by new vehicle technology and by the increased use of low carbon fuel. However, even taking these measures into account, it will be necessary to achieve significant additional greenhouse gas reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32.

(d) In addition, automobiles and light trucks account for 50 percent of air pollution in California and 70 percent of its consumption of petroleum. Changes in land use and transportation policy, based upon established modeling methodology, will provide significant assistance to California's goals to implement the federal and state Clean Air Acts and to reduce its dependence on petroleum.

(e) Current federal law requires regional transportation planning agencies to include a land use allocation in the regional transportation plan. Some regions have engaged in a regional "blueprint" process to prepare the land use allocation. This process has been open and transparent. The Legislature intends, by this act, to build upon that successful process by requiring metropolitan planning organizations to develop and incorporate a sustainable communities strategy which will be the land use allocation in the regional transportation plan.

(f) The California Environmental Quality Act (CEQA) is California's premier environmental statute. New provisions of CEQA should be enacted so that the statute encourages developers to submit applications and local governments to make land use decisions that will help the state achieve its climate goals under AB 32, assist in the achievement of state and federal air quality standards, and increase petroleum conservation.

(g) Current planning models and analytical techniques used for making transportation infrastructure decisions and for air quality planning should be able to assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives.

(h) The California Transportation Commission has developed guidelines for travel demand models used in the development of regional transportation plans. This act assures the commission's continued oversight of the guidelines, as the commission may update them as needed from time to time.

(i) California local governments need a sustainable source of funding to be able to accommodate patterns of growth consistent with the state's climate, air quality, and energy conservation goals."

Section 4 of SB 375 added Government Code section 65080, which provides, in relevant part:

"(a) **Each transportation planning agency** designated under Section 29532 or 29532.1 **shall prepare and adopt a regional transportation plan directed at achieving a coordinated and balanced regional transportation system**, including, but not limited to, mass transportation, highway, railroad, maritime, bicycle, pedestrian, goods movement, and aviation facilities and services. The plan shall be action-oriented and pragmatic, considering both the short-term and long-term future, and shall present clear, concise policy guidance to local and state officials. The regional transportation plan shall consider factors specified in Section 134 of Title 23 of the United States Code. Each transportation planning agency shall consider and incorporate, as appropriate, the transportation plans of cities, counties, districts, private organizations, and state and federal agencies.

(b) The regional transportation plan shall be an internally consistent document and shall include all of the following:

(1) A policy element that describes the transportation issues in the region, identifies and quantifies regional needs, and describes the desired short-range and long-range transportation goals, and pragmatic objective and policy statements. The objective and policy statements shall be consistent with the funding estimates of the financial element. The policy element of transportation planning agencies with populations that exceed 200,000 persons may quantify a set of indicators including, but not limited to, all of the following:
(A) Measures of mobility and traffic congestion, including, but not limited to, daily vehicle hours of delay per capita and vehicle miles traveled per capita.
(B) Measures of road and bridge maintenance and rehabilitation needs, including, but not limited to, roadway pavement and bridge conditions.
(C) Measures of means of travel, including, but not limited to, percentage share of all trips (work and nonwork) made by all of the following:
(i) Single occupant vehicle.
(ii) Multiple occupant vehicle or carpool.
(iii) Public transit including commuter rail and intercity rail.
(iv) Walking.
(v) Bicycling.
(D) Measures of safety and security, including, but not limited to, total injuries and fatalities assigned to each of the modes set forth in subparagraph (C).
(E) Measures of equity and accessibility, including, but not limited to, percentage of the population served by frequent and reliable public transit, with a breakdown by income bracket, and percentage of all jobs accessible by frequent and reliable public transit service, with a breakdown by income bracket.
(F) The requirements of this section may be met utilizing existing sources of information. No additional traffic counts, household surveys, or other sources of data shall be required.

(2) A sustainable communities strategy prepared by each metropolitan planning organization as follows:
(A) No later than September 30, 2010, the State Air Resources Board shall provide each affected region with greenhouse gas emission reduction targets for the automobile and light truck sector for 2020 and 2035, respectively.

***

(B) **Each metropolitan planning organization shall prepare a sustainable communities strategy,** subject to the requirements of Part 450 of Title 23 of, and Part 93 of Title 40 of, the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. The sustainable communities strategy shall (i) identify the general location of uses, residential densities, and building intensities within the region, (ii) identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over

the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth, (iii) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584, (iv) identify a transportation network to service the transportation needs of the region, (v) gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01, (vi) consider the state housing goals specified in Sections 65580 and 65581, (vii) **set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board,** and (viii) allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. Sec. 7506).

Section 14 of SB 375, among other revisions, amended Pub. Res. Code section 21155.3 to provide as follows:

"(a) The legislative body of a local jurisdiction may adopt traffic mitigation measures that would apply to transit priority projects. These measures shall be adopted or amended after a public hearing and may include requirements for the installation of traffic control improvements, street or road improvements, and contributions to road improvement or transit funds, transit passes for future residents, or other measures that will avoid or mitigate the traffic impacts of those transit priority projects.

(b)(1) A transit priority project that is seeking a discretionary approval is not required to comply with any additional mitigation measures required by paragraph (1) or (2) of subdivision (a) of Section 21081, for the traffic impacts of that project on intersections, streets, highways, freeways, or mass transit, if the local jurisdiction issuing that discretionary approval has adopted traffic mitigation measures in accordance with this section.
(2) Paragraph (1) does not restrict the authority of a local jurisdiction to adopt feasible mitigation measures with respect to the effects of a project on public health or on pedestrian or bicycle safety.

(c) The legislative body shall review its traffic mitigation measures and update them as needed at least every five years."

As already noted, the centerpiece of this case is the parties' fundamental disagreement over implementation of these statutory requirements within the framework of CEQA. In all the statutory quotations immediately above, **bold type** has been added by the court.

The court agrees with the points made in section III of the Cleveland brief (ROA 55), part II of the AG's brief (ROA 52), and pp. 4-5 of the CREED-21 brief (ROA 54) regarding the inadequate treatment of greenhouse gas emissions in the EIR. This failure is not, as SANDAG would have it, merely a debate over "editorial control" of the EIR (ROA 62 at 32:24). Rather, the issue is whether the EIR fails to carry out its role as an informational document to inform the public about the choices made by its leaders. The court finds that this failure is manifest in several ways.

First, although SANDAG acknowledges SB 375 mandates a "sharper focus on reducing GHG emissions" (AR 13091, Excerpt Tab 190), the EIR is impermissibly dismissive of Executive Order S-03-05. SANDAG argues that the Executive Order does not constitute a 'plan' for GHG reduction, and no state plan has been adopted to achieve the 2050 goal. [ROA 62 at 34] The EIR therefore does not find the RTP/SCS's failure to meet the Executive Order's goals to be a significant impact. This position fails to recognize that Executive Order S-3-05 is an official policy of the State of California, established by a

gubernatorial order in 2005, and not withdrawn or modified by a subsequent (and predecessor) governor. Quite obviously it was designed to address an environmental objective that is highly relevant under CEQA (climate stabilization). See AR 17622 (Excerpt Tab 216). SANDAG thus cannot simply ignore it. This is particularly true in a setting in which hundreds of thousands of people in the communities served by SANDAG live in low-lying areas near the coast, and are thus susceptible to rising sea levels associated with global climate change. The court in *Association of Irritated Residents v. State Air Resources Board*, 206 Cal. App. 4th 1487, 1492-93 (2012), recognized the importance of the Executive Order in upholding the ARB's Scoping Plan. The court agrees with petitioners that the failure of the EIR to cogently address the inconsistency between the dramatic increase in overall GHG emissions after 2020 contemplated by the RTP/SCS and the statewide policy of reducing same during the same three decades (2020-2050) constitutes a legally defective failure of the EIR to provide the SANDAG decision makers (and thus the public) with adequate information about the environmental impacts of the SCS/RTP. Moreover, as was pointed out in oral argument, having chosen to develop a plan for 15 years beyond that which was required under law, SANDAG was obligated to discuss impacts beyond the 2020 horizon. The ARB's scoping plan adopts the Executive Order, and SANDAG failed to extend the analysis to 2050.

Second, SANDAG's response has been to "kick the can down the road" and defer to "local jurisdictions." See, e.g. AR 31-0064, 32-0065, 33-0066, 34-0067, 35-0068, 117-0090, 118-0091 (Excerpts Vol. 1, Tab 3); 4.8-36, 0790 (Excerpts Tab 7); AR G-63-64, 03825-3826 (Excerpts Tab 8B); AR 27734 and 8A:2588 (Nov. 19 Appx.). This theme is repeated in SANDAG's brief at page 38 (arguing mitigation is the responsibility of other agencies). This perverts the regional planning function of SANDAG, ignores the purse string control SANDAG has over TransNet funds, and more importantly conflicts with Govt. Code section 65080(b)(2)(B) quoted above. As the AG argues, it is certainly feasible for SANDAG to agree to fund local climate action plans, yet the EIR does not adopt or even adequately discuss this form of mitigation (AR 2588, Excerpt Tab 8A). And as argued by petitioners in their consolidated reply brief, "encouraging" an optional local plan that "should" incorporate regional policies falls well short of a legally enforceable mitigation commitment with teeth. This is what the CEQA Guidelines require at subsections 15126.4(a)(1)(B), (a)(2) and (c)(5) in a setting in which SANDAG controls the funding for at least some of the projects contemplated by the SCS/RTP. Contrary to SANDAG's assertion (Oppo. at 38:21), it does have the legal power -- indeed, the obligation – to see to it that TransNet funds are spent in a manner consistent with the law. SANDAG conceded (even embraced) this at the November 30 hearing.

Resolution No. 2012-09, adopted by SANDAG, finds that the RTP/SCS "achieves the regional greenhouse gas reduction targets established by CARB" (AR 239-0219, Excerpts Tab 4) when in fact it either does not (AR 118-0091-92, Excerpts Tab 3; AR 4.8-21-23, 0775-0777, Excerpts Tab 7; AR 4.8-15-17, 02567-2569, 2578, Excerpts Tab 8A; AR08242-8245, Excerpts Tab 111) or does so based on questionable inputs [AR 30143, 30187 *et seq.* (Supp. filed 10/22/12); compare AR 14550 (Excerpt Tab 190). The shortcomings of the **EIR** in this regard (for petitioners do not contend, nor does the court

find, that SB 375 was violated) were called to SANDAG's attention as evidenced by what it called "Master Response # 20-23," discussed at AR G-55, 03817 *et seq.* (Excerpts Tab 8B); see also AR 19685 (Excerpts Tab 296); AR 25640 *ff* (Excerpts Tab 311). SANDAG erroneously and peremptorily states in response to these comments that the "upward trajectory" in per capita GHG emissions "does not present an SB 375 or CEQA compliance issue." AR G-59. CEQA requires further discussion, not a one sentence dismissal. Nor is the court convinced that SANDAG may avoid examination of GHG reduction due to "modeling constraints." AR G-68, 003830 (Master Response #23).

In light of the foregoing, the court finds that the petitioners and intervenor have overcome the presumption of validity and have established a prejudicial abuse of discretion. The court does not reach this conclusion lightly, as it is evident from section 9.0 of the EIR that it involved thousands of hours of effort by numerous talented professionals. No doubt the EIR is a satisfactory informational document in many respects; being the first in the state to tackle something as important to future generations as reduction of greenhouse gases in a regional transportation setting carried some risk, and the court, after reviewing the Administrative Record independently, finds that the EIR is inconsistent with state law as described above. Thus, it is the court's duty under *Vineyard, supra*, to sustain the positions advanced by petitioners and the petitioner in intervention.

Had they been permitted to file briefs, *amici* would no doubt have argued that the court's interpretation of CEQA's interface with Executive Order S-03-05 and the statutory scheme of SB 375 (which the Legislative Counsel's Digest filed with Secretary of State September 30, 2008 concedes is an "unfunded mandate") will retard growth, harm California's efforts to attract jobs and create economic activity, and slow down the state's recovery from the recession. All of this may very well be true, but these are arguments properly presented to the political branches of the government which adopted the Executive Order and enacted SB 375 in the first place.

Because the court finds it can resolve the case solely on the inadequate treatment in the EIR of the greenhouse gas emission issue, it finds that it need not address the other issues raised by the parties. *Compare Natter v. Palm Desert Rent Review Comm'n.,* 190 Cal. App. 3d 994, 1001 (1987); *Young v. Three for One Oil Royalties*, 1 Cal. 2d 639, 647-648 (1934).

Let a writ of mandate issue forthwith, directing respondent SANDAG to set aside its October 28, 2011certification of the EIR for the RTP/SCS. Counsel for petitioners is directed to forthwith submit same to the court for signature.

IT IS SO ORDERED.

Dated: December 3, 2012

TIMOTHY B. TAYLOR
Judge of the Superior Court

SUPERIOR COURT OF CALIFORNIA, COUNTY OF SAN DIEGO

Central
330 West Broadway
San Diego, CA 92101

SHORT TITLE: Cleveland National Forest Foundation vs. San Diego Association of Governments [IMAGED]

CLERK'S CERTIFICATE OF SERVICE BY MAIL	CASE NUMBER: **37-2011-00101593-CU-TT-CTL**

I certify that I am not a party to this cause. I certify that a true copy of the Ruling on Petitions for Writ of Mandate dated December 3, 2012 was mailed following standard court practices in a sealed envelope with postage fully prepaid, addressed as indicated below. The mailing and this certification occurred at San Diego, California, on 12/03/2012.

Clerk of the Court, by: Andrea Taylor A. Taylor, Deputy

MEKAELA M GLADDEN
BRIGGS LAW CORPORATION
99 EAST C STREET, STE. 111
UPLAND, CA 91786

NICOLE H GORDON
THE SOHAGI LAW GROUP, PLC
11999 SAN VICENTE BOULEVARD # 150
LOS ANGELES, CA 90049

DANIEL P SELMI
919 S ALBANY STREET
LOS ANGELES, CA 90015

JULIE D WILEY
SAN DIEGO ASSOCIATION OF GOVERNMENTS
401 B STREET SUITE 800
SAN DIEGO, CA 92101

WHITMAN F MANLEY
REMY MOOSE MANLEY, LLP
455 CAPITOL MALL # 210
SACRAMENTO, CA 95814

RACHEL B HOOPER
396 HAYES STREET
SAN FRANCISCO, CA 94102

NANCY C MILLER
428 J ST #400
SACRAMENTO, CA 95814

MARCO GONZALEZ
COAST LAW GROUP, LLP
1140 SOUTH COAST HIGHWAY 101
ENCINITAS, CA 92024

☐ Additional names and address attached.

Exhibit J
SB 743 Final Preliminary Discussion
Draft of Updates 08 06 14

Updating Transportation Impacts Analysis in the CEQA Guidelines

Preliminary Discussion Draft of Updates to the CEQA Guidelines Implementing Senate Bill 743 (Steinberg, 2013)

Governor's Office of Planning and Research
8/6/2014

Senate Bill 743 (Steinberg, 2013)

Excerpt of Public Resources Code § 21099

(b) (1) The Office of Planning and Research shall prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to Section 21083 establishing ***criteria for determining the significance of transportation impacts*** *of projects within transit priority areas. Those criteria shall* ***promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses****. In developing the criteria, the office shall recommend potential metrics to measure transportation impacts that* ***may include, but are not limited to, vehicle miles traveled****, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated. The office may also establish criteria for models used to analyze transportation impacts to ensure the models are accurate, reliable, and consistent with the intent of this section.*

(2) Upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, ***automobile delay****, as described solely by level of service or similar measures of vehicular capacity or traffic congestion* ***shall not be considered a significant impact on the environment*** *pursuant to this division, except in locations specifically identified in the guidelines, if any.*

(3) This subdivision does not relieve a public agency of the requirement to analyze a project's potentially significant transportation impacts related to air quality, noise, safety, or any other impact associated with transportation. The methodology established by these guidelines shall not create a presumption that a project will not result in significant impacts related to air quality, noise, safety, or any other impact associated with transportation. Notwithstanding the foregoing, the adequacy of parking for a project shall not support a finding of significance pursuant to this section.

(4) This subdivision ***does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements*** *pursuant to the police power or any other authority.*

(5) ***On or before July 1, 2014****, the Office of Planning and Research shall circulate* ***a draft*** *revision prepared pursuant to paragraph (1).*

(c) (1) The Office of Planning and Research ***may adopt guidelines*** *pursuant to Section 21083* ***establishing alternative metrics to the metrics used for traffic levels of service for transportation impacts outside transit priority areas****. The alternative metrics may include the retention of traffic levels of service, where appropriate and as determined by the office.*

(2) This subdivision shall not affect the standard of review that would apply to the new guidelines adopted pursuant to this section.

Executive Summary

On September 27, 2013, Governor Brown signed Senate Bill 743 (Steinberg, 2013). Among other things, SB 743 creates a process to change the way we analyze transportation impacts under the California Environmental Quality Act (Public Resources Code section 21000 and following) (CEQA). Currently, environmental review of transportation impacts focuses on the delay that vehicles experience at intersections and on roadway segments. That delay is often measured using a metric known as "level of service," or LOS. Mitigation for increased delay often involves increasing capacity (i.e. the width of a roadway or size of an intersection), which may increase auto use and emissions and discourage alternative forms of transportation. Under SB 743, the focus of transportation analysis will shift from driver delay to reduction of greenhouse gas emissions, creation of multimodal networks and promotion of a mix of land uses.

SB 743 requires the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines (Title 14 of the California Code of Regulations sections and following) to provide an alternative to level of service for evaluating transportation impacts. The alternative criteria must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." (New Public Resources Code Section 21099(b)(1).) Measurements of transportation impacts may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated." (*Ibid*.)

This document contains a ***preliminary discussion draft*** of changes to the CEQA Guidelines implementing SB 743. In developing this preliminary discussion draft, OPR consulted with a wide variety of potentially affected stakeholders, including local governments, metropolitan planning organizations, state agencies, developers, transportation planners and engineers, environmental organizations, transportation advocates, academics, and others. OPR released its preliminary evaluation of different alternatives for public review and comment in December 2013. Having considered all comments that it received, and conducted additional research and consultation, OPR now seeks public review of this preliminary discussion draft.

This document contains background information, a narrative explanation of the proposed changes, text of the proposed changes, and appendices containing more detailed background information.

Contents

Executive Summary 3

Background 5

Explanation of Proposed New Section 15064.3 6

- Subdivision (a): Purpose 7
- Subdivision (b): Criteria for Analyzing Transportation Impacts 8
  - Subdivision (b)(1): Vehicle Miles Traveled and Land Use Projects 8
  - Subdivision (b)(2): Induced Travel and Transportation Projects 9
  - Subdivision (b)(3): Local Safety 10
  - Subdivision (b)(4): Methodology 10
- Subdivision (c): Mitigation and Alternatives 11
- Subdivision (d): Applicability 11

Explanation of Amendments to Appendix F: Energy Impacts 12

Explanation of Amendments to Appendix G: Transportation 12

Text of Proposed New Section 15064.3 13

Text of Proposed Amendments to Appendix F 16

Text of Proposed Amendments to Appendix G 20

Providing Input 21

- When and Where to Submit Comments 21
- Tips for Providing Effective Input 21

Appendices 22

Analyzing Transportation Impacts

Proposed New Section 15064.3 and Proposed Amendments to Appendix F

Background

Californians drive approximately 332 *billion* vehicle miles each year. That driving accounts for 36 percent of all greenhouse gases in the state. (California Air Resources Board, First Update to the Climate Change Scoping Plan (May 2014).) Meanwhile, existing roadway networks are deteriorating. While new development may pay the capital cost of installing roadway improvements, neither the state nor local governments are able to fully fund operations and maintenance. (See, e.g., Nichols Consulting Engineers, California Statewide Local Streets and Roads Needs Assessment (January 2013).) While the health benefits of walking, bicycling and transit use are becoming more well-known, planning has literally pushed those other modes aside. Why?

Traffic studies used in CEQA documents have typically focused on one thing: the impact of projects on traffic flows. By focusing solely on delay, environmental studies typically required projects to build bigger roads and intersections as "mitigation" for traffic impacts. That analysis tells only part of the story, however.

Impacts on pedestrians, bicyclists and transit, for example, have not typically been considered. Projects to improve conditions for pedestrians, bicyclist and transit have, in fact, been discouraged because of impacts related to congestion. Requiring "mitigation" for such impacts in the CEQA process imposes increasing financial burdens, not just on project developers that may contribute capital costs for bigger roadways, but also on taxpayers that must pay for maintenance and upkeep of those larger roads. Ironically, even "congestion relief" projects (i.e., bigger roadways) may only help traffic flow in the short term. In the long term, they attract more and more drivers (i.e., induced demand), leading not only to increased air pollution and greenhouse gas emissions, but also to a return to congested conditions. (Matute and Pincetl, "Use of Performance Measures that Prioritize Automobiles over Other Modes in Congested Areas;" Handy and Boarnet, "DRAFT Policy Brief on Highway Capacity and Induced Travel," (April 2014).) Under current practice, none of these impacts are considered in a typical project-level environmental review.

Such impacts have not completely escaped notice, however. For many years, local governments, transportation planners, environmental advocates and others have encouraged the Goveror's Office of Planning and Research (OPR) to revise the CEQA Guidelines to reframe the analysis of transportation impacts away from capacity. In 2009, the Natural Resources Agency revised the Appendix G checklist to focus more on multimodal, "complete streets" concepts. (Natural Resources Agency, Final Statement of Reasons: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97 (December 2009).)

Just last year, the Legislature passed, and Governor Brown signed into law, Senate Bill 743 (Steinberg, 2013), which requires OPR to develop alternative methods of measuring transportation impacts under CEQA. At a minimum, the new methods must apply within areas that are served by transit; however, OPR may extend the new methods statewide. Once the new transportation guidelines are adopted, automobile delay will no longer be considered to be an environmental impact under CEQA. SB 743 requires OPR to circulate a first draft of the new guidelines by July 1, 2014. The preliminary discussion draft below satisfies that requirement.

Before turning to a detailed explanation of the proposed text, OPR urges reviewers to consider the following:

- This is a ***preliminary discussion draft*** of a proposal that responds to SB 743. It reflects the information and research contained in OPR's Preliminary Evaluation of Alternative Methods of Transportation Analysis (December 2013), as well as comments submitted on that evaluation and informal consultation with stakeholder groups across the state. However, OPR expects this draft to evolve, perhaps substantially, in response to this larger vetting and review process.
- Because this is a preliminary discussion draft, reviewers may notice some terms that should be defined, or concepts that should be further explored. OPR invites your suggestions in that regard.
- This proposal involves changes to the CEQA Guidelines. Because the CEQA Guidelines apply to all public agencies, and all projects, throughout the state, they generally must be drafted broadly. Similarly, this proposal reflects CEQA's typical deference to lead agencies on issues related to methodology. The background paper accompanying this proposal, however, provides additional detail on a sample methodology for conducting an analysis, lists models capable of estimating vehicle miles traveled, and ideas for mitigation and alternatives. We invite reviewers to let us know if greater or less detail should be included in the new Guidelines.

This preliminary discussion draft consists of several parts. First, it contains a proposed new section 15064.3 of the CEQA Guidelines, which itself contains several subdivisions. Second, it proposes amendments to Appendix F (Energy Impacts) to describe possible mitigation measures and alternatives. Each of these components is described below.

Explanation of Proposed New Section 15064.3

OPR proposes to add a new section 15064.3 to the CEQA Guidelines to provide new methods of measuring transportation impacts. OPR initially considered whether to put the new methods in an appendix or in a new section of the Guidelines. OPR chose the latter, because experience with Appendix F, which requires analysis of energy impacts, has shown that requirements in appendices may not be consistently applied in practice.

Having decided to add a new section to the Guidelines, the next question was where to put it. As required by SB 743, the new guidelines focus on "determining the significance of transportation impacts." Section 15064 of the CEQA Guidelines contains general rules regarding "determining the

significance of the environmental effects caused by a project." Since the new Guideline section focuses on the specific rules regarding transportation impacts, OPR determined that it would be appropriate to place the new rules close to the section containing the general rules. Also, the new section 15064.3 would be contained within Article 5 of the Guidelines, which address "preliminary review of projects and conduct of initial study," and therefore would be relevant to both negative declarations and environmental impact reports.

The proposed new section 15064.3 contains several subdivisions, which are described below.

Subdivision (a): Purpose

Subdivision (a) sets forth the purpose of the entire new section 15064.3. First, the subdivision clarifies that the primary consideration, in an environmental analysis, regarding transportation is the amount and distance that a project might cause people to drive. This captures two measures of transportation impacts: auto trips generated and trip distance. These factors are important in an environmental analysis for the reasons set forth in the background materials supporting vehicle miles traveled as a transportation metric. These factors were also identified by the legislature in SB 743. (Pub. Resources Code § 21099(b)(1).) Specifying that trip generation and vehicle miles traveled are the primary considerations in a transportation analysis is necessary because impacts analysis has historically focused on automobile delay.

The second sentence in subdivision (a) also identifies impacts to transit and the safety of other roadway users as relevant factors in an environmental analysis. Impacts to transit and facilities for pedestrians and bicyclists are relevant in an environmental impacts analysis because deterioration or interruption may cause users switch from transit or active modes to single-occupant vehicles, thereby causing energy consumption and air pollution to increase. Further, impacts to human safety are clearly impacts under CEQA. (Pub. Resources Code § 21083(b)(3) (a significance finding is required if "a project will cause substantial adverse effects on human beings, either directly or indirectly").) Finally, SB 743 requires the new guidelines to promote "multimodal transportation" and to provide for analysis of safety impacts. (Pub. Resources Code § 21099(b)(1), (b)(3).)

The third sentence clarifies that air quality and noise impacts related to transportation may still be relevant in a CEQA analysis. (Pub. Resources Code § 21099(b)(3) (the new guidelines do "not relieve a public agency of the requirement to analyze a project's potentially significant transportation impacts related to air quality, noise, safety, or any other impact associated with transportation").) However, those impacts are typically analyzed in the air quality and noise sections of environmental documents. Further, there is nothing in SB 743 that requires analysis of noise or air quality in a transportation section of an environmental document. In fact, the content of any environmental document may vary provided that any required content is included in the document. (State CEQA Guidelines § 15120(a).)

Finally, the last sentence clarifies that automobile delay is not a significant effect on the environment. This sentence is necessary to reflect the direction in SB 743 itself that vehicle delay is not a significant environmental impact. (Pub. Resources Code § 21099(b)(2) ("Upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described

solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any").) As noted above, traffic-related noise and air quality impacts, for example, may still be analyzed in CEQA and mitigated as needed. Mitigation would consist of measures to reduce noise or air pollutants, however, and not necessarily the delay that some vehicles may experience in congestion.

Subdivision (b): Criteria for Analyzing Transportation Impacts

While subdivision (a) sets forth general principles related to transportation analysis, subdivision (b) focuses on specific criteria for determining the significance of transportation impacts. It is further divided into four subdivisions: (1) vehicle miles traveled and land use projects, (2) induced travel and transportation projects, (3) safety, and (4) methodology.

The lead-in sentences to these subdivisions clarify two things. First, CEQA's general rules regarding the determination of significance apply to all potential impacts, including transportation impacts. These general rules include the necessity to consider context and substantial evidence related to the project under consideration, as well as the need to apply professional judgment. These rules are contained in section 15064 of the CEQA Guidelines, which is included as a cross-reference in subdivision (b). The second lead-in sentence clarifies that the new section 15064.3 contains rules that apply specifically to transportation impacts.

Subdivision (b)(1): Vehicle Miles Traveled and Land Use Projects

The first sentence in subdivision (b)(1) states that vehicle miles traveled is generally the most appropriate measure of transportation impacts. It uses the word "generally" because OPR recognizes that the CEQA Guidelines apply to a wide variety of project types and lead agencies. Therefore, this sentence recognizes that in appropriate circumstances, a lead agency may tailor its analysis to include other measures.

SB 743 did not authorize OPR to set thresholds, but it did direct OPR to develop Guidelines "for determining the significance of transportation impacts of projects[.]" (Pub. Resources Code § 21099(b)(2).) Therefore, to provide guidance on determining the significance of impacts, subdivision (b)(1) describes factors that might indicate whether the amount of a project's vehicle miles traveled may be significant, or not.

For example, a project that results in vehicle miles traveled that is greater than the regional average might be considered to have a significant impact. Average in this case could be measured using an efficiency metric such as per capita, per employee, etc. Travel demand models can provide information on those regional averages. "Region" refers to the metropolitan planning organization or regional transportation plan area within which the project is located. Notably, because the proposed text states that greater than regional average "may indicate a significant impact," this subdivision would not prevent a local jurisdiction from applying a *more stringent* threshold. (Pub. Resources Code § 21099(e) (the new Guidelines do not "affect the authority of a public agency to establish or adopt thresholds of

significance that are more protective of the environment").) Note, this potential finding of significance would not apply to projects that are otherwise statutorily or categorically exempt.

Why regional average? First, the region generally represents the area within which most people travel for their daily needs. Second, focusing on the region recognizes the many different contexts that exist in California. Third, pursuant to SB 375, metropolitan planning organizations throughout the state are developing sustainable communities strategies as part of their regional transportation plans, and as part of that process, they are developing data related to vehicle miles traveled. Fourth, average vehicle miles traveled per capita, per employee, etc., can be determined at the regional level from existing data. Finally, because SB 375 requires all regions to reduce region-wide greenhouse gas emissions related to transportation, projects that move the region in the other direction may warrant a closer look.

Subdivision (b)(1) also gives examples of projects that might have a less than significant impact with respect to vehicle miles traveled. For example, projects that locate in areas served by transit, where vehicle miles traveled is generally known to be low, may be considered to have a less than significant impact. (See, e.g., California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures," (August 2010).) Further, projects that are shown to decrease vehicle miles traveled, as compared to existing conditions, may be considered to have a less than significant impact. Such projects might include, for example, the addition of a grocery store to an existing neighborhood that enables existing residents to drive shorter distances. Notably, in describing these factors, the Guidelines use the word "may" to signal that a lead agency should still consider substantial evidence indicating that a project may still have significant vehicle miles traveled impacts. For example, the addition of regional serving retail to a neighborhood may draw customers from far beyond a single neighborhood, and therefore might actually increase vehicle miles traveled overall. Similarly, a project located near transit but that also includes a significant amount of parking might indicate that the project may still generate significant vehicle travel.

Most of the examples in this subdivision are most relevant to specific development projects. Land use plans, such as specific plans or general plans, might be considered to have a less than significant effect at the plan level if they are consistent with an adopted sustainable communities strategy.

Subdivision (b)(2): Induced Travel and Transportation Projects

While subdivision (b)(1) addresses vehicle miles traveled associated with land use projects, subdivision (b)(2) focuses on impacts that result from certain transportation projects. Specifically, research indicates that adding new traffic lanes in areas subject to congestion tends to lead to more people driving further distances. (Handy and Boarnet, "DRAFT Policy Brief on Highway Capacity and Induced Travel," (April 2014).) This is because the new roadway capacity may allow increased speeds on the roadway, which then allows people to access more distant locations in a shorter amount of time. Thus, the new roadway capacity may cause people to make trips that they would otherwise avoid because of congestion, or may make driving a more attractive mode of travel. Research also shows that extending new roadway capacity, like the addition of water or sewer infrastructure, may remove barriers to growth in undeveloped areas. Subdivision (b)(2) would therefore require lead agencies that add new physical roadway capacity in congested areas to consider these potential growth-inducing impacts.

Subdivision (b)(2) also clarifies that not all transportation projects would be expected to cause increases in vehicle miles traveled. For example, projects that are primarily designed to improve safety or operations would not typically be expected to create significant impacts. The same is true of pedestrian, bicycle and transit projects, including those that require reallocation or removal of motor vehicle lanes.

Subdivision (b)(3): Local Safety

Subdivision (b)(3) recognizes that vehicle miles traveled may not be the only impacts associated with transportation. While vehicle miles traveled may reflect regional concerns, transportation impacts may also be felt on a local level. The convenience of drivers and the layout of local roadway systems are issues that can, and likely will continue to be, addressed in local planning processes. Safety impacts, as noted above, are local impacts that are appropriate in a CEQA analysis.

Specifically, subdivision (b)(3) clarifies that lead agencies should consider whether a project may cause substantially unsafe conditions for various roadway users. The potential safety concern must be one that affects many people, not just an individual. Further, the potential safety concern must relate to actual project conditions, and not stem solely from subjective fears of an individual. Subdivision (b)(3) includes a non-exclusive list of potential factors that might affect the safety of different roadway users.

Subdivision (b)(4): Methodology

Subdivision (b)(4) provides guidance on methodology. First, it clarifies that analysis of a project's vehicle miles traveled is subject to the rule of reason. In other words, a lead agency would not be expected to trace every possible trip associated with a project down to the last mile. Conversely, to the extent that available models and tools allow, a lead agency would be expected to consider vehicle miles traveled that extend beyond the lead agency's political boundaries. (See, e.g., State CEQA Guidelines § 15151 ("An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible").) This clarification is needed because under current practice, some lead agencies do not consider the transportation impacts of their own projects that may be felt within adjacent jurisdictions.

Subdivision (b)(4) also recognizes the role for both models and professional judgment in estimating vehicle miles traveled. Many publicly available models are available that can estimate the amount of vehicle miles traveled associated with a project. Models, however, are only tools. A model relies on certain assumptions and its use may, or may not, be appropriate given a particular project and its context. For similar reasons, model outputs may need to be revised. Thus, subdivision (b)(4) expressly recognizes the role of professional judgment in using models. Notably, this is consistent with general CEQA rules in determining significance. (See, e.g., State CEQA Guidelines § 15064(b) (determining significance "calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data").) To promote transparency, subdivision (b)(4) requires that any adjustments to model inputs or outputs be documented and explained. Further, this documentation should be made plain in the environmental document itself.

Subdivision (c): Mitigation and Alternatives

Subdivision (c) restates the general rule that when a lead agency identifies a significant impact, it must consider mitigation measures that would reduce that impact. The selection of particular mitigation measures, however, is always left to the discretion of the lead agency. Further, OPR expects that agencies will continue to innovate and find new ways to reduce vehicular travel. Therefore, OPR proposes to identify several potential mitigation measures and alternatives in existing Appendix F (regarding energy impacts analysis), and include a cross-reference to Appendix F in subdivision (c). Subdivision (c) also makes explicit that this section does not limit any public agency's ability to condition a project pursuant to other laws. For example, while automobile delay will not be treated as a significant impact under CEQA, cities and counties may still require projects to achieve levels of service designated in general plans or zoning codes. (Pub. Resources Code § 21099(b)(4) ("This subdivision [requiring a new transportation metric under CEQA] does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements pursuant to the police power or any other authority").) Similarly, with regard to projects that have already undergone environmental review, subdivision (c) clarifies that nothing in these proposed rules would prevent a lead agency from enforcing previously adopted mitigation measures. In fact, within the bounds of other laws, including adopted general plans, lead agencies have discretion to apply or modify previously adopted mitigation measures. (*Napa Citizens for Honest Government v. Napa County Bd. of Sup*. (2001) 91 Cal. App. 4th 342, 358 (because "mistakes can be made and must be rectified, and … the vision of a region's citizens or its governing body may evolve over time… there are times when mitigation measures, once adopted, can be deleted").) Notably, deletion of measures imposed solely to address automobile delay should not require any additional environmental review because section 21099 of the Public Resources Code states that automobile delay is not a significant impact under CEQA.

Subdivision (d): Applicability

OPR recognizes that the procedures proposed in this section may not be familiar to all public agencies. OPR also recognizes that this section proposes a new way to evaluate transportation impacts. Therefore, to allow lead agencies time to familiarize themselves with these new procedures, OPR proposes a phased approach to implementation. Doing so will also allow OPR to continue studying the application of vehicle miles traveled in the environmental review process, and to propose further changes to this section if necessary.

Subdivision (d) explains when these new rules will apply to project reviews. The first sentence restates the general rule that changes to the CEQA Guidelines apply prospectively to new projects that have not already commenced environmental review. (See State CEQA Guidelines § 15007.)

The second sentence provides that the new procedures will apply immediately upon the effective date of these Guidelines to projects located within one-half mile of major transit stops and high quality transit corridors. Those transit-served areas have been the focus of planning under SB 375 and jurisdictions containing such areas may be more likely to be familiar with tools that estimate vehicle miles traveled.

The third sentence allows jurisdictions to opt-in to these new procedures, regardless of location, provided that they update their own CEQA procedures to reflect the rules in this section. (See State CEQA Guidelines § 15022.) This is intended to provide certainty to project applicants and the public regarding which rules will govern project applications. Notably, a lead agency's adoption of updates to its own CEQA procedures will not normally be considered a project that requires its own environmental review. (*See California Building Industry Assn. v. Bay Area Air Quality Management Dist*. (2014) 218 Cal. App. 4th 1171, 1183-1192 (certiorari granted on other grounds).)

Finally, the last sentence states that after January 1, 2016, the rules in this section will apply statewide.

Explanation of Amendments to Appendix F: Energy Impacts

OPR proposes to provide suggestions of potential mitigation measures and alternatives that might reduce a project's vehicle miles traveled in Appendix F of the State CEQA Guidelines. Appendix F provides detailed guidance on conducting an analysis of a project's energy impacts. Inclusion of the list of suggested measures in Appendix F is proposed for at least two reasons. First, vehicle miles traveled may be a relevant consideration in the analysis and mitigation of a project's energy impacts. Second, the list of potential mitigation measures is lengthy and is more appropriate for an appendix than the body of the Guidelines.

Notably, the suggested mitigation measures and alternatives were largely drawn from the California Air Pollution Control Officers Association's guide on Quantifying Greenhouse Gas Mitigation Measures. That guide relied on peer-reviewed research on the effects of various mitigation measures, and provides substantial evidence that the identified measures are likely to lead to quantifiable reductions in vehicle miles traveled.

Explanation of Amendments to Appendix G: Transportation

OPR proposes several changes to the questions related to transportation in Appendix G to conform to the proposed new Section 15064.3. First, OPR proposes to revise the question related to "measures of effectiveness" so that the focus is more on the circulation element and other plans governing transportation. Second, OPR proposes to revise the question that currently refers to "level of service" to focus instead on a project's vehicle miles traveled. Third, OPR proposes to recast the question related to design features so that it focuses instead on whether a roadway project would tend to induce additional travel. Fourth, OPR proposes to revise the question related to safety to address the factors described in subdivision (b)(3) of the proposed new Section 15064.3.

Text of Proposed New Section 15064.3

Proposed New **Section 15064.3. Determining the Significance of Transportation Impacts; Alternatives and Mitigation Measures**

(a) Purpose.

When analyzing a project's potential environmental impacts related to transportation, primary considerations include the amount and distance of automobile travel associated with the project. Other relevant considerations include the effects of the project on transit and non-motorized travel and the safety of all travelers. Indirect effects of project-related transportation, such as impacts to air quality and noise, may also be relevant, but may be analyzed together with stationary sources in other portions of the environmental document. A project's effect on automobile delay does not constitute a significant environmental impact.

(b) Criteria for Analyzing Transportation Impacts.

Section 15064 contains general rules governing the analysis, and the determination of significance, of environmental effects. Specific considerations involving transportation impacts are described in this section. For the purposes of this section, "vehicle miles traveled" refers to distance of automobile travel associated with a project.

(1) Vehicle Miles Traveled and Land Use Projects. Generally, transportation impacts of a project can be best measured using vehicle miles traveled. A development project that is not exempt and that results in vehicle miles traveled greater than regional average for the land use type (e.g. residential, employment, commercial) may indicate a significant impact. For the purposes of this subdivision, regional average should be measured per capita, per employee, per trip, per person-trip or other appropriate measure. Also for the purposes of this subdivision, region refers to the metropolitan planning organization or regional transportation planning agency within which the project is located. Development projects that locate within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor generally may be considered to have a less than significant transportation impact. Similarly, development projects, that result in net decreases in vehicle miles traveled, compared to existing conditions, may be considered to have a less than significant transportation impact. Land use plans that are either consistent with a sustainable communities strategy, or that achieve at least an equivalent reduction in vehicle miles traveled as projected to result from implementation of a sustainable communities strategy, generally may be considered to have a less than significant impact.

DRAFT

(2) Induced Vehicle Travel and Transportation Projects. To the extent that a transportation project increases physical roadway capacity for automobiles in a congested area, or adds a new roadway to the network, the transportation analysis should analyze whether the project will induce additional automobile travel compared to existing conditions. The addition of general purpose highway or arterial lanes may indicate a significant impact except on rural roadways where the primary purpose is to improve safety and where speeds are not significantly altered. Transportation projects that do not add physical roadway capacity for automobiles, but instead are for the primary purpose of improving safety or operations, undertaking maintenance or rehabilitation, providing rail grade separations, or improving transit operations, generally would not result in a significant transportation impact. Also, new managed lanes (i.e. tolling, high-occupancy lanes, lanes for transit or freight vehicles only, etc.), or short auxiliary lanes, that are consistent with the transportation projects in a Regional Transportation Plan and Sustainable Communities Strategy, and for which induced travel was already adequately analyzed, generally would not result in a significant transportation impact. Transportation projects (including lane priority for transit, bicycle and pedestrian projects) that lead to net decreases in vehicle miles traveled, compared to existing conditions, may also be considered to have a less than significant transportation impact.

(3) Local Safety. In addition to a project's effect on vehicle miles traveled, a lead agency may also consider localized effects of project-related transportation on safety. Examples of objective factors that may be relevant may include:

(A) Increase exposure of bicyclists and pedestrians in vehicle conflict areas (i.e., remove pedestrian and bicycle facilities, increase roadway crossing times or distances, etc.).

(B) Contribute to queuing on freeway off-ramps where queues extend onto the mainline.

(C) Contribute to speed differentials of greater than 15 miles per hour between adjacent travel lanes.

(D) Increase motor vehicle speeds.

(E) Increase distance between pedestrian or bicycle crossings.

(4) Methodology. The lead agency's evaluation of the vehicle miles traveled associated with a project is subject to a rule of reason; however, a lead agency generally should not confine its evaluation to its own political boundary. A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project.

(c) Alternatives and Mitigation.

Examples of mitigation measures and alternatives that may reduce vehicle miles travelled are included in Appendix F. Neither this section nor Appendix F limits the exercise of any public agency's discretion provided by other laws, including, but not limited to, the authority of cities and counties to condition project approvals pursuant to general plans and zoning codes. Previously adopted

measures to mitigate congestion impacts may continue to be enforced, or modified, at the discretion of the lead agency.

(d) Applicability.

The provisions of this section shall apply prospectively as described in section 15007. Upon filing of this section with the Secretary of State, this section shall apply to the analysis of projects located within one-half mile of major transit stops or high quality transit corridors. Outside of those areas, a lead agency may elect to be governed by the provisions of this section provided that it updates its own procedures pursuant to section 15022 to conform to the provisions of this section. After January 1, 2016, the provisions of this section shall apply statewide.

Note: Authority cited: Sections 21083 and 21083.05, Public Resources Code. Reference: Sections 21099 and 21100, Public Resources Code; *California Clean Energy Committee v. City of Woodland* (2014) 225 Cal. App. 4th 173.

DRAFT

Text of Proposed Amendments to Appendix F

Appendix F

Energy Conservation

I. Introduction

The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

(1) decreasing overall per capita energy consumption,

(2) decreasing reliance on fossil fuels such as coal, natural gas and oil, and

(3) increasing reliance on renewable energy sources.

In order to assure that energy implications are considered in project decisions, the California Environmental Quality Act requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (see Public Resources Code section 21100(b)(3)). Energy conservation implies that a project's cost effectiveness be reviewed not only in dollars, but also in terms of energy requirements. For many projects, cost effectiveness may be determined more by energy efficiency than by initial dollar costs. A lead agency may consider the extent to which an energy source serving the project has already undergone environmental review that adequately analyzed and mitigated the effects of energy production.

II. EIR Contents

Potentially significant energy implications of a project shall be considered in an EIR to the extent relevant and applicable to the project. The following list of energy impact possibilities and potential conservation measures is designed to assist in the preparation of an EIR. In many instances specific items may not apply or additional items may be needed. Where items listed below are applicable or relevant to the project, they should be considered in the EIR.

A. Project Description may include the following items:

1. Energy consuming equipment and processes which will be used during construction, operation and/or removal of the project. If appropriate, this discussion should consider the energy intensiveness of materials and equipment required for the project.

2. Total energy requirements of the project by fuel type and end use.

3. Energy conservation equipment and design features.

4. Identification of energy supplies that would serve the project.

5. Total estimated daily vehicle trips to be generated by the project and the additional energy consumed per trip by mode.

B. Environmental Setting may include existing energy supplies and energy use patterns in the region and locality.

C. Environmental Impacts may include:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate, the energy intensiveness of materials maybe discussed.

2. The effects of the project on local and regional energy supplies and on, requirements for additional capacity.

3. The effects of the project on peak and base period demands for electricity and other forms of energy.

4. The degree to which the project complies with existing energy standards.

5. The effects of the project on energy resources.

6. The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

D. Mitigation Measures may include:

1. Potential measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal. The discussion should explain why certain measures were incorporated in the project and why other measures were dismissed.

2. The potential of siting, orientation, and design to minimize energy consumption, including transportation energy, increase water conservation and reduce solid-waste.

3. The potential for reducing peak energy demand.

4. Alternate fuels (particularly renewable ones) or energy systems.

5. Energy conservation which could result from recycling efforts.

DRAFT

6. Potential measures to reduce vehicle miles traveled include, but are not limited to:

a. Improving or increasing access to transit.

b. Increasing access to common goods and services, such as groceries, schools, and daycare.

c. Incorporating affordable housing into the project.

d. Improving the jobs/housing fit of a community.

e. Incorporating neighborhood electric vehicle network.

f. Orienting the project toward transit, bicycle and pedestrian facilities.

g. Improving pedestrian or bicycle networks, or transit service.

h. Traffic calming.

i. Providing bicycle parking.

j. Limiting parking supply.

k. Unbundling parking costs.

***l*. Parking or roadway pricing or cash-out programs.**

m. Implementing a commute reduction program.

n. Providing car-sharing, bike sharing, and ride-sharing programs.

o. Providing transit passes.

E. Alternatives should be compared in terms of overall energy consumption and in terms of reducing wasteful, inefficient and unnecessary consumption of energy. **Examples of project alternatives that may reduce vehicle miles traveled include, but are not limited to:**

1. Locating the project in an area of the region that already exhibits below average vehicle miles traveled.

2. Locating the project near transit.

3. Increasing project density.

4. Increasing the mix of uses within the project, or within the project's surroundings.

5. Increasing connectivity and/or intersection density on the project site.

DRAFT

6. Deploying management (e.g. pricing, vehicle occupancy requirements) on roadways or roadway lanes.

F. Unavoidable Adverse Effects may include wasteful, inefficient and unnecessary consumption of energy during the project construction, operation, maintenance and/or removal that cannot be feasibly mitigated.

G. Irreversible Commitment of Resources may include a discussion of how the project preempts future energy development or future energy conservation.

H. Short-Term Gains versus Long-Term Impacts can be compared by calculating the project's energy costs over the project's lifetime.

I. Growth Inducing Effects may include the estimated energy consumption of growth induced by the project.

Note: Authority cited: Sections 21083**, 21083.05** and 21087, Public Resources Code. Reference: Sections 21000-21176. Public Resources Code.

DRAFT

Text of Proposed Amendments to Appendix G

The following is an excerpt of Section XVI of existing Appendix G, as proposed to be amended to conform to proposed Section 15064.3:

[…]

XVI. TRANSPORTATION~~/TRAFFIC~~ -- Would the project:

a) Conflict with a~~n applicable~~ plan, ordinance or policy ~~establishing measures of effectiveness for the~~ **addressing the safety or** performance of the circulation system, **including transit, roadways, bicycle lanes and pedestrian paths?** ~~taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?~~

b) **Cause vehicle miles traveled (per capita, per service population, or other appropriate measure) that exceeds the regional average for that land use?** ~~Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?~~

c) Result in **substantially unsafe conditions for pedestrians, bicyclists, transit users, motorists or other users of public rights of way by, among other things, increasing speeds, increasing exposure of bicyclists and pedestrians in vehicle conflict areas, etc.?** ~~a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?~~

d) Substantially **induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow lanes) or by adding new roadways to the network?** ~~increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?~~

e) Result in inadequate emergency access?

~~f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?~~

[…]

DRAFT

Providing Input

This is a preliminary discussion draft, which we expect to change for the better through public input. We hope that you will share your thoughts and expertise in this effort.

When and Where to Submit Comments

Input may be submitted electronically to CEQA.Guidelines@ceres.ca.gov. While electronic submission is preferred, suggestions may also be mailed or hand delivered to:

Christopher Calfee, Senior Counsel
Governor's Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

Please submit all suggestions before **October 10, 2014** at **5:00 p.m**.

Tips for Providing Effective Input

OPR would like to encourage robust engagement in this update process. We expect that participants will bring a variety of perspectives. While opposing views may be strongly held, discourse can and should proceed in a civil and professional manner. To maximize the value of your input, please consider the following:

- In your comment(s), please clearly identify the specific issues on which you are commenting. If you are commenting on a particular word, phrase, or sentence, please provide the page number and paragraph citation.
- Explain why you agree or disagree with OPR's proposed changes. Where you disagree with a particular portion of the proposal, please suggest alternative language.
- Describe any assumptions and support assertions with legal authority and factual information, including any technical information and/or data. Where possible, provide specific examples to illustrate your concerns.
- When possible, consider trade-offs and potentially opposing views.
- Focus comments on the issues that are covered within the scope of the proposed changes. Avoid addressing rules or policies other than those contained in this proposal.
- Consider quality over quantity. One well-supported comment may be more influential than one hundred form letters.
- Please submit any comments within the timeframe provided.

Appendices

Appendix A: Frequently Asked Questions

Appendix B: Vehicle Miles Traveled, Air Quality and Energy

Appendix C: Technical Considerations in Assessing Vehicle Miles Traveled

Appendix D: Sample Trip-Based VMT Calculation

Appendix E: Estimating VMT From Roadway Capacity Increasing Projects

Appendix F: Available Models for Estimating Vehicle Miles Traveled

Appendix A

Frequently Asked Questions

1. *What is "level of service" and how is it used in environmental review?*

   Many jurisdictions use "level of service" standards to measure potential transportation impacts of development projects and long range plans. Commonly known as LOS, level of service measures vehicle delay at intersections and on roadways and is represented as a letter grade A through F. LOS A represents free flowing traffic, while LOS F represents congested conditions. LOS standards are often found in local general plans and congestion management plans. LOS is also often used in traffic impact studies prepared under the California Environmental Quality Act (CEQA). Exceeding LOS standards can require changes in proposed projects, installation of additional infrastructure, or, in some cases, financial penalties.

2. *What is wrong with treating congestion as an environmental impact under CEQA?*

   Stakeholders have reported several problems with level of service, and congestion generally, as a measure of environmental impact under CEQA. First, as a measure of delay, congestion measures more of social, rather than an environmental impact. Second, the typical way to mitigate congestion impacts is to build larger roadways, which imposes long-term maintenance costs on tax-payers, pushes out other modes of travel, and may ultimately encourage even more congestion. Third, addressing congestion requires public agencies to balance many factors, including fiscal, health, environmental and other quality of life concerns. Such balancing is more appropriate in the planning context where agency decisions typically receive deference.

3. *How does SB 743 affect the use of level of service to measure transportation impacts?*

   SB 743 requires the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide an alternative to level of service for evaluating transportation impacts. The alternative approach must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." (*New* Public Resources Code Section 21099(b)(1).) According to the statute, potential alternative measurements of transportation impacts may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated." (*Ibid*.) OPR must develop an alternative approach for areas near transit, but also has discretion to develop such alternative criteria beyond those areas, if appropriate. (*Id*. at subd. (c).)

Transportation impacts related to air quality, noise and safety must still be analyzed under CEQA where appropriate. (*Id*. at subd. (b)(3).)

4. *Will the new CEQA Guidelines eliminate the use of level of service in all cases?*

   No. Automobile delay will no longer be considered a significant environmental impact under CEQA in areas specified in the Guidelines. As currently proposed, those areas would initially include areas near transit, as well as those jurisdictions that wish to opt-in to this new approach. After a period of time, the new Guidelines would apply throughout the state. Level of service may still be used, however, for planning purposes outside of CEQA (see below).

5. *Some communities still use level of service to plan their transportation networks. Will the new guidelines prevent my city/county from using it for that purpose?*

   No. The Guidelines only address impacts analysis under CEQA. Many jurisdictions have level of service standards in their general plans, zoning codes and fee programs. These proposed Guidelines would not affect those uses of level of service. Maintaining level of service in planning allows a jurisdiction to balance automobile delay with other interests, e.g. mode share objectives, human health, fiscal health, etc.

6. *Doesn't level of service help indicate whether the project will cause safety concerns? How will the new Guidelines address local safety?*

   Safety is an issue that both the statute and these proposed Guidelines identify as a potential area of study under CEQA. Level of service does not itself measure safety. For example, higher level of service often indicates higher vehicle speeds, which put all road users at greater risk in the event of a collision. On the other hand, it may indicate areas where large speed differentials might occur, for example an off ramp backing up onto a highway mainline. Where analysis is needed to determine the significance of potential safety impacts, that analysis will still be required under these proposed Guidelines.

7. *Traffic causes air quality and noise problems. How will those issues be addressed in the new Guidelines?*

   SB 743 and these proposed Guidelines explicitly specify that potential impacts from transportation other than delay, for example air quality and noise, continue to be analyzed under CEQA. The methods for addressing those factors remain unchanged.

8. *How will the new Guidelines affect fee programs in my community?*

   SB 743 and these proposed Guidelines both recognize that jurisdictions maintain their ability to retain and enact fee programs, including those based on level of service. The proposed Guidelines explicitly state that they do not limit the discretion of public agencies in implementing other laws, including city and county general plans, zoning codes and other planning laws.

9. *Why not limit the change to just transit priority areas?*

   OPR looked broadly, but did not find a geographic area of the state or project type for which use of level of service would do a better job of protecting the environment or human health, or achieving the interests specified in the statute (promoting reduction of greenhouse gas emissions, development of multimodal transportation networks, and a diversity of land uses) than vehicle miles traveled. However, as noted above, the proposed guideline would phase-in application of the new methodology, and would start in areas near transit.

10. *My community does not have frequent transit. What options are available for reducing VMT?*

    Extensive research has been conducted on different ways that local governments can reduce vehicle miles traveled. Some useful sources of information include:

    - California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures," (August 2010)
    - California Energy Commission, "Energy Aware Planning Guide" (February 2011)
    - Salon, Deborah, "Quantifying the effect of local government actions on VMT," Prepared for the California Air Resources Board and the California Environmental Protection Agency (September 2013)

11. *Didn't SB 743 make other changes to CEQA related to infill projects?*

    Yes. SB 743 created a new exemption from CEQA for certain projects that are consistent with a Specific Plan. (See New Public Resources Code Section 21155.4.) SB 743 also provides that certain types of infill projects are not required to analyze aesthetic impacts or impacts related to parking. (New Public Resources Code Section 21099, subd. (d).) Those changes went into effect January 2014. Additional information regarding those provisions is available here.

12. *When would the new rules go into effect?*

    OPR released a ***preliminary discussion draft*** on August 6, 2014. That draft will likely undergo significant revisions in response to public input. After a full public vetting, OPR will then submit a draft to the Natural Resources Agency, which will then conduct a formal rulemaking process. That rulemaking process will itself entail additional public review, and may lead to further revisions. New rules would not go into effect until after the Natural Resources Agency adopts the new Guidelines, and the package undergoes review by the Office of Administrative Law. Notably, the new Guidelines would apply prospectively only, and would not affect projects that have already commenced environmental review.

Appendix B

Vehicle Miles Traveled, Air Quality and Energy

Vehicle travel leads to a number of direct and indirect impacts to the environment and human health. Among other effects, loading additional vehicle miles traveled, or VMT, onto the roadway network leads to increased emissions of air pollutants, including greenhouse gases, as well as increased consumption of energy. Some direct effects of increased VMT are described below.

Air Pollution

In California, transportation is associated with more greenhouse gas emissions than any other sector. Increased tailpipe emissions are a direct effect of increased VMT.

As VMT increases, so do carbon dioxide (CO2), (Chester and Horvath, 2009) methane (CH4), and nitrogen dioxide (N20) emissions. (U.S. Environmental Protection Agency, Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle (February 2005).) The U.S. Environmental Protection Agency estimates that model 2005 passenger vehicles in the US emit an average of 0.0079 grams of N2O and 0.0147 grams of NH4 per mile. (U.S. Environmental Protection Agency, Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance: Direct Emissions from Mobile Combustion Sources (May 2008).) Other air pollutants also directly result from increased VMT. Per mile traveled, California's light vehicles emit:

- 2.784 grams of CO
- 0.272 grams of NOX
- 0.237 grams of ROC (reactive organic gases, similar to volatile organic compounds)

(California Air Resources Board, Methods to Find the Cost-Effectiveness of Funding Air Quality Projects (May 2013).) While technological improvements are reducing vehicle emissions, those improvements are being eroded by a dramatic increase in vehicle miles traveled. (U.S. Environmental Protection Agency, Our Built and Natural Environments 2nd Ed. (June 2013).)

Energy

In addition to generating air pollution, vehicle travel can consumes substantial amounts of energy. Over 40 percent of California's energy consumption occurs in the transportation sector. (See California Energy Commission, "Energy Aware Planning Guide" (February 2011).) Passenger vehicles account for 74 percent of emissions from the transportation sector. (*Ibid*.)

Appendix C

Technical Considerations in Assessing Vehicle Miles Traveled

Many practitioners are familiar with accounting for vehicle miles traveled, commonly referred to as VMT, in connection with long range planning, or as part of the analysis of a project's greenhouse gas emissions or energy impacts. This Appendix provides background information on how vehicle miles traveled may be assessed as part of a transportation impacts analysis under the California Environmental Quality Act.

What VMT to Count

The simplest and most straightforward counting method is to simply estimate VMT from trips generated or attracted by a project (i.e., from trips made by residents, employees, students, etc.). This method is known as trip-based VMT. Agencies with access to more sophisticated modeling capabilities have can examine VMT in a more comprehensive manner, examining projected travel behavior, including effects the project has on other trip segments. For projects that might replace longer trips with shorter ones, a lead agency might analyze total area-wide VMT to see whether it would decrease were the project to be built. These methods are described below. [Additional background information regarding travel demand models is available in the California Transportation Commission's "2010 Regional Transportation Plan Guidelines," beginning at page 35.]

Trip-based VMT

Trip-based VMT includes all VMT from trips that begin or end at the project. It answers the question, "How much driving would be needed to get people to and from the project?" Standard 4-step travel demand models can measure trip-based VMT. For residential development, trip-based VMT is called home-based VMT.

Tour-based VMT

A tour is defined as a series of trips beginning and ending at the residence. Tour-based VMT includes all VMT from the entire tour that includes a stop at the project. As such, it captures the influence the project has on broader travel choices; for example, a project which is accessible by automobile can influence a traveler to choose travel by automobile for their day's needs, and this choice necessitates automobile use along the rest of their tour, which in turn can influence destination choices. Tour-based models, which are typically activity-based models, model entire tours rather than trips. Tour-based VMT for a residential development, for example, would count all the travel undertaken by its residents; this is called household VMT.

A shortcut: mapping trip- and tour-based VMT

Trip- or tour-based travel can be calculated on a project-by-project basis, but it is also possible to use a travel demand model to map the VMT of existing development. Because the travel behavior of new development tends to mimic that of existing development, such maps could be used to estimate VMT from new development in those locations.

Area-wide VMT

An area-wide analysis compares total VMT with and without the project. It answers the question, "What is the net effect of the project on area VMT?" The area for analysis should be chosen to capture the full VMT effects of the project; it should avoid truncating the analysis. In some cases, a strategically located project can reduce the total amount of VMT by substituting shorter trips for longer ones. For example, a grocery store in an area that previously had none could allow shorter shopping trips to substitute for longer ones. The area-wide VMT method should also be used when calculating the VMT impacts of transportation infrastructure projects.

Choosing a Denominator

A transportation analysis for a land use project should measure transportation efficiency, rather than the total amount of VMT generated. Therefore, a VMT metric used for trip- or tour-based assessments should include a denominator. Typical denominators include per capita for residential, per employee for office, and per trip for other uses. Per person-trip is another option that could be used for all land use types. Note, examination of area-wide VMT typically does not include a denominator, because the objective is to examine the magnitude of increase or decrease in total VMT.

Measuring VMT for Land Use Projects

The proposed Guidelines suggest that projects generating or attracting greater than regional average VMT may be an indication of a significant transportation impact. Similarly, the proposed Guidelines suggest that a net reduction in VMT may be an indication of a less than significant impact. The paragraphs below provide additional detail on how an agency might make those determinations.

Calculating Regional Average VMT

When comparing project VMT to regional average VMT, the same denominator and VMT counting method (trip-based or tour-based) should be used. For example, a trip-based VMT analysis for a residential project, which estimates home-based VMT per capita, should be compared with the regional total home based VMT divided by the total regional population. Totals should be taken over the entire region, i.e. the full geography of the MPO or RTPA.

Demonstrating a Reduction in Area-Wide VMT

The area-wide method of counting VMT may be used to determine whether total VMT increases or decreases with the project. The area chosen for analysis should cover the full area over which the project affects travel behavior.

Transportation projects should assess VMT using the area-wide method. Transit and active transportation projects can generally be presumed to reduce total VMT, unless substantial evidence demonstrates otherwise, because their largest effect on VMT is typically mode shift away from automobile use. Projects that increase physical roadway capacity typically induce additional vehicle travel, generally leading to increases in total VMT. However, a roadway project that improves connectivity can, in some cases, shorten trip lengths sufficiently to outweigh the induced travel effect, leading to an overall reduction in VMT.

Appendix D

Sample Trip-Based VMT Calculation

This sample describes the steps in estimating the vehicle miles traveled associated with a project. In this example, a 100 unit residential subdivision is proposed in a low-density large lot development pattern (i.e., one unit per 5 acres). This type of pattern has no mix of uses and relatively long distances to jobs, schools, and services. As such, residents typically have to rely on private vehicles for any trip and each trip is many miles. With no mix of uses, no 'internal' vehicle trips are projected to occur. To estimate daily VMT for the project, the following steps are used.

1. Multiply the number of residential units (100) by an average vehicle daily trip rate. This rate can be obtained by conducting local surveys of at least three similar sites, but in absence of this data, the analyst can rely on the ITE *Trip Generation Manual*. The manual contains an average daily vehicle trip rate for single family detached homes of 9.52. It should be noted that this rate only captures trip to/from the home (i.e., home-based work (HBW) and home-based other (HBO)) and not all trips made by the residents of the home.

   100 single-family detached residential dwelling units x 9.52 vehicle trips per unit =

   952 daily vehicle trips

2. Multiply the number of home-based trips by trip lengths. If trip lengths are available by trip purpose, then the trip generation estimate should be divided into purposes based on household survey data or travel forecasting model estimates. Potential sources for trip lengths by purpose are available through the California Household Travel Survey, the National Household Travel Survey, and MPO model estimates. In this simple estimate, only one trip length is assumed to be available and it represents the average weekday trip length for California based on the National Household Travel Survey.

   952 daily vehicle trips x 10 miles per trip = 9,520 daily VMT

   9,520 daily VMT/100 residential units =

   95.2 daily VMT per residential unit

3. Divide by the expected average project household occupancy. A specific estimate based on project characteristics (i.e. unit sizes and number of bedrooms) and location is preferable. Here we use the average for Sacramento County, 2.69 persons per household:

   95.2 daily VMT generated per residential unit / 2.69 persons per unit =

   35.4 daily VMT per capita

Appendix E

Estimating VMT From Roadway Capacity Increasing Projects

Introduction

CEQA requires analysis of a project's potential growth-inducing impacts. (Public Resources Code § 21100(b)(5); State CEQA Guidelines, § 15126.2(d).) Many agencies are familiar with the analysis of growth inducing impacts associated with water, sewer and other infrastructure. As part of its effort to reform the analysis of transportation impacts in the CEQA Guidelines, the Office of Planning and Research is proposing criteria for determining the significance of growth-inducing impacts related to transportation projects. This document provides additional background and information related to induced travel.

Because a roadway project can induce substantial vehicle miles traveled, or VMT, incorporating estimates of induced travel is critical to calculating both transportation and other impacts of a roadway expansion project. Induced travel also has the potential to reduce congestion relief benefits, and so any weighing of cost and benefit of a highway project will be inaccurate if it is not fully accounted for.

How Does Roadway Capacity Relate to Throughput?

The capacity of a road is the maximum number of vehicles per hour that the road can service. Throughput, meanwhile, is the number vehicles per hour that the road is servicing at any given time. In general, adding lanes to roads increases capacity. The magnitude of the increase depends on the type of lane (e.g. general purpose lanes, managed lanes, auxiliary lanes).

When a roadway is serving vehicles at capacity, adding more vehicles will disrupt traffic flow causing speed reductions (i.e., congestion) and reduce throughput. Conversely, reducing the number of vehicles entering a congested roadway will reduce congestion and increase throughput. So, travel demand management programs or traffic systems management programs that reduce vehicle miles traveled loaded onto a roadway can improve throughput without increasing capacity.

What is Induced VMT?

Additional roadway capacity may lead to additional VMT, a phenomenon known as induced travel, or induced VMT. It occurs when congestion is already present and a capacity expansion will lead to an appreciable reduction in travel time. With lower travel times, the modified facility becomes more attractive to travelers, resulting in the following trip-making changes, which have implications for total VMT:

- **Longer trips.** The ability to travel a long distance in a shorter time increases the attractiveness of destinations that are further away, increasing trip length and VMT.
- **Changes in mode choice.** When transportation investments are devoted to reducing automobile travel time, travelers tend to shift toward automobile use from other modes, which increases VMT.

- **Route changes.** Faster travel times on a route attract more drivers to that route from other routes, which can increase or decrease VMT depending on whether it shortens or lengthens trips.
- **Newly generated trips.** Increasing travel speeds can add trips, which increases VMT. For example, an individual who previously telecommuted or purchased goods on the internet might choose to travel by automobile as a result of increased speeds.
- **Land Use Changes.** Faster travel times along a corridor lead to land development further along that corridor; that development generates and attracts longer trips, which increases VMT.

These effects operate over different time scales. For example, changes in mode choice might happen immediately or within a few years, while land use changes typically take a few years or longer.

Has Induced VMT Been Studied?

On the whole, evidence links highway capacity expansion to VMT increases. Numerous studies have estimated the magnitude of the induced travel phenomenon. Most of these studies express the amount of induced travel as an "elasticity," which is a multiplier that describes the percent increase in VMT resulting from a given percent increase in lane miles of new roadway capacity. Many distinguish "short run elasticity" (increase in vehicle travel in the first few years) from "long run elasticity" (increase in vehicle travel beyond the first few years). Long run elasticity is typically larger than short run elasticity, because as time passes, more of the components of induced travel materialize. Generally, short run elasticity can be thought of as excluding the effects of land use change, while long run elasticity includes them. Most studies find long run elasticities between 0.6 and just over 1.0 (California Air Resources Board *DRAFT Policy Brief on Highway Capacity and Induced Travel*, p. 2.)

How Would an Agency Estimate Induced VMT for Proposed Projects?

Transportation analysis undertaken for transportation infrastructure projects typically requires use of a travel demand model. Proper use of a travel demand model will yield a reasonable estimate of short run induced VMT, generally including the following components:

- Trip length (generally increases VMT)
- Mode shift (generally shifts from other modes towards automobile use, increasing VMT)
- Route changes (can act to increase or decrease VMT)
- Newly generated trips (generally increases VMT; note that not all travel demand models have sensitivity to this factor, so an off-model estimate may be necessary)

Estimating long run induced VMT requires consideration of changes in land use. At a minimum, VMT resulting from land use changes induced by the project should be acknowledged and discussed. The analysis should disclose any limitations related to VMT forecasting that may have not been sensitive to induced travel effects and how these effects could influence the analysis results. Quantitative analysis is also possible using integrated transport and land use models or by relying on expert panels employing techniques such as the Delphi method. Once developed, the estimates of land use changes can then be analyzed by the travel demand model to assess VMT effects.

Alternately, the travel demand model analysis can be performed without an estimate of land use changes, and then the results can be compared to empirical studies of induced travel found in the types of studies described above. If the modeled elasticity falls outside of that range, then the VMT estimate can be adjusted to fall within the range, or an explanation can be provided describing why the project would be expected to induce less VMT than the subjects of those studies. (For an example of an EIR that includes a number of these elements, see *Interstate 5 Bus/Carpool Lanes Project Final EIR, pp. 2-52--2-56.*)

Example Outline for induced Travel Analysis

The following is a sample outline for describing induced VMT in the analysis of a project which includes a roadway capacity increase:

- Description of potential sources of induced travel due to the project alternatives resulting from
    - Longer trips
    - Changes in mode choice
    - Route changes
    - Newly generated trips
    - Land Use Changes
- If an estimate of land use change resulting from project alternatives is available from an expert panel or a land use model, that estimate should be used in the travel demand model to estimate VMT. Alternately, include:
    - A calculation of the long run elasticity of induced VMT for each project alternative (change in VMT divided by change in lane miles)
    - A comparison of that elasticity to empirical studies OR an estimate of land use changes
    - A discussion of potential sources for error in the induced travel estimate made by the travel demand model
    - An estimate of induced VMT that provides a best estimate correction to the results from the travel demand model

Variations in Induced VMT by Lane Type

The amount of VMT induced by a roadway capacity expansion depends on the amount of capacity added. All else being equal, as capacity is added, more VMT would be induced. Different types of lanes induce different amounts of VMT because they have different capacities or different abilities to influence travel time. Travel demand models can reflect these distinctions, as the capacities of lane types are programmed into the model and they are sensitive to travel time.

General purpose lanes can be used by any vehicle, and tend to exhibit the greatest vehicle capacity. Managed lanes are designated for use by vehicles occupied by at least a certain number of passengers (HOV lanes), those vehicles plus ones that have paid a toll (HOT lanes), or only ones that have paid a toll (Toll lanes). They are typically managed to prevent congestion by placing a restriction on the vehicles that may use the lane. Typically the target throughput is somewhat below capacity, for the purpose of having the managed lane maintain a speed advantage over the general purpose lanes. Thus, effective capacity of a managed lane is typically reduced.

Auxiliary lanes are defined as lanes that are only one link in length (starting at an on ramp and terminating at the next off ramp). The purpose of an auxiliary lane is to provide additional roadway capacity to accommodate the weaving that takes place near ramps as vehicles maneuver to enter or exit the freeway. Auxiliary lanes add capacity to a roadway, but near ramps their capacity is reduced, because cars are weaving into and out of them require extra space. Portions of an auxiliary lane away from ramps behave like a general purpose lane. Auxiliary lanes of approximately 1 mile or less in length can generally be assumed to have a reduced capacity along their full length, but longer auxiliary lanes may function like general purpose lanes. (See, Sacramento Area Council of Governments, Sacramento Activity-Based Travel Simulation Model: Model Reference Report, at p. 3-3.)

Transit lanes, which are designated for transit vehicles only, and truck lanes, which are designated for freight vehicles only, do not directly provide capacity for private passenger vehicles. However, these lane types attract trucks or transit vehicles from general purpose lanes, freeing up capacity in those lanes, and as a result can induce private passenger vehicle travel.

Mitigation and Alternatives

Induced travel has the potential to reduce congestion relief benefits, increase VMT, and increase other environmental impacts that result from vehicle travel. These effects may be considered potential impacts requiring consideration of mitigation or the development of alternatives. If the impact is determined to be significant, the lead agency must consider feasible measures to mitigate the impact, or consider project alternatives. In the context of increased travel induced by capacity increases, appropriate mitigation and alternatives that a lead agency might consider include managing the new lane or improving the passenger throughput of existing lanes. For example, a planned general purpose lane could instead be built as an HOV or HOT lane, reducing induced VMT. Travel demand management off site can also reduce VMT.

Appendix F

Available Models for Estimating Vehicle Miles Traveled

Overview

Our ability to anticipate the transportation outcomes of land use development has increased greatly in recent years. Research undertaken by academics, consulting firms, and public agencies provide the basis for estimating future vehicle travel, and advances in computing power have allowed more sophisticated application of that research.

Models range in complexity and sensitivity to factors that can influence vehicle miles traveled, or VMT. Simpler tools make assumptions, but are easier to implement. More complex models consider more variables, but are not always necessary or feasible. Models generally fall into one of two categories:

Sketch models use statistical characterizations of land use projects and transportation networks to estimate project VMT. For example, a sketch model might characterize the transportation network using statistics like intersections per square mile and number of transit stops per day within a half mile, rather than actually containing a detailed representation of the network itself. They range in sophistication from simple spreadsheet tools, which often require a smaller number of inputs and are therefore easier to use but sensitive to fewer variables, to complex software packages. A number of sketch models can be downloaded free of charge.

Three sketch models commonly used in California include:

- Urban Emissions Model (URBEMIS) - *California Air Resources Board*
- California Emissions Estimator Model (CalEEMod) – *California Air Pollution Control Officers' Association*
- EPA Mixed-Use Development Model (MXD) - *U.S. EPA*

Travel demand models represent links and nodes in the transportation network explicitly rather than statistically. As a result, they generally require more data, maintenance, and run time than sketch models. Because of their greater complexity, and because their use is typically required for various statutory functions (e.g. determining air quality conformity), travel demand models are maintained by all MPOs and RTPAs, and also by some cities and counties. For this reason, a regional travel demand model already exists in most locations and can be used to develop estimates of VMT. Because they represent the transportation network explicitly, travel demand models are required when analyzing the VMT impacts of transportation projects.

Travel demand models can supply inputs for sketch models, particularly trip lengths; a single travel demand model run can supply these inputs for sketch model runs throughout the region. Travel

demand models can also be used to develop maps depicting VMT generation across the model's geography, providing a quick method for estimating VMT of a project in a certain location.

Catalog of Models

This section catalogs many of the models that generate estimates of VMT. Some were primarily designed to estimate project VMT, while others calculate VMT primarily in order to estimate GHG emissions and/or other outcomes. Please note, this inventory of possible models should not be construed as an endorsement of any particular model.

Name: VMT+

Developer: Fehr and Peers

Year: 2013

Accessibility: Free, only web browser and Internet access required

Description: This free website functions like a spreadsheet tool, estimating weekly VMT and GHG by the size and type of land uses developed. The calculation is based on trip generation. ITE data are provided as a default for "Average Western US City" and for four California metropolitan areas. All default data (including trip generation, average trip length, and internal trip rates) can be replaced with project specific information. This tool is useful for development projects or land use plans of various sizes.

URL: http://www.fehrandpeers.com/vmt

Name: RapidFire

Developer: Calthorpe Associates

Year: 2011

Accessibility: Paid, spreadsheet software (e.g. Microsoft Excel) required

Description: This spreadsheet tool can estimate VMT and GHG, among many other factors, and is appropriate for a neighborhood and larger scale development. RapidFire, as deployed during the Plan Bay Area project in the San Francisco Bay Area, applies a user-friendly web interface to allow the public to explore the VMT and GHG outcomes of their development preferences.

URL: http://www.calthorpe.com/scenario_modeling_tools

Documentation:
http://www.calthorpe.com/files/Rapid%20Fire%20V%202.0%20Tech%20Summary_0.pdf

Name: Transportation Emissions Guidebook and Calculator

Developer: Center for Clean Air Policy

Year: 2007

Accessibility: Free, spreadsheet software (e.g. Microsoft Excel) required

Description: This spreadsheet tool uses a trip generation model to estimate neighborhood VMT and GHG, and then estimates the impact of 19 mitigation strategies. Required inputs include present day mode share, trip generation rates, and average trip length. This model is unique among those listed here in that it includes school siting as a potential VMT mitigation strategy.

URL: http://www.ccap.org/safe/guidebook/guide_complete.html

Documentation:

http://www.ccap.org/guidebook/CCAP%20Transportation%20Guidebook%20(1).pdf

Name: Sketch7 VMT Spreadsheet Tool

Developer: UC Davis Institute of Transportation Studies

Year: 2012

Accessibility: Free, spreadsheet software (e.g. Microsoft Excel) required

Description: This Excel spreadsheet and online GIS application use elasticities for seven "D's" (density, diversity, distance, design, destination, demographics, and development scale) to compare site or neighborhood plans, and estimate the VMT and GHG produced by each.

URL: http://ultrans.its.ucdavis.edu/projects/improved-data-and-tools-integrated-land-use-transportation-planning-california

Documentation:
http://downloads.ice.ucdavis.edu/ultrans/statewidetools/Appendix_G_VMT_Spreadsheet_Tool.pdf

Name: COMMUTER

Developer: United States Environmental Protection Agency (U.S. EPA), Cambridge Systematics, Inc.

Year: 2011

Accessibility: Free, spreadsheet software (e.g. Microsoft Excel) required

Description: This spreadsheet tool estimates the impact on VMT and GHG of several common transportation demand management strategies, including pricing/subsidy, transit improvements, carpooling, and telecommute promotion. The model allows the user to provide baseline mode share, trip generation and length, and population as inputs, or alternately can provide defaults from MOBILE6.

URL: http://cfpub.epa.gov/crem/knowledge_base/crem_report.cfm?deid=74941

Documentation: http://www.epa.gov/otaq/stateresources/policy/transp/commuter/420b05017.pdf

Name: Envision Tomorrow

Developer: Fregonese Associates, U.S. Office of Housing and Urban Development (HUD)

Year: 2014 (version 3.4)

Accessibility: Free, spreadsheet software (e.g. Microsoft Excel) required

Description: This suite of linked spreadsheets allows users to "paint" changes to land use and transportation at the neighborhood or site level and model the resulting impacts on travel behavior. Inputs include employment characteristics, intersection counts, transit coverage, and assumed average vehicle speeds. The spreadsheets use trip generation rates to estimate VMT and GHG. Envision Tomorrow is distributed under a Creative Commons license, is free to use, and is open source.

URL: http://www.envisiontomorrow.org/site-level-travel-model

Documentation: http://www.envisiontomorrow.org/storage/user_manuals/20131029ENVISION%20TOMORROW%20PLUS_USER%20MANUAL_1st%20COMPLETE%20VERSION_updated_sm2.pdf

Name: Urban Emissions Model (URBEMIS)

Developer: California Air Resources Board (CARB)

Year: 2007

Accessibility: Free

The Urban Emissions Model (URBEMIS) was developed to model VMT and GHG from new development, and is appropriate for small and large site developments. The tool was developed with the support of California air districts, and is free to download and use. As it was designed with local data, URBEMIS is used across California, including in the San Joaquin Valley. It has faced and passed legal challenges. The model calculates impacts from many mitigation measures, including affordable housing, free transit passes, and transit availability, as well as decisions throughout the construction phase.

URL: http://www.urbemis.com

Documentation: http://www.urbemis.com/support/manual.html

Name: California Emissions Estimator Model (CalEEMod)

Developer: California Air Pollution Control Officers Association (CAPCOA)

Year: 2013

Accessibility: Free

Description: This user-friendly tool is appropriate for any size site development, and estimates VMT and GHG based on the size and land use(s) of the project. The model integrates with the California Air Pollution Control Officers Association (CAPCOA) Quantification of GHG Mitigation Measures.

URL: http://www.caleemod.com

Documentation: http://www.aqmd.gov/caleemod/user's-guide

Name: Smart Growth INDEX 2.0

Developer: United States Environmental Protection Agency (U.S. EPA), Criterion Planners/Engineers

Year: 2002

Accessibility: Free

Description: This tool requires users to upload a map of the project's surrounding neighborhood into a GIS system such as ESRI ArcMap. Inputs (shapefile format) include: land use, transportation, demographics, housing, and other community features. Once uploaded, users can configure and compare development scenarios, projecting 56 indicators that include VMT and GHG. Designed for stakeholder engagement, the tool can be set to rank the performance of multiple scenarios by community-defined metrics.

URL: http://www.epa.gov/smartgrowth/topics/sg_index.htm

Documentation: http://www.epa.gov/dced/pdf/4_Indicator_Dictionary_026.pdf

Name: Low-Carb Land

Developer: Sonoma Technology, Inc., Washington State Department of Transportation

Year: 2011

Accessibility: Paid

Description: This sketch-planning tool is intended primarily for site development in suburban and rural areas because it uses simple and high-level inputs, and doesn't account for the complexities of more centrally-located development. Users model a base case and one or more project scenarios. Aside from location, the other inputs are the "5 D's" commonly discussed in VMT mitigation: density, diversity, destination, distance and design. The tool incorporates prevailing VMT rates and elasticities for the area.

URL: http://www.sonomatech.com/project.cfm?uprojectid=672

Documentation: http://www.trpc.org/regionalplanning/transportation/Documents/Modeling/Low-Carb%20Land_TRB%20Presentation_2011.pdf

Name: CommunityViz

Developer: Placeways

Year: 2014 (version 4.4)

Accessibility: Paid, ESRI ArcGIS required

Description: CommunityViz, is a model designed to facilitate an engaging experience between planners and the public. Optional inputs include demographic data, transportation network characteristics, land use, water use, and jobs. Outputs include VMT and GHG. The user-friendly, interactive interface was designed to invite community members step up during public meetings, enter their own preferences, and then model and display the results in real-time, using with 3-D visualizations, charts, and maps.

URL: http://placeways.com/communityviz/

Documentation:
http://placeways.com/communityviz/resources/downloads/items/WhitePaperIndicators2011.pdf

Name: Transportation Impacts of Mobility Management Strategies (TRIMMS)

Developer: United States Environmental Protection Agency (U.S. EPA), Center for Urban Transportation Research, University of South Florida

Year: 2012

Accessibility: Free, spreadsheet software (e.g. Microsoft Excel) required

Description: Using constant elasticities of demand, TRIMMS predicts VMT and GHG changes brought about by the application of several mitigation strategies, including Smart Growth land use development, transit fare reduction, transit service enhancements, and parking pricing. TRIMMS also estimates GHG emissions.

URL: http://www.nctr.usf.edu/abstracts/abs77805.htm

Documentation: http://ntl.bts.gov/lib/43000/43600/43635/77932-final.pdf

Name: Emme

Developer: INRO (Canada)

Year: 2014 (version 4.1)

Accessibility: Paid

Description: Used in the United States and internationally, Emme is a desktop-based model that uses neighborhood-level household information to estimate the impacts of a variety of transportation policy and infrastructure decisions, including transit service, bicycle facilities, carpooling, and tolling. Emme is appropriate for neighborhood-level development and outputs VMT and GHG.

URL: http://www.inro.ca/en/products/emme/index.php

Name: I-PLACE3S

Developer: Parson Brinkerhoff, Freonese Calthorpe Associates

Year: 1996

Accessibility: Free, ESRI ArcGIS required

Description: I-PLACE3S was launched in 2002 as a web-based modeling tool commissioned by the California Energy Commission, and is appropriate for larger developments and plans. The model works by developing a comprehensive land use and transportation network for a base year, before estimating effects of the development on VMT and GHG, among other variables. I-PLACE3S has a user-friendly interface, and is currently being used in several cities across the United States.

URL: http://www.smartcommunities.ncat.org/articles/place3s.shtml

Documentation: http://www.smartcommunities.ncat.org/pdf/places.pdf

Name: Surface Transportation Efficiency Analysis System

Developer: Federal Highway Administration (FHWA), Cambridge Systematics, Inc.

Year: 1997

Accessibility: Free

Description: Though STEAM requires substantial base year data; it is well suited for exploring many VMT mitigation strategies in a sub-region or along a corridor. Inputs include baseline vehicle occupancy, trip length, and population as well as several elasticities. Outputs include VMT and GHG.

URL: https://www.fhwa.dot.gov/steam/products.htm

Documentation: https://www.fhwa.dot.gov/steam/20manual.htm

Name: Urban Footprint

Developer: Calthorpe Associates

Year: 2012

Description: Developed for the Vision California process, this web-based tool allows users to estimate VMT and GHG at a large site or neighborhood scale. Urban Footprint also outputs land consumption, fiscal impact (household and government), household resource use, and public health. Within California, Urban Footprint is currently being used by the Sacramento Area Council of Governments (SACOG), San

Diego Association of Governments (SANDAG) and the Southern California Association of Governments (SCAG).

URL: http://www.calthorpe.com/scenario_modeling_tools

Documentation: http://www.calthorpe.com/files/UrbanFootprint%20Technical%20Summary%20-%20July%202012.pdf

Name: UrbanSim

Developer: Synthicity

Year: 2014 (ongoing open source improvements)

Accessibility: Free, ESRI ArcGIS required

Description: UrbanSim is an open-source transportation and land use scenario-planning tool, which can model VMT and GHG, among many other outcomes. The Metropolitan Transportation Commission (MTC) applied UrbanSim to forecast its Plan Bay Area outcomes. Modeling site and neighborhood development with UrbanSim is most feasible if the surrounding region already uses UrbanSim.

URL: http://www.urbansim.org/Main/UrbanSim

Documentation: https://github.com/synthicity/urbansim/wiki

Name: EPA Mixed-Use Development (MXD) Model

Developer: United States Environmental Protection Agency (U.S. EPA)

Year: 2007

Accessibility: Free, spreadsheet software and ESRI ArcGIS required

Description: The MXD Model is a spreadsheet tool designed to model VMT production from project sites and neighborhoods that apply Smart Growth principles. The model must integrate with a desktop GIS application, and for inputs, it requires household and employment characteristics, intersection density, and transit availability.

URL: http://www.epa.gov/smartgrowth/mxd_tripgeneration.html

Name: MXD+ / Plan+ / TDM+ Toolkit

Developer: Fehr and Peers

Year: 2013

Accessibility: Paid

Description: These proprietary tools build on the EPA MXD model, estimating VMT for site and neighborhood-scaled development. MXD+ adjusts trip generations rates downward for mixed use development. Plan+ introduces new land use mitigations (parking pricing, connection to transit, bicycle parking) to estimate further reductions. TDM+ models the effects of the CAPCOA Guideline mitigations.

URL: http://asap.fehrandpeers.com/tools/sustainable-development/plan

Name: CUTR_AVR

Developer: Federal Highway Administration (FHWA)

Year: 1999

Accessibility: Free

Description: The CUTR_AVR model is ideal for large office developments with 100 or more employees with innovative TDM programs. The model estimates the mode share and ridership effects of the TDM programs, which can be input into other models to estimate VMT and GHG. The model is based on a dataset including 7,000 employer TDM programs from three metropolitan areas in Arizona and California.

Information:
http://www.fhwa.dot.gov/environment/air_quality/conformity/research/transportation_control_measures/emissions_analysis_techniques/descriptions_cutr_avr.cfm

Download: http://www3.cutr.usf.edu/tdm/registercutravr.htm

Documentation: http://www3.cutr.usf.edu/tdm/pdf/CUTRAVR.PDF

Name: National Energy Modeling System (NEMS): Transportation Sector Module (TSM)

Developer: United States Department of Energy (DOE) Energy Information Administration

Year: 2001

Accessibility: Free

Description: This model focuses exclusively on the impact of changes in the vehicle fleet on VMT and GHG. Input data includes the vehicle fleet (personal, transit, and freight), fuel prices, fuel economy, passenger miles, population, income, and changes in costs and income.

URL: http://www.eia.gov/bookshelf/models2002/tran.html

Documentation: http://www.eia.gov/FTPROOT/modeldoc/m0702001.pdf

Name: VMT Impact Tool

Developer: California Air Resources Board (CARB)

Year: 2014

Accessibility: Free, spreadsheet software (e.g. Microsoft Excel) required

Description: This spreadsheet tool calculates the effect of changes in seven factors on VMT: pricing, transit utilization, job access, activity mix, active mode share, road network connectivity, and mixing of uses. It does not calculate absolute VMT quantities, but can be used to estimate the change in VMT that would result from policy changes. The results can be exported to GIS to visualize spatial relationships.

URL (Tool and Documentation): http://www.arb.ca.gov/research/single-project.php?row_id=64861

Exhibit K
Institute for Local Government - Best Practices

Sustainability Best Practices Framework

About ILG's Sustainable Communities Program

The Institute's Sustainable Communities program helps local officials and staff identify and apply policies and best practices that support sustainable communities — places that foster and maintain a high quality of life for their residents on an ongoing basis. www.ca-ilg.org/Sustainability

Sustainability Best Practices Framework: Options to Consider

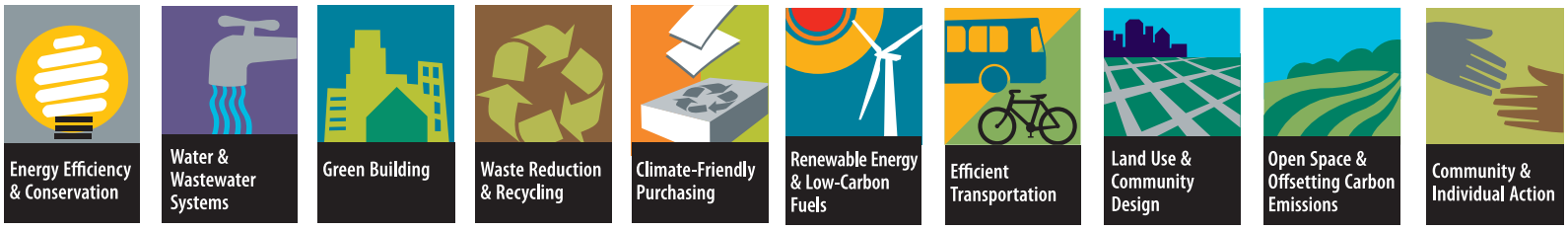
The Institute for Local Government's Sustainability Best Practices Framework offers options for local action in ten areas. They are drawn from practical experiences of cities and counties throughout California. The options vary in complexity and are adaptable to fit the unique needs and circumstances of individual communities.

Local officials and staff may use the framework in a variety of ways, including to:

- Generate ideas about programs and policies to pursue;
- Inform a comprehensive climate action planning process; or
- Integrate sustainability into general plan policies.

Many of the activities can lead to multiple benefits, including:

- Reduced greenhouse gas emissions;
- Energy, water, fuel and cost savings;
- Improved health; and
- Increased resilience to climate change impacts.



Feedback Welcome

The Sustainability Best Practices Framework highlights the ongoing good work at the local level to save energy and reduce greenhouse gas emissions. It is an evolving resource. New ideas are welcome, along with any materials or background information that may benefit local agencies. Please email us at **sustainability@ca-ilg.org**.

About the Institute for Local Government

The Institute for Local Government (ILG) is the nonprofit research affiliate of the League of California Cities and the California State Association of Counties. The Institute's mission is to promote good government at the local level with practical, impartial and easy-to-use resources for California communities. **www.ca-ilg.org**

The activities can also help make communities more attractive places to live, work and conduct business. Learn more about the co-benefits of sustainability strategies at **www.ca-ilg.org/SustainabilityCo-Benefits**

Updated Sustainability Best Practices Now Available

First released in 2008, the Sustainability Best Practices Framework has gone through several iterations, including the most recent 2013 update.

The new updates reflect activities local agencies, including cities and counties, participating in the Beacon recognition program have undertaken, technological advancements, and policy changes at the state level. Like the original Best Practices Framework, these updates have been peer-reviewed and reflect input from local and state officials, technical experts and others. **www.ca-ilg.org/SustainabilityBestPractices**

More Information to Support Local Efforts

Visit the Institute's website (**www.ca-ilg.org/SustainabilityBestPractices**) to read stories and watch videos (**www.ca-ilg.org/BeaconAwardVideos**) about local sustainability efforts from around California and to access resources to support efforts in the ten best practice areas.

Additionally, join the Institute's Sustainable Communities Learning Network LinkedIn group (**www.ca-ilg.org/SCLNLinkedIn**), which enables local agency sustainability practitioners to connect, exchange information, discuss best practices, and seek feedback directly from their peers.

Local Leadership Toward Solving Climate Change

About the Beacon Program

The Beacon program, sponsored by the Institute for Local Government and the Statewide Energy Efficiency Collaborative, recognizes and supports California cities and counties that are working to reduce greenhouse gas emissions, save energy and adopt policies and programs that promote sustainability. Learn about the Beacon program and participant accomplishments at **www.ca-ilg.org/BeaconAward**.

The program is funded by California utility customers and administered by Southern California Gas Company, San Diego Gas & Electric Company, Pacific Gas and Electric Company and Southern California Edison, under the auspices of the California Public Utilities Commission.

The Statewide Energy Efficiency Collaborative (SEEC) is an alliance to help cities and counties reduce greenhouse gas emissions and save energy. SEEC is a collaboration between three statewide non-profit organizations, including the Institute for Local Government, and California's four investor-owned utilities. **www.californiaseec.org**

www.ca-ilg.org

Energy Efficiency & Conservation

Options to Consider

Energy generation is the second largest source of greenhouse gas emissions. Thus, strategies to conserve energy and use it more efficiently in agency operations and the community help reduce greenhouse gas emissions. In addition, energy efficiency and conservation measures save money and resources.

For other energy-related best practices: see Green Building and Water and Waste Water Systems areas.

Agency

Audits and Assessment

- Audit energy use of agency buildings to identify opportunities for energy savings through efficiency and conservation measures.
- Use energy management software to monitor real-time energy use in agency buildings to identify energy usage patterns and abnormalities.
- Conduct commissioning and retro-commissioning studies of agency buildings, including equipment such as heating, ventiliation and air conditioning (HVAC) and lighting systems to ensure they are operating as designed and installed.
- Benchmark energy use of major agency buildings.

Internal Policies and Procedures

- Establish an energy efficiency and conservation policy that provides employees with behavioral guidelines for energy efficient use of the facility such as turning lights, copiers and computers off, appropriate thermostat use, etc.
- Establish energy efficiency and conservation protocols for building custodial and cleaning services and other contract employees.
- Adopt and implement a policy to reduce "plug" load in agency facilities by removing personal equipment such as desk lamps and space heaters or installing smart power strips.
- Implement a network cloud-computer system to reduce computer work station energy use.
- Incorporate energy efficiency features in agency data centers, such as through implementation of an information technology energy efficiency program.
- Adopt ENERGY STAR® purchasing standards for all new computer equipment, appliances and equipment.
- Require new agency buildings to exceed Title 24, California's energy efficiency building standard.
- Implement off-peak scheduling of pumps, motors, and other energy intensive machinery where possible.
- Implement a revolving loan fund or other mechanism to finance future energy investments in agency buildings and operations.
- Work with energy provider to access technical assistance and financial incentives, such as facility audits, rebates, on-bill financing, loans, savings-by-design and demand management programs.
- Require agency new construction to be net zero energy.

Continued on next page

- Train agency building inspectors to understand and enforce Title 24, California's energy efficiency building standard.
- Develop and implement shading requirements for agency buildings and other facilities.
- Require agency funded or supported affordable housing projects to incorporate energy efficiency features, equipment and appliances.
- Prepare and implement an Energy Action Plan for agency facilities.
- Participate in voluntary sustainability and climate change recognition program, The Beacon Award: Local Leadership toward Solving Climate Change to track and share agency energy savings accomplishments. **www.ca-ilg.org/BeaconAward**

Retrofits and Upgrades

- Develop and implement a schedule to address no cost/low cost energy retrofit projects.
- Develop and implement a schedule to address capital intensive energy retrofits projects.
- Reduce energy demand by capturing "day lighting" opportunities.
- Install motion sensors, photocells, and multi-level switches to control room lighting systems.
- Replace incandescent lights with more energy efficient lighting, such as compact fluorescents, overhead fluorescent lights or light-emitting diodes (LEDs).
- Upgrade exit signs with light-emitting diode (LED) lighting.
- Add vending misers to cold beverage machines.
- Upgrade pumps, motors and other energy intensive machinery where feasible.
- Replace agency appliances and equipment such as vending machines, refrigerators, and washing machines, with energy efficient models.
- Replace agency natural gas fueled appliances and equipment, such as boilers, stoves, water heaters, with high efficiency units.
- Replace and/or tint windows in agency-owned buildings to reduce heating by sunlight.
- Install cool roof systems on existing and new agency buildings.
- Install smart meters on agency buildings.

Tip: Evaluate agency electric bills to ensure each account is on the optimal rate schedule.

Outside Lighting

- Use "de-lamping" techniques to reduce lighting levels at parks, sports fields and parking lots, where appropriate for the location and use, considering security and decorative lighting issues.
- Change downtown holiday or decorative lighting to light-emitting diodes (LEDs) or other energy efficient lighting systems.
- Replace incandescent traffic and crosswalk lights with energy-efficient lighting such as light-emitting diodes (LEDs).
- Replace incandescent and mercury vapor street, parking lot, park and other outdoor lights with energy efficient alternatives, such as light-emitting diodes.

Continued on next page

Community

Working with Local Businesses

- Encourage community businesses to conduct energy audits and implement energy efficiency retrofits through activities such as energy efficiency workshops, energy fairs, agency websites and social media.
- Encourage businesses to install energy efficient exterior lighting that is appropriate for the location and use, considering security and decorative lighting issues.
- Collaborate with local retail businesses to encourage businesses to purchase energy efficient products.
- Promote and reward energy efficiency efforts of local retail businesses.
- Adopt an energy financing program, such as through a PACE (Property Assessed Clean Energy) financing district, to help businesses install energy efficiency retrofits in existing residential and commercial buildings.
- Require energy audits and/or retrofits for commercial properties at time of sale.
- Require new commercial buildings to exceed Title 24, California's energy efficiency standard, to the extent permitted by law.
- Require new commercial construction to be net zero energy.

Working with Homeowners and Apartment Owners

- Provide information about Energy Upgrade California™ to help homeowners increase energy efficiency.
- Provide rebates or other financial incentives to help residents pay for whole house retrofits.
- Sponsor a home energy makeover contest that includes energy efficient audit and improvements as prizes.
- Adopt an energy financing program, such as through a PACE (Property Assessed Clean Energy) financing district, to help homeowners install energy efficiency retrofits in existing residential buildings.
- Require energy audits and/or retrofits at time of sale for residential properties.
- Require energy audits and/or retrofits at time of residential remodeling or renovation projects.
- Require new residential buildings to exceed Title 24, California's energy efficiency standard, to the extent permitted by law.
- Require new residential construction to be net zero energy.

Working with Energy Providers

- Work with energy provider to encourage local businesses to implement energy efficiency strategies and retrofits.
- Work with energy provider to provide information to homeowners and businesses about available utility rebates for new residential and commercial buildings that exceed Title 24, California's energy code, by 15 percent or more.

Continued on next page

- Work with energy provider to promote use of utility financial incentives to assist residential and commercial customers improve energy efficiency, such as by using on-bill financing, loans and rebates and demand management programs, as appropriate for the customer.

Engaging the Community

- Host/support compact fluorescent light bulb, LED give-away or incandescent bulb exchange programs.
- Collaborate with schools and colleges to co-sponsor students to conduct energy audits and/or retrofits for agency buildings, businesses or homeowners.
- Upgrade foreclosed homes in the community with energy efficiency measures and solar photovoltaic or hot water systems.
- Prepare and monitor progress of implementing Energy Action Plan to reduce energy use in the community.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Green Building

Options to Consider

Green buildings reduce energy consumption, use water more efficiently and utilize materials with recycled content, thus saving money and natural resources and related greenhouse gas emissions. Local agencies have taken a variety of approaches to embrace green building policies and programs, consistent with the unique characteristics of their individual communities.

Note: The California Green Building Standards Code, known as CALGreen, went into effect in 2011 for residential and non-residential new construction and major remodels. CALGreen is updated triennially with the next update going into effect January 2014. CALGreen includes options for stronger locally adopted standards. Several other green building rating systems, such as GreenPoint Rated and LEED® certification programs, provide options to consider for exceeding California's Green Building Code. **www.bsc.ca.gov/Home/CALGreen.aspx**

For other green building-related best practices: see Energy Efficiency and Conservation area.

Agency

- Adopt a policy that requires new agency buildings to exceed the minimum requirements of California's Green Building Standards Code (also known as CalGreen). Options to exceed the standard include CALGreen's built-in tiers and/or certification under Build It Green's Green Point Rated system, LEED®, or alternative certification program.
- Require agency buildings to exceed Title 24, Part 6, the State's Building Standard Code which establishes energy efficiency requirements for residential and non-residential new construction and major remodels.
- Incorporate materials that are renewable, reusable, recyclable, recycled, non-toxic and those that have zero or low volatile organic compounds (VOCs).
- Explore using alternate materials such as packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance replenishment of ground water.
- Develop and implement sustainable landscaping standards for public agency facilities to reduce water consumption.
- Incorporate water efficient plants, trees, green roofs and rain gardens in agency landscaping.
- Use compost and mulch in agency landscaping as a water conservation measure.
- Require agency landscaping and parks to incorporate smart irrigation technology systems that save water rand energy.
- Require verification by a certified third-party rater to ensure compliance with green building standards for all newly built agency facilities.

Community

- Establish a green building awareness program to educate and encourage homeowners and builders to use green building techniques.
- Organize a sustainable building task force that includes representation from various fields within the building industry and other groups to evaluate feasibility of incorporating green building techniques that exceed the state standards into all new building and retrofit projects in the community.
- Create a dedicated page on the agency's website to help residents find green building information and resources.
- Provide information to homeowners and businesses about available utility rebates for new residences and commercial buildings that exceed California's Title 24 energy code by 15 percent.
- Provide incentives, such as expedited review/permit processing, to encourage green building.
- Provide technical and financial assistance and other significant incentives to development projects that meet or exceed specified standards under green building programs.

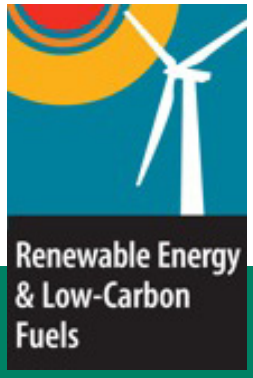
Continued on next page

Green Building continued

- Train appropriate agency staff (such as planners, inspectors, and plan checkers) in green building standards and technologies to facilitate the permitting approval and inspection processes.
- Adopt a policy that requires new homes, buildings or remodels to exceed the minimum requirements of California's Green Building Standards Code (also known as CalGreen). Options to exceed the standard include CALGreen's built-in tiers and/or certification under Build It Green's Green Point Rated system, LEED®, or alternative certification program.
- Adopt a "Solar Ready" ordinance, requiring all new residential buildings to be pre-wired and pre-plumbed for photovoltaic and solar hot water systems. (Required in the California Green Building Code January 1, 2014)
- Require new residential and commercial construction buildings to exceed Title 24 energy efficiency standards, to extent permitted by law.
- Require new and renovated commercial construction to incorporate smart irrigation technology systems that save water and energy.
- Require energy efficiency performance audits for specific types of residential and commercial remodeling projects.
- Require buildings, facilities or affordable housing developments using agency funds or other agency support to exceed minimum state green building or energy standards.
- Offer fee reductions, waivers, loans or grants to developers and contractors who commit to verifiable green building practices that exceed state or local minimum standards.
- Offer technical expertise and assistance for community members, builders and businesses undertaking green building projects.
- Work with neighboring jurisdictions, where feasible, to adopt a regional green building standard that exceeds the California Green Building Code Standard or Title 24 energy efficiency standards.
- Enact a construction and demolition debris recycling ordinance that requires 50 percent or more diversion of project waste.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org



Renewable Energy and Low Carbon Fuels

Options to Consider

Energy generated from renewable sources produces less greenhouse gas emissions than energy generated from conventional sources. Low carbon fuels are those that are formulated to produce fewer greenhouse gas emissions.

For other renewable energy and low carbon fuels-related best practices: see Efficient Transportation and Waste Reduction and Recycling areas.

Agency

Solar Projects

- Replace traditional pedestrian "walk" signals and safety lights with solar powered signals.
- Install solar powered smart parking meters.
- Adopt a "Solar Ready" policy requiring new agency buildings to be pre-wired and pre-plumbed for solar photovoltaic and solar hot water systems. (Required January 2014 as part of the California Green Building Code.)
- Purchase solar photovoltaic systems or enter into power purchase agreements (PPA) to meet all or part of the electrical energy requirements of buildings and facilities owned, leased or operated by the agency.

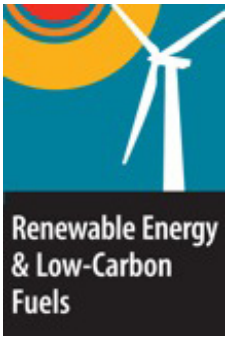
Methane Recovery Programs and Projects

- For jurisdictions that own or operate landfills, recover and use the maximum feasible amount of methane gas from the landfill to produce electricity, fuel co-generation facilities, and/or produce compressed natural gas for use in alternative fuel vehicles.
- For jurisdictions that host landfills owned by private companies or other public agencies, enter into partnerships or agreements with agencies or companies that own or operate landfills to ensure that the maximum feasible amount of methane is recovered for waste-to-energy or other renewable energy projects.
- Install digesters and other technologies at wastewater treatment facilities to capture methane and other bio-fuels.
- Install fuel cells to generate power for wastewater treatment plants.

Fuel Efficient and Alternative Fuel Vehicles

- Establish and implement a policy to convert agency fleets, including agency owned, leased or operated vehicles, to alternative or fuel efficient vehicles.
- Establish and implement a policy to purchase new alternative or fuel efficient vehicles for agency operated transit systems.
- Use regional purchasing options or the California Department of General Services bulk purchasing program to buy green fleet vehicles from local auto dealers.
- Train agency fleet mechanics to service alternative and fuel efficient vehicles.
- Implement bike sharing program for agency employees traveling between agency facilities.
- Install bicycle racks, showers, and other amenities at agency facilities to promote bicycle use by agency employees and visitors.

Continued on next page



Community

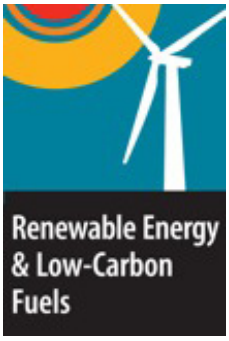
Solar and Small Wind Projects

- Develop a map that residents can access online that identifies where solar projects are located in the community.
- Conduct renewable energy workshops for residential, commercial and industrial property owners.
- Offer workshops and information for residents and businesses to provide resources and permitting assistance for those interested in adding renewable energy systems to their properties.
- Provide information about the California Solar Initiative rebate and other renewable energy incentive programs on agency website.
- Work with solar photovoltaic system providers to establish a discounted bulk purchasing program for residents and businesses that wish to purchase and install solar photovoltaic systems on their buildings.
- Offer financial incentives to those who install solar photovoltaic or hot water systems on homes or businesses.
- Adopt a renewable energy financing program, such as through a PACE (Property Assessed Clean Energy) financing district, to help homeowners, multi-family dwellings and businesses install solar photovoltaic and hot water systems on existing residential and commercial buildings.
- Adopt policy or program that offers incentives, such as streamlined permitting system or fee waivers, to encourage installation of photovoltaic systems on new or existing residential and commercial buildings.
- Adopt a "Solar Ready" ordinance requiring new residential or commercial construction to be pre-wired and pre-plumbed for solar photovoltaic and solar hot water systems. (Required January 2014 as part of the California Green Building Standards Code.)
- Adopt an ordinance for small wind energy systems for residential and commercial installations.
- Adopt a solar photovoltaic system siting ordinance for systems proposed on agricultural and open space lands.

Fuel Efficient and Alternative Fuel Vehicles

- Work with electric utility to develop and implement electric vehicle charging infrastructure plan for the community.
- Develop permitting standards for installation of electric vehicle charging stations at residential and commercial buildings.
- Streamline the permitting process for installing home or business electric vehicle charging stations.
- Install electric vehicle charging stations at public facilities, such as at parking lots and airports, for community use.

Continued on next page



- Allow the public to use agency facilities that support use of alternate fuel vehicles, such as compressed natural gas fueling facilities and electric vehicle charging stations.
- Require new commercial developments to include electric vehicle charging stations in parking lots or garages.

Water and Wastewater Systems

Options to Consider

Agency

Water and wastewater systems play an important role in sustainability for several reasons. First, energy is used to convey, pump, distribute, treat and heat water, so saving water saves energy. Second, experts agree that the effects of climate change will further reduce the availability of water. Therefore, efforts to conserve water will play an important role saving energy, reducing greenhouse gas emissions and securing water resources for the future.

For other water and wastewater-related best practices: see Green Building, Energy Efficiency and Conservation, and Land Use and Community Design areas.

Ensure Water Efficiency in Agency Buildings and Operations

- Audit agency's water and wastewater pumps and motors to identify most and least efficient equipment.
- Work with agency or company that provides water and wastewater service to implement a cycling and equipment replacement program for least efficient water and wastewater pumps and motors.
- Initiate a water loss program or "leak-audit" of agency water infrastructure.
- Upgrade and retrofit agency plumbing systems and appliances with water efficient technology and fixtures.
- Retrofit existing agency buildings and facilities to meet standards for the LEED® Standards Rating Systems for Existing Buildings (EB), Build It Green, Commercial Interiors (CI), or other equivalent standards.
- Incorporate water-efficient systems in new agency buildings that include opportunities for recycled water.
- Require dual plumbing for use of recycled water for new facilities.

Reduce Water Use in Parks and Landscaping

- Implement all feasible water efficiency strategies included in the Ahwahnee Water Principles for Resource Efficient Land Use in agency parks, landscaping and other new developments. (www.lgc.org/ahwahnee/h2o_principles)
- Install smart water meters to track water usage and the effectiveness of water efficiency activities and programs.
- Assess, maintain and repair existing irrigation systems to minimize water use, including parking lot landscaping, public rest rooms and parks, golf courses and other recreational facilities.
- Install weather-based smart irrigation systems in agency parks and landscaping areas.
- Adopt a water recycling master plan that connects parks into a recycled water system.
- Use recycled water for agency facilities and operations, including parks and medians, where appropriate.
- Convert all water distributing vehicles, such as street sweepers and tree-watering tankers, to use reclaimed water, where feasible.
- Reduce turf and grass in agency landscaped areas. Use native turf and grass, when applicable.
- Implement drought tolerant and hydro-design principles to group compatible plants based upon water needs for agency parks and landscaping.
- Use compost, biosolids and mulch in agency landscaping as a water conservation measure.

Continued on next page

Tip: For more information, visit ILG's Water Conservation Leadership Guide: Issues for Local Officials to Consider at **www.ca-ilg.org/WaterConservationLeadership**.

Create Safe and Efficient Water and Wastewater Systems

- Use non-toxic fertilizers in agency parks and landscaped areas to reduce contaminates in run-off.
- Create a Fats, Oils and Grease (FOG) Control Program to reduce blockages in the wastewater system.
- Reduce energy use by auditing agency's water and wastewater pumps and motors to identify most and least energy efficient equipment.
- Work with agency or company that provides wastewater service to implement an audit, cycling and equipment replacement program to increase energy efficiency for water and wastewater pumps and motors.
- Work with local wastewater service provider to determine whether biosolids can be recycled by using them on local landscaping, golf courses, community parks and other programs to improve soil quality and reduce irrigation needs.
- Promote methane capture and enhanced production through co-digestion of other organic waste streams for use as renewable energy at wastewater treatment plants.

Address Future Water Security

- Construct a new groundwater recharge facility that can hold additional surface water secured in wet years to eliminate possible groundwater overuse in the region.
- Create an urban runoff recycling facility.

Community

Promote Water Conservation

- Adopt water efficiency principles similar to the Ahwahnee Water Principles for Resource Efficient Land Use for new and existing residential and commercial developments. (**www.lgc.org/ahwahnee/h2o_principles**)
- Adopt a retrofit program to encourage or require installation of water conservation measures in existing businesses and homes that exceed state standards.
- Require water efficiency audits at point of sale for commercial and residential properties.
- Provide free faucet aerators, water-efficient shower heads and low flow hose nozzles to residents at community or other events.
- Pass a water-efficient landscaping ordinance stronger than state standards, where feasible.
- Develop a training program to educate local landscapers and agency personnel on practices that reduce the use of water and toxic pesticides.
- Create a water efficient demonstration garden that includes native and drought tolerant plants and requires low volume mulch, irrigation and other water saving features.
- Implement a lawn buy-back program for residents who convert sod or grass to drought-tolerant landscaping.

Continued on next page

Promote Water Recycling and Greywater Use

- Incentivize and promote the installation of residential greywater systems that meet appropriate regulatory standards.
- Develop a local ordinance to require all new homes to have a greywater system.
- Require dual plumbing for use of recycled water for new commercial and/or residential developments.
- Provide educational resources to encourage residents to harvest rainwater.

Educate about Water Pollution Prevention

- Install informational kiosks at agency parks to educate residents about stormwater pollution.
- Engage the public in riverbank planting events, storm drain marking or stream-cleanup programs.
- Promote bio-retention basins for stormwater collection and treatment prior to discharge.
- Promote local solutions for stormwater management, such as rain gardens, green roofs and detention ponds.
- Develop an educational community program or campaign that engages residents as watershed stewards.

Tip: Greywater is wastewater generated from domestic activities such as laundry, dishwashing and bathing, which can be recycled in-site for uses such as landscape and irrigation.

Note: For additional stormwater management practices, visit **www.epa.gov/stormwater/best_practices.htm**.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Waste Reduction and Recycling

Options to Consider

The largest sources of human-generated methane, a potent greenhouse gas, comes from improperly managed landfills. Thus, waste reduction and recycling activities reduce the potential to generate methane at landfills, as well as reduces pollutants generated from transporting waste to disposal sites. Waste reduction and recycling also conserve natural resources.

Agency

Reduce

- Implement a comprehensive waste reduction and recycling program in agency offices and facilities.
- Create and facilitate an agency employee education program highlighting waste reduction and recycling best practices.
- Adopt a policy to encourage paper reduction through activities such as:
  - Promoting a "think before you print" campaign.
  - Reducing margins and logos on agency templates, letterhead and memos.
  - Using computer software that removes blank pages and images from documents.
  - Using "eCopy" copy machines that allow users to scan paper documents and distribute electronic copies via e–mail.
  - Uploading bid documents using online resources instead of printing hard copies for contractors.
  - Requiring fewer or smaller-sized copies of project plans or submittals.
  - Establishing a policy to use electronic devices (tablets, computers and projectors) for agendas and notes at meetings, such as for board of supervisor, city council or planning commission meetings.

Reuse

- Reuse unwanted printed material for other purposes, such as for scratch paper or shred for use at the local animal shelter.
- Reuse or redistribute to community non-profit groups office items such as supplies, computer, furniture and cell phones in order to divert items from the landfill.
- Host a community garage sale or swap meet for the community to sell or redistribute unwanted items.
- Incorporate reuse programs at publically owned landfills and transfer stations for diverting materials to non-profits.
- Provide and encourage the use of reusable dishes and drinkware at agency facilities.

Recycle

- Adopt a "Buy Recycled" policy for agency departments.
- Recycle or refill ink/toner cartridges, as appropriate.

Continued on next page

- Provide bins for collection of used batteries and compact florescent lights for proper disposal or recycling.
- Implement a partnership with other public agency offices located within the jurisdiction for green procurement, waste reduction and recycling at those facilities.
- Require all agency demolition projects to incorporate de-construction/ construction and demolition waste recycling or recovery practices.
- Adopt agency or community waste diversion and recycling goals that are higher than existing state law.
- Evaluate current community recycling infrastructure relative to future population growth and waste generation.
- Include provisions and incentives for new recycling infrastructure and facilities to accommodate growth in land use planning and zoning.
- Work with solid waste and recycling collection providers to calculate the carbon footprint of collection system.
- Work with solid waste and recycling collection providers to reduce collection system carbon footprint.

Organics

- Evaluate agency facilities and operations to identify opportunities to increase material recovery and beneficial use of organic material.
- Evaluate opportunities to convert agency organic waste into biofuels to use in agency vehicles.
- Distribute or post materials illustrating best practices for organics collection and composting.
- Establish a program to use the maximum amount of organic waste possible that is generated within the jurisdiction to produce compost for use on agency parks and landscaping.
- Create a vermicomposting (worm-bin) program with a complementary educational component at agency facilities, such as county detention centers and city jails.
- Approve siting of composting facility within jurisdiction.
- Distribute an annual newsletter highlighting agency and community waste reduction programs and accomplishments.

Businesses

- Coordinate with the California Department of Resources, Recycling, and Recovery (CalRecycle) on the latest information, resources and programs to assist local businesses. **www.calrecycle.ca.gov**
- Adopt a program or ordinance to encourage or require waste audits and waste reduction plans for existing and/or new commercial developments.
- In partnership with the waste hauler(s) serving the commercial sector, institute a comprehensive waste reduction and recycling program with financial and other incentives, such as a tiered rate system that charges less for collecting recyclable materials than for collecting solid waste, to promote waste reduction and recycling for commercial/industrial waste generators.

Note - California law now requires:

- All businesses that generate 4 or more cubic yards of waste weekly to recycle.
- Apartment communities/multi-family housing with 5 or more units to recycle.
- Apartment owners to offer recycling services to residents.
- Cities and counties to educate businesses about new recycling requirements.

Continued on next page

- Adopt a program or ordinance that exceeds state minimum standards by requiring businesses generating less than 4 cubic yards of waste a week to recycle.
- Work with local material collectors and economic development experts to recruit or retain regional recycling manufacturers.
- Adopt an ordinance to restrict the use of expanded-polystyrene containers at fast food restaurants and other establishments.
- Adopt a program or ordinance to restrict the availability of single-use bags at retail stores.
- Implement a green business program that rewards local businesses for sustainability measures.
- Implement a food scrap collection program for large food waste generators.
- Encourage local restaurants to use compostable foodware, where appropriate.
- Encourage local restaurants to create opportunities and signage that promotes food waste and recyclable collections.
- Require food waste and recycling at farmers markets and other community events.
- Require recycling at special events, such as through special event permit conditions.

Residential

- Include information about recycling opportunities on agency's website.
- Provide information to residents about how to stop receiving unwanted catalogues, phone books and weekly circulars.
- Work with landlords to include recycling requirement information in lease agreements and/or move in packets.
- Adopt a program or ordinance that exceeds state standards by requiring recycling at multi-family housing with four or fewer units.
- Offer a food waste recycling program to residential customers.
- Educate residents about the importance of not contaminating recyclable wastestreams.
- Work with solid waste service providers to adopt enforcement mechanisms for residents and businesses that misuse or contaminate green waste and recycling containers.
- Offer composting and sustainable landscaping classes to the community.
- Implement a vermiculture (worm bin) composting program where residents can "check out" or borrow composting bins and equipment from the agency to start their own composting efforts at home.
- Educate the community about "buy recycled" opportunities.

Continued on next page

For other recycling-related best practices: see Green Building and Climate-Friendly Purchasing areas.

Schools

- Create a partnership with local schools to help encourage waste reduction and recycling.
- Collaborate with schools or nonprofit agencies to help develop and distribute educational materials related to recycling and waste reduction for use in classrooms.
- Encourage schools and other public agencies to use rubberized asphalt pavement for parking lots, where feasible.
- Encourage schools to use tire-derived products for a variety of uses, including sport facilities.

Electronic-Waste and Hazardous Materials

- Create and distribute information about e-waste and hazardous waste disposal.
- Increase opportunities for e-waste and hazardous materials collection and recycling.
- Distribute information and create opportunities for used motor oil recycling.
- Promote proper recycling and disposal options for compact fluorescent light bulbs and batteries.
- Offer disposal options for home-generated "sharps" (needles) and prescription drugs to prevent injuries and contamination of water and wastewater.

Construction Materials and Debris

- Adopt a program or ordinance to reduce, reuse and recycle community construction and demolition waste.
- Adopt a "deconstruction" program or ordinance to salvage and reuse materials in all community remodeling projects.
- Establish a program or ordinance that results in 100 percent recycling of all Portland cement and asphalt concrete.
- Adopt a policy to require use of rubberized asphalt concrete for streets and roads.
- Adopt a policy to use recycled asphalt pavement for streets and roads.
- Adopt a policy to use recycled asphalt pavement for commercial and community parking lots, where feasible.
- Use recycled tire rubber for playground resurfacing and other projects, where appropriate.
- Partner with local businesses to create materials reuse opportunities.

Additional Resources:

- ILG's Commercial Recycling Resource Center: **www.ca-ilg.org/commercialrecycling.**
- Carbon Footprint Calculator for businesses: **www.coolcalifornia.org/business-calculator.**
- Commercial Recycling Climate Calculator: **www.calrecycle.ca.gov/climate/calculator.**

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Climate-Friendly Purchasing

Options to Consider

Local agencies are large consumers of goods and services. As such, their purchasing practices can have a significant impact on the environment. By purchasing products or procuring services that reduce greenhouse gas emissions relative to competing goods and services, local agencies can remain fiscally responsible while promoting practices that conserve natural resources.

For other climate-friendly purchasing-related best practices: see Waste Reduction and Recycling and Green Building areas.

Tip: See ILG's Sample Climate-Friendly Purchasing Policy at **www.ca-ilg.org/samplepurchasingpolicy** and ILG's Greening Agency Fleets Resource Center at **www.ca-ilg.org/GreeningAgencyfleets**.

Agency

- Review current purchasing practices to identify possible green procurement opportunities.
- Adopt and implement a procurement policy that establishes standards for purchasing climate-friendly products and services. Examples may include:

  Office and cleaning supplies and equipment that minimize environmental impacts and that do not have a negative effect on human health, such as:

  - Paper products that contain a minimum percentage of post-consumer recycled content.
  - Cleaning products and services recognized with the GreenSeal or EcoLogo.
  - New equipment that meets Energy Star or comparable energy efficiency standards.
  - Computers that meet the highest feasible Electronic Product Environmental Assessment Tool (EPEAT) certification level.
  - Computer and lighting controls that reduce energy and computer idle time.
  - Rechargable batteries, where appropriate.
  - Recyclable or reusable cups, plates and utensils.

  Green Building materials that create a healthier and more sustainable environment, such as:

  - Building and landscaping materials and systems that exceed the CALGreen building code.
  - Carpeting, furnishings or plastic items that contain a minimum percentage of recycled content
  - Paint or carpets that contain low or no volatile organic compounds (VOC).

  Fleets that reduce environmental impact, such as:

  - Fuel efficient, dual fuel or alternative fuel fleet vehicles.
  - Vehicles that have GPS or trip planning devices.
- Conduct employee awareness training on the purchasing and use of green products and services.
- Establish an interdepartmental team to promote policy implementation, track policy adherence and suggest additional items to be included in the policy.
- Report achievements of green procurement program to staff and policy makers annually.
- Consider participating in multi-agency procurement pools that have a climate-friendly purchasing component.
- Consider life cycle pricing to ensure that the maintenance, operating, insurance, disposal and replacement cost of the product or service is considered when evaluating purchase options.

Continued on next page

Climate-Friendly Purchasing continued

- Consider efficient transportation methods when purchasing goods and services, such as using local vendors and or locally produced goods to reduce greenhouse gas emissions.
- Consider encouraging the practice of not purchasing new materials, such as office supplies and furniture, through the reuse of existing items in surplus when appropriate and feasible.
- Ensure that minimal packaging materials are used by the agency and that all packaging materials are recycled, non-toxic and/or reusable, where feasible.

Contracting

- Require consultants, contractors and grantees to use recycled products and supplies, when feasible.
- Require service providers to follow climate-friendly practices, or include a preference in selecting and contracting with service providers to those that use climate-friendly practices.
- Require parks maintenance staff or contractors to adopt water or Bay-Friendly practices, if applicable.
- Require agency-issued bids specifications to exceed state law requirements for recycled content.
- When feasible, consider the greenhouse gas emission impacts associated with transportation distances when determining which business or service providers to award contract.
- Provide incentives for the use of fuel-efficient, dual-fuel or alternative fuel vehicles for agency contracts for services involving vehicles, such as buses, waste hauling and recycling, and construction.
- When issuing proposals for services, request firms to show current green certifications that demonstrate their technical knowledge and commitment to sustainability.

Community

- Educate the public about climate-friendly procurement opportunities through the agency's website, traditional marketing and social media.
- Work with the business community to educate them about climate- friendly procurement opportunities through social media and traditional marketing.
- Educate the public about climate-friendly procurement actions being implemented by a local agency.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Efficient Transportation

Options to Consider

Agency

Transportation is the largest generator of greenhouse gas emissions in California. Efficient transportation systems, encouraging alternatives to single occupancy vehicles, and reducing the miles that vehicles travel can reduce greenhouse gas emissions, help conserve fuel and cut fuel costs, improve air quality, reduce traffic congestion and make streets safer for pedestrians, bicyclists, transit users and motorists.

Note: Metropolitan Planning Organizations and Regional Transportation Planning Agencies can provide guidance on inter-agency collaboration and technical support for the adaptation and use of transportation models.

For other efficient transportation-related best practices: see Land Use and Community Design area.

Planning

- Assess the long-term mobility (the ability for people to get around) needs of the community, including the efficient movement of people and goods.
- Update transportation models to reflect all types (or modes) of transportation, such as walking, bicycling, private vehicles, commercial vehicles, buses, trains and other forms of transit.
- Include transportation mitigation measures for new development which enhance all modes of travel rather than only focusing on automobile delay or speeds.
- Develop short and long-range community transportation goals, objectives and policy statements and include all appropriate goals, objectives and policies in the circulation element of the agency's general plan.
- Develop and include a realistic long-range transportation and land use scenario (or diagram) for local and regional growth in the circulation element of the agency's general plan and other local land use plans (such as specific plans and project development plans), consistent with a regional Sustainable Communities Strategy, if appropriate.
- Collaborate with other agencies (such as cities, counties and metropolitan planning organizations) to share transportation-related information, coordinate planning goals and processes, and take advantage of opportunities to combine and leverage resources.
- Make reducing vehicle-miles traveled (VMT) a high-priority criteria in evaluation of policy, program, and project proposals and alternatives.
- Adopt a policy requiring limitations on idling for commercial vehicles, construction vehicles, buses and other similar vehicles, beyond the requirements of state law, where feasible.
- Implement programs to reduce "incident-based" traffic congestion, such as expedited clearing of accidents from major traffic arteries, airport traffic mitigation, etc.
- Develop a financial plan that covers life-cycle costs related to the development, maintenance and operation of current and future transportation facilities and services (such as transit service).
- Identify funding sources for implementing transportation plans.
- Implement transportation planning strategies that consider demand management solutions for transit, bicycle and walking growth equally with strategies to increase automobile capacity.

Infrastructure

- Implement Intelligent Transportation Systems (ITS) for surveillance and traffic control, such as synchronized signals, transit and emergency signal priority, and other traffic flow management techniques as appropriate, to improve traffic flow and reduce vehicle idling.

Continued on next page

Efficient Transportation continued

- Install signal priority technology in agency transit systems (such as buses) to reduce number of stops and idling.
- Ensure that traffic lights have sensors to detect bicycles.
- Install roundabouts in lieu of signalized intersections as a way to improve traffic flow, reduce accidents and reduce greenhouse gases.
- Improve intersection safety through pedestrian countdown signals and high visibility crosswalks.
- Identify opportunities for infrastructure improvements such as High Occupancy Vehicle (HOV), High Occupancy Toll (HOT) lanes and dedicated bus rapid transit right-of-ways and coordinate with regional and state agencies when appropriate.
- Encourage and/or construct infrastructure for electric vehicle charging and natural gas vehicle fueling for agency vehicles and the community.
- Develop a non-motorized connectivity plan (complete streets) to create a path and roadway network and make sure that bicycle paths and pedestrian walkways connect to neighborhood destinations, schools, parks, light rail stations and essential services.
- Include bicycle, pedestrian and transit facilities in public works projects, where appropriate, as a component of a local complete streets program.
- Prepare a bicycle master plan to guide bikeway policies and development standards to make bicycling safer, more convenient and enjoyable for all bicyclists.
- Prepare a pedestrian master plan to guide walkway policies and development standards to make walking safer, more convenient and enjoyable for all pedestrians.
- Increase the number of bicycle lanes, lockers, racks, paths and signage throughout the community.
- Reduce parking requirements for projects that link or emphasize alternative types of travel.
- Use microwave technology, video detection and street embedded sensors to protect cyclists from buses, cars and motorcycles.
- Use alternative or recycled materials for road paving (such as cold central plant recycling or cold in-place recycling) to reduce energy and greenhouse gas emissions from transport and material production/processing.

For more options: see Renewable and Low-Carbon Fuels area.

Agency Fleet

- Adopt a policy that sets fleet efficiency standards for new agency vehicles.
- Purchase or lease fuel efficient or alternative fuel vehicles, including zero or near-zero emission vehicles, to save fuel and money and reduce greenhouse gas emissions.
- Install low-draw emergency lighting in agency vehicles, allowing lights to be used without the engine running.
- Consider purchasing bicycles for local travel by agency employees.
- Install battery systems for vehicles with onboard equipment (such as boom tucks) to decrease truck idling while equipment is used.

Continued on next page

For additional resources related to Fuel Efficient and Alternative Fuel Vehicles: see ILG's Greening Agency Fleets Resource Center at **www.ca-ilg.org/greeningagency-fleets**.

- Provide fuel saving tips to drivers of fleet vehicles.
- Use Global Positioning Systems (GPS) and integrated software to control fleet vehicles, reduce misuse and increase efficiency through trip planning and location information.
- Replace buses with smaller, more fuel efficient, buses for light-traveled transit routes.
- Evaluate natural gas fueling infrastructure and sharing of facilities with other public agencies to help pay for installation and ongoing costs.
- Establish a crew-based maintenance plan (such as with parks employees) instead of individual assignments, to create a "carpool effect" that lowers the annual miles traveled for maintenance staff.
- Utilize technology options (such as digital service requests accessible by mobile devices) for field personnel to avoid extra trips back to the office.

Agency Employee Programs

- Offer agency employees with incentives to use alternatives to single-occupant auto commuting, such as parking cash-out, flexible schedules, transit incentives, bicycle facilities, bicycle sharing programs, ridesharing services and subsidies, locker/shower facilities and telecommuting.
- Develop a real-time ridesharing program that utilizes smart phone technology.
- Incorporate a guaranteed ride home program as part of agency commuter trip reduction incentive programs.
- Provide parking spaces dedicated to employees who use alternative transportation (such as walking, bicycling, bus, etc.) for the rare occasions they need to drive to work.
- Implement a flexible work schedule for agency employees, incorporating telecommuting and modified schedules.
- Establish a "bike barn" to enable agency employees to borrow a bicycle to use for local meetings.
- Construct bicycle stations for employees that include bicycle storage, showers and bicycle repair space.
- Offer employees incentives to purchase fuel efficient or alternative fuel vehicles.

Community

- Increase online permitting services to reduce the need to travel to agency offices for minor permits.
- Consolidate offices that community members often visit at the same time (such as building permitting and environmental health permitting) to reduce vehicle miles traveled.
- Encourage and facilitate the development of car-sharing, Dial-a-Ride (or a similar flexible-route transit service), bicycle sharing programs and other services that reduce the need to use a personal motor vehicle.
- Implement variable demand pricing for on- and off-street parking facilities in order to discourage single-occupant-vehicle and peak travel, increase parking supply, business access and parking turnover.

Continued on next page

- Work with major employers in the community to offer incentives and services to increase the use of alternatives to single-occupant auto commuting (also called voluntary commute trip reduction programs).
- Develop and implement voluntary agreements to encourage commuter trip reduction programs for new commercial developments.
- Offer car and bicycle-sharing programs in the community.
- Encourage or require parking preferences for those who rideshare or use alternative fuel vehicles in public and private parking lots, garages, and on-street spaces.
- Adjust bus schedules to maximize ridership opportunities for residents.
- Provide real-time bus arrival and departure information to riders at transit stops and through the web-based services and text messaging.
- Dedicate revenues from fees and tolls to promote alternative transportation modes, to the extent permitted by law.
- Consider the public health co-benefits in promoting use of transit and other alternatives to single-occupant vehicle travel.
- Offer presentations to community groups highlighting the economic, health and environmental benefits of bicycling and walking.
- Partner with health organizations to offer incentive programs to encourage bicycling and walking.
- Partner with schools and other agencies to identify and implement safer travel opportunities for bicycles and walking between home and school (such as through Safe Routes to School Programs).
- Create and distribute bike maps and "safe routes to school" maps to community members through collaborating with local businesses, service organizations and schools.
- Include information on agency website about state and federal clean vehicle rebates.

Note - Additional resources available from ILG:

- SB 375 Resource Center: **www.ca-ilg.org/sb-375-resource-center**.
- Greening Agency Fleets Resource Center: **www.ca-ilg.org/greeningagencyfleets**.
- Safe Routes to Schools Toolkit: **www.ca-ilg.org/srts-toolkit**.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Land Use and Community Design

Options to Consider

Agency

Well-planned communities with a balance of housing, jobs, shopping, schools and recreation can reduce the length and frequency of trips and give people the option of walking, biking, or using transit rather than driving. This results in lower greenhouse gas emissions and also promotes physical activity and more vibrant, healthy and sustainable communities.

For other land use and community design-related best practices: see Green Building, Renewable Energy and Efficient Transportation areas.

Encourage Compact, Efficient and Contiguous Development

- Develop general plan policies that integrate diverse land uses – including housing, employment and community services – at appropriate densities to help reduce automobile travel and promote walking, bicycling and other opportunities for physical activities.
- Work with school districts to develop school siting policies that encourage infill locations to take advantage of existing complementary uses, existing housing, and walking and bicycling opportunities, and avoid greenfield locations outside established urban areas.
- As part of general plan housing element updates, inventory potential infill development sites, and maintain a community-wide database of vacant and underutilized infill sites to monitor the community's growth and change.
- Plan, zone and provide incentives for new development and renovation of existing uses in identified infill areas.
- Streamline the entitlement process for development of high quality residential construction in older and infill areas through updates to the housing element of the general plan or the zoning code, including taking full advantage of opportunities to streamline the California Environmental Quality Act (CEQA) review for infill development.
- Implement methods (such as urban service boundaries and priority infrastructure investment areas) to limit non-contiguous development patterns and foster more compact urban form.
- Consider increasing development density in areas that are well-served by transit, including incentives and streamlining for transit-oriented development.
- Develop policies and incentives (such as minimum conservation requirements, development boundaries, density limitations and support for the Williamson Act) to promote the preservation of farmland, open space and sensitive lands.
- Establish a policy that increases the available open space (such as parks, green belts, hiking trails, etc.) to support different types of uses and the different recreational needs of the community.

Support Alternative Energy and Waste Processing Land Use Options

- Identify appropriate sites for potential solar or wind generation facilities.
- Identify appropriate sites and zoning designations for recycling processing facilities and manufacturing that uses recycled materials.
- Adopt policy or program that mandates or offers incentives (such as Property Assessed Clean Energy (PACE) financing, streamlined permitting or fee waivers) for installation of photovoltaic and/or solar hot water systems on new or existing residential and commercial buildings and energy efficiency retrofits on existing buildings.

Continued on next page

Land Use Policies Supporting Green Building

- As a way to provide more predictability to the development community, include in the general plan and the zoning code policies and regulations that support and encourage green building practices and development patterns that promote sustainable communities through subjects, such as green building ordinances, solar orientation of structures and subdivisions, bicycle and pedestrian access, in-fill development and alternative energy use.
- Require new housing and mixed use developments to be built to the LEED® for Neighborhood Development (LEED-ND) standard, Build It Green or equivalent standards.
- Require bicycle racks, showers and/or other amenities as part of new commercial development projects to promote bicycle use by new employees/residents.
- Provide expedited application processing for development projects that meet or exceed sustainable land use policies.

Planning for a Variety of Transportation Choices

Tip: Consider a public health approach to planning and development that encourages alternatives to single-occupant-vehicle travel and promotes active transportation in order to provide health benefits such as new exercise opportunities (walking and bicycling), pedestrian and bicyclist safety and improved air quality that reduces asthma and other health conditions and diseases.

Bicycle and Pedestrian Opportunities

- Assess and report to local governing body and the public on pedestrian and bicycle conditions in existing communities and neighborhoods.
- Develop and adopt a community-wide pedestrian and bicycle plan and capital investment program that maximizes the potential for residents to walk or bicycle within and between neighborhoods.
- Provide bicycle access to transit services on major transit corridors and other routes that may attract bicyclists, such as routes serving schools and colleges.
- Incorporate new overpasses and underpasses with bike lanes and pedestrian sidewalks to improve air quality by reducing GHG emissions from vehicle idling while waiting for pedestrians and bicycles crossing.
- Increase opportunities for walking and bicycling by requiring direct pedestrian and bike paths even when roadways do not connect through new and existing developments.
- Implement zoning for mixed-use development to encourage walking or biking for short trips rather than using vehicles.
- Require sidewalks in all new developments and incorporate new trees and tree wells in sidewalk areas.

Transit Opportunities

- Update the general plan to address multi-modal transit, mass transit, infill development, density and mixed-use and reducing greenhouse gas emissions.
- Provide incentives and remove potential barriers to the development of mixed-use and higher intensity development projects at transit nodes and along transit corridors (existing and planned).
- Require new development at transit nodes and along transit corridors to meet planning and design standards to generate, attract and facilitate transit ridership as a condition of approval; for instance, make the project more attractive to the target population (such as young, single urban individuals).

Continued on next page

Parking Opportunities

- Reduce parking requirements, to the extent feasible, to facilitate higher density development that fosters access to walking, biking and public transit.
- Integrate park-and-ride lots and car sharing service spaces with mixed-use facilities and transportation hubs/centers.
- Promote revitalization of transit corridors by improving light rail, bus rapid transit (BRT) or other high-service transit facilities and services, and promoting an appropriate mix of housing, retail, and office space.
- Require new commercial developments to include electric vehicle charging and natural gas fueling stations in parking lots or garages.

Streets and Roads Opportunities

- Plan and encourage roadways of smaller residential-scaled streets (generally 2 or 4 lanes maximum) with high levels of connectivity and short blocks.
- Implement design standards that require streets and sidewalks to be designed for multi-modal mobility and access, including walking and bicycling, to ensure that new development is designed, sited and oriented to facilitate pedestrian, bicycle and other mobility and access (also referred to as complete streets).
- Create residential neighborhood traffic management (traffic calming) plans to improve livability by reducing speeding and traffic volumes and increase safety for walking and bicycling.
- Cluster freight facilities near ports, airports, and rail terminals to reduce their impact on streets and roadways.

Evaluate Greenhouse Gas Emissions and Plan for Mitigating and Adapting to Climate Change

- Adopt a climate action plan or include a greenhouse gas reduction, climate adaptation or climate mitigation plan or policies in the general plan, or include within the general plan a requirement for development and adoption of such plans.
- Ensure that the adopted climate action plan complies with the California Environmental Quality Act (CEQA) Guidelines to help streamline the CEQA review for future development projects that are consistent with the climate action plan.
- Include within a climate action plan or general plan a procedure to monitor and track greenhouse gas emissions associated with development projects and municipal operations.
- Review zoning codes and development policies to identify changes that could improve implementation of land use and transportation policies that reduce greenhouse gas emissions.
- Develop and adopt a preferred land use and transportation scenario for future development to reduce vehicle miles traveled (VMT) in alignment with the region's sustainability strategy, including through computer modeling tools.
- Work with other jurisdictions within the region to identify and address existing and potential regional sources of greenhouse gas emissions under different development scenarios.

Continued on next page

- Amend local CEQA guidelines to explain how to treat analysis of greenhouse gas emissions, such as including thresholds of significance.
- Adopt policies in the general plan, climate action plan or other appropriate policy document to address the potential land use and community design effects of climate change (such as sea level rise, heat events, wildfires) especially for providing essential public services (such as police, fire, etc.).

Improve Communication, Collaboration and Inclusion

- Coordinate planning and project approval procedures to increase collaboration between planning and other agency staff (such as public works, utilities, public safety, etc.), as appropriate.
- Involve a diverse group of stakeholders in planning processes to ensure the agency's guiding plans are representative of community's diverse population and interests.
- Use non-conventional methods to gather input from diverse community groups, particularly those that do not ordinarily participate in community planning efforts (for example conduct outreach and education through community groups and non-profits prior to public hearings).
- Collaborate with local, regional and state agencies to share land use and community design-related information, coordinate planning goals and processes, and take advantage of opportunities to combine and leverage scarce resources.
- Analyze impacts of development projects on safety and involve emergency responders and public safety staff early and consistently in development of growth plans.
- Develop and implement an approach to planning that identifies and balances economic, environmental and social equity needs.
- Participate in regional planning efforts, such as processes to develop and implement the regional Sustainable Communities Strategy pursuant to SB 375 and, where appropriate, align local general plans and zoning for consistency with the regional transportation plan.

Open Space and Offsetting Carbon Emissions

Options to Consider

Agency

Forests, parks, agricultural lands and open space serve as "carbon sinks" by storing greenhouse gas emissions that otherwise contribute to climate change. Co-benefits of preserving open space and protecting local agriculture may include: making recreational activities available to community residents and, in some cases, reducing vehicle miles traveled.

Note: Greenhouse gas emissions (also called carbon emissions) generally include carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons and sulfur hexafluoride. Greenhouse gas emissions are expressed as "carbon dioxide equivalents" which are numbers that translate emissions from different types of greenhouse gases, based upon their climate warming potential, into the equivalent amount of emissions from carbon dioxide.

Plans and Policies

- Include specific goals and policies designed to reduce carbon emissions in the open space element of the agency's general plan.
- Adopt a tree ordinance to protect urban forests, including protection for specific individual trees or tree species important to the community.
- Adopt a ridgeline and hills ordinance to restrict grading and home building on hillsides as a way to enhance public safety and preserve open space.
- Adopt a climate action plan that includes strategies to reduce carbon emissions through open space.
- Adopt a policy to thin agency trees and remove brush on agency land, as feasible and appropriate, to reduce the threat of fire and release of carbon emissions from forest and range fires.
- Adopt a policy to support waste-to-energy projects that use forest waste, food waste or other vegetative sources of methane and other greenhouse gases that would otherwise release greenhouse gases into the atmosphere.
- Apply for designation as a Tree City USA community by the Arbor Day Foundation.

Parks

- Increase the number, type and accessibility of parks and other recreational opportunities in the community, including promoting associated public health benefits.
- Increase opportunities for recreational open space.
- Build environmentally sustainable parks by incorporating reused and recycled materials, water-efficient landscaping and water-efficient technology systems.
- Evaluate opportunities to convert closed solid waste landfills to parks or open space.

Habitat & Open Space

- Protect natural lands through:
  - Partnerships with other agencies, stakeholders and non-profit organizations
  - Land acquisition
  - Conservation easements
  - Other long-term mechanisms
- Evaluate habitat monitoring, management and restoration protocols to consider possible future impacts of changing climatic conditions.
- Work with property owners, state and federal wildlife agencies to create a new or expanded multi-species habitat conservation plan.

Continued on next page

- Develop and implement a community-wide urban forestry management and reforestation program to increase the carbon storage potential of trees and other vegetation in the community.
- Manage parks, open space, recreational facilities and other natural areas owned or operated by the agency to ensure the long-term health and viability of trees and other vegetation.
- Remove invasive non-native plants in order to reduce risk of forest and grassland fires (and the associated greenhouse gas release) and promote sustainable native forests and grasslands.
- Inventory existing trees on property owned or managed by the agency, including street trees, and implement a management system to preserve and enhance the tree system.
- Plant native trees and drought tolerant vegetation throughout the community.

Agriculture and Food Purchases

- Enact a policy to purchase locally grown food for agency food purchases, when feasible, to promote retention of local agricultural land uses.
- Where feasible, direct new development away from open space and agricultural lands in order to take advantage of carbon storage opportunities.

Offsetting Carbon (Greenhouse Gas) Emissions

- Achieve carbon neutrality at agency-sponsored events and activities through conservation, efficiency, recycling, alternative transportation and other strategies that reduce greenhouse gas emissions.
- Purchase and retire (put out of use) third-party verified greenhouse gas emission reduction credits.
- Create incentives for community organizations, businesses and residents to reduce their carbon emissions, including the purchase of third-party verified greenhouse gas emission reductions.

Community

Tree Planting

- Provide tree planting resources and information on the agency website to encourage tree planting by residents.
- Participate in regional tree planting efforts to mobilize and encourage the community to plant trees.
- Create an agency-sponsored tree planting program that offers free shade and other trees to residents, businesses, schools and non-profits, as well as education about the care and benefits from trees. Collaborate with the local utility if it has a tree planting program to help get the word out.

Continued on next page

Agriculture and Food Purchases

- Assist efforts by community groups and non-profit organizations to create community gardens.
- Encourage community gardens and farmers markets to support the availability of healthy, locally grown produce.
- Provide financial incentives for low-income residents to purchase fresh produce at farmers markets in the community.
- Promote the purchase of locally-grown produce through farmers markets and other measures.
- Promote conservation tillage and other agricultural practices to retain carbon fixed in soils.
- Host workshops to showcase community supported agriculture, farm-to-school programs and local organic farms.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Community & Individual Action

Providing reliable and objective information helps inform residents about the causes, impacts and possible responses to climate change. Involving the community in the development of proposed sustainability policies and programs builds buy-in and awareness. Providing practical information that helps individuals reduce their greenhouse gas emissions empowers them to take action and make a difference.

Community and Individual Action

Options to Consider

Inform

- Develop and implement a community climate change education program that provides community members with basic information about climate change.
- Host informational workshops to educate residents and businesses about sustainability opportunities, such as those from energy efficiency and water conservation.
- Develop information and positive messages about activities individuals and businesses can take to reduce greenhouse gas emissions.
- Inform the public about the environmental, community and financial benefits of actions that reduce greenhouse gas emissions.
- Create a sustainability handbook, available online and in hard copy, that outlines the steps residents and businesses can take to go green, such as by reducing energy and water use, recycling and using alternative transportation.
- Issue a sustainability edition of the agency newsletter.
- Include information in local agency mailings, websites and other media about actions that individuals and businesses can take to address climate change.
- Share progress with community members on the implementation of agency and/or community climate action plans and sustainability policies.
- Use the agency's social media channels, such as Facebook, Twitter, Nixle and Notify Me, to inform the community about sustainable activities in the community.
- Work with ethnic media to engage non-English speaking groups in the development of sustainability programs and policies.
- Develop public service announcements and/or talk shows related to sustainability.
- Distribute give-away items, such as reusable bags and compact fluorescent lightbulbs, to encourage environmental responsibility.
- Distribute maps showing the community bicycle and walking trail systems to encourage reduction of vehicle miles traveled.

Consult

- Survey businesses and residents to understand attitudes and behaviors related to sustainability, energy efficiency and climate change; use this information to develop and implement community wide sustainability action items.
- Create ongoing opportunities for community members to provide feedback on proposed sustainability policies and programs, such as through surveys, online or public forums and at stakeholder meetings.

Continued on next page

Involve

- Create a community sustainability commission to help with the development, implementation and tracking of a climate action or sustainability plan.
- Host a green leadership summit for community leaders, school groups and private entities to gather and share experiences, expertise, strategies and ideas for the development of a healthier and more sustainable community.
- Involve diverse stakeholders, including such groups as ethnic chambers of commerce and neighborhood groups, in developing sustainability policies and programs.
- Include sustainability and climate change-related projects as part of youth commission activities.
- Provide programs and/or incentives to individuals, groups and businesses that adopt practices that reduce their carbon footprint. Incentives can be financial or non-financial, such as official recognition of participants' efforts.
- Challenge community members to go on a "carbon diet" to promote individual action to reduce greenhouse gas emissions.

Collaborate

- Invite community members, organizations and other local agencies to participate in ongoing conversations regarding future growth plans and policies.
- Collaborate with local utilities to create and publicize energy efficiency opportunities for residents and businesses, such as through an energy showcase home or model sustainable landscape projects that reduce water and energy.
- Collaborate with schools to educate students about opportunities to be more energy efficient and to reduce, re-use and recycle.
- Develop a sustainability or community climate change outreach and education program that enlists participation from schools, museums, service groups and business organizations, such as local chambers of commerce, neighborhood and homeowner associations and other community partners.
- Partner with the local community college and grade schools to develop classes or workshops with an environmental focus.
- Collaborate with high schools and community colleges to provide students with internship opportunities related to sustainability.
- Collaborate with other local government agencies to share information about climate change and best practices to reduce greenhouse gases.
- Partner with other organizations to implement a bulk purchase discount program for such items as energy efficiency equipment and photovoltaic solar systems.
- Create an inter-agency local or regional climate action partnership and/or action plan with one or more agencies or neighboring jurisdictions.
- Initiate a community climate action partnership with a global sister agency.

Continued on next page

Empower

- Participate in the CoolCalifornia Challenge which challenges local agencies to engage residents in taking action to reduce household energy and vehicle miles traveled.
- Sponsor a program to assist local business in adopting sustainable practices.
- Host one or more events to highlight and promote sustainability programs, such as an e-waste drop off, plant a tree, bike to work day or buy local campaigns.

INSTITUTE FOR LOCAL GOVERNMENT

www.ca-ilg.org

Exhibit L
Spreading Sunshine all over the Place

JUNE 2013

OUTLOOK

Newsletter and Activity Guide

lancaster ca
it's positively clear

SUMMER CLASS SCHEDULE INSIDE!

Spreading Sunshine All Over the Place

City moves forward with new solar initiative

The City of Lancaster has become the first city in America to require all new residential construction projects to include solar power beginning in 2014.

Part of Lancaster's ongoing commitment to produce more clean energy than it consumes, the new rules were adopted on a 5-0 vote by the City Council, after previously being recommended unanimously by the City's Planning Commission.

The new regulations do not require solar panels to be installed on every home within a new subdivision, but do call for a minimum average solar generating capability of .5 to 1.5 kW per unit depending on lot size and location. New multi-family developments are also covered by the ordinance.

"We've taken a forward looking approach to this new ordinance. It is much more about the future than the past," said James Vose, Planning Commission Chairman. "This plan will help reduce our residents' energy costs while lessening the impact of fossil fuel on our environment."

In developing the new "Residential Zone Update," the Planning Commission and City staff tried to balance the needs of builders with the desires of the City to reduce its environmental impact and improve overall quality of life.

"City planning staff and commissioners did a great job in collaborating with the residential building industry, as well as real estate and building trade associations to obtain the necessary input and feedback on the ordinance," added Vose. "We spent a year discussing this in public meetings, workshops and field trips before recommending these regulations to the City Council."

In addition to the solar requirements, the new ordinance provides builders with greater flexibility in their site designs, to help improve the walkability of neighborhoods. The new regulations also call for increased use of porches and recessed garages in new developments, thus encouraging more front yard activity. It has been shown that such architectural features help create a more cohesive neighborhood while discouraging crime by putting more "eyes on the street."

The new zoning rules also provide incentives for infilling existing vacant parcels within the City rather than consuming raw land along the edges of the City. The rules also make it easier to accommodate "granny flats" and similar accessory dwellings in new developments, for use by family members. They also ease regulations on live/work situations in homes along major thoroughfares.

For more information on the new Residential Zone Update, visit the City's website at www.cityoflancasterca.org/residentialzoneupdate.

"We've taken a forward looking approach to this new ordinance. It is much more about the future than the past. This plan will help reduce our residents' energy costs while lessening the impact of fossil fuel on our environment."

– James Vose
Planning Commission Chairman

Exhibit M
Riverside County LMS
Conditions of Approval

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

EVERY DEPARTMENT

10. EVERY. 1 SP - Hold Harmless RECOMMND

The applicant/permittee or any successor-in-interest shall defend, indemnify, and hold harmless the County of Riverside or its agents, officers, and employees (COUNTY) from the following:

(a) any claim, action, or proceeding against the COUNTY to attack, set aside, void, or annul an approval of the COUNTY, its advisory agencies, appeal boards, or legislative body concerning the SPECIFIC PLAN and,

(b) any claim, action or proceeding against the COUNTY to attack, set aside, void or annul any other decision made by the COUNTY concerning the SPECIFIC PLAN including, but not limited to, decisions made in response to California Public Records Act requests.

The COUNTY shall promptly notify the applicant/permittee of any such claim, action, or proceeding and shall cooperate fully in the defense. If the COUNTY fails to promptly notify the applicant/permittee of any such claim, action, or proceeding or fails to cooperate fully in the defense, the applicant/permittee shall not, thereafter, be responsible to defend, indemnify or hold harmless the COUNTY.

The obligations imposed by this condition include, but are not limited to, the following: the applicant/permittee shall pay all legal services expenses the COUNTY incurs in connection with any such claim, action or proceeding, whether it incurs such expenses directly, whether it is ordered by a court to pay such expenses, or whether it incurs such expenses by providing legal services through its Office of County Counsel.

10. EVERY. 2 SP - Definitions RECOMMND

The words identified in the following list that appear in all capitals in the attached conditions of Specific Plan No.375 shall be henceforth defined as follows:

SPECIFIC PLAN = Specific Plan No. 375

CHANGE OF ZONE = Change of Zone No. 7623.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10. EVERY. 2 SP - Definitions (cont.) RECOMMND

GPA = Comprehensive General Plan Amendment No. 910.

EIR = Environmental Impact Report No. 514.

DISTRICT or DISTRICTS = A SPECIFIC PLAN'S Planning Cluster of Planning Areas as specified in the SPECIFIC PLAN, a large planning area. The intent of the DISTRICT is to break down a very large Specific Plan into manageable sections or pieces. Each DISTRICT should be about the size of a traditional Specific Plan.

DISTRICT REFINEMENT PLAN or DRP = a substantial conformance to the SPECIFIC PLAN intended to become a Design Guideline Document, submitted separately for each DISTRICT within the SPECIFIC PLAN. The DISTRICT REFINEMENT PLAN may address features that are specific to an individual DISTRICT and may not affect the entire SPECIFIC PLAN.

TOTAL DWELLING UNIT TRACKING MATRIX = A chart for purposes of tracking the total build out of the SPECIFIC PLAN maintained by TLMA Counter Services Divison. The matrix shall differentiate between individual building permits and the total number of dwelling units that are represented by the building permits that have been issued for the entire Specific Plan.

BUILDING PERMITS = the number of dwelling units constructed within an implementing project. Any condition of approval that uses the term "building permit" to trigger an event or to cause another action to take place shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

CLIMATE ACTION PLAN or CAP = a section of the SPECIFIC PLAN that outlines standards, suggestions, and guidance intended to reduce Greenhouse Gases.

10. EVERY. 3 SP - SP Document RECOMMND

Specific Plan No. 375 shall include the following:

a. Specific Plan Document, which shall include:

1. Board of Supervisors Specific Plan Resolution including the Mitigation Reporting/Monitoring Program

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10. EVERY. 3 SP - SP Document (cont.) RECOMMND

2. Conditions of Approval.
3. Specific Plan Zoning Ordinance.
4. Land Use Plan in both 8 1/2" x 11" black-and-white and 11" x 17" color formats.
5. Specific Plan text.
6. Descriptions of each DISTRICT in both graphical and narrative formats.

b. Final Environmental Impact Report No. 514 Document, which must include, but not be limited to, the following items:

1. Mitigation Monitoring/Reporting Program.
2. Draft EIR
3. Comments received on the Draft EIR either verbatim or in summary.
4. A list of person, organizations and public agencies commenting on the Draft EIR.
5. Responses of the County to significant environmental points raised in the review and consultation process.
6. Technical Appendices on CD.

If any specific plan conditions of approval differ from the specific plan text or exhibits, the specific plan conditions of approval shall take precedence.

10. EVERY. 4 SP - Ordinance Requirements RECOMMND

The development of the property shall be in accordance with the mandatory requirements of all Riverside County ordinances including Ordinance Nos. 348 and 460 and state laws; and shall conform substantially with the adopted SPECIFIC PLAN as filed in the office of the Riverside County Planning Department, unless otherwise amended.

10. EVERY. 5 SP - Limits of SP DOCUMENT RECOMMND

No portion of the SPECIFIC PLAN which purports or proposes to change, waive or modify any ordinance or other legal requirement for the development shall be considered to be part of the adopted specific plan. Notwithstanding to above, the design guidelines and development standards of the SPECIFIC PLAN shall apply in place of more general County guidelines and standards.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

BS GRADE DEPARTMENT

10.BS GRADE. 1 SP-GSP-1 ORD. NOT SUPERSEDED RECOMMND

Anything to the contrary, proposed by this Specific Plan, shall not supersede the following: All grading shall conform to the California Building code, County General Plan, Ordinance 457 and all other relevant laws, rules and regulations governing grading in Riverside County.

10.BS GRADE. 2 SP-GSP-2 GEO/SOIL TO BE OBEYED RECOMMND

All grading shall be performed in accordance with the recommendations of the included -County approved- geotechnical/soils reports for this Specific Plan.

10.BS GRADE. 3 SP-ALL CLEARNC'S REQ'D B-4 PMT RECOMMND

Prior to issuance of a grading permit, all certifications affecting grading shall have written clearances. This includes, but is not limited to, additional environmental assessments, erosion control plans, geotechnical/soils reports, and departmental clearances.

10.BS GRADE. 4 SP-NO GRADING & SUBDIVIDING RECOMMND

If grading of the entire - or any portion there of - Specific Plan site is proposed, UNDER A SUBDIVISION OR LAND USE CASE ALREADY APPROVED FOR THIS SPECIFIC PLAN, at the same time that application for further subdivision of any of its parcels is being applied for, an exception to Ordinance 460, Section 4.5.B, shall be obtained from the Planning Director, prior to issuance of the grading permit (Ord. 460 Section 3.1). THIS EXCEPTION WILL NOT APPLY TO ANY CASE HAVING ONLY AN APPROVED SPECIFIC PLAN.

FIRE DEPARTMENT

10.FIRE. 1 SP-#47 SECONDARY ACCESS RECOMMND

In the interest of Public Safety, the project shall provide an Alternate or Secondary Access(s) as stated in the Transportation Department Conditions. Said Alternate or Secondary Access(s) shall have concurrence and approval of both the Transportation and Fire Departments and shall be maintained through out any phasing.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.FIRE. 2 SP-#86-WATER MAINS RECOMMND

All water mains and fire hydrants providing required fire flows shall be constructed in accordance with the appropriate sections of Riverside County Ordinance 460 and/or No.787, subject to the approval by the Riverside County Fire Department.

10.FIRE. 3 SP-#101-DISCL/FLAG LOT RECOMMND

1) FLAG LOTS WILL NOT BE PERMITTED BY THE FIRE DEPARTMENT.

) This project lies within the VERY HIGH FIRE HAZARD SEVERITY ZONE.

3) A fire fuel analysis of the open space/wildlands within and outside the project area may be required prior to submitting a fuel modification plan.

NOTICE:
The transferor of real property shall disclose to the transferee that this project lies within a VERY HIGH FIRE HAZARD area.

10.FIRE. 4 SP-#71-ADVERSE IMPACTS RECOMMND

The proposed project will have a cumulative adverse impact on the Fire Department's ability to provide an acceptable level of service. These impacts include an increased number of emergency and public service calls due to the increased presence of structures and population. The project proponents/develpers shall participate in the development Impact fee program as adopted by the Riverside County Board of Supervisors to mitigate a portion of these impacts. This will provide funding for capitol improvements such as land/equipment purchases and fire station construction. The Fire Department reserves the right to negotiate developer agreements associated with the development of land and/or construction of fire facilities to meet service demands through the regional integrated fire protection response system.

10.FIRE. 5 SP-#100-FIRE STATION RECOMMND

Based on the adopted Riverside County Fire Protection Master Plan, one new fire station and/or engine company could be required for every 2,000 new dwelling units,and/ or 3.5 million square feet of commercial/industrial

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.FIRE. 5 SP-#100-FIRE STATION (cont.) RECOMMND

occupancy. Given the project's proposed development plan, up to 6 fire station(s) MAY be needed to meet anticipated service demands. The Fire Department reserves the right to negotiate developer agreements associated with the development of land and/or construction of fire facilities to meet service demands through the rgional intergrated fire protection response system.

PLANNING DEPARTMENT

10.PLANNING. 17 SP - PDP01341 RECOMMND

County Paleontological Report (PDP) No. 1341, submitted for this case (SP00375), was prepared by Paleo Environmental Associates, Inc. and is entitled: "Paleontological Resources Inventory and Impact Assessment Technical Report prepared in support of Travertine Point Specific Plan, Vicinity of Salton Sea, Riverside County, California", dated December 2008.

PDP01341 concluded:

1.The project plan area is underlain by paleontologically highly sensitive strata.

2.Earthmoving activities associated with development of the plan area would have a high potential for encountering fossil remains.

3.Paleontological resources might be adversely affected by the earth-moving activities associated with the development of the Travertine Point Specific Plan.

4.Paleontological resources impact mitigation is warranted.

PDP01341 recommended:

1.Paleontological construction monitoring and fossil/sample recovery.

2.Paleontological Resource Impact Mitigation Program design criteria are discussed in this report.

3.The level and type of mitigation effort in a particular part of the plan area reflects the paleontologic or

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 17 SP - PDP01341 (cont.) RECOMMND

scientific importance and the corresponding impact sensitivity.

PDP01341 satisfies the requirement for a Paleontological Study for Planning/CEQA purposes. PDP01341 is hereby accepted for SP00375. A project specific Paleontological Resource Impact Mitigation Program (PRIMP) shall be prepared and submitted to the County Geologist for review and approval prior to issuance of any grading permit for each implementing project under this Specific Plan.

10.PLANNING. 18 SP - GEO02091 RECOMMND

County Geologic Report (GEO) No. 2091, submitted for this project (SP00375) was prepared by Sladden Engineering and is entitled: "Geotechnical Investigation, Proposed Master Planned Community, Rivera-Travertine Properties, South of 81st Avenue Along Highway 86, Oasis Area of Riverside County, California, Project No. 544-06699", dated November 30, 2006. In addition, Sladden prepared the following documents:

"Response to County of Riverside Review comments dated October 30, 2008: County Geologic Report No. 2091", dated May 24, 2009.

"Response to County of Riverside Review comments dated November 12, 2009: County Geologic Report No. 2091; Review Comments #2", dated December 16, 2009

These documents are herein incorporated as a part of GEO02091.

GEO02091 concluded:

1.The subject site is located in an area of seismic activity and will likely experience intense seismic shaking during the design life of the proposed project.

2.No known faults have been mapped trending through the site.

3.Risks associated with surface fault rupture should be considered low.

4.The low calculated factors of safety for some of the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 18 SP - GEO02091 (cont.) RECOMMND

granular layers and non-plastic silt deposits suggest that the layers may exhibit liquefaction behavior for the design level earthquake ground shaking considered.

5.The maximum total liquefaction-induced ground settlement at the site could be up to 3 inches during the postulated earthquake. The differential settlement resulting from liquefaction should be less than 1.5 inches.

6.The subject parcels are located on relatively level ground and are not situated immediately adjacent to any mountains or hillsides. As such, the subject parcels are not susceptible to any forms of slope instability.

7.Seiches should be considered a potential hazard to the site.

8.Risks associated with flooding and erosion may need to be considered.

GEO02091 recommended:

1.Remedial grading for building areas to result in the construction of a uniform compacted soil mat beneath all structures.

2.Post-tensioned slabs are recommended to mitigate surficial ground movement related to liquefaction.

3.Mitigation of seiche potential through the use of earthen levees, dykes, or similar water retaining structures.

GEO02091 satisfies the requirement for a Geologic Study for Planning / CEQA purposes. GEO No. 2091 is hereby accepted for Planning purposes for this Specific Plan. This approval is not intended, and should not be misconstrued as approval for any future entitlement project or grading permit. Engineering and other building code parameters will be reviewed and additional comments and/or conditions may be imposed by the Building and Safety Department upon application for grading and/or building permits.

A geologic investigation report will be required for all implementing projects (Tract Map, Plot Plan, etc.) as described elsewhere in this conditions set.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 19 SP - MANTN AREAS,PHASES&DIST RECOMMND

All planning area's, phase numbers, and DISTRICT numbers shall be maintained throughout the life of the SPECIFIC PLAN, unless changed through the approval of a specific plan amendment or specific plan substantial conformance accompanied by a revision to the complete SPECIFIC PLAN document.

10.PLANNING. 20 SP - NO P.A. DENSITY TRANSPER RECOMMND

Density transfers between Planning Areas within the SPECIFIC PLAN shall not be permitted, except through the Specific Plan Amendment process.

In this SPECIFIC PLAN, each Planning Area (PA) has a "Target" unit count. Each PA also has a Land Use Designation Range. The Target unit count is an estimate used to create a total dwelling unit number for the entire SPECIFIC PLAN. However, the target for each PA does not limit the number of dwelling units in a PA. A PA is permitted to build over or under the Target density so long as the PA total unit count does not exceed the top or bottom of its Land Use Designation range. In no case shall the SPECIFIC PLAN maximum total permitted residential dwelling units (16,655) be exceeded.

10.PLANNING. 22 SP - LC LANDSCAPING PLANS RECOMMND

All landscaping plans shall be prepared in accordance with Ordinance No. 859 (as adopted and any amendments thereto), the Riverside County Guide to California Landscaping, and Ordinance No. 348, Section 18.12. In the event conflict arises between Ordinance No. 859 and the SPECIFIC PLAN, then the requirements of Ordinance No. 859 shall prevail.

10.PLANNING. 23 SP - MITIG MEASURE 6.2-2 RECOMMND

Mitigation Measure 6.2-2 from EIR514 requires:

Prior to building final inspection, applicant shall provide for the purchasers of residential, commercial, and industrial units in planning areas that would be located adjacent to active agricultural land (either active agricultural land within the project site or adjacent to the project site's boundaries) to be notified pursuant to either the Right To Farm notice for Riverside County (Ordinance No.460) and/or Imperial County (Right-to-Farm

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 23 SP - MITIG MEASURE 6.2-2 (cont.) RECOMMND

Ordinance) as appropriate.

10.PLANNING. 24 SP - MITIG MEASURE 6.3-17 RECOMMND

Mitigation Measure 6.3-17 from EIR514 requires:

Prior to issuance of the wastewater treatment facility building final permits for each tract map, the wastewater treatment facility shall enclose odor-generating processes and utilize other odor-abatement technologies as required under state and local regulations.

10.PLANNING. 25 SP - MITIG MEASURE 6.3-18 RECOMMND

Mitigation Measure 6.3-18 from EIR514 requires:

Prior to issuance of the wastewater treatment facility building final permits for each tract map, the wastewater treatment facility shall develop a protocol for handling odor complaints.

10.PLANNING. 26 SP - MITIG MEASURE 6.5-7 RECOMMND

Mitigation Measure 6.5-7from EIR514 requires:

If human remains are encountered during a public or private construction (earthmoving) activity, State Health and Safety Code 7050.5 states that no further disturbance shall occur until the Riverside or Imperial County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The Riverside County Coroner must be notified within 24 hours.

If the coroner determines that the burial is not historic, but prehistoric, the Native American Heritage Commission (NAHC) must be contacted to determine the most likely descendent (MLD) for this area. The MLD may become involved with the disposition of the burial following scientific analysis.

Upon clearance by the coroner and the NAHC for Native American remains, construction (earthmoving) activities may resume.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 27 SP - MITIG MEASURE 6.5-5 RECOMMND

Mitigation Measure 6.5-5from EIR514 requires:

If avoidance and/or preservation in place of cultural resources is not possible, the following mitigation measures shall be initiated for each impacted site:

(1) A participant-observer from the appropriate Indian Band or Tribe shall be used during archaeological testing or excavation in the project site.

(2) Prior to grading final, the project applicant shall develop a test level research design detailing how the cultural resource investigation shall be executed and providing specific research questions that shall be addressed through the excavation program. In particular, the testing program shall characterize the site constituents, horizontal and vertical extent, and, if possible, period of use. The testing program shall also address the California Register and National Register eligibility of the cultural resource and make recommendations as to the suitability of the resource for listing on either register. The research design shall be submitted to the County of Riverside Regional Park and Open-Space District or the County or Imperial Planning Department, as appropriate, for review and comment. For sites determined through the testing program to be ineligible for listing on either the California or National Register, execution of the testing program will suffice as mitigation of project impacts to this resource.

(3) Prior to the issuance of a grading permit issuance for each implementing project, and after approval of the research design, the project applicant shall complete the excavation program as specified in the research design. The results of this excavation program shall be presented in a technical report that follows the County of Riverside outline for Archaeological Testing. The Test Level Report shall be submitted to the County of Riverside Regional Park and Open-Space District or the County of Imperial Planning Department, for review and comment. If cultural resources that would be affected by the project are found ineligible for listing on the California or National Register, test level investigations will have depleted the scientific value of the sites and the project can proceed.

(4) If the resource is identified as being potentially

10. GENERAL CONDITIONS

10.PLANNING. 27 SP - MITIG MEASURE 6.5-5 (cont.) RECOMMND

eligible for either the California or National Register, and project designs cannot be altered to avoid impacting the site, a Treatment Program to mitigate project effects shall be initiated. A Treatment Plan detailing the objectives of the Treatment Program shall be developed. The Treatment Plan shall contain specific, testable hypotheses relative to the sites under study and shall attempt to address the potential of the sites to address these research questions. The Treatment Plan shall be submitted to the County of Riverside Regional Park and Open-Space District or Imperial Planning Department, as appropriate, for review and comment.

(5) After approval of the Treatment Plan, the Treatment Program for affected, eligible sites shall be initiated. A Treatment Program typically involves excavation of a statistically representative sample of the site to preserve those resource values that qualify the site as being eligible for the California or National Register. At the conclusion of the excavation or research program, a Treatment Report, following the outline of the County of Riverside for Archaeological Mitigation or Data Recovery, shall be developed. This data recovery report shall be submitted to the County of Riverside Regional Park and Open-Space District or Imperial Planning Department, as appropriate, for review and comment.

10.PLANNING. 28 SP - MITIG MEASURE 6.5-4 RECOMMND

Mitigation Measure 6.5-4from EIR514 requires:

Consultation and in conjunction with the Torres-Martinez Desert Cahuilla Indians is recommended to ascertain if Phase II Testing and Evaluation is warranted for CA-IMP-33 to assess the site's content, depth, and integrity for cultural deposits, as well as data removal. It is also recommended that the modern graffiti be carefully removed from Travertine Rock in its entirety, with special care not to damage the prehistoric rock art. It is also recommended that aesthetically pleasing and protective fencing be placed around Travertine Rock. And finally, Travertine Rock should be formally nominated as a Traditional Cultural Property (TCP).

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 RECOMMND

Mitigation Measure 6.5-2 from EIR514 requires:

The following standard policies and policy implementation measures shall be implemented prior to implementing project approval:

Cultural Resources Policy 1

Prior to grading final for each implementing project, a comprehensive survey program for unsurveyed areas within the project area shall be completed to identify, document, and protect, if feasible, prehistoric and historical archaeological sites, and sites containing Native American human remains.

Implementation Measure 1.1 The proposed project would be covered under the State CEQA Guidelines (California 2005) or Section 106 of the NHPA, and shall be surveyed by a professional who meets the Secretary of the Interior's Standards and Guidelines regarding archaeological activities and methods prior to the County's approval of proposed project plans and prior to grading final (48 CFR 44716-44742).

Implementation Measure 1.2 All archaeological site location data collected during the cultural resources surveys must be considered to be of a sensitive nature and must remain confidential. Caution must be exercised when disseminating this information; in particular, maps and site location data should be made available only to managers, County officials, and other professionals who have a legitimate need to know.

Implementation Measure 1.3 For potentially significant prehistoric archaeological resources or sites containing Native American human remains identified during the project's archaeological surveys, the project proponent, Federated Insurance Company or their designee, shall continue consultation with the NAHC in Sacramento and interested Native American individuals and organizations.

Cultural Resources Policy 2

Avoid impacts to potentially significant prehistoric and historical archaeological resources and sites containing Native American human remains, where feasible.

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 (cont.) RECOMMND

Implementation Measure 2.1 If cultural resources avoidance is feasible, potentially significant archaeological resources and sites containing Native American human remains shall be placed within permanent project-specific conservation easements or dedicated open space areas prior to grading final.

Implementation Measure 2.2 Where avoidance of archaeological resources and sites containing Native American human remains is not a feasible management option, capping these resources with sterile sediments and avoidance planting (e.g., planting of cactus, mesquite, or other native plants) shall be considered the next most favorable management option. In doing so, capping the resource(s) will ensure that indirect impacts from increased public availability to these sites are avoided. Plans for capping identified cultural resources shall be submitted to and approved by the County prior to map recordation.

Cultural Resources Policy 3

Reduce adverse impacts to significant archaeological resources that cannot be protected in place through data recovery excavations.

Implementation Measure 3.1 If avoidance and/or preservation in place of known prehistoric and historical archaeological resources is not a feasible management option, the project proponent shall ensure that potentially significant archaeological resource(s) and site(s) shall be investigated pursuant to the standards, guidelines, and principles of the Advisory Council's Treatment of Archaeological Properties: A Handbook (ACHP 1980).

Prior to grading final for each implementing project, the project applicant shall retain a qualified archaeologist who meets the Secretary of Interior's Standards and Guidelines, and shall use the project's Research Design detailed in the Phase I Cultural Resources Survey Report for the Travertine Point Specific Plan (Applied EarthWorks 2008) to guide the implementation of a Phase II Testing and Evaluation Program. In general terms, the Phase II Testing and Evaluation Program shall be designed to further define site boundaries and to assess the structure, content,

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 (cont.) (cont.) RECOMMND

nature, and depth of subsurface cultural deposits and features. Emphasis shall also be placed on assessing site integrity and the site's potential to address regional archaeological research questions. These data shall then be used to address the NRHP/CRHR eligibility requirements for the archaeological resource and make recommendations as to the suitability of the resource for listing on either the NRHP/CRHR.

Prior to grading final for each implementing project and after approval of the project's various cultural resources survey reports by the County, the project applicant shall retain a qualified archaeologist to complete the Phase II Testing and Evaluation Program as specified in the project's Phase II Testing and Evaluation Proposal and Research Design and prior to the issuance of a project grading permit. The results of this Phase II Testing Program shall be presented in a technical report that follows the State of California Office of Historic Preservation Archaeological Resource Management Report Recommended Contents and Format Guidelines (California 1990). The Phase II Report shall be submitted to the County's Planning Department for review and comment and the Torres-Martinez Desert Cahuilla Indians prior to the issuance of a project grading permit. If the resource is determined to be ineligible for listing on the NRHP or CRHR upon completion of the Phase II Testing Program, no further cultural resources management of this resource would be required.

Implementation Measure 3.2 A participant-observer(s) from the Torres-Martinez Desert Cahuilla Indians shall be present during Phase II archaeological excavations involving all sites of Native American concern.

Implementation Measure 3.2 A participant-observer(s) from the Torres-Martinez Desert Cahuilla Indians shall be present during Phase II archaeological excavations involving all sites of Native American concern. Implementation Measure 3.3?If the cultural resource is identified as being potentially eligible for listing on either the NRHP or CRHR, and project designs cannot be altered to avoid impacting the site, a Phase III Data Recovery Program to mitigate project effects shall be initiated. A Data Recovery Treatment Plan detailing the objectives of the Phase III Program shall be developed and

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 (cont.) (cont.) (conRECOMMND

shall contain specific testable hypotheses pertinent to the project's Research Design and relative to the site(s) under study. The Phase III Data Recovery Treatment Plan shall be submitted to the County's Planning Department, the Torres-Martinez Desert Cahuilla Indians, if applicable, and the SHPO for review and comment prior to implementation of the Data Recovery Program.

After approval of the Treatment Plan, the Phase III Data Recovery Program for affected, eligible site(s) shall be completed. Typically, a Phase III Data Recovery Program involves the excavation of a statistically representative sample of the site(s) to preserve those resource values that qualify the site(s) as being eligible for listing on the NRHP/CRHR. Again, participant-observer(s) from the Torres-Martinez Desert Cahuilla Indians shall be present during archaeological data-recovery excavations involving sites of Native American concern. At the conclusion of the Phase III Program, a Phase III Data Recovery Report shall be prepared, following the State of California Office of Historic Preservation Archaeological Resource Management Report Recommended Contents and Format Guidelines (California 1990).

The Phase III Data Recovery Report shall be submitted to the County's Planning Department, the Torres-Martinez Desert Cahuilla Indians, if applicable, and the SHPO for review and comment prior to the issuance of a project grading permit.

Implementation Measure 3.4 All archaeological materials recovered during implementation of the project's Phase II Testing or Phase III Data Recovery programs shall be processed, including cleaning and cataloging, detailed description, and analysis, as appropriate. Following completion of laboratory and analytical procedures, all project-related collections shall be suitably packaged and transferred to a curation facility that meets the standards of 36 CFR 79 for long-term storage. Materials to be curated include archaeological specimens and samples, field notes, feature and burial records, maps, plans, profile drawings, photo logs, photographic negatives, consultants' reports of special studies, and copies of the final technical reports.

It should be noted that provisions of the Native American Graves Protection Repatriation Act (NAGPRA) pertaining to

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 (cont.) (cont.) (conRECOMMND

Native American burials, sacred objects, and objects of cultural patrimony would come into effect when archaeological materials are recovered from lands owned by the Torres-Martinez Desert Cahuilla Indians and managed by the BIA. NAGPRA would also come into effect when ownership of the collections from anywhere within the Travertine Specific Plan study area is transferred to a curation repository that receives federal funding.

Cultural Resources Policy 4

Ensure proper identification and treatment of cultural resources discovered during project development and construction.

Implementation Measure 4.1 Registered professional archaeologists and culturally affiliated Native Americans, with knowledge in cultural resources, shall monitor all project-related ground-disturbing activities that extend into natural sediments in areas determined to have high archaeological sensitivity for prehistoric resources.

Prior to grading final for each implementing project, the project applicant shall include in its mitigation plan provisions for the identification and evaluation of archaeological resources inadvertently discovered during construction. If buried archaeological resources are uncovered during construction, all work shall be halted in the vicinity of the archaeological discovery until a registered professional archaeologist can visit the site of discovery and evaluate the significance of the archaeological resource.

Implementation Measure 4.2 If the archaeological resource is determined to be a potentially significant cultural resource, the project proponent's mitigation plan shall include provisions for the preparation and implementation of a Phase III Data Recovery Program, as well as disposition of recovered artifacts, in accordance with Cultural Resources Policy 3 Implementation Measure 4, above. The mitigation plan shall be reviewed and approved by the County prior to grading final.

Implementation Measure 4.3 In the event of an accidental discovery of any human remains in a location other than a dedicated cemetery on privately owned or State-owned land,

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 (cont.) (cont.) (conRECOMMND

the steps and procedures specified in Health and Safety Code Section 7050.5, State CEQA Guidelines 15064.5(d), and Public Resources Code Section 5097.98 shall be implemented. Specifically, in accordance with Public Resources Code (PRC) Section 5097.98, the Riverside County Coroner shall be notified within 24 hours of the discovery of potentially human remains. The Coroner shall then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the NAHC by phone within 24 hours, in accordance with PRC Section 5097.98. The NAHC shall then designate a Most Likely Descendant (MLD) with respect to the human remains within 48 hours of notification.

The MLD shall then have the opportunity to recommend to the project proponent means for treating or disposing, with appropriate dignity, the human remains and associated grave goods within 24 hours of notification. Whenever the NAHC is unable to identify a MLD, or the MLD fails to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the MLD and the mediation provided for in subdivision (k) of PRC Section 5097.94 fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall re-inter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance.

It should be noted in the event that Native American human remains are inadvertently discovered during the County-permitted, project-related construction activities, there would be unavoidable significant adverse impacts to these resources. Implementation of the Cultural Resources Policies 1, 2, and 3 and their corresponding implementation measures would, however, reduce impacts to other types of archaeological resources to a level that is less than significant.

Implementation Measure 4.4 The treatment and management of potential TCPs identified with the Travertine Point Specific Plan study area shall be conducted through extensive consultation with concerned Native American groups and organizations. These consultation efforts shall be conducted utilizing the County of Riverside's SB 18

10. GENERAL CONDITIONS

10.PLANNING. 29 SP - MITIG MEASURE 6.5-2 (cont.) (cont.) (conRECOMMND

consultation process.

Cultural Resources Policy 5

Ensure that the project proponent shall bear all costs associated with cultural resources management within the County's jurisdiction.

Implementation Measure 5.1 The project proponent shall bear all expenses related to the identification, evaluation, and treatment of cultural resources directly or indirectly affected by project-related construction activity. Such expenses may include pre-field planning, field work, post-field analysis, research, interim and summary report preparation, and final report production (including draft and final versions), and costs associated with the curation of project documentation and the associated artifact collections.

Implementation Measure 5.2 Prior to grading final, on behalf of the County and the project applicant, the final technical reports detailing the results of the Phase II Testing or Phase III Data Recovery programs shall be submitted to the appropriate Archaeological Information Centers of the California Historical Resources Inventory System for their information and where they would be available to other researchers. Final Phase III Data Recovery Reports shall also be submitted to local libraries, schools, and historical societies to enable the general public to learn about their local cultural heritage.

10.PLANNING. 30 SP - MITIG MEASURE 6.22-2 RECOMMND

Mitigation Measure 6.22-2 from EIR514 requires:

The project proponent shall make every effort feasible to recycle, reuse, and/or reduce the amount of construction and demolition materials (i.e., concrete, asphalt, wood, etc.) generated by development of the project that would otherwise be taken to a landfill. This diversion of waste must exceed a 50 percent reduction by weight. The project shall complete the Riverside County Waste Management Department Construction and Demolition Waste Diversion Program Form B or and Form C process as evidence to ensure compliance. Form B (Recycling Plan) must be submitted and

10. GENERAL CONDITIONS

10.PLANNING. 30 SP - MITIG MEASURE 6.22-2 (cont.) RECOMMND

approved by the Riverside County Waste Management Department and provided to the Department of Building and Safety prior to the issuance of building permits. Form C (Reporting Form) must be approved by the Riverside County Waste Management Department and submitted to the Department of Building and Safety prior to the issuance of certificate of occupancy/final inspection.

10.PLANNING. 31 SP - MITIG MEASURE 6.22-3 RECOMMND

Mitigation Measure 6.22-3from EIR514 requires:

Applicant(s) shall dispose of any hazardous wastes, including paint, used during construction and grading at a licensed facility in accordance with local, state, and federal guidelines.

10.PLANNING. 32 SP - MITIG MEASURE 6.22-4 RECOMMND

Mitigation Measure 6.22-4 from EIR514 requires:

All commercial and residential refuse generated from the proposed project within Riverside County portion of the proposed project shall be delivered to the Coachella Valley Transfer Station or the Edom Hill Transfer Station; any residual waste that these transfer stations could not accept shall be disposed of at the Lamb Canyon Landfill or Badlands Landfill or other locations as determined by the Riverside County Waste Management Department. All commercial and residential refuse generated from the proposed project within the Imperial County portion of the proposed project shall be delivered to Salton City Landfill or other locations as determined by the Imperial County Waste Management Department.

10.PLANNING. 33 SP - MITIG MEASURE 6.22-5 RECOMMND

Mitigation Measure 6.22-5 from EIR514 requires:

The Homeowners Association established for the proposed development shall establish green waste recycling through its yard maintenance or waste hauling contracts. Green waste recycling includes such things as grass recycling (where lawn clippings from a mulching-type mower are left on the lawn) and on- or off-site composting. This measure shall be implemented to reduce green waste going to

10. GENERAL CONDITIONS

10.PLANNING. 33 SP - MITIG MEASURE 6.22-5 (cont.) RECOMMND

landfills. If such services are not available through the yard maintenance or waste haulers in the area, the HOA shall provide individual homeowners with information about ways to recycle green waste individually and collectively. Homeowners shall be notified of such in the CC&Rs.

10.PLANNING. 34 SP - MITIG MEASURE 6.7-1 RECOMMND

Mitigation Measure 6.7-1 from EIR514 requires:

Proposed school sites shall undergo subsequent environmental review prior to construction as required by the Coachella Valley Unified School District (CVUSD). Final locations shall be subject to the review and approval of the CVUSD subject to the requirements of the California Department of Education (CDE) and the Department of Toxic Substances Control (DTSC).

10.PLANNING. 35 SP - MITIG MEASURE 6.7-4 RECOMMND

Mitigation Measure 6.7-4 from EIR514 requires:

Prior to building final inspection for each development phase, the homeowner's associations (HOAs) shall coordinate with the CVMVCD to provide public pamphlets that provide information to minimize mosquito breeding grounds and the HOAs shall work with the CVMVCD to control the mosquito population.

10.PLANNING. 36 SP - MITIG MEASURE 6.7-5 RECOMMND

Mitigation Measure 6.7-5 from EIR514 requires:

Work crews shall use respirators during project clearing, grading, and excavation operations, in accordance with California Division of Occupational Safety and Health regulations. The cabs of grading and construction equipment shall be air conditioned.

10.PLANNING. 37 SP - MITIG MEASURE 6.7-6 RECOMMND

Mitigation Measure 6.7-6 from EIR514 requires:

Construction roads shall be paved, when possible, to reduce fugitive dust and potential exposure to the fungus; or the access road into the project site shall be paved or treated

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 37 SP - MITIG MEASURE 6.7-6 (cont.) RECOMMND

with environmentally safe dust control agents, and where unpaved shall be wetted two times per day to minimize dust.

10.PLANNING. 38 SP - MITIG MEASURE 6.7-7 RECOMMND

Mitigation Measure 6.7-7 from EIR514 requires:

Prior to building final inspection for each planning area, the HOA, in coordination with government authorities (i.e., California Fish and Game), shall prepare public outreach programs and information pamphlets regarding the potential danger of digesting fish and waterfowl tissue that would be contaminated with selenium.

10.PLANNING. 39 SP - MITIG MEASURE 6.8-4 RECOMMND

Mitigation Measure 6.8-4 from EIR514 requires:

Periodic inspection of the conditions of the channels will need to be performed year round and after significant precipitation events will be required to be performed by each homeowner-owner association (HOA). Annual inspection reports shall be prepared by each HOA, and submitted to and filed with the Coachella Valley Water District by June 30th of each calendar year.

10.PLANNING. 40 SP - MITIG MEASURE 6.8-7 RECOMMND

Mitigation Measure 6.8-7from EIR514 requires:

The location, nature, and importance of the subdrainage system shall be disclosed to the ultimate owners of the property, so that the property owners can avoid damage to the drains' or negatively affect the drains' performance. In addition to disclosure to potential homeowners, tile drains that cross onto private lots shall be protected by one or more of the following mechanisms: the creation of easements, CC&R protocols, identification through flagging or risers, or other suitable mechanisms.

10.PLANNING. 41 SP - MITIG MEASURE 6.8-9 RECOMMND

Mitigation Measure 6.8-9 from EIR514 requires:

Prior to implementing project approval for each phase or district, as appropriate, the applicant shall submit for

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 41 SP - MITIG MEASURE 6.8-9 (cont.) RECOMMND

review and approval a hydrology report to further define flow conditions related to Channel 4 at SR-86S and for all channels east of SR 86S, and provide for the design of such facilities such that discharge is released in a manner consistent with pre-project/existing conditions, or alternatively, provide for storage or discharge flows within the boundaries of the northern portion of the proposed project or off-site with approval and easements from adjacent property owners.

10.PLANNING. 42 SP - MITIG MEASURE 6.8-11 RECOMMND

Mitigation Measure 6.8-11 from EIR514 requires:

Prior to implementing project approval for each phase or district, as appropriate, the applicant shall submit for review and approval a hydrology report to address potential sediment depositions in the Salton Sea and downstream properties. The report shall provide for design considerations to be implemented in proposed Channels 1, 2 and 3, as appropriate.

10.PLANNING. 43 SP - MITIG MEASURE 6.8-12 RECOMMND

Mitigation Measure 6.8-12 from EIR514 requires:

Prior to implementing project approval for each phase or district, as appropriate, the applicant shall submit for review and approval a plan for the management, operation and maintenance of the flood control system.

10.PLANNING. 44 SP - MITIG MEASURE 6.11-1 RECOMMND

Mitigation Measure 6.11-1 from EIR514 requires:

Where feasible and consistent with the Riverside County standards, any paving or repaving of off-site roadways that must be conducted in conjunction with implementation of the specific plan should utilize asphalt-rubber paving material consisting of 20 percent recycled rubber or more and 80 percent paving-grade asphalt. Studies have demonstrated that such paving material will reduce traffic noise by as much as 3 to 5 dB(A).

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 45 SP - MITIG MEASURE 6.11-2 RECOMMND

Mitigation Measure 6.11-2 from EIR514 requires:

With permission from the Riverside County Transportation Departments, speed limits on arterials experiencing significant noise impacts off-site should be reduced from existing speed limits. Each 5 mile per hour reduction in the speed limit can decrease the CNEL level by about 1 dB(A).

10.PLANNING. 46 SP - MITIG MEASURE 6.11-8 RECOMMND

Mitigation Measure 6.11-8 from EIR514 requires:

The project applicant shall require by contract specifications that the following construction best management practices (BMPs) be implemented by contractors to reduce construction noise levels:

-Two weeks prior to the commencement of construction, notification must be provided to surrounding land uses within 1,000 feet of a project site disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period.

-Ensure that construction equipment is properly muffled according to industry standards and in good working condition.

-Place noise-generating construction equipment and locate construction staging areas away from sensitive uses, where feasible.

-Schedule high noise-producing activities between the hours of 8:00 AM and 5:00 PM to minimize disruption to sensitive uses.

-Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, temporary noise barriers or noise blankets around stationary construction noise sources.

-Use electric air compressors and similar power tools rather than diesel equipment, where feasible.

-Construction-related equipment, including heavy-duty

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 46 SP - MITIG MEASURE 6.11-8 (cont.) RECOMMND

equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 30 minutes.

-Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow for surrounding owners and residents to contact the job superintendent. If the Riverside County or the job superintendent receives a complaint, the superintendent shall investigate, take appropriate corrective action, and report the action taken to the reporting party. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by Riverside County prior to grading final.

The Riverside County Building and Safety Department shall monitor and oversee the BMPs to verify that they are implemented correctly by the construction contractors.

10.PLANNING. 47 SP - MITIG MEASURE 6.13-4 RECOMMND

Mitigation Measure 6.13-4 from EIR514 requires:

Prior to final building inspection for each implementing project, applicants for implementing projects shall provide final fire-flow plans to the RCFD and SCSD, as appropriate, which include fire-flow requirements within commercial projects to be based on square footage and type of construction associated with development of the structures.

10.PLANNING. 48 SP - MITIG MEASURE 6.13-5 RECOMMND

Mitigation Measure 6.13-5 from EIR514 requires:

Prior to final building inspection for each implementing project, applicants for implementing projects shall provide final fire flow plans to the RCFD ensuring that all water mains and fire hydrants providing required fire flows would be constructed in accordance with the appropriate development schedule sections of Riverside County Ordinance No. 460 and/or Ordinance No. 787. Each fire flow plan that is submitted would be reviewed and approved by the RCFD prior to final building inspection.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 49 SP - MITIG MEASURE 6.21-1 RECOMMND

Mitigation Measure 6.21-1 from EIR514 requires:

Prior to implementing project approval of the first project phase in the proposed Specific Plan, the applicant shall prepare and submit to CVWD, SCSD, the County of Riverside for review and approval, as appropriate, a Wastewater Management Plan (WMP) that provides for the final location, development, and funding mechanisms of the wastewater conveyance infrastructure system and wastewater treatment system associated with development of the entire project. This WMP shall describe and finalize the design parameters and locations of piping necessary to convey wastewater originating within the project site for the specified tract. Each WMP shall also be submitted to the Regional Water Quality Control Board for approval and to ensure that the wastewater infrastructure conveyance system meets their requirements for collection and treatment of wastewater.

10.PLANNING. 50 SP - MITIG MEASURE 6.21-2 RECOMMND

Mitigation Measure 6.21-2 from EIR514 requires:

Prior to building final inspection for the first residential unit and/or commercial unit within the Riverside County portion of the proposed project, the applicant shall execute a Special Agreement with CVWD to design, permit, construct, operate, and maintain an expandable wastewater treatment plant and nonpotable water storage and distribution system. The agreement shall provide for the initial size of the treatment plant to meet the initial development requirements of the project. The agreement shall provide for the plant to be expanded as the project proceeds to meet the project's full wastewater flow requirements within Riverside County and CVWD jurisdiction (estimated to be 3.0 mgd). Wastewater treatment and reuse facilities are provided for in Planning Area 4-3 or alternately an off-site location as provided for in the Wastewater Master Plan (see Figure 3.0-21). The project applicant shall provide necessary funding for the construction of this facility. All wastewater treatment facilities will be creditable toward the facilities component of CVWD's Sanitation Capacity charge for all residential, commercial, and industrial structures within CVWD's portion of the project boundary. The applicant's financial responsibility for these facilities is only for those components of the wastewater treatment facilities

10. GENERAL CONDITIONS

10.PLANNING. 50 SP - MITIG MEASURE 6.21-2 (cont.) RECOMMND

necessary to provide wastewater treatment for the proposed project's and its associated effluent.

10.PLANNING. 51 SP - MITIG MEASURE 6.22-6 RECOMMND

Mitigation Measure 6.22-6 from EIR514 requires:

Prior to issuance of Building Permits for any multi-unit residential, commercial or industrial facilities, clearance from the Riverside County Waste management Department is needed to verify compliance with California Solid Waste Reuse and Recycling Act of 1991 (AB 1327), which requires the local jurisdiction to require adequate areas for collecting and loading recyclable materials.

10.PLANNING. 52 SP - MITIG MEASURE 6.22-8 RECOMMND

Mitigation Measure 6.22-8 from EIR514 requires:

Prior to implementing project approval for Planning Areas 2-17, 2-21, 2-19, and 2-20, the applicant(s) shall provide for a buffer and restrict development adjacent to the active or closed landfill from the Oasis Landfill property line for a distance of a minimum of 1,000 feet and a maximum of 1,320 feet originating at the Oasis Landfill disposal footprint, until the landfill is closed to provide adequate spacing for monitoring probes, as recommended by the RCWMD and in accordance with the Southern California Air Quality Management District's Rule 1150.1.

10.PLANNING. 53 SP - MITIG MEASURE 6.22-9 RECOMMND

Mitigation Measure 6.22-9 from EIR514 requires:

Prior to implementing project approval for Planning Areas 2-18 and 2-19, the Oasis landfill shall be closed by the RCWMD in accordance with CalRecycle guidelines for closure with waste in place.

10.PLANNING. 54 SP - MITIG MEASURE 6.22-10 RECOMMND

Mitigation Measure 6.22-10 from EIR514 requires:

Prior to implementing project approval in Planning Area 2-18, the applicant shall consult with officials from RCWMD and agree on a circulation plan for roads that would be

10. GENERAL CONDITIONS

10.PLANNING. 54 SP - MITIG MEASURE 6.22-10 (cont.) RECOMMND

developed around and adjacent to the Oasis Landfill site. Best Management Practices (BMPs) shall be developed and implemented within the circulation plan for Planning Areas 2-18 and 2-19 to avoid the restructuring of roadways around and adjacent to the Oasis Landfill.

10.PLANNING. 55 SP - MITIG MEASURE 6.23-4 RECOMMND

Mitigation Measure 6.23-4 from EIR514 requires:

Prior to the first implementing project approval for each development phase, the project applicant shall submit a plan for providing local transit services within the project site to the Riverside County Planning Department for review and approval.

10.PLANNING. 56 SP - HOLD HARMLESS (2) RECOMMND

The Desert Recreation District (DRD) or other designated entity responsible for park maintenance shall indemnify all usual park and recreational activities and shall be responsible for all maintenance and repair activities of improvements proposed by and for the SPECIFIC PLAN within Planning Area 2-18. This does not include Riverside County Waste Management facilities.

10.PLANNING. 57 SP - DRP CONSISTENCY RECOMMND

All implimenting projects must be consistent with the approved DISTRICT REFINEMENT PLAN of the corresponding DISTRICT, per the SPECIFIC PLAN.

10.PLANNING. 58 SP - DU/BLDG PERM MATRIX RECOMMND

Given the size and scope of the project, every condition of approval which uses the term "Building Permit" as a trigger point shall be interpreted to mean "Residential Dwelling Unit." For example a 100 unit apartment complex in one building shall count as 100 BUILDING PERMITS for purposes of these conditions, not simply one building permit. Additionally, the Matrix shall make it clear which residential units are within the County Jurisdiction and which are not. A total unit count, regardless of jurisdiction, must be shown as most conditions are triggered by a total project unit count for all jurisdictions.

10. GENERAL CONDITIONS

10.PLANNING. 58 SP - DU/BLDG PERM MATRIX (cont.) RECOMMND

For purposes of tracking the total build out of the SPECIFIC PLAN, the TLMA Counter Services Team shall maintain a TOTAL DWELLING UNIT TRACKING MATRIX. The matrix shall differentiate between individual building permits and the total number of dwelling units that are represented by the building permits that have been issued for the entire SPECIFIC PLAN. Any condition that requires a specific action at a specified "building permit issuance" shall use the TOTAL DWELLING UNIT TRACKING MATRIX to determine if the threshold has been met.

10.PLANNING. 59 SP - PUB BLDG STANDARDS RECOMMND

All public buildings which require an occupancy permit and are intended to be owned by the County upon completion shall comply with Board Policy H-29.

10.PLANNING. 60 SP - MODIFICATN TO CONDITIONS RECOMMND

Once the SPECIFIC PLAN is approved, in addition to any thresholds listed in the SPECIFIC PLAN, any modifications to the Conditions of Approval that affect the entire SPECIFIC PLAN shall require a SPECIFIC PLAN Amendment unless otherwise determined by the County Planning Director. Any modifications to the Conditions of Approval that only affect a specific DISTRICT shall require a Substantial Conformance determination to the SPECIFIC PLAN.

10.PLANNING. 61 SP - IMPERIAL SP APPROVAL RECOMMND

The County of Riverside adoption of the SPECIFIC PLAN only pertains to those areas where the County has jurisdiction. If for any reason Imperial County does not approve the portion of the SPECIFIC PLAN within Imperial County, or if Imperial County adopts a version of the SPECIFIC PLAN that is not in substantial conformance with the County of Riverside adopted SPECIFIC PLAN, then an amendment to the entire SPECIFIC PLAN, through the County of Riverside will be required to assure consistency.

10.PLANNING. 62 SP - IMPLEMENTING PROJECTS RECOMMND

For the purposes of this project, any condition of approval that refers to "implementing projects" shall include Schedule I subdivisions as identified in Ordinance No. 460.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 63 SP - TILE DRAINS RECOMMND

Portions of the site are underlain by an existing tile drain system installed in the past to help control high groundwater levels and related saltation problems associated with former agricultural activities. If any tile drains exist within the boundaries of any implementing project, that project shall complete a review of the tile drain system to be submitted for review and approval by the County Geologist. Said study shall, at a minimum, determine if the drains are structurally sound, or if the system should be replaced. In no case shall a project with previous tile drains be permitted to develop without a tile drain system to control future groundwater levels which will assist in the mitigation of liquefaction. In addition these drains will help prevent the development of a "salt" crust related to evapotranspiration of landscape water.

Any future underground utility lines which intercept the existing tile drain system should be evaluated on a case-by-case basis to determine if they will interfere with or assist the performance of the existing tile drains. All underground utilities which may potentially provide for enhanced groundwater control should be incorporated into the existing system so as to provide additional control of the groundwater levels beneath this site. Any interference of a newly installed utility or any other underground installation (i.e. swimming pools, basements, etc.) with the existing tile drains should be addressed in such a way as to maintain the functionality of the tile drain system. If no tile drains are located this condition shall not apply.

10.PLANNING. 64 SP - DRP REQUIRED RECOMMND

Prior to or concurrent with the first approval of any implementing project within any DISTRICT, a Specific Plan Substantial Conformance application for a DISTRICT REFINEMENT PLAN shall be required in accordance with Section 3.13.1.1 of the SPECIFIC PLAN. No implementing project shall be approved before a DISTRICT REFINEMENT PLAN for the corresponding DISTRICT receives approval from the Planning Commission. DISTRICT REFINEMENT PLANS may be processed concurrently with implementing projects.

Note: The DISTRICT REFINEMENT PLAN is processed as a Specific Plan Substantial Conformance; however, once

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 64 SP - DRP REQUIRED (cont.) RECOMMND

approved the Planning Director shall create a new LMS development number for the land management tracking system and all implementing projects within the respective DISTRICT shall be attached to the new DISTRICT REFINEMENT PLAN development number. Once the DISTRICT REFINEMENT PLAN is approved, all Specific Plan Conditions of approval shall be transferred into the new development number created by the DISTRICT REFINEMENT PLAN. All dwelling units shall be tracked at the DISTRICT level through the DISTRICT REFINEMENT PLAN development number and through the separate spread sheet referenced in condition 10.Planning.58 DU/BUILDING PERMIT MATRIX. Additionally, only Conditions of Approval approriate to the DISTRICT need be moved. Minor modifications to the Conditions of Approval are permitted for the DRP if said revisions are specific to the DISTRICT and do not significantly alter the intent of the Condition of Approval. This note shall not apply if an alternative permit tracking process to LMS is being used.

Once approved, the DISTRICT REFINEMENT PLAN shall be added as an appendix to the SPECIFIC PLAN and act as additional Design Standards for the respective DISTRICT."

10.PLANNING. 65 SP - NEIGHBORHOOD PARKS RECOMMND

A minimum of 6.6 acres of neighborhood parks shall be developed in conjunction for every 500 residential dwelling units.

10.PLANNING. 66 SP - AG SETBACKS RECOMMND

Existing Agricultural uses are allowed to continue during the development of the SPECIFIC PLAN. Proposals to improve, enhance, intensify and/or expand an existing agricultural operation shall be subject only to the approval of the Travertine Point Property Owners Association, provided the public's health, safety and welfare are protected and that no existing residential use is closer than 300 feet of the existing and/or proposed improvement, enhancement, intensification and/or expansion. Residential units associated with or ancillary to the existing agricultural operation are not included in the 300 foot setback requirement. Agricultural uses proposed less than 300 feet from existing residential uses would require a Conditional Use Permit.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.PLANNING. 67 MM - LANDFILL MOU IMP RECOMMND

All provisions of the Landfill MOU specified in condition of approval 30.PLANNING.2 shall be implemented throughout the life of the project to the satisfaction of the Riverside County Waste Management Department.

TRANS DEPARTMENT

10.TRANS. 1 SP - SP375/TS CONDITIONS RECOMMND

The Transportation Department has reviewed the Traffic Impact Analysis (TIA), dated March 9, 2009 submitted for the proposed project. The TIA has been prepared in accordance with County-approved guidelines. The Transportation Department has also reviewed the Traffic Study Supplement (TSS), dated August 5, 2010. We generally concur with the findings relative to traffic impacts.

The General Plan circulation policies require a minimum of Level of Service 'C', except that Level of Service 'D' may be allowed in community development areas at intersections of any combination of secondary highways, major highways, arterials, urban arterials, expressways or state highways and ramp intersections.

The TIA and TSS indicate that it is possible to achieve adequate levels of service for the following intersections based on the traffic study assumptions.

Harrison Street (NS) at:
62nd Avenue (EW)

Harrison Street (NS) at:
64th Avenue (EW)

Harrison Street (NS) at:
66th Avenue (EW)

Harrison Street (NS) at:
70th Avenue (EW)

Harrison Street (NS) at:
72nd Avenue (EW)

Harrison Street (NS) at:
74th Avenue (EW)

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.TRANS. 1 SP - SP375/TS CONDITIONS (cont.) RECOMMND

Harrison Street (NS) at:
Pierce Street (EW)

Harrison Street (NS) at:
78th Avenue (EW)

Harrison Street (NS) at:
81st Avenue (EW)

Polk Street (NS) at:
74th Avenue (EW)

Fillmore Street (NS) at:
78th Avenue (EW)

Village Way (NS) at:
82nd Avenue (EW)

Village Way (NS) at:
Jewel Street (EW)

Village Way (NS) at:
Town Center Way North (EW)

Village Way (NS) at:
Town Center Way South (EW)

SR-86S Southbound Ramps (NS) at:
62nd Avenue (EW)

SR-86S Northbound Ramps (NS) at:
62nd Avenue (EW)

SR-86S Southbound Ramps (NS) at:
66th Avenue (EW)

SR-86S Northbound Ramps (NS) at:
66th Avenue (EW)

SR-86S Southbound Ramps (NS) at:
70th Avenue (EW)

SR-86S Northbound Ramps (NS) at:
70th Avenue (EW)

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.TRANS. 1 SP - SP375/TS CONDITIONS (cont.) (cont.) RECOMMND

SR-86S Southbound Ramps (NS) at:
74th Avenue (EW)

SR-86S Northbound Ramps (NS) at:
74th Avenue (EW)

SR-86S Southbound Ramps (NS) at:
81st Avenue (EW)

SR-86S Northbound Ramps (NS) at:
81st Avenue (EW)

SR-86 Southbound Ramps (NS) at:
Town Center Way (EW)

SR-86 Northbound Ramps (NS) at:
Town Center Way (EW)

SR-86 Southbound Ramps (NS) at:
Desert Shores Drive (EW)

SR-86 Northbound Ramps (NS) at:
Desert Shores Drive (EW)

SR-86 Southbound Ramps (NS) at:
Brawley Avenue (EW)

SR-86 Northbound Ramps (NS) at:
Brawley Avenue (EW)

SR-86 Southbound Ramps (NS) at:
Sea Oasis Boulevard (EW)

SR-86 Northbound Ramps (NS) at:
Sea Oasis Boulevard (EW)

SR-86 Southbound Ramps (NS) at:
Marina Drive (EW)

SR-86 Northbound Ramps (NS) at:
Marina Drive (EW)

Paseo Street (NS) at:
81st Avenue (EW)

Lincoln Street (NS) at:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.TRANS. 1 SP - SP375/TS CONDITIONS (cont.) (cont.) (conRECOMMND

81st Avenue (EW)

Lincoln Street (NS) at:
Paseo Street (EW)

Lincoln Street (NS) at:
Jewel Street (EW)

Gateway Street (NS) at:
Town Center Way West (EW)

Jewel Street (NS) at:
Paseo Street North (EW)

Jewel Street (NS) at:
Paseo Street South (EW)

Jewel Street (NS) at:
Bayside Way (EW)

Town Center Way (NS) at:
Paseo Street North (EW)

Town Center Way (NS) at:
Paseo Street South (EW)

Travertine Estates (NS) at:
Paseo Street (EW)

A Street (NS) at:
Jewel Street (EW)

A Street (NS) at:
Desert Shores Drive (EW)

Sea Oasis Drive (NS) at:
Travertine Estates (EW)

Sea Oasis Drive (NS) at:
Desert Shores Drive (EW)

The associated conditions of approval incorporate mitigation measures identified in the traffic study, which are necessary to achieve or maintain the required level of service.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.TRANS. 2 SP-SP375/DEF-PROJ DEV DISTS RECOMMND

In SP00375 five Development Districts are identified. The Planning Areas in each District are numbered as follows:

District 1:Planning Areas 1-1 through 1-23

District 2:Planning Areas 2-1 through 2-21

District 3:Planning Areas 3-1 through 3-12

District 4:Planning Areas 4-1 through 4-8

District 5:Planning Areas 5-1 through 5-15

10.TRANS. 3 SP-SP375/DEF-RDWY IMPVT PHASES RECOMMND

In the TSS for SP00375, dated August 5, 2010, nineteen (19) transportation improvement phases are identified. Following is a listing of the transportation system improvement phases and the Planning Areas that would be developed in each phase.

Rdwy Impvt Phase	Planning Areas Developed
1	1-1,1-2,1-3,1-5,1-7,1-8,1-12 (partial)
2a	1-9,1-12(partial),1-13,1-14,1-15
2b	1-4,1-6,1-11
2c	2-1,2-1,2-3
2d	2-8,2-9,2-14 (partial)
2e	1-16,4-5 (partial)
2f	2-19 (partial),2-20 (partial), 2-21,4-1
3a	1-10,2-4,2-5,2-6,2-7,2-10,2-11,2-12
3b	4-3,4-4 (partial), 5-1
3c	5-13
3d	2-13,2-14 (partial),2-15,2-16

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.TRANS. 3 SP-SP375/DEF-RDWY IMPVT PHASES (cont.) RECOMMND

3e	2-17, 2-18,2-19 (partial),2-20 (partial)
3f	4-2,4-5 (partial),4-6
3g	1-17,1-18,1-19,1-20,1-21,1-22,1-23
3h	4-7,4-8
3i	3-1,3-2
3j	3-3,3-4,3-5,3-6,3-7,3-8,3-9,3-10, 3-11,3-12
3k	4-4,5-2,5-3,5-4,5-5
3l	5-6,5-7,5-8,5-9,5-10,5-11,5-12, 5-14,5-15

If development occurs in a different order, or if there is substantial overlapping of phases, then a new traffic study shall be completed to determine if any improvements from the prior un-built phase need to be constructed to mitigate impacts caused by the phase being developed.

10.TRANS. 4 SP-SP375/FUND SR-86/SR-86S IMP RECOMMND

Recognizing that 00375 and other developments in Riverside and Imperial Counties along the SR-86/SR86-S will necessitate improvements along SR-86/SR-86S, Riverside County will take the lead in upgrading SR-86/SR-86S to a six-lane freeway between 62nd Avenue in Riverside County and Marina Drive in Imperial County. The six-lane freeway would have grade-separated interchanges in Riverside County at SR-86S/62nd Avenue, SR-86S/66th Avenue,SR-86S/70th Avenue, SR-86S/74th Avenue, SR-86S/81st Avenue, SR-86/Town Center Way North, and in Imperial County at SR-86/Desert Shores Drive, SR-86/Brawley Avenue, SR-86/Sea Oasis Boulevard, and SR-86/Marina Drive. Pending the outcome of further engineering, financial, environmental, and other studies, the County intends to establish a Road and Bridge Benefit District (RBBD), or other area-wide funding mechanism for the corridor, which includes this project site, in order to upgrade SR-86/SR-86S to a six-lane

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

10. GENERAL CONDITIONS

10.TRANS. 4 SP-SP375/FUND SR-86/SR-86S IMP (cont.) RECOMMND

freeway. The funding mechanism may have a two-tiered structure:

One tier to fund the addition of one lane in each direction along SR-86/SR-86S that would include the entire benefit corridor, and

A second tier consisting of several subareas within the benefit corridor to fund interchanges that would serve a specific subarea.

The Traffic Study for the Project used a 10 mile study area north and south of the Project site, which is twice the 5 mile study scope typically required by the County. Impacts within the study scope area are fully mitigated as set forth in this EIR. Possible impacts beyond the 10 mile study area are deemed too speculative to evaluate at this time, given various unknown factors such as the pace of Specific Plan implementation over an estimated 30-40 year build out, the pace of other improvements to local roads and highways during that 30-40 year project build out, and the pace of other development in the vast area north and south of the Specific Plan site that may contribute trips but also funding sources for road and highway improvements. The project conditions of approval require that all future tract maps be conditioned to provide updated traffic studies prior to final map approval. Those traffic studies shall include an analysis of potentially significant traffic impacts beyond the 10 mile study scope established by the County for the Specific Plan traffic study. To the extent that future traffic studies, required for all implementing tract maps, show any significant impacts beyond the 10 mile study area used for the Specific Plan traffic study, including but not limited to significant impacts to 86s, the I-10, and/or local roadways, the tract map applicants shall be required to participate in an RBBD, or other similar financial mechanism such as a CFD, to mitigate such impacts to a less than significant level. Implementing projects of SP375 shall be required to pay CVAG TUMF fees. The fees collected can also be made eligible, through the CVAG transportation prioritization process, for regional improvements within and beyond the study area.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

20. PRIOR TO A CERTAIN DATE

PLANNING DEPARTMENT

20.PLANNING. 1 SP - 90 DAYS TO PROTEST RECOMMND

The applicant has ninety (90) days from the date of the approval of these conditions to protest, in accordance with the procedures set forth in Government Code Section 66020, the imposition of any and all fees, dedications, reservations, and/or exactions imposed on this project as a result of the approval or conditional approval of this project.

20.PLANNING. 2 SP - SUBMIT FINAL DOCUMENTS RECOMMND

Within 60 days of the tentative approval of the project by the Board of Supervisors and prior to closing the DBF accounts for the project, Four (4) hard copies and Fifteen (15) copies on CD of the final SPECIFIC PLAN and EIR documents (SP/EIR) documents shall be submitted to the Planning Department for review, approval and distribution.

The documents shall include all the items listed in the condition titled "SP - Documents". The final SP/EIR documents shall be distributed in the following fashion:

One hard copy to the Planning Counter Services Division,

One hard copy to the Planning Department Library,

One hard copy to the Desert Office,

One hard copy to the Planning Department Project Manager,

Digital versions (CD) to the following:

Building and Safety Department 1 copy

Department of Environmental Health 1 copy

Fire Department 1 copy

Flood Control and Water Conservation District 1 copy

Transportation Department 1 copy

Executive Office - CSA Administrator 1 copy

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

20. PRIOR TO A CERTAIN DATE

20.PLANNING. 2 SP - SUBMIT FINAL DOCUMENTS (cont.) RECOMMND

Clerk of the Board of Supervisors 1 copy

Any park provider if not the CSA 1 copy

Any and all remaining documents shall be kept with the Planning Department in Riverside, or as otherwise determined by the Planning Director.

30. PRIOR TO ANY PROJECT APPROVAL

E HEALTH DEPARTMENT

30.E HEALTH. 1 SP-WATER AND SEWER WILL SERVE RECOMMND

A "will serve" letter from the agency serving potable water and sanitary sewers is required.

30.E HEALTH. 2 SP - LEA CLEARANCE RECOMMND

Clearance from Environmental Resource Management Division (Local Enforcement Agency) is required.

EPD DEPARTMENT

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR DRAFT

TRAVERTINE POINT EIR MITIGATION IDENTIFIED FOR SP 375 (SOURCE: Impact Sciences, Inc. EIR 514

As stated in the EIR 514 Section 6.4, Biology potentially significant impacts would occur to special-status plant species, Palm Springs round-tailed ground squirrel, western yellow bat, and burrowing owl with the implementation of the proposed Travertine Point Specific Plan. The sensitive plant community of blue palo verde wash woodland is present on site and will be impacted by project implementation. No impacts will remain potentially significant after application of the proposed mitigation measures.

The following mitigation measure shall be implemented for activities that would occur within the jurisdiction of Riverside County or Imperial County. Where the mitigations identify activities that would

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) DRAFT

occur on tribal lands, the mitigations are recommended; the implementation of the mitigation measures on tribal lands will require consideration and approval by the Torres-Martinez Desert Cahuilla Indians (TMDCI). However, as noted in the Project Description (see Section 3.5), the project is subject to the implementation of a Memorandum of Understanding (MOU) between Riverside County, Imperial County, and TMDCI to address issues relating to tribal involvement on the properties within the boundaries of the specific plan. The MOU will, among other requirements, include that proposed mitigations that involve tribal lands will be permitted and implemented. Therefore, the mitigation proposed herein will apply to the entire project regardless of jurisdiction. The project proponent will be required to demonstrate compliance and address the potential impacts to the resources through project design.

6.4-1: Prior to implementing project approval, a qualified biologist currently holding an MOU with Riverside County shall conduct a focused survey for the two special-status plant species observed within the Riverside County portion of the proposed project site, chaparral sand verbena and Peirson's pebble pincushion, which are not covered under the CVMSHCP within the proposed development areas in order to determine the extent of individual plants to be impacted by the implementing project design. Impacts resulting from project construction to the two special-status plant species observed shall be mitigated through a seed collection and planting program. The planting program will be reviewed and approved by CDFG and will include provisions for monitoring success criteria and performance standards.

6.4-2: Prior to implementing project approval, the project applicant shall retain a qualified biologist currently holding an MOU with Riverside County, to collect seed from specialstatus plant species individuals during the appropriate season (after the blooming period, when seeds have formed). The collected seed shall be planted in predetermined

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

suitable habitat in an appropriate area within Open Space(Conservation) on the project site that will not be impacted by project development or subsequent activities. A portion of Sonoran creosote bush scrub and blue palo verde wash woodland located in the southern portion of the proposed project site will remain undeveloped upon implementation of the proposed project. In addition, appropriate disturbed/recovering Sonoran creosote bush scrub areas will also be areas for potential seed planting.

6.4-3: Prior to implementing project approval, the project applicant shall protect those portions of Sonoran creosote bush scrub and blue palo verde wash woodland occurring within the Open Space-Conservation land use category through a conservation easement, deed restriction, or similar mechanism. This area provides suitable habitat for relocation of chaparral sand verbena and Peirson's pebble pincushion. A report documenting the seed collection and planting plan shall be submitted to the Riverside County Environmental Programs Department.

6.4-4: Impacts resulting from project construction within the Riverside County portion of the proposed project site to those special-status wildlife species covered under the CVMSHCP, including desert pupfish, flat-tailed horned lizard, Yuma clapper rail, burrowing owl, Crissal thrasher, Le Conte's thrasher, western yellow bat, Palm Springs round-tailed ground squirrel, and Palm Springs pocket mouse, shall be mitigated through payment of the CVMSHCP Local Development Mitigation Fee.
Prior to implementing project approval, fee payment shall be made by the project applicant to Riverside County. The fee payment shall be made at the cost per acre provided at the time of payment in the CVMSHCP and updated by the Coachella Valley Conservation Commission.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

6.4-5: Impacts resulting from project construction within the Riverside County portion of the proposed project site to Couch's spadefoot, which is not covered under the CVMSHCP, shall be mitigated. Prior to implementing project approval, in areas of suitable habitat for Couch's spadefoot on the project site, a qualified biologist currently holding an MOU with Riverside County shall conduct focused surveys including areas of ruts or small pools, as well as the irrigation ponds, and relocate any toad individuals or eggs found. The survey shall be conducted during the active season of Couch's spadefoot (which corresponds with the rainy season). The survey results shall be submitted to the Riverside County Environmental Programs Department and Imperial County and CDFG.

6.4-6: Prior to implementing project approval, if the above surveys result in the observation of Couch's spadefoot within project impact areas, observed individuals and/or eggs shall be removed from project impact areas (with the prior approval of the CDFG) and relocated to predetermined suitable habitat in an appropriate area within Open Space-Conservation areas on the project site that will not be impacted. A portion of Sonoran creosote bush scrub and blue palo verde wash woodland located in the southern portion of the proposed project site will remain undeveloped upon implementation of the proposed project. Prior to implementing project approval, the project applicant shall protect those portions of Sonoran creosote bush scrub and blue palo verde wash woodland occurring within the Open Space-Conservation land use category through a conservation easement, deed restriction, or similar mechanism, as required by Mitigation Measure 6.4-3. If suitable habitat for relocation of Couch's spadefoot is found within this area, toad individuals or eggs will be taken to this location. In addition, suitable

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

disturbed/recovering Sonoran
creosote bush scrub areas will also be considered for
relocation efforts.

6.4-7: Prior to implementing project approval, impacts
resulting from project construction to
rosy boa, which is not covered under the CVMSHCP, within
the Riverside County
portion of the proposed project site shall be mitigated
through pre-construction surveys
and relocation. The applicant shall retain a qualified
biologist currently holding an MOU
with Riverside County to conduct focused pre-construction
surveys for individuals of
this species within suitable habitat for the species.
Surveys shall be conducted within
suitable habitat located within 500 feet of the grading
limits. Surveys shall include an
examination of those portions of Sonoran creosote bush
scrub, blue palo verde wash
woodland, disturbed/recovering Sonoran creosote bush scrub,
and saltbush scrub
habitats that will be developed as part of project
implementation.
If rosy boa individuals are found, an active trapping and
relocation program, conducted
by a qualified biologist currently holding an MOU with
Riverside County and in
coordination with the CDFG, that will move individuals to
suitable on-site habitat that
will not be directly impacted by project implementation,
shall take place. A portion of
Sonoran creosote bush scrub and blue palo verde wash
woodland located in the southern
portion of the proposed project site will remain
undeveloped upon implementation of
the proposed project.
In the event that off-site habitat areas within 500 feet of
grading are not accessible during
preconstruction surveys, the presence of rosy boa shall be
assumed and the entire project
site boundary within 500 feet of grading activities shall
be fenced to prohibit entry of rosy
boa into the grading site. The fence shall be monitored as
a regular part of construction
monitoring.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

Prior to implementing project approval, the project applicant shall protect those portions of Sonoran creosote bush scrub and blue palo verde wash woodland occurring within the Open Space-Conservation land use category through a conservation easement, deed restriction, or similar mechanism, as required by Mitigation Measure 6.4-3. This area provides suitable habitat for relocation of rosy boa.

6.4-8: Prior to implementing project approval, impacts resulting from project construction within the Riverside County portion of the proposed project site to special-status bird species not covered under the CVMSHCP, which include loggerhead shrike and blacktailed gnatcatcher, shall be mitigated through pre-construction surveys for nesting individuals of these species. Such surveys may be conducted concurrently with general nesting bird surveys, discussed in Mitigation Measure 6.4-13, below, and shall follow the methodology given in Mitigation Measure 6.4-13. If construction activities on the site are proposed during the nesting/breeding season (February 1 through August 31), a pre-activity survey shall be conducted by a qualified biologist currently holding an MOU with Riverside County prior to implementing project approval, to determine if active nests of species protected by the Migratory Bird Treaty Act (MBTA) or the California Fish and Game Code are present in the construction zone. Once the survey is complete, a report shall be prepared and sent to the Environmental Programs Department for review and concurrence. If active nests are observed and located, consultation with the California Department of Fish and Game (CDFG) to establish appropriate buffers will be required and the results of the report shall be submitted to CDFG for review and approval. The Environmental Programs Department will be contacted to ensure that proper CDFG approved buffers are in place prior to grading final. No grading permits

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

will be issued until the Environmental Programs Department confirms the presence of
appropriate buffers. In addition, a biological monitor will also be required to be on site
during all grading activities to ensure that the buffers are not compromised. At the
conclusion of all grading activity, the biological monitor will submit a letter report to the
Environmental Programs Department summarizing the result of the grading activity.
Focused surveys for nesting loggerhead shrike and black-tailed gnatcatcher individuals
shall be conducted in trees and shrubs of Sonoran creosote bush scrub, blue palo verde
wash woodland, disturbed/recovering Sonoran creosote bush scrub, and saltbush scrub
habitats that will be developed as part of project implementation or that is located within
500 feet of development areas. Because of the high mobility of non-nesting adult
individuals of these species, it is expected that surveys for nesting individuals and their
young, and protection for any nesting birds found, will provide the mitigation
appropriate for project-related impacts. Where nesting loggerhead shrike and/or blacktailed
gnatcatcher individuals are found, protection of nests shall include postponing or
halting clearing and construction activities within 500 feet of the nest until the nest is
vacated and juveniles have fledged and there is no evidence of a second attempt at
nesting, as determined by the biologist Construction personnel shall be instructed on the
sensitivity of nest areas and shall be instructed to avoid entering the approved buffers
around the nest. The biologist shall serve as a construction monitor during those periods
when construction activities will occur near active nest areas (within 500 feet) to ensure
that no inadvertent impacts on these nests will occur. The results of the survey, as well as
any avoidance measures taken and the success of those measures, shall be submitted to
the Riverside County Environmental Programs Department within 30 days of completion

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

of the pre-construction surveys and/or construction nest monitoring to document compliance with applicable state and federal laws pertaining to the protection of native birds.

6.4-9: Prior to implementing project approval, impacts resulting from project construction within the Riverside County portion of the proposed project site to pallid San Diego pocket mouse, which is not covered under the CVMSHCP, shall be mitigated through focused surveys utilizing small mammal trapping and relocation of this species. The applicant shall retain a qualified biologist currently holding a MOU with Riverside County to conduct the trapping. The survey results shall be submitted to the Riverside County Environmental Programs Department and CDFG. Prior to implementing project approval, if pallid San Diego pocket mouse is found during small mammal trapping efforts, an active trapping and relocation program shall be conducted by a qualified biologist currently holding a MOU with Riverside County, in coordination with the CDFG. The active trapping and relocation program shall move individuals to suitable on-site or off-site habitat that will not be directly impacted by project implementation. A portion of Sonoran creosote bush scrub and blue palo verde wash woodland located in the southern portion of the proposed project site will remain undeveloped upon implementation of the proposed project. Prior to implementing project approval, the project applicant shall protect those portions of Sonoran creosote bush scrub and blue palo verde wash woodland occurring within the Open Space-Conservation land use category through a conservation easement, deed restriction, or similar mechanism, as required by Mitigation Measure 6.4-3. This area provides suitable habitat for relocation of pallid San Diego pocket mouse.

6.4-10: Prior to implementing project approval, impacts

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

resulting from project construction
within the Riverside County portion of the proposed project
site to Colorado Valley
woodrat, which is not covered under the CVMSHCP, shall be
mitigated through
pre-construction surveys and relocation. The applicant
shall retain a qualified biologist
currently holding an MOU with Riverside County, to conduct
focused pre-construction
surveys for individuals of this species within suitable
habitat for the species. Surveys
shall be conducted within suitable habitat located within
500 feet of grading limits.
Surveys shall include an examination of those portions of
Sonoran creosote bush scrub,
blue palo verde wash woodland, disturbed/recovering Sonoran
creosote bush scrub, and
saltbush scrub habitats that will be developed as part of
project implementation. The
biologist shall survey for Colorado Valleywoodrat nests.
Where a Colorado Valley woodrat nest is found, it shall be
determined by the biologist in
which direction escape by any rat individuals occurring
inside the nest will be
encouraged. Vegetation around the nest in the opposite
direction shall be cleared to
discourage woodrat individuals from moving in that
direction. Once vegetation in that
direction is cleared, the nest shall be nudged with a
front-end loader, encouraging any
woodrats in the nest to exit the structure in the direction
that leads toward adjacent
habitat occurring within the Open Space-Conservation land
use category of the proposed
project or alternatively within areas near the project site
(such as ABDSP and SRSJM
National Monument, or other state or federally controlled
open space lands as allowable
by the administering agencies) including areas within
conservation easements). Once any
woodrats present in the nest have been encouraged to exit
the nest, nest materials shall
be carefully and slowly picked up with a front end loader
(slowly enough that any
woodrats remaining in the nest can escape), and the
materials shall be moved to adjacent

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

suitable habitat, as noted above, that will not be impacted by project development, where woodrats may scavenge nest materials to build newnests. Due to hantavirus hazards, the nest shall not be excavated by hand, and nest materials shall not be carried by hand. In the event that off-site habitat areas within 500 feet of grading are not accessible during preconstruction surveys, the presence of Colorado Valley woodrat shall be assumed and the entire project site boundary within 500 feet of grading activities shall be fenced to prohibit entry of woodrats into the grading site. The fence shall be monitored as a regular part of construction monitoring.

6.4-11: Prior to implementing project approval, impacts resulting from project construction within the Riverside County portion of the proposed project site to American badger, which is not covered under the CVMSHCP, shall be mitigated through a pre-construction clearance survey. The applicant shall retain a qualified biologist currently holding an MOU with Riverside County to conduct focused pre-construction surveys for individuals of this species within suitable habitat for the species. Surveys shall be conducted within suitable habitat located within 500 feet of grading limits. Surveys shall include an examination of those portions of Sonoran creosote bush scrub, blue palo verde wash woodland, disturbed/recovering Sonoran creosote bush scrub, and saltbush scrub habitats that will be developed as part of project implementation.

Prior to implementing project approval, if an active American badger burrow is located within project impact areas, a relocation program shall be implemented to remove the individual(s) from the area. The relocation program may be passive, in which badgers are excluded from occupied burrows by installation of a one-way door in burrow entrances, monitoring of the burrow for one week to confirm badger

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

usage has been discontinued,
and hand excavation and collapse of the burrow to prevent reoccupation; or the
relocation program may be active, in which badger individuals are safely captured and
transported to suitable habitat outside the impact area. Trapped individuals of the above
species shall be safely relocated onto on-site Sonoran creosote bush scrub and blue palo
verde wash woodland habitat located in of the project site that is not planned for
development. A portion of Sonoran creosote bush scrub and blue palo verde wash
woodland located in the southern portion of the proposed project site will remain
undeveloped upon implementation of the proposed project. In the event that off-site habitat areas within 500 feet of grading are not accessible during
preconstruction surveys, the presence of American badger shall be assumed and the
entire project site boundary within 500 feet of grading activities shall be fenced to
prohibit entry of badgers into the grading site. The fence shall be monitored as a regular
part of construction monitoring.
Prior to implementing project approval for each implementing project, the project
applicant shall protect those portions of Sonoran creosote bush scrub and blue palo verde
wash woodland occurring within the Open Space (Conservation) land use category
through a conservation easement, deed restriction, or similar mechanism, as required by
Mitigation Measure 6.4-3. This area provides suitable habitat for relocation of American
badger and sufficient carrying capacity is assumed for the conserved areas.

6.4-12: Prior to implementing project approval, impacts resulting from project construction
within the Riverside County portion of the proposed project site to special-status bird
species not covered under the CVMSHCP, which include great egret, great blue heron,
black-crowned night heron, double-crested cormorant, snowy egret, gull billed tern,

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

white-faced ibis, and black skimmer, shall be mitigated through pre construction surveys for nesting individuals of these species. Such surveys may be conducted concurrently with general nesting bird surveys, discussed in Mitigation Measure 6.4-13, below, and shall follow the methodology given in Mitigation Measure 6.4-13. If construction activities on the site are proposed during the nesting/breeding season (February 1 through August 31), a pre-activity survey shall be conducted by a qualified biologist currently holding an MOU with Riverside County prior to implementing project approval, to determine if active nests of species protected by the Migratory Bird Treaty Act (MBTA) or the California Fish and Game Code are present in the construction zone. Once the survey is complete a report shall be prepared and sent to the Environmental Programs Department for review and concurrence. If active nests are observed and located consultation with the California Department of Fish and Game (CDFG) to establish appropriate buffers will be required and the results of the report shall be submitted to CDFG for review and approval. The Environmental Programs Department will be contacted to ensure that proper CDFG approved buffers are in place prior to grading final. No grading permits will be issued until the Environmental Programs Department confirms the presence of appropriate buffers. In addition, a biological monitor will also be required to be on site during all grading activities to insure that the buffers are not compromised. At the conclusion of all grading activity, the biological monitor will submit a letter report to the Environmental Programs Department summarizing the result of the grading activity. Focused surveys for nesting individuals of these species shall be conducted in trees and shrubs and on the ground of Salton Sea shoreline habitat and arrowweed scrub adjacent to the Salton Sea that will be developed

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

as part of project implementation or that is located within 500 feet of development areas.
Because of the high mobility of non-nesting adult individuals of these species, it is
expected that surveys for nesting individuals and their young, and protection for any
nesting birds found, will provide the mitigation appropriate for project-related impacts.

6.4-13: Proposed project construction impacts to nesting birds located in project impact areas
within the Riverside County portion of the project site shall be mitigated through
pre-construction nesting bird surveys and avoidance of any nesting birds found.
If construction activities on the site are proposed during the nesting/breeding season
(February 1 through August 31), a pre-activity survey shall be conducted by a qualified
biologist currently holding an MOU with Riverside County prior to implementing
project approval, to determine if active nests of species protected by the Migratory Bird
Treaty Act (MBTA) or the California Fish and Game Code are present in the construction
zone. Once the survey is complete, a report shall be prepared and sent to the
Environmental Programs Department for review and concurrence. If active nests are
observed and located, consultation with the California Department of Fish and Game
(CDFG) to establish appropriate buffers will be required and the results of the report
shall be submitted to CDFG for review and approval. The Environmental Programs
Department will be contacted to ensure that proper CDFG approved buffers are in place
prior to grading final. No grading permits will be issued until the Environmental
Programs Department confirms the presence of appropriate buffers. In addition, a
biological monitor will also be required to be on site during all grading activities to
insure that the buffers are not compromised. At the conclusion of all grading activity, the
biological monitor will submit a letter report to the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.EPD. 1 EIR MIT. PRIOR TO PROJECT APPR (cont.) (cont.DRAFT

Environmental Programs Department
summarizing the result of the grading activity. Prior to grading final for each
implementing project for construction or site preparation, including grubbing or grading,
the applicant shall have weekly surveys conducted by a qualified biologist currently
holding an MOU with Riverside County to determine if active nests of native bird species
(including the special-status species discussed above) protected by the Migratory Bird
Treaty Act and/or the California Fish and Game Code are present in the construction
zone or within 300 feet (500 for raptors) of the construction zone. Surveys shall take place
in all habitat types containing trees, shrubs, or grasses. Because many birds known to the
project area (including loggerhead shrike) nest during the late winter, breeding bird
surveys shall be carried out both during the typical nesting/breeding season (mid-March
through September) and in January, February, and early March for winter nesting
species. The surveys shall continue on a weekly basis, with the last survey being
conducted no more than three days prior to initiation of clearance or construction work.
If ground-disturbing activities are delayed, then additional pre-construction surveys
shall be conducted such that no more than three days will have elapsed between the last
survey and the commencement of ground disturbing activities. Surveys shall include
examination of trees, shrubs, and the understory, as several bird species known to the
area and project site, are ground nesters, including burrowing owl, California horned
lark, and mourning dove.

FIRE DEPARTMENT

30.FIRE.999 SP - CONTACT FIRE REQUIRED

Applicant shall contact the Strategic Planning Bureau and submit a separate Memorandum of Understanding and/or Fire Mitigation Agreement for fire station design, construction

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.FIRE.999 SP - CONTACT FIRE (cont.) REQUIRED

and equipment purchase.

PARKS DEPARTMENT

30.PARKS. 1 SP - SP TRAILS PLAN RECOMMND

PRIOR TO THE APPROVAL OF ANY PROJECT (TENTATIVE MAP, USE PERMIT, AND/OR CHANGE OF ZONE):

The applicant is required to submit a trails plan for the project to the Riverside County Regional Park and Open-Space District for review and approval prior to project approval. The plan is to show an internal trail network and all connections to both the County of Riverside and County of San Diego trails systems and surrounding cities. It is provide typical cross sections for proposed development.

The applicant and its representative is advised to coordinate a meeting with the Planning staff at the Regional Park and Open-Space District to review trails and trail standards. The District's phone number is 951.955.4310

PLANNING DEPARTMENT

30.PLANNING. 1 MM - TRIBAL MOU RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the applicant shall secure a Memorandum of Understanding (MOU) between (a) the applicat, Riverside County, and the Torres Martinez Desert Cahuilla Indians (TMDCI) and (b) the applicant, Imperial County, and the TMDCI to address issues relating to tribal involvement on the properties within the boundaries of the specific plan and the application of EIR mitigation measures for the entire project site.

The MOU shall, at a minimum, include:

a. a tax-sharing arrangement between each County and the TMDCI;

b. assurances that drainage can and will be maintained across tribal land in perpetuity;

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 1 MM - TRIBAL MOU (cont.) RECOMMND

c. assurances that conservation easements can and will be maintained on tribal land in perpetuity;

d. assurances that the roads and circulation through tribal land will remain open to the public;

e. assurances that the land uses on tribal land will remain compatible with those areas in each County areas surrounding the tribal land;

f. permission to perform studies, including but not limited to, health risk assessments and biological surveys to ensure that public health and safety are maintained;

g. that proposed mitigations that involve tribal lands shall be permitted and implemented on all land within the project site; and

h. a limited waiver of sovereign immunity by the TMDCI sufficient to ensure that each County has an adequate legal remedy with respect to enforceability of the above items.

30.PLANNING. 2 MM - WASTE MGMT MOU (1) RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN, the County of Riverside Waste Management Department and the applicant shall enter into a Memorandum of Understanding (MOU) regarding the entire 166.6-acre County owned property, which includes the Oasis Landfill (two parcels consisting of APN 737-240-003 consisting of 161 acres and APN 737-200-032 consisting of 5.6 acres, and also referred as Planning Areas 2-18 and 2-19 of the SPECIFIC PLAN). If a portion of the 166.6 acre aforementioned property is not used as a regional style park, an amendment to the SPECIFIC PLAN shall be filed to specify an alternate location for a regional style park.

The Oasis Landfill shall remain open and active until Riverside County decides in its discretion to close the Oasis Landfill. The applicant shall use approximately 116.6 acres of the Oasis Landfill site as a future regional style park or other related uses (e.g., drainage). If the Oasis Landfill is to be used as a park site or otherwise developed, a formal agreement must be entered into between Riverside County and applicant or their successors and

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 2 MM - WASTE MGMT MOU (1) (cont.) RECOMMND

assigns, allowing for development of the 116.6-acre site for the use proposed by the applicant.

The MOU shall, at a minimum:

a. provide that approximately 50 acres of the Oasis Landfill site within the 161-acre parcel (APN 737-240-003), including the 23 acres currently permitted and used for solid waste disposal, will remain owned by the Riverside County Waste Management Department (the 50-acre site);

b. specify applicant's obligation to provide replacement off-site acreage (in fee simple title), for the 116.6 acres of non-landfill acreage owned by the County within the project site (i.e., SPECIFIC PLAN Planning Area 2-18 and the 166.6 acres owned by the County less the 50 acre site for the Oasis Landfill), in an acreage amount and location acceptable to the Riverside County Waste Management Department. The acreage amount shall not exceed 116.6 replacement acres. Other financial arrangements acceptable to the Riverside County may also be made in lieu of providing 116.6 replacement acres to the County;

c. specify the amount and timing of applicant's obligations, if any, with respect to funding the Box Canyon/State Highway 195 realignment and securing any and all necessary right-of-way approvals for such realignment;

d. provide that the applicant shall be responsible for mitigating the land use compatibility impacts associated with developing the SPECIFIC PLAN area and shall fund all mitigation costs necessary to make development activities compatible with adjacent Oasis Landfill (including, but not limited to screening, enhanced security, and enhanced environmental monitoring);

e. provide that applicant shall convey easements to the County sufficient to allow for the County's environmental monitoring/control activities within areas adjacent to the Oasis Landfill site;

f. provide that the Riverside County Waste Management Department and Riverside County is defended and indemnified for any liabilities arising out of applicant's activities on the 116.6 acre site;

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 2 MM - WASTE MGMT MOU (1) (cont.) (cont.) RECOMMND

g. provide that Riverside County Waste Management Department shall continue to be responsible for all monitoring and maintenance activity on the 50-acre site.

In the event that the Developer and/or the County elects not to enter into an MOU, then a Specific Plan Amendment shall be filed that shall, at a minimum, remove the 166.6-acre County owned land from the SPECIFIC PLAN, identify an alternative regional park location within the SPECIFIC PLAN, revise the Land Use Plan to reflect the new park site, and revise all other aspects of the SPECIFIC PLAN to accommodate the new park site. Any revised CEQA documentation shall also be completed with the Specific Plan Amendment.

30.PLANNING. 3 MM - WASTE MGMT MOU (2) RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"Prior to the issuance of any grading permits within the Specific Plan boundaries, a clearance letter shall be obtained from the Riverside County Waste Management Department (RCWMD) indicating that the applicant is in substantial conformance with the terms of the Landfill MOU specified in condition of approval 30.PLANNING.2, to the satisfaction of RCWMD."

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN RECOMMND

The following policies and implementation measures comprise the Master Cultural Resources Plan for SP 375 - Travertine Point Specific Plan and any descendant or implementing projects within the specific plan boundaries.

Cultural Resources Policy 1:
To actively pursue a comprehensive survey program for the entire 4,918-acre project area to identify, document, and protect, if feasible, prehistoric and historical archaeological sites, and sites containing Native American human remains.

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) RECOMMND

Implementation Measure 1-1: the proposed Project would be covered under the CEQA Guidelines (California 2005) or Section 106 of the National Historic Preservation Act (NHPA), and shall be surveyed by a professional who is registered with the County of Riverside for those areas within Riverside County, and acceptable to Imperial County and/or the Bureau of Indian Affairs for those project areas under those jurisdictions, regarding archaeological activities and methods prior to the County's approval of proposed Project plans (48 CFR 44716-44742).

Implementation Measure 1-2: All archaeological site location data collected during the cultural resources surveys shall be considered to be of a sensitive nature and must remain confidential. Caution must be exercised when disseminating this information; in particular, maps and site location data should be made available only to managers, County officials, federal officials, and other professionals on a demonstrated need to know basis.

Implementation Measure 1-3: For potentially significant prehistoric archaeological resources or sites containing Native American human remains identified during the Project's archaeological surveys, the Project proponent, or their designee or successors, shall continue consultation with the Native American Heritge Commission (NAHC) in Sacramento and interested Native American individuals and organzations.

Cultural Resources Policy 2:
To avoid impacts to potentially significant prehistoric and historical archaeology resources and sites containing Native American human remains, where feasible.

Implementation Measure 2-1: If Cultural resources avoidance is feasible, potentailly significant archaeological resources and sites containing Native American human remains shall be placed within permanent Project-specific conservation easements or dedicated open space-conservation areas.

Implementation Measure 2-2: Where avoidance of archaeological resources and sites containing Native American human remains is not a feasible managment option, capping these resources with sterile sediments and avoidance planting (e.g. planting of cactus, mesquite, or

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

other Native plants) shall be considered the next most favorable management option. In doing so, capping the resource(s) will ensure that direct impacts from increased public availability to these sites are avoided.
Site CA-RIV-8895 (33-17086) deep sediments may contain intact subsurface cultural deposits below the zone of disturbance. If this site cannot be avoided during project development, Phase II Testing and Evaluation is required to ascertain site integrity, data potential, and significance.

Site CA-RIV-8896 (33-17087) - If this site cannot be avoided during project development, Phase II testing is required to ascertain site integrity, data potential, and significance.

Site CA-IMP-8784 (13-009821) - If this site cannot be avoided during project development, Phase II testing is required to ascertain site integrity, data potential, and significance, in accordance with the standards of Imperial County.

Site CA-IMP-8785 (13-009822) - If this site cannot be avoided during project development, Phase II testing is required to ascertain site integrity, data potential, and significance, in accordance with the standards of Imperial County.

Site CA-IMP-8786 (13-009823) - this site consists of several interconnecting segments of a prehistoric aboriginal trail system that may be part of the "Northwest Santa Rosa Trail". Consultation with the participating Native American tribes is required to complete a determination for significance. Pending that consultation, this site is determined to be significant, in accordance with teh standards of Imperial County.

Site CA-IMP-33 - Travertine Rock - This is a significant site and avoidance is strongly recommended, in accordance with the standards of Imperial County. This site shall be be formally nominated as a Traditional Cultural Property (TCP) and to the National Register of Historic Places, if it has not already been listed, in accordance with the standards of Imperial County.

Site CA-IMP-92 - This site shall be tested to ascertain

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

site integrity, data potential, and site signfiicance if it cannot be avoided during project development, in accordance with the standards of Imperial County.

Site CA-IMP-100 - This site shall be tested to ascertain site integrity, data potential, and site significance if it cannot be avoided during project development, in accordance with teh standards of Imperial County.

Site CA-IMP-2626 - If this site cannot be avoided during project development, Phase II Testing and Evaluation is recommended to ascertain site integrity, data potential, and significance, in accordance with the standards of Imperial County.

Site CA-RIV-1525 - This site contained the largest aggregate of fish traps yet found in the Coachella Valley, however much of the site was destroyed by agriculture and land clearing by the applicant. Extant portions of the site may be eligible for listing on the National Register of Historic Places, and further evaluation is required prior to any implementing project approval within the site area. Portions of the site located on the tribal lands of the Torres-Martinez Desert Cahuilla Indians should be preserved in perpetuity.

Cultural Resources Policy 3:
To reduce adverse impacts to significant archaeological resources that cannot be protected in place through data recovery excavations.

Implementation Measure 3-1: If avoidance and/or preservation in place of known prehistoric and historical archaeological resources is not a feasible management option, the Project proponent or his/her successors, shall ensure that potentially significant archaeological resource(s), and site(s) shall be investigated pursuant to the standards, guidelines, and principles of the Advisory Council's Treatment of Archaeological Properties: A Handbook (ACHP 1980), except where any existing policies or guidelines adopted by the County of Riverside, County of Imperial, and/or Bureau ofIndian Affairs differ.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

Prior to the issuance of a Project-related grading permit, the Projects' proponent's consultant, registered with the County of Riverside and/or who meets the professional requirements of the County of Imperial or the Bureau of Indian Affairs, shall use the Project's Research Design detailed in Chapter 6 of the Phase I Cultural Resources report prepared by Applied Earthworks, dated April 2008, to guide the implementation of a Phase II Testing and Evaluation Program. In general terms, the Phase II Testing and Evaluation Program shall be designed to further define site boundaries and to assess the structure, content, nature, and depth of subsurface cultural deposits and features. Emphasis shall also be placed on assessing site integrity and the site's potential to address regional archaeological research questions. These data shall then be used to address the NRHP/CRHR eligibility requirements for the archaeological resource, and make recommendations as to the suitability of the resource for listing on either the national or state register of sites.

After approval of the Project's various cultural resources reports by the appropriate County and/or Bureau of Indian Affairs and prior to issuance of Project-related grading permits, the Project proponent's consultant shall complete the Phase II Testing Program as specified in the Project Phase II Testing and Evaluation Proposal and Research Design and prior to the issuance of a Project grading permit. The results of this Phase II Testing Program shall be presented in a technical report that follows the report requirements of the County of Riverside and/or the County of Imperial or the Bureau of Indian Affairs. The Phase II Report shall be submitted to the Lead Agency's Planning Department for review and comment and the Torres-Martinez Desert Cahuilla Indians prior to the issuance of a Project-related grading permit. If the resource is determined to be ineligible for listing on the NRHP/CRHR upon completion of the Phase II Testing Program, no further cultural resources management of this resource would be required.

Implementation Meausre 3-2: A participant-observer(s) from the Torres-Martinez Desert Cahuilla Indians shall be present during Phase II archaeological excavations involving all sites of Native American concern.

Implementation Measure 3-3: If the cultural resource is

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

identified as being potentially eligible for listing on wither NRHP and CRHR, and Project designs cannot be altered to avoid impacting the site, a Phase III Data Recovery Program to mitigate project effects shall be initiated. A Data Recovery Treatment plan detailing the objectives of the Phase III Program shall be developed and contain specific testable hypotheses pertinent to the project's Research Design and relative to the site(s) under study. The Phase III Data Recovery Treatment Plan shall be submitted to the County's Planning Department, the Torres-Martinez Desert Cahuilla Indians, if applicable, and the State Historic Preservation Office (SHPO) for review and comment prior to implementation of the Data Recovery program.

After Approval of the Treatment Plan, the Phase III Data Recovery Program for affected, eligible site(s) shall be completed. Typically, a Phase III Data Recovery Program involves the excavation of a statistically representative sample of the site(s) as being eligible for listing on the National Register of Historic Places of the California Register of Historic Resources. Again, participant-observer(s) from the Torres-Martinez Desert Cahuilla Indians shall be present during archaeological data-recovery excaations involving sites of Native American concern. At the conclusion of the Phase III Program, a Phase III Data Recovery Report shall be prepared, fulfilling the report requirements of the County of Riverside, County of Imperial, and/or the Bureau of Indian Affairs, as applicable. The Phase III Data Recovery Report shall be submitted to the County's Planning Department, the Torres-Martinez Desert Cahuilla Indians, if applicable, and the BIA and SHPO for review and comment prior to the issuance of a Project grading permit.

Implementation Measure 3-4: All arcaheological materials recovered during implementation of the Project's Phase II Testing or Phase III Data Recovery programs shall be processed, including cleaning and cataloguing, detailed description, and analyses, as appropriate. Following completion of laboratory and analytical procedures, all Project-related collections shall be suitably packaged and transferred to a curation facility that meets the standards of 36 CFR 79 for long-term storage. Materials to be curated include archaeological specimens and samples, field notes, feature and burial records, maps, plans, profile drawings,

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

photo logs, photographic negatives, consultant's reports of special studies, and copies of the final technical reports.

It should be noted that provisions of the Native American Graves Protection Repatriation Act (NAGPRA) pertaining to Native American burials, sacred objects, and objects of cultural patrimony would come into effect when archaeological materials are recovered from lands owned by the Torres-Martinez Desert Cahuilla Indians and managed by the BIA. As well, NAGPRA would also apply when ownership of the collections from anywhere within the Travertine Point Specific Plan study area transfer to a curation repository that received federal funding. Should the Torres-Martinez Band of Desert Cahuilla Indians request repatriation of cultural materials from non-federal lands within the Specific Plan, those materials shall be repatriated upon submittal of the Phase IV Archaeological Monitoring Report to the County Archaeologist. This report shall follow the report format posted on the TLMA website for Phase IV work.

Cultural Resources Policy 4:
To ensure proper identification and treatment of cultural resources discovered during Project development and construction.

Implementation Meaure 4-1: Registered professional archaeologists and culturally affiliated Native Americans, with knowledge in cultural resources, shall monitor all Project-related ground-disturbing activities that extend into natural sediments or other land forms in areas determined to have high archaeological sensitivity for prehistoric resources.

Prior to the County-permitted Project, the Project proponent shall include in their Mitigation Plan provisions for the identification and evaluation of archaeological resources inadvertantly discovered during construction. Thus, if buried archaeological resources are uncovered during construction, all work shall be halted in the vicinity of the archaeological discovery until a registered professional archaeologist can visit the site of discovery and evaluate the significance of the archaeological resource.

Implementation Measure 4-1a: Registered professional

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

archaeologists experienced in historical archaeological resources shall monitor all Project-related ground-disturbing activities that extend into natural sediments or other land forms in areas determined to have high archaeological sensitivity for historical resources.

Implementation Measure 4-2: If the archaeological resource is determined to be a potentially significant cultural resource, the Project proponent's Mitigation Plan shall include provisions for the preparation and implementation of a Phase III Data Recovery Program, as well as disposition of recovered artifacts, in accordance with Cultural Resource Policy 3, Implementation Measure 4, above.

Implementation Measure 4-3: In the event of an accidental discovery of any human remains in a location other than a dedicated cemetery on privately-owned or State-owned land, the steps and procedures specified in Health and Safety Code Subsection 7050.5, State CEQA Guidelines 15064.5(d, and Public Resources Code Subsection 5097.98 shall be implemented. Specifically, in accordance with Public Resources Code Subsection 5097.98, the Riverside County Coroner shall be notified within 24 hours of the discovery of potentially human remains. The Coroner shall then detemine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with PRC Subsection 5097.98. The NAHC shall then designate a Most Likely Descendant (MLD) with respect to the human remains within 48 hours of notification.

The MLD shall then have the opportunity to recommend to the Project proponent means for treating or dispsoing with appropriate dignity, the human remains and associated grave goods wtihin 24 hours of notification. Whenever the NAHC is unable to identify an MLD, or the MLD fails to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the MLC and the mediation provided for in subdivision (k) of the PRC SS 5097.94 fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall re-inter the human remains and items associated with Native American burials with appropriate

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

dignity on the property in a location not subject to further subsurface disturbance.

It should be noted that in the event that Native American human remains are inadvertantly discovered during the County-permitted, Project-related construction activitie, there would be unavoidable signfiicant adverse impacts to these resources. Implementation of the Cultural Resources Policies 1, 2 and 3 and their corresponding implmentation measures would, however, reduce impacts to other types of archaeological resources to a level that is less than significant.

Implementation Measure 4-4: The treatment and management of potential Traditional Cultural Properties (TCPs) identified with the Travertine Point Specific Plan study area shall be conducted through extensive consultation with concerned Native American groups and organzations. These consultation efforts shall be conducted utilizing the County of Riverside's SB 18 consultation process, or those employed by the County of Imperial, as appropriate.

Cultural Resources Policy 5:
To ensure that the Project proponent shall bear all costs associated with cultural resources management within the County's jurisdiction.
Implementation Measure 5-1: The Project proponent shall bear all expenses realted to the identification, evaluation, and treatment of cultural resources directly or indirectly affected by Project-related construction activity. Such expenses may include, pre-field planning, field work, post field analyses, research, interim and summary report preparation, and final report production (including draft and final versions), and costs associated with the curation of project documentation and the associated artifact collections.

Implementation Measure 5-2: On behalf of the County and the Project proponent, the final technical reports detailing the results of the Phase II Testing or Phase III Data Recovery programs shall be submitted to the appropriate Archaeological Information Centers of the California Historical Resources Inventory System for their information and where they would be available to other researchers. As well, final Phase III Data Recovery Reports shall be submitted to local libraries, schools, participating

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.)RECOMMND

tribes, and historical societies to enable the general public to learn about their local cultural heritage.

Implementation Measure 5-3: Phase IV Archaeological Monitoring Reports shall be submitted prior to final inspection for each permitted project within the specific plan. Every grading permit subject to archaeological monitoring shall result in a Phase IV report submitted to the County Archaeologist and/or BIA.

Cultural Resources Policy 6- Directives for specific cultural resources sites known as of September 18, 2008, pursuant to the recommendations from the Phase I Cultural Resources report prepared for this specific plan by Applied Earthworks, April 2008:

Site AE-TRV-1H - preliminary significance evalution determines that this site is potentially significant resource as it has been an important source of fresh water to enable the settlement and agricultural development of this portion of the Coachella Valley for the past 70 years.

Site CA-RIV-8891 (33017082) - if this site cannot be avoided during project development, Phase II Testing and Evaluation is recommended to ascertain site integrity, data potential, and significance.

Site CA-RIV-8892/H (33-17083) - The data potential was realized during site recordation and archival resarch, therefore no further management of this resource is recommended.

Site CA-RIV-8893/H (33-17084) - The data potential was realized during recordation and archival research, therefore no further management of this resource is recommended.

Site CA-RIV-8894 (33-17085) - The site is located within an alluvial, depositional environment with undetermined soil depth, and there is some potential for intact subsurface cultural deposits beneath the zone of mechanical distrubance. If this site cannot be avoided during the project development, Phase II Testing and Evaluation is recommended to ascertain site integrity, data potential, and significance.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 4 SP - MASTER CULTURAL RES PLAN (cont.) (cont.) RECOMMND

Site CA-RIV-8895 (33-17086) deep sediments may contain intact subsurface cultural deposits below the zone of disturbance. If this site cannot be avoided during project development, Phase II Testing and Evaluation is required to ascertain site integrity (33-17086) - The potentially s

30.PLANNING. 7 SP - GEOLOGIC STUDY RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project and satisified prior to scheduling that project for public hearing:

"PRIOR TO SCHEDULING THIS PROJECT FOR A PUBLIC HEARING/ACTION, THE FOLLOWING SPECIAL GEOLOGIC STUDIES SHALL BE SUBMITTED TO AND APPROVED BY THE COUNTY GEOLOGIST:

A geologic/geotechnical investigation report. The investigation shall address geologic hazards including, but not necessarily limited to, slope stability, rock fall hazards, landslide hazards, surface fault rupture, fissures, liquefaction potential, collapsible and/or expansive soils, subsidence, wind and water erosion, debris flows, and groundshaking potential. For completeness and direct correlation to the proposed project, the consultant shall be provided the most recent copy of the project case exhibit (tract map, parcel map, plot plan, CUP, etc.) for incorporation into the consultant's report. Furthermore, the consultant shall plot all appropriate geologic and geotechnical data on this case exhibit and include it as an appendix/figure/plate in their report. The geologic/geotechnical investigation report shall be reviewed and approved by the County Engineering Geologist prior to scheduling this case for a public hearing.

Note: acquisition of a County geologic report (GEO) number and submittal of review fees is required (DBF to be determined). All reports (2 wet-signed original copies), Planning Geologic Report application (case sub-type GEO3) and deposit base fee payment should be submitted, in person by the applicant or his/her representative, at one of the County's two main offices (Riverside, Palm Desert). These items should be submitted at the Land Use counter. Reports and payment should not be given to the Planner or County Geologist directly.

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 7 SP - GEOLOGIC STUDY (cont.) RECOMMND

The applicant and their consultant should also be aware that County Ordinance 457.98 requires a grading permit for any exploratory excavations consisting of 1000 cubic yards or greater in any one location of one acre or more. This applies to all trenching, borings and any access road clearing/construction that may be necessary."

30.PLANNING. 8 SP - M/M PROGRAM (GENERAL) RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"The EIR prepared for the SPECIFIC PLAN imposes specific mitigation measures and monitoring requirements on the project. Certain conditions of the SPECIFIC PLAN and this implementing project constitute reporting/monitoring requirements for certain mitigation measures."

30.PLANNING. 12 SP - PROJECT LOCATION EXHIBIT RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"The applicant shall provide to the Planning Department an 8 1/2" x 11" exhibit showing where in the SPECIFIC PLAN this project is located. The exhibit shall also show all prior implementing projects within the SPECIFIC PLAN that have already been approved.

This condition shall be considered MET once the applicant provides the Planning Department with the required information. This condition may not be DEFERRED."

30.PLANNING. 19 SP - EA REQUIRED RECOMMND

Prior to the approval of any implementation project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 19 SP - EA REQUIRED (cont.) RECOMMND

"If this implementing project is subject to the California Environmental Quality Act (CEQA), an environmental assessment shall be filed and processed concurrently with this implementing project. At a minimum, the environmental assessment shall utilize the evaluation of impacts addressed in the EIR prepared for the SPECIFIC PLAN.

This condition shall be considered as MET if an environmental assessment was conducted for this implementing project. This condition may be considered as NOT APPLICABLE if this implementing project is not subject to CEQA. This condition may not be DEFERRED."

30.PLANNING. 20 SP *- ADDENDUM EIR RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"This implementing project has been reviewed in the context the EIR, which is associated with this SPECIFIC PLAN. The Planning Department has reviewed this project and its relationship to the EIR, and has found that no new environmental impacts have arisen since the certification of the EIR. Although the EIR adequately addressed the environmental impacts of the SPECIFIC PLAN as a whole, more detailed technical informaiton (i.e. traffic studies, updated biological studies, etc.) have been required by the Planning Department and/or other COUNTY land development review departments in order to complete its environmental review. Therefore, an ADDENDUM to the previously certified EIR has been prepared in conjunction with this implementing application.

This condition shall be considered MET if an ADDENDUM to the EIR has been prepared. Alternatively, this condition shall be considered as NOT APPLICABLE if an ADDENDUM to the EIR is not required."

30.PLANNING. 21 SP *- SUPPLEMENT TO EIR RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 21 SP *- SUPPLEMENT TO EIR (cont.) RECOMMND

"This implementing project has been reviewed in the context the EIR, which is associated with this SPECIFIC PLAN. The Planning Department has reviewed this project and its relationship to the EIR, and has found that although the EIR adequately addressed the environmental impacts of the SPECIFIC PLAN at the time, new environmental impacts have arisen since the certification of the original EIR. The Planning Department has determined that the new environmental impacts can be mitigated to below a level of significance. Therefore, a SUPPLEMENT to the previously certified EIR has been prepared in conjunction with this implementing application.

This condition shall be considered MET if a SUPPLEMENT to the EIR has been prepared. Alternatively, this condition shall be considered as NOT APPLICABLE if a SUPPLEMENT to the EIR is not required."

30.PLANNING. 22 SP *- SUBSEQUENT EIR RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"This implementing project has been reviewed in the context the EIR, which is associated with this SPECIFIC PLAN. The Planning Department has reviewed this project and its relationship to the EIR, and has found that although the EIR adequately addressed the environmental impacts of the SPECIFIC PLAN at the time, new environmental impacts have arisen since the certification of the original EIR. The Planning Department has determined that this implementing project may have a signficant impact to the new environmental impacts that have arisen. Therefore, a SUBSEQUENT EIR has been prepared in conjunction with this implementing application.

This condition shall be considered MET if a SUBSEQUENT EIR has been prepared. Alternatively, this condition shall be considered as NOT APPLICABLE if a SUBSEQUENT to the EIR is not required."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 23 SP - COMPLETE CASE APPROVALS RECOMMND

Prior to the approval of any implementing project (tract map, parcel map, use permit, plot plan, etc.) the SPECIFIC PLAN, the GPA, the CHANGE OF ZONE, and the EIR must have been approved, adopted, and certified by the Board of Supervisors, respectively.

This condition shall be considered as MET once the SPECIFIC PLAN, the GPA, the CHANGE OF ZONE, and the EIR have been approved, adopted, and certified by the Board of Supervisors, repectively. This condition may not be DEFERRED.

30.PLANNING. 24 SP - AMENDMENT REQUIRED RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"If this implementing project meets any of the following criteria, an amendment to the SPECIFIC PLAN shall be required and processed concurrently with this implementing project:

1. The implementing project adds any area to, or deletes area from, the SPECIFIC PLAN;

2. The implementing project proposes a substantially different use than currently allowed in the SPECIFIC PLAN (i.e. proposing a residential use within a commercially designated area); or

3. as determined by the Planning Director.

Any amendment to the SPECIFIC PLAN, even though it may affect only one portion of the SPECIFIC PLAN, shall be accompanied by a complete specific plan document which includes the entire specific plan, including both changed and unchanged parts.

This condition shall be considered MET if the specific plan amendment has been filed, and NOT APPLICABLE if a specific plan amendment is determined to be unnecessary."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 25 SP - PARK AGENCY REQUIRED RECOMMND

Prior to the approval of any implementing land division project within the SPECIFIC PLAN (i.e. tract map, or parcel map), the following condition shall be placed on the implementing project:

"PRIOR TO MAP RECORDATION of any subdivision, or other residential development application, all portions of this implementing project not currently within the boundaries of the Desert Recreation District (DRD), shall be annexed into the DRD or a similar entity such as a County Service Area/District that has been designated by the Board of Supervisors, pursuant to Section 10.35(G) of Ordinance No. 460, to receive park dedications and fees. Documentation of said annexation shall be provided to the Planning Department.

This condition shall be considered as NOT APPLICABLE if the DRD, or simmilar entity, is unwilling or unable to annex the property in question."

30.PLANNING. 26 SP - AG/DAIRY NOTIFICATION RECOMMND

Prior to the approval of any implementing residential land division within the SPECIFIC PLAN, and within one half mile of existing agricltural uses, the following condition of approval shall be applied to the implementing project stating that:

"PRIOR TO MAP RECORDATION, the applicant shall submit a detailed proposal for the notification of all initial and future purchasers of dwelling units within the subject project of the existence of dairies and/or other agricultural uses within one half mile of the subject property (both within and external to the SPECIFIC PLAN) and potential impacts resulting from those uses. Said notification shall be in addition to any notice required by Ordinance No. 625 (Riverside County Right-to-Farm Ordinance). Said approved notification shall be provided to all initial and all future purchasers of dwelling units within the subject project as long as proximal agricultural uses continue."

30.PLANNING. 27 SP *- PA PROCEDURES RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map or parcel map), the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 27 SP *- PA PROCEDURES (cont.) RECOMMND

following condition shall be placed on the implementing project PRIOR TO MAP RECORDATION in the case of land division applications (tentative parcel maps or tentative tract maps) or PRIOR TO BUILDING PERMITS in the case of use permit applications (plot plans, conditional use permits, or public use permits):

"The planning area[s] for which this land division application is located must be legally defined. Any of the following procedures may be used in order to legally define this [these] planning area[s]:

1. The project proponent has processed a FINAL CHANGE OF ZONE MAP concurrent with the SPECIFIC PLAN which legally defined this [these] planning area[s].
2. The project proponent shall file a change of zone application along with a legal description defining the boundaries of the planning area affected by this land division application. The applicant will not be changing the allowed uses or standards within the existing zone but will merely be providing an accurate legal description of the affected planning area. The change of zone shall be approved and adopted by the Board of Supervisors."

30.PLANNING. 28 SP *- CC&R RES PUB COMMON AREA RECOMMND

Prior to the approval of any implementing land division project (i.e. tract map or parcel map), the following condition shall be applied to the land division PRIOR TO MAP RECORDATION if the permanent master maintenance organization referenced in the condition entitled "SP - Common Area Maintenance" is a public organization:

"The applicant shall convey to the County fee simple title, to all common open space areas, free and clear of all liens, taxes, assessments, leases (recorded or unrecorded) and easement, except those easements which in the sole discretion of the County are acceptable. As a condition precedent to the County accepting title to such areas, the applicant shall notify the Planning Department that the following documents shall be submitted to the Office of the County Counsel and submit said documents for review along with the current fee, which shall be subject to County Counsel approval:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 28 SP *- CC&R RES PUB COMMON AREA (cont.) RECOMMND

1. A cover letter identifying the project for which approval is sought;

2. A signed and notarized declaration of covenants, conditions and restrictions;

3. A sample document, conveying title to the purchaser, of an individual lot or unit which provides that the declaration of covenants, conditions and restrictions is incorporated therein by reference; and,

4. A deposit equaling three (3) hours of the current hourly fee for Review of Covenants, Conditions and Restrictions established pursuant to County Ordinance No. 671 at the time the above referenced documents are submitted for County Counsel review.

The declaration of covenants, conditions and restrictions submitted for review shall a) provide for a minimum term of 60 years, b) provide for the establishment of a property owners' association comprised of the owners of each individual lot or unit as tenants in common, and c) contain the following provisions verbatim:

"Notwithstanding any provision in this Declaration to the contrary, the following provisions shall apply:

The property owners' association established herein shall, if dormant, be activated, by incorporation or otherwise, at the request of the County of Riverside, and the property owners' association shall unconditionally accept from the County of Riverside, upon the County's demand, title to all or any part of the 'common area', more particularly described on Exhibit '___' attached hereto. Such acceptance shall be through the president of the property owner's association, who shall be authorized to execute any documents required to facilitate transfer of the 'common area'. The decision to require activation of the property owners' association and the decision to require that the association unconditionally accept title to the 'common area' shall be at the sole discretion of the County of Riverside.

In the event that the 'common area', or any part thereof, is conveyed to the property owners' association, the association, thereafter, shall own such 'common area',

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 28 SP *- CC&R RES PUB COMMON AREA (cont.) (cont.RECOMMND

shall manage and continuously maintain such 'common area', and shall not sell or transfer such 'common area' or any part thereof, absent the prior written consent of the Planning Director of the County of Riverside or the County's successor-in-interest. The property owners' association shall have the right to assess the owner of each individual lot or unit for the reasonable cost of maintaining such 'common area', and shall have the right to lien the property of any such owner who defaults in the payment of a maintenance assessment. An assessment lien, once created, shall be prior to all other liens recorded subsequent to the notice of assessment or other document creating the assessment lien.

This declaration shall not be terminated, 'substantially' amended, or property deannexed therefrom absent the prior written consent of the Planning Director of the County of Riverside or the County's successor-in-interest. A proposed amendment shall be considered 'substantial' if it affects the extent, usage or maintenance of the 'common area' established pursuant to this Declaration.

In the event of any conflict between this Declaration and the Articles of Incorporation, the Bylaws, or the property owners' association Rules and Regulations, if any, this Declaration shall control."

Once approved by the Office of County Counsel, the declaration of covenants, conditions and restrictions shall be recorded by the Planning Department with one copy retained for the case file, and one copy provided to the County Transportation Department - Survey Division."

30.PLANNING. 29 SP *- CC&R RES PRI COMMON AREA RECOMMND

Prior to the approval of any implementing land division project within the SPECIFIC PLAN (tract map or parcel map), the following condition shall be placed on the implementing project PRIOR TO MAP RECORDATION if the permanent master maintenance organization referenced in the condition entitled "SP - Common Area Maintenance" is a private organization:

"The applicant shall notify the Planning Department that the following documents shall be submitted to the Office of

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 29 SP *- CC&R RES PRI COMMON AREA (cont.) RECOMMND

County Counsel and submit said documents for review along with the current fee, which shall be subject to County Counsel approval:

1. A cover letter identifying the project for which approval is sought;

2. A signed and notarized declaration of covenants, conditions and restrictions;

3. A sample document, conveying title to the purchaser of an individual lot or unit, which provides that the declaration of covenants, conditions and restrictions is incorporated therein by reference; and,

4. A deposit equaling three (3) hours of the current hourly fee for Review if Covenants, Conditions and Restrictions established pursuant to County Ordinance No. 671 at the time the above referenced documents are submitted for County Counsel review.

The declaration of covenants, conditions and restrictions submitted for review shall a) provide for a minimum term of 60 years, b) provide for the establishment of a property owners' association comprised of the owners of each individual lot or unit as tenants in common, c) provide for ownership of the common area by either the property owners' association or the owners of each individual lot or unit as tenants in common, and (d) contain the following provisions verbatim:

"Notwithstanding, any provision in this Declaration to the contrary, the following provisions shall apply:

The property owners' association established herein shall manage and continuously maintain the 'common area', more particularly described on Exhibit '___', attached hereto, and shall not sell or transfer the 'common area' or any part thereof, absent the prior written consent of the Planning Director of the County of Riverside or the County's successor-in-interest.

The property owners' association shall have the right to assess the owners of each individual lot or unit for the reasonable cost of maintaining such 'common area' and shall have the right to lien the property of any such owner who

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 29 SP *- CC&R RES PRI COMMON AREA (cont.) (cont.RECOMMND

defaults in the payment of a maintenance assessment. An assessment lien, once created, shall be prior to all other liens recorded subsequent to the notice of assessment or other document creating the assessment lien.

This Declaration shall not be terminated, 'substantially' amended, or property deannexed therefrom absent the prior written consent of the Planning Director of the County of Riverside or the County's successor-in-interest. A proposed amendment shall be considered 'substantial' if it affects the extent, usage or maintenance of the 'common area' established pursuant to this Declaration.

In the event of any conflict between this Declaration and the Articles of Incorporation, the Bylaws, or the property owners' association Rules and Regulations, if any, this Declaration shall control."

Once approved by the Office of County Counsel, the declaration of covenants, conditions and restrictions shall be recorded the Planning Department with one copy retained for the case file, and one copy provided to the County Transportation Department - Survey Division."

30.PLANNING. 31 SP - PALEO M/M PROGRAM RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMITS, the project applicant shall enter into an agreement with a qualified paleontologist. This agreement shall include, but not be limited to, the preliminary mitigation and monitoring procedures to be implemented during the process of grading. A copy of said agreement shall be submitted to the Planning Department. No grading permits will be issued unless the preliminary mitigation and monitoring procedures as described in the EIR are substantially complied with."

30.PLANNING. 32 SP - GENERIC M/M PROGRAM RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit,

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 32 SP - GENERIC M/M PROGRAM (cont.) RECOMMND

plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMITS, the project applicant shall provide to the Planning Department a detailed proposal for complying with the preliminary mitigation and monitoring procedures described in the EIR for the process of grading. Grading permits will not be issued unless the preliminary mitigation and monitoring procedures as described in the EIR are substantially complied with."

30.PLANNING. 33 SP - F&G CLEARANCE RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e. tract map, parcel map, use permit, plot plan, etc.) which may propose grading or construciton within or along the banks of any blue-lined stream, the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMITS, the applicant shall obtain written notification to the County Planning Department that the appropriate California Department of Fish and Game notification pursuant to Sections 1601/1603 of the California Fish and Game Code has taken place, or obtain an "Agreement Regarding Proposed Stream or Lake Alteration" (Sections 1601/1603 Permit) should any grading or construction be proposed within or along the banks of any natural watercourse or wetland, located either on-site or any required off-site improvement areas. Copies of any agreement shall be submitted with the notification."

30.PLANNING. 34 SP - ACOE CLEARANCE RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e. tract map, parcel map, use permit, plot plan, etc.) which may propose grading or construciton within or along the banks of any blue-lined stream which is determined to be within the jurisdiction of the United States Army Corps of Engineers, the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMITS, the applicant shall obtain written notification to the County Planning Department that the alteration of any watercourse or

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 34 SP - ACOE CLEARANCE (cont.) RECOMMND

wetland, located either on-site or on any required off-site improvement areas, complies with the U.S. Army Corps of Engineers Nationwide Permit Conditions, or obtain a permit under Section 404 of the Clean Water Act should any grading or construction be proposed within or along the banks of any natural watercourse or wetland. Copies of any agreement shall be submitted with the notification."

30.PLANNING. 36 SP - POST GRADING REPORT RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMITS, the project applicant shall provide to the Planning Department a post grading report. The report shall describe how the mitigation and monitoring program as described in the EIR and pre-grading agreement with the qualified archaeologist/paleontologist/other were complied with."

30.PLANNING. 37 SP - SCHOOL MITIGATION RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO BUILDING PERMITS, impacts to the Coachella Valley Unified School District shall be mitigated in accordance with state law."

30.PLANNING. 38 SP - ARCHAEOLOGIST RETAINED RECOMMND

Prior to the approval of any land division or development permit (use permit, plot plan, etc.), a condiiton of approval shall be applied to the land division or development permit to ensure that the unique archaeologic resources identified in the Cultural Resources Report prepared as part of this Specific Plan's environmental documentation have been adequately addressed. The condition shall read as follows:

Prior to the issuance of grading permits, a qualified archaeologist shall be retained by the land divider for

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 38 SP - ARCHAEOLOGIST RETAINED (cont.) RECOMMND

consultation and comment on the proposed grading with respect to potential impacts to unique archaeological resources. Should the archaeologist, after consultation with the appropriate Native American tribe, find the potential is high for impact to unique archaeological resources (cultural resources and sacred sites), a pre-grading meeting between the archaeologist, a Native American observer, and the excavation and grading contractor shall take place. During grading operations, when deemed necessary in the professional opinion of the retained archaeologist (and/or as determined by the Planning Director), the archaeologist, the archaeologist's on-site representative(s) and the Native American Observer shall actively monitor all project related grading and construction and shall have the authority to temporarily divert, redirect, or halt grading activity to allow recovery of unique archaeological resources. Prior to the issuance of grading permits, the NAME, ADDRESS and TELEPHONE NUMBER of the retained archaeologist shall be submitted to the Planning Department and the B&S Grading Division. If the retained archaeologist, after consultation with the appropriate Native American tribe, finds no potential for impacts to unique archaeological resources, a letter shall be submitted to the Planning Department certifying this finding by the retained qualified archaeologist.

30.PLANNING. 39 SP - IF HUMAN REMAINS FOUND RECOMMND

Prior to the approval of any land division or development permit (use permit, plot plan, etc.), a condition of approval shall be applied to the land division or development permit, and shall read as follows:

If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resource Code section 5097.98. The County Coroner shall be notified of the find immediately. If the remains are determined to be prehistoric, the coroner shall notify the Native American Heritage Commission, which will determine and notify the appropriate NATIVE AMERICAN TRIBE who is the most likely descendent. The descendent shall inspect the site of the discovery and make a recommendation as to the appropriate mitigation. After the recommendations have

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 39 SP - IF HUMAN REMAINS FOUND (cont.) RECOMMND

been made, the land divider, a Native American Tribe representative, and a County representative shall meet to determine the appropriate mitigation measures and corrective actions to be implemented.

30.PLANNING. 40 SP - COMMON AREA MAINTENANCE RECOMMND

Prior to the approval of any implementing land division project within the SPECIFIC PLAN (i.e. tract map or parcel map), the following condition shall be placed on the implementing application:

"PRIOR TO MAP RECORDATION, the following procedures for common area maintenance procedures shall be complied with:

a. A permanent master maintenance organization shall be established for the SPECIFIC PLAN area to assume ownership and maintenance responsibility for all common recreation, open space, circulation systems and landscaped areas. The organization may be public or private. Merger with an area-wide or regional organization shall satisfy this condition provided that such organization is legally and financially capable of assuming the responsibilities for ownership and maintenance. If the organization is a private association then neighborhood associations shall be established for each residential development, where required, and such associations may assume ownership and maintenance responsibility for neighborhood common areas.

b. Unless otherwise provided for in these conditions of approval, common open areas shall be conveyed to the maintenance organization as implementing development is approved or any subdivision as recorded.

c. The maintenance organization shall be established prior to or concurrent with the recordation of the first land division. Any agreements with the maintenance organization shall stipulate that maintenance of landscaped areas will occur in accordance with Ordinance No. 859 (as adopted and any amendments thereto) and the Riverside Guide to California Friendly Landscaping.

d. Covenants, Conditions, and Restrictions for the SPECIFIC PLAN shall prohibit the use of water-intensive landscaping and require the use of low water use landscaping pursuant to the provisions of Ordinance No.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 40 SP - COMMON AREA MAINTENANCE (cont.) RECOMMND

859 (as adopted and any amendments thereto).

e. Covenants, Conditions, and Restrictions for the SPECIFIC PLAN shall incorporate provisions concerning landscape irrigation system management and maintenance for the purpose of facilitating the water-efficient landscaping requirements of Ordinance No. 859 (as adopted and any amendments thereto). The common areas to be maintained by the master maintenance organization shall be identified in the DISTRICT REFINMENT PLAN'S"

30.PLANNING. 41 SP - ENTRY MONUMENTATION RECOMMND

All monumentation shall be in substantial conformance to the DISTRICT REFINMENT PLAN for the respective DISTRICT of the SPECIFIC PLAN.

Landscaping of entry monument(s) shall comply with Ordinance No. 859 (as adopted and any amendments thereto) and the Riverside County Guide to California Friendly Landscaping."

30.PLANNING. 45 SP - CVWD CLEARANCE RECOMMND

The Coachella Valley Water District (CVWD) has indicated a conceptual approval of the Specific Plan design and related studies in a letter provided to the Planning Department on October 22, 2010. The following conditions of approval were requested in said letter. Prior to approval of any implementing project, the project proponent shall provide a clearance letter from CVWD to the Planning Department indicating that the following requirements have been met to the satisfaction of CVWD:

1. Flood risks from two drainage areas and potential flows from the Un-named Canyon South of Barton Canyon-Fan 6 and Barton Canyon-Fan 5 were not identified in the Report as a flood hazard that impact the development at the northwestern and north boundaries (Pierce Street and Avenue 80). The two drainage areas contribute approximately 1,200 - 2,000 cfs per square mile. The flows from the two drainage areas along with potential flows from Un-named Canyon-Fan 6 and Barton Canyon-Fan 5 will need to be determined and facilities constructed to collect, route and discharge the flows in a manner compatible with pre-project/existing conditions. These flood risks are

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 45 SP - CVWD CLEARANCE (cont.) RECOMMND

identified on the Exhibit.

2. The proposed flood control scheme will need to adequately address potential upstream and downstream impacts, as summarized below:

a. Channel 4 collects flow from a fan surface and discharges 3,490 cfs of concentrated flow into a culvert at HWY 86 where there are no downstream improvements. The discharge from Channel 4 must be released in a manner consistent with pre- project/existing conditions, which will require future analysis to define these conditions. Altematively, the developer can store or discharge flows within the boundaries of the northem portion of the development or obtain flooding easements from northem adjacent property owners.

b. The existing flood hazard analysis shows depths of 1 to 2 feet and velocities of 6 to 7 feet per second (fps) near the upstream (southwesterly) boundary of the development. The flood control concept plans show velocities that exceed 15 fps and depths of over 2 feet in the proposed channels. It is our view that the proposed depths and velocities will rapidly erode their proposed (natural bottom) flood channels and erosion may extend upstream of the development boundary. Future detailed analyses will be required to demonstrate that the channels remain stable, maintain their flood conveyance capacity and do not alter properties upstream of the development. Engineering solutions may include wider or concrete lined flood control channels.

c. The flood control scheme proposes to excavate flood basins and sediment traps and construct diversion channels to route flows from Channel 1, 2 and 3 through existing culverts within HWY 86's right-of-way. It is not known if Caltrans will permit the developer to build these facilities and we are not yet convinced that routing the peak flows through the existing culverts is a practical solution to flood management. Future detailed analysis will be required and engineering solutions may require improved or new culverts/bridges under HWY 86.

d. The developer will be required to obtain tentative approval from Caltrans for use and/or improvements within their right-of-way.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 45 SP - CVWD CLEARANCE (cont.) (cont.) RECOMMND

e. The flood control scheme has three channels that discharge concentrated flows of 840 cfs, 34,039 cfs and 11,306 cfs into the Salton Sea. No analysis has been provided to demonstrate these discharges are reasonably similar to pre-project conditions. As well, potential impacts from sediment deposition and the Sea's receding shoreline on downstream properties have not been addressed. Future detailed analysis will be required that demonstrates the issues above have been addressed; such an analysis may result in changes to the conceptual designs of Channels 1, 2 and 3.

f. The flood control scheme proposes flood basins and sediment traps to the east of HWY 86 as part of protecting the development. These basins will capture sediment transported from the Santa Rosa Mountains and also capture sediments eroded from the flood control channels. Future detailed analyses will be required to predict the volumes of sediment that might be transported and trapped to ensure that the flood control scheme will function under these predicted volumes and develop a practical sediment management program.

3. A future detailed document that discusses the management, operations, and maintenance of the flood control system will also be required.

The development proposes to use for flood control several CVWD irrigation drainage channels that discharge into the Salton Sea. Coachella Valley drainage channels have existing beneficial uses that include preservation of rare, threatened or endangered species. Please note that the Conditional Letter of Map Revision (CLOMR) process as of October 1, 2010, requires compliance with the Endangered Species Act (ESA). ESA compliance documentation is required prior to submitting the CLOMR to FEMA. Because of the recent change, CVWD may require that the developer obtain a CLOMR prior to approval of Tentative Map.

The Salton Sea is designated as Waters of the United States; the developer will be required to obtain permission and/or permits for the construction of the channels at the Salton Sea from the Army Corps of Engineers, the Environment Protection Agency (EPA) and the Regional Water Quality Control Board.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 45 SP - CVWD CLEARANCE (cont.) (cont.) (cont.) RECOMMND

The developer is urged to begin consultation with U.S. Department of Interior's Fish and Wildlife Service, California Department of Fish and Game, Army Corps of Engineers and other environmental agencies regarding the flood control scheme to minimize any potential future impacts/changes to the flood control scheme.

CVWD requests the county require the developer to update the pertinent sections of Specific Plan 375 and the EIR documentation to include the above conditions as part of the flood control scheme concept approval. Also, CVWD requests to reserve the right to comment on the flood control scheme in the event modifications are made during the finalization of the Specific Plan & EIR documentation.

30.PLANNING. 46 SP - MITIG MEASURE 6.1-4 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.1-4 from EIR514 requires:

Prior to grading final, the project applicant shall develop a lighting plan to reduce off-site and nighttime lighting impacts that shall be subject to approval by the Riverside Planning Department. The plan shall require all lighting adjacent to open space areas to be downcast luminaries with light patterns directed away from and shielded so that light is not directed into open space areas. Mercury vapor and halide lighting shall not be used on the perimeter of the developed areas and in areas adjacent to undeveloped open space. Security lighting throughout the project shall be controlled to limit light shine to necessary periods."

30.PLANNING. 47 SP - MITIG MEASURE 6.3-1 RECOMMND

Mitigation Measure 6.3-1 from EIR514 requires:

Prior to implementing project approval, applicants for

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 47 SP - MITIG MEASURE 6.3-1 (cont.) RECOMMND

implementing projects shall develop a Construction Traffic Emission Management Plan to minimize emissions from vehicles including, but not limited to, scheduling truck deliveries to avoid peak hour traffic conditions, consolidating truck deliveries, and prohibiting truck idling in excess of 5 minutes.

30.PLANNING. 48 SP - MITIG MEASURE 6.3-2 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-2 from EIR514 requires:

Prior to grading permit issuance, applicants for implementing projects shall develop a Construction Emission Management Plan to minimize construction-related emissions. The Construction Emission Management Plan shall include, at a minimum, the following elements:

-Use of water trucks or sprinkler system in sufficient quantities to prevent airborne dust from leaving the site. When wind speeds exceed 15 miles per hour the operators shall increase watering frequency.

-Suspend grading and excavation activities during windy periods (i.e., surface winds in excess of 20 miles per hour).

-Suspend the use of all construction equipment during first-stage smog alerts.

-Active sites shall be watered at least three times daily during dry weather.

-Increase watering frequency during construction or use non-toxic chemical stabilizers if it would provide higher control efficiencies.

-Application of non-toxic chemical soil stabilizers or

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 48 SP - MITIG MEASURE 6.3-2 (cont.) RECOMMND

apply water to form and maintain a crust on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days) or plant vegetative ground cover as soon as possible.

-Application of non-toxic binders to exposed areas after cut and fill operations and hydroseeded areas.

-Cover or application of water or non-toxic chemical suppressants to form and maintain a crust on inactive storage piles.

-Retrofit large off-road construction equipment that will be operating for significant periods. Retrofit technologies such as particulate traps, selective catalytic reduction, oxidation catalysts, air enhancement technologies, etc., shall be evaluated. These technologies will be required if they are certified by CARB and/or the US EPA, and are commercially available and can feasibly be retrofitted onto construction equipment.

-The project applicant shall require all on-site construction equipment to meet US EPA Tier 4 or higher emissions standards according to the following:

-Post-January 1, 2015: All off-road diesel-powered construction equipment greater than 50 horsepower shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. A copy of each unit's certified tier specification, BACT documentations, and CARB, SCAQMD, or ICAPCD operating permit shall be provided at the time of mobilization of each applicable unit of equipment.

-Designate personnel to monitor dust control measures to ensure effectiveness in minimizing fugitive dust emissions.

-An information sign shall be posted at the entrance to each construction site that identifies the permitted construction hours and provides a telephone number to call and receive information about the construction project or

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 48 SP - MITIG MEASURE 6.3-2 (cont.) (cont.) RECOMMND

to report complaints regarding excessive fugitive dust generation. Any reasonable complaints shall be rectified within 24 hours of their receipt.

"The contractor shall utilize low-VOC content coatings and solvents that are consistent with applicable SCAQMD and ICAPCD rules and regulations.

Consideration shall be given to use of other transportation methods to deliver materials to the construction sites (for example, trains or conveyors) if it would result in a reduction of criteria pollutant emissions."

30.PLANNING. 49 SP - MITIG MEASURE 6.3-3 RECOMMND

Mitigation Measure 6.3-3 from EIR514 requires:

Prior to implementing project approval, applicants for implementing projects located in areas under the jurisdiction of the SCAQMD shall be required to conduct a project-level Localized Significance Thresholds (LST) analysis in accordance with the SCAQMD Final Localized Significance Thresholds Methodology or any superseding guidance document adopted by the SCAQMD Governing Board (South Coast Air Quality Management District, Final Localized Significance Threshold Methodology (2008). The guidance document may be viewed at the following website: http://www.aqmd.gov/ceqa/handbook/lst/lst.html.).

30.PLANNING. 50 SP - MITIG MEASURE 6.3-4 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-4 from EIR514 requires:

Prior to building final inspection, the applicant shall submit building plans to the County Building Department to demonstrate that all residential buildings are designed to achieve energy efficiency equivalent to levels 30 percent

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 50 SP - MITIG MEASURE 6.3-4 (cont.) RECOMMND

better than the current standards required by Title 24 (2008) Standards at the time building permits are issued."

30.PLANNING. 51 SP - MITIG MEASURE 6.3-5 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-5 from EIR514 requires:

Prior to building final inspection, the applicant shall submit building plans to the County Building Department to demonstrate that all commercial buildings shall be designed to achieve energy efficiency equivalent to levels 15 percent better than the current standards presently required by Title 24 (2008) Standards at the time building permits are issued."

30.PLANNING. 52 SP - MITIG MEASURE 6.3-6 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-6 from EIR514 requires:

Prior to building final inspection, the applicant shall provide preferential parking spaces for carpools and vanpools at major commercial and office locations. The spaces shall be clearly identified in plot plans and may not be pooled in one location. A minimum of 10 percent of parking spaces in excess of those required by County ordinance shall be reserved for carpool or vanpool parking."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 54 SP - MITIG MEASURE 6.3-7 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-7 from EIR514 requires:

Prior to building final inspection, applicants shall post "5-minute idling" signs for trucks where applicable."

30.PLANNING. 55 SP - MITIG MEASURE 6.3-8 RECOMMND

Mitigation Measure 6.3-8 from EIR514 requires:

Prior to implementing project approval, applicants for implementing projects shall provide or make arrangements to provide shuttle service connecting the project's medium- and high-density development areas to existing transit service until such time that full transit service is provided to and within the project site.

30.PLANNING. 56 SP - MITIG MEASURE 6.3-10 RECOMMND

Mitigation Measure 6.3-10 from EIR514 requires:

Prior to implementing project approval, plans demonstrating that active parks, playgrounds, schools, and nursing/hospital facilities are to be located at least 500 feet from the closest right of way of State Route 86S shall be submitted to the County Planning Department for review and approval.

30.PLANNING. 57 SP - MITIG MEASURE 6.3-11 RECOMMND

Mitigation Measure 6.3-11 from EIR514 requires:

Prior to implementing project approval, plans demonstrating that residential units are to be located a minimum of 300 feet from the nearest right of way of State Route 86S to the lot line shall be submitted to the County Planning Department for review and approval.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 58 SP - MITIG MEASURE 6.3-12 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-12 from EIR514 requires:

Prior to building final inspection, residential units located within 500 feet from the closest right of way of State Route 86S shall be equipped with high-efficiency electrostatic cleaning devices."

30.PLANNING. 59 SP - MITIG MEASURE 6.3-13 RECOMMND

Mitigation Measure 6.3-13 from EIR514 requires:

Prior to implementing project approval, residential units located within 500 feet from the closest right of way of State Route 86S shall be required to conduct a health risk assessment.

30.PLANNING. 60 SP - MITIG MEASURE 6.3-14 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.3-14 from EIR514 requires:

Prior to building final inspection, permit applicants shall provide to the County Planning Department a disclosure document form, to be provided to all future property owners (residential and commercial), disclosing that the property is in the Salton Sea Air Basin, which is an area designated as in nonattainment status by the U.S. EPA and California Air Resources Board (CARB) for particulate matter, including but not limited to PM10. The documentation shall

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 60 SP - MITIG MEASURE 6.3-14 (cont.) RECOMMND

note that periodic windblown dust and particulate matter from agricultural lands in Riverside, and exposed Salton Sea shoreline areas if sea levels recede further, may result in adverse respiratory health impacts. The disclosure form shall be provided to all future property owners within the Project site, after review and approval by the County Planning Department."

30.PLANNING. 61 SP - MITIG MEASURE 6.3-15 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.3-15 from EIR514 requires:

Prior to grading permit issuance, the construction contractor shall prepare a Work Plan for review and approval by County Building and Safety Department and County Department of Public Health that includes the following measures, where feasible, to reduce valley fever and Hantavirus risk during construction:

-For construction activity involving substantial soil disturbance activity, preferentially assign persons with positive coccidioidin skin tests (since those with positive tests can be considered immune to reinfection of valley fever) to perform the work.

-Hire crews from local populations when and where possible, since it is more likely that they have been previously exposed to the fungus (coccidioides immitis) and are therefore immune.

-Consult with staff from the Coachella Valley Mosquito and Vector Control District to ascertain whether the wild rodent surveillance program has identified risks posed by the Hantavirus in areas under construction. Construction activity shall be limited in areas identified as a risk and workers shall be notified of the findings.

-Require crews to use respirators during project clearing,

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 61 SP - MITIG MEASURE 6.3-15 (cont.) RECOMMND

grading, and excavation operations in accordance with California Division of Occupational Safety and Health regulations.

-Require that the cabs of grading and construction equipment be air-conditioned.

-Preferentially assign crews to work upwind from excavation sites to the greatest extent possible. This measure does not apply to persons with positive coccidioidin skin tests (since those with positive tests can be considered immune to reinfection of valley fever).

-Pave or apply sufficient water or environmentally safe dust control agents on all construction roads.

-Where acceptable to the fire department, control weed growth by mowing instead of discing, thereby leaving the ground undisturbed and with a mulch covering.

-During rough grading and construction, the access way into the project site from adjoining paved roadways should be paved or treated with water or environmentally safe dust control agents."

30.PLANNING. 62 SP - MITIG MEASURE 6.3-16 RECOMMND

Mitigation Measure 6.3-16 from EIR514 requires:

Prior to implementing project approval, stationary sources of diesel, ozone, or particulate matter (PM10 and PM2.5) contaminants or projects attracting or generating substantial numbers of diesel truck trips shall be required to demonstrate to the County Planning Department that such projects would not exceed the health-based significance thresholds established by the SCAQMD and/or ICAPCD as appropriate. Based on the current health-based significance thresholds, if the assessment determines that the project would result in an incremental increase in cancer risk of more than 10 in 1 million at the maximally impacted residential, sensitive, and off-site workplace receptors or that the chronic hazard indices for non-cancer health impacts are above 1.0 at the maximally exposed residential, sensitive, and off-site workplace receptors, the proposed project shall be required to implement project design changes or measures that would reduce impacts to below the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 62 SP - MITIG MEASURE 6.3-16 (cont.) RECOMMND

thresholds.

30.PLANNING. 63 SP - MITIG MEASURE 6.3-19 RECOMMND

Mitigation Measure 6.3-19 from EIR514 requires:

Prior to implementing project approval, plans demonstrating that auto body shops with painting/coating operations are to be located at least 1 mile feet from odor sensitive receptors shall be submitted to the County Planning Department for review and approval.

30.PLANNING. 64 SP - MITIG MEASURE 6.3-20 RECOMMND

Mitigation Measure 6.3-20 from EIR514 requires:

Prior to implementing project approval, plans demonstrating that asphalt plants are to be located at least 1 mile feet from odor sensitive receptors shall be submitted to the County Planning Department for review and approval.

30.PLANNING. 65 SP - MITIG MEASURE 6.5-1 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.5-1 from EIR514 requires:

Prior to issuance of a grading permit, as required by State CEQA Guidelines Sections 15064.5(e) and (f), a cultural resources management plan (CRMP) shall be prepared and submitted for the appropriate County Planning Department for review and approval. The CRMP shall contain detailed provisions for the treatment of unanticipated discoveries during project construction, including human remains. The provisions of the CRMP should be consistent with state law as contained in Health and Safety Code Section 7050.5, and PRC Sections 5097.94 and 5097.98. Such mitigation shall be addressed in a manner consistent with the following:

-If buried materials of potential historical or cultural

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 65 SP - MITIG MEASURE 6.5-1 (cont.) RECOMMND

significance are accidentally discovered during any earth-moving operations associated with the proposed project, all work in that area shall be halted or diverted until a qualified historian/archaeologist can evaluate the nature and significance of the finds. If the find is determined to be an historical resource, as defined in Section 15064.5 of the California Code of Regulations (State CEQA Guidelines), avoidance or other appropriate measures as discussed in the CRMP shall be implemented.

-If evidence of potentially significant prehistoric or historic resources is uncovered during project-related grading areas in which archaeological and Native American monitoring has already been required, the extent of monitoring shall be amended and the presence of a Native American monitors shall be incorporated into the monitoring program for all areas in the affected tentative tract."

30.PLANNING. 66 SP - MITIG MEASURE 6.5-3 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.5-3 from EIR514 requires:

Prior to grading final for any grading activity near any of the sites listed below, the respective following site shall be tested and evaluated in consultation with the Torres-Martinez Desert Cahuilla Indians as required, and pursuant to the requirements of Phase II Archaeological standards and practices, as approved by Riverside County, for the sites to determine integrity, data potential and significance: CA-RIV-8891 (33-17082), CA-RIV-8894 (33-17085), CA-RIV-8895 (33-17086), CA-RIV-8896 (33-17087), CA-IMP-8784 (13-009821), CA-IMP-8785 (13-009822), CA-IMP-8786 (13 009823), CA-IMP-92, CA-IMP-100, and CA-IMP-2626."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 67 SP - MITIG MEASURE 6.5-6 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.5-6 from EIR514 requires:

Prior to grading final for each implementing project, the areas under consideration shall be monitored by a County-approved and qualified paleontologist, who shall develop a formal agreement with a recognized museum repository, such as the Natural History Museum of Los Angeles County Vertebrate Paleontology Department (LACM). Prior to earth moving activities, the paleontologist shall coordinate with appropriate construction contractor personnel.

Should paleontological resources be discovered during earthmoving activities, work shall cease and no further disturbance shall occur in the immediate vicinity of the uncovered resource and an area 50 feet in diameter of the find. A paleontologist shall be contacted to investigate the find and, if deemed necessary, collect uncovered paleontological resources, curate any resources collected with an appropriate reposition, and file a report with the appropriate Planning Department documenting any paleontological resources that are found. Upon completion of the field investigation, collection of the resources, if necessary, and clearance of the find by the paleontologist, earthmoving activities may resume."

30.PLANNING. 68 SP - MITIG MEASURE 6.6-1 RECOMMND

Mitigation Measure 6.6-1 from EIR514 requires:

Prior to implementing project approval, site-specific geotechnical and engineering geologic investigations that analyze site-specific seismic shaking including provisions for appropriate construction techniques, including adherence to local codes and the California Building Code's design criteria for construction within former Seismic Zone 4, now Seismic Design Category E or F, shall be prepared by

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 68 SP - MITIG MEASURE 6.6-1 (cont.) RECOMMND

California-registered geotechnical engineers and certified engineering geologists, and submitted to the Riverside County Planning Department-Geology (or equivalent) for review and approval.

30.PLANNING. 69 SP - MITIG MEASURE 6.6-2 RECOMMND

Mitigation Measure 6.6-2 from EIR514 requires:

Prior to implementing project approval, site-specific geotechnical and engineering geologic investigations shall analyze site-specific lateral spread landslide potential (in accordance with Special Report 117 and the 2007 CBC) and (as appropriate) include provisions for appropriate construction techniques. This shall include adherence to the California Building Code's design criteria for construction within Seismic Design Category E or F. This study and all appropriate recommendations shall be prepared by California registered geotechnical engineers and certified engineering geologists, and submitted to the Riverside County Planning Department-Geology (or equivalent) for review and approval.

30.PLANNING. 70 SP - MITIG MEASURE 6.6-3 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GARDING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.6-3 from EIR514 requires:

Prior to the issuance of grading permits and in compliance with the requirements of Riverside County ordinances, a detailed design-level geotechnical report(s) shall be submitted to the County's Geologist for review and approval concurrent with each tract map or parcel map application. The report(s) shall identify and address site-specific (a) underlying soil conditions (including corrosive and expansive soil conditions), (b) liquefaction potential, (c) seismic parameters and building requirements, (d) tile drain and subdrainage system conditions, and (e) slope stability and rockfall hazards. The measures recommended in

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 70 SP - MITIG MEASURE 6.6-3 (cont.) RECOMMND

the final geotechnical report(s) shall be identified on applicable grading plans and shall be implemented to the satisfaction of the County Geologist. Grading shall be performed in accordance with applicable provisions of the Standard Grading Specifications contained in the design-level geotechnical reports."

30.PLANNING. 71 SP - MITIG MEASURE 6.6-4(A) RECOMMND

Mitigation Measure 6.6-4 from EIR514 requires:

Prior to implementing project approval (and grading final, see 30.PLANNING.72) site-specific hydrologic, geotechnical and engineering geologic investigations shall analyze site-specific soils for erosion, sedimentation, and debris flow potential (in accordance with local codes and the 2007 CBC) and (as appropriate) include provisions for appropriate construction techniques. These studies and all appropriate recommendations shall be prepared by California registered geotechnical engineers, registered civil engineers, and certified engineering geologists, and submitted to the Riverside County Planning Department-Geology (or equivalent) for review and approval.

30.PLANNING. 72 SP - MITIG MEASURE 6.6-4(B) RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.6-4from EIR514 requires:

Prior to grading final, site-specific hydrologic, geotechnical and engineering geologic investigations shall analyze site-specific soils for erosion, sedimentation, and debris flow potential (in accordance with local codes and the 2007 CBC) and (as appropriate) include provisions for appropriate construction techniques. These studies and all appropriate recommendations shall be prepared by California registered geotechnical engineers, registered civil

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 72 SP - MITIG MEASURE 6.6-4(B) (cont.) RECOMMND

engineers, and certified engineering geologists, and submitted to the Riverside County Planning Department-Geology (or equivalent) for review and approval."

30.PLANNING. 73 SP - MITIG MEASURE 6.6-5 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.6-5 from EIR514 requires:

Prior to grading final for each implementing project, the project applicant shall submit a copy of the Notice of Intent (NOI) to obtain coverage under the Construction General Permit of the National Pollutant Discharge Elimination System (NPDES) issued by the Colorado River Regional Water Quality Control Board (CRRWQCB). The applicant shall submit a copy of the NOI and shall provide a copy of the required Storm Water Pollution Prevention Plan (SWPPP) to Riverside (or equivalent) for review and approval. A copy of the SWPPP must be maintained on the project site during grading and construction activities. The Riverside County Planning Department shall review the documentation and shall conduct site inspections during construction to monitor for compliance with the SWPPP. The project's SWPPP shall also include the following provisions:

-Pre-Grading: The portions of the site to be graded shall be pre-watered to a depth designated by the soils engineer prior to the onset of grading operations.

-Pre-Grading: Undisturbed areas of biological soil crusts in "non-construction" areas adjacent to proposed roadways, buildings, parking areas, etc., shall be marked so that unnecessary disturbance of the biological soil crusts is minimized.

-During Grading: Once grading has commenced, and until

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 73 SP - MITIG MEASURE 6.6-5 (cont.) RECOMMND

grading has been completed, watering of the site and/or other treatment(s) determined to be appropriate shall be ongoing.

-Post-Grading: All disturbed areas shall be treated to prevent erosion during the term that the area will remain undeveloped.

-Landscape and irrigation shall be installed per future plan submittals."

30.PLANNING. 74 SP - MITIG MEASURE 6.6-6 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.6-6 from EIR514 requires:

Prior to grading final for each implementing project, the applicant/owner shall submit and implement a Storm Water Quality Management Plan (SWQMP). The SWQMP shall include the following elements: identification of potential pollutant sources that may affect the quality of the storm water discharges; the proposed design and placement of structural and non-structural best management practices (BMPs) to address identified pollutants; a proposed inspection and maintenance program; and a method for ensuring maintenance of all BMPs over the life of the project. The approved measures shall also be shown on site, building, and grading plans. Maintenance records shall be maintained by the applicant/owner for residential developments, or landowners for commercial developments. Prior to approval of the Land Use Permit, the SWQMP shall be submitted to Riverside County Flood Control and Water Conservation District. All measures specified in the plan shall be constructed and operational prior to occupancy clearance. Maintenance records shall be submitted to Riverside County Planning Department on an annual basis prior to the start of the rainy season and for five years thereafter. After the fifth year, the records shall be

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 74 SP - MITIG MEASURE 6.6-6 (cont.) RECOMMND

maintained by the landowner or applicant/owner, and be made available to Riverside County Planning Department on request."

30.PLANNING. 75 SP - MITIG MEASURE 6.6-7 RECOMMND

Mitigation Measure 6.6-7 from EIR514 requires:

Prior to implementing project approval, site-specific geotechnical investigations shall be prepared and submitted to the Riverside County of Planning Department-Geology, as appropriate, to identify areas of potential shallow groundwater. The geotechnical studies shall identify appropriate construction techniques (e.g., dewatering, groundwater barriers, et al.) where groundwater is identified within 50 feet of the ground surface.

30.PLANNING. 76 SP - MITIG MEASURE 6.6-8 RECOMMND

Mitigation Measure 6.6-8 from EIR514 requires:

Prior to implementing project approval, site-specific geotechnical investigations shall be prepared and submitted to the Riverside County Planning Department-Geology, as appropriate, to identify potential impacts related to subsidence. The geotechnical studies shall identify appropriate construction techniques to be used during grading and building design such as the compaction of soils, modified grading techniques, use of spread footings, the use of post tensioned slabs, and other methods.

30.PLANNING. 77 SP - MITIG MEASURE 6.6-9 RECOMMND

Mitigation Measure 6.6-9 from EIR514 requires:

Prior to implementing project approval, site-specific geotechnical and engineering geologic investigations that analyze site-specific soil conditions, including the potential for collapsible soils, shall be prepared by California registered geotechnical engineers and certified engineering geologists, and submitted to the Riverside County Planning Department-Geology (or equivalent) for review and approval. Recommended mitigations may include overexcavation of the subject soils and recompaction on new engineered fill material, possibly pre-saturating the subject soils, and provision of proper surface drainage

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 77 SP - MITIG MEASURE 6.6-9 (cont.) RECOMMND

away from structures and building foundations.

30.PLANNING. 78 SP - MITIG MEASURE 6.6-10 RECOMMND

Mitigation Measure 6.6-10 from EIR514 requires:

Prior to implementing project approval, site-specific geotechnical studies, including soil expansion tests, shall be prepared and submitted to the Riverside County Planning Department-Geology, as appropriate, and shall include appropriate construction methods to reduce impacts from expansive soils.

30.PLANNING. 79 SP - MITIG MEASURE 6.7-2 RECOMMND

Mitigation Measure 6.7-2 from EIR514 requires:

Prior to implementing project approval and grading final, future applicants for implementing projects and grading permits on the project site shall conduct a site survey by a County-approved licensed professional to identify and remediate all contaminated soils on the project site. All pesticide residue measured in on-site soils shall not exceed the applicable Preliminary Remediation Goals and the survey report shall be approved and documented by the Riverside County Department of Environmental Health.

30.PLANNING. 80 SP - MITIG MEASURE 6.7-3 RECOMMND

Mitigation Measure 6.7-3 from EIR514 requires:

Prior to implementing project approval, the applicant shall submit plans to the Coachella Valley Mosquito and Vector Control District (CVMVCD) which identify potential breeding sources for mosquitoes (such as standing water in street catch basins, subdivision drains, roadside ditches, flood channels, ravines, and similar places on public right-of-way and parks) that demonstrate designs that would minimize such breeding sources.

30.PLANNING. 81 SP - MITIG MEASURE 6.8-1 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 81 SP - MITIG MEASURE 6.8-1 (cont.) RECOMMND

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.8-1 from EIR514 requires:

Prior to grading final for each implementing project, a project-specific water quality management plan (WQMP) shall be submitted to Riverside County for review and approval."

30.PLANNING. 82 SP - MITIG MEASURE 6.8-2 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.8-2 from EIR514 requires:

Prior to grading final for each implementing project, a detailed operation and maintenance plan shall be submitted to the Riverside County, and Coachella Valley Water District, for review and approval for the as-built project conditions."

30.PLANNING. 83 SP - MITIG MEASURE 6.8-3 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.8-3 from EIR514 requires:

Prior to grading final for each implementing project, a Storm Water Pollution Prevention Plan (SWPPP) shall be developed and submitted to the Regional Water Quality

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 83 SP - MITIG MEASURE 6.8-3 (cont.) RECOMMND

Control Board for review approval. The SWPPP shall identify potential sources of pollution and specify runoff controls or BMPs during construction for the purpose of minimizing the discharge of pollutants in stormwater from the construction area. In addition, the SWPPP must identify post-construction control measures and a monitoring plan."

30.PLANNING. 84 SP - MITIG MEASURE 6.8-5 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.8-5 from EIR514 requires:

Prior to grading final for each implementing project, the applicant shall provide a plan for re-routing or connecting to existing irrigation and drainage facilities. This may include use of or alternation to facilities operated by or within the rights-of-way of other entities/The plan shall be submitted to the appropriate agency (US Bureau of Reclamation, Caltrans, or Coachella Valley Water District) for review and approval."

30.PLANNING. 85 SP - MITIG MEASURE 6.8-6 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.8-6 from EIR514 requires:

During grading, the existing under-drainage system (tile drains), shall be preserved, where possible, to reduce potential adverse effects due to groundwater. Light weight excavation equipment shall be used where excavations come near the existing title drains to prevent damage to the

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 85 SP - MITIG MEASURE 6.8-6 (cont.) RECOMMND

underdrainage system. Where the tile drains are to be disrupted or exposed during grading, a replacement set of drains will be needed. The grading and construction aspects of the underdrainage system shall be performed under the guidance, observation/documentation, and recommendations of the Project Geologist. A formal evaluation of the installed subdrainage system, including the remaining tile drains, shall be evaluated for operation and flow once grading activities are completed. This report shall be prepared by the Project Geologist, the Project Civil Engineer, or the Project Agricultural/Civil Engineer and submitted to Riverside County for review."

30.PLANNING. 86 SP - MITIG MEASURE 6.8-8 RECOMMND

Mitigation Measure 6.8-8 from EIR514 requires:

Prior to implementing project approval, the applicant shall submit to Coachella Valley Water District (CVWD) for review and approval a hydrologic study that evaluates the potential flows from Un-Named Canyon-Fan 6 and Barton Canyon-Fan 5. This study will identify facilities to be constructed to collect, route and discharge flows in a manner compatible with pre-project/existing conditions across the project site.

30.PLANNING. 87 SP - MITIG MEASURE 6.8-10 RECOMMND

Mitigation Measure 6.8-10 from EIR514 requires:

Prior to implementing project approval for each phase or district, as appropriate, the applicant shall submit for review and approval a hydrology report to address potential erosion issues within the proposed channels to demonstrate that the channels remain stable, maintain their flood conveyance capacity, and do not alter properties upstream of the proposed project.

30.PLANNING. 88 SP - MITIG MEASURE 6.11-3 RECOMMND

Mitigation Measure 6.11-3 from EIR514 requires:

Prior to implementing project approval for each implementing project, for residential lots located within 65 dB(A) CNEL or greater noise contour or adjacent to a road that is classified as a secondary or larger, an

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 88 SP - MITIG MEASURE 6.11-3 (cont.) RECOMMND

acoustic analysis shall be required to address requirements for determining and mitigating traffic noise impacts to residential structures. The acoustical analysis must be received, reviewed, and approved by the appropriate agency (such as the Riverside County Office of Industrial Hygiene). Methods that may be implemented to meet the standards include, but are not limited to, providing noise walls of sufficient size to break the line of sight between roadways and residential areas, providing open-space buffers, providing natural barriers such as hills, berms, boulders, and dense vegetation, or a combination of these methods.

30.PLANNING. 89 SP - MITIG MEASURE 6.11-4 RECOMMND

Mitigation Measure 6.11-4 from EIR514 requires:

Prior to implementing project approval for each implementing project, a future noise study is required to address the stationary commercial noise standard as it relates to parking lot noise. Facility-related noise as projected to any portion of any surrounding property containing a "habitable dwelling, hospital, school, library, or nursing home," must not exceed the following worst-case noise levels of 45 dB(A) - 10-minute noise equivalent level (Leq) between the hours of 10:00 PM to 7:00 AM (nighttime standard); and 65 dB(A) - 10-minute Leq, between 7:00 AM and 10:00 PM (daytime standard). The noise study must be received, reviewed, and approved by the appropriate agency (such as the Riverside County Office of Industrial Hygiene). Methods that may be employed to reduce parking lot noise may include a noise barrier of sufficient size to break the line of sight, an open-space buffer, a setback, or a combination of methods shall be developed along locations between parking lot noise and exterior usable areas within residential uses where these uses interface.

30.PLANNING. 90 SP - MITIG MEASURE 6.11-5 RECOMMND

Mitigation Measure 6.11-5 from EIR514 requires:

Prior to implementing project approval for each implementing project, a future noise study is required to address the stationary commercial noise standard as it relates to loading dock noise. Facility-related noise as

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 90 SP - MITIG MEASURE 6.11-5 (cont.) RECOMMND

projected to any portion of any surrounding property containing a "habitable dwelling, hospital, school, library, or nursing home," must not exceed the following worst-case noise levels of 45 dB(A) - 10-minute noise equivalent level (Leq) between the hours of 10:00 PM to 7:00 AM (nighttime standard); and 65 dB(A) - 10-minute Leq, between 7:00 AM and 10:00 PM (daytime standard). The noise study must be received, reviewed, and approved by the appropriate agency (such as the Riverside County Office of Industrial Hygiene) prior to each implementing project approval. Methods that may be employed to reduce parking lot noise may include designing loading docks to have either a depressed (i.e., below grade) loading dock area, an internal bay, or a wall to break the line of sight between residential land uses and loading operations.

30.PLANNING. 91 SP - MITIG MEASURE 6.11-6 RECOMMND

Mitigation Measure 6.11-6 from EIR514 requires:

Prior to implementing project approval, a future noise study is required to address the stationary commercial noise standard as it relates to mechanical, electrical, or other related commercial type noise. Facility-related noise as projected to any portion of any surrounding property containing a "habitable dwelling, hospital, school, library, or nursing home," must not exceed the following worst-case noise levels of 45 dB(A) - 10 minute noise equivalent level (Leq) between the hours of 10:00 PM to 7:00 AM (nighttime standard); and 65 dB(A) - 10-minute Leq, between 7:00 AM and 10:00 PM (daytime standard). The noise study must be received, reviewed, and approved by the appropriate agency (such as the Riverside County Office of Industrial Hygiene) prior to each implementing project approval. Method that may be employed to reduce mechanical, electrical, or other commercial type noise may include locating equipment away from receptor areas, proper selection and sizing of equipment, installation of equipment with proper acoustical shielding, and incorporating the use of parapets into building design.

30.PLANNING. 92 SP - MITIG MEASURE 6.11-7 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 92 SP - MITIG MEASURE 6.11-7 (cont.) RECOMMND

on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.11-7 from EIR514 requires:

Prior to grading final for each implementing project, the construction contractors shall use best management practices (BMPs) to reduce vibration due to specific plan construction activities by implementing the following:

-identifying all uses in the vicinity that may be adversely affected by the vibrations, including residences built in earlier phases and non-residential land uses that may contain vibration-sensitive equipment;

-installing seismographs at the aforementioned sensitive locations to ensure that vibration thresholds are not exceeded, and/or that construction activities would not cause structural damage or adversely affect vibration-sensitive equipment;

-adjusting vibration amplitudes of the construction equipment used on site such as limiting the number of pieces operating in one location at the same time in areas where conditions would affect structures, the sensitivity of vibration sensitive equipment, and/or human tolerance;

-utilizing cast-in-drilled-hole (CIDH) piles in lieu of pile driving;

-providing notification to the residential land uses directly adjacent to the project site, at least 10 days in advance, of construction activities that are anticipated to result in vibration levels above the thresholds;

-conducting demolition, earthmoving, and ground-impacting operations sequentially, so as not to have two such operations occurring on the project site at the same time;

-selecting a demolition method to minimize vibration, where possible (e.g., sawing masonry into sections rather than demolishing it by pavement breakers); and/or

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 92 SP - MITIG MEASURE 6.11-7 (cont.) (cont.) RECOMMND

-operating earth-moving equipment on the construction site as far away as possible or practical from vibration-sensitive sites; using wheeled or rubber-tracked equipment, and using small pieces of equipment such as smaller bulldozers when possible.

The Riverside County Building and Safety Department shall monitor the conditions to determine that these BMPs are being utilized correctly and efficiently in order to reduce vibration impacts throughout the proposed project."

30.PLANNING. 93 SP - MITIG MEASURE 6.11-9 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.11-9from EIR514 requires:

Prior to grading final for each implementing project, the project applicant shall submit copies of proposed project construction documents and specifications to the Riverside County Building and Safety Department, as appropriate, indicating that construction staging areas along with the operation of earthmoving equipment within the project area is located as far away from vibration- and noise-sensitive sites as possible."

30.PLANNING. 94 SP - MITIG MEASURE 6.11-10 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.11-10 from EIR514 requires:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 94 SP - MITIG MEASURE 6.11-10 (cont.) RECOMMND

Prior to grading final for each implementing project, the project applicant shall submit copies of proposed project construction documents and specifications to the Riverside County Planning Department, as appropriate, indicating that heavily loaded trucks used during construction would be routed away from residential streets to the extent feasible."

30.PLANNING. 95 SP - MITIG MEASURE 6.13-7 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.13-7 from EIR514 requires:

Prior to grading final, the construction contractor shall provide a plan for review and approval by Riverside County Fire Department (RCFD) to demonstrate that during all grading and site clearance activities, all earth-moving equipment shall be equipped with spark arrestors and at least two portable fire extinguishers per vehicle. All equipment used in the vegetation-clearance phase shall be equipped with spark arrestors and best available fire safety technology. The vegetation-clearance activities shall be coordinated with and approved by the RCFD or SCSD in advance."

30.PLANNING. 96 SP - MITIG MEASURE 6.13-8 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.13-8 from EIR514 requires:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 96 SP - MITIG MEASURE 6.13-8 (cont.) RECOMMND

Prior to building final permit, the applicant shall submit proof that all structures adjacent to open space shall be designed to satisfy at least a 1-hour fire resistant rating. Such structures shall incorporate fire retardant features such as boxed-in eaves, reduced overhangs, double-paned windows, convection resistant roof design, non-combustible roofing material, and related design features, as determined necessary by the RCFD and/or SCSD. Building permits shall not be issued until review of fire-retarding architectural features has been completed by the RCFD and/or SCSD. Design standards meeting RCFD and/or SCSD shall be included in the Fire Hazard Reduction Program and incorporated into the Fire Hazard Reduction Design Guidelines for the residential units."

30.PLANNING. 97 SP - MITIG MEASURE 6.13-10 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.13-10 from EIR514 requires:

Prior to building final inspection, the applicant shall provide for the purchasers of residential, commercial, and industrial units in planning areas that would be located adjacent to Open Space-Conservation and other off-site undeveloped or natural areas to be notified as to the requirements and maintenance of a brush-clearance radius of 100 feet around all buildings pursuant to Riverside County Ordinance No. 787 as appropriate."

30.PLANNING. 98 SP - MITIG MEASURE 6.14-1 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING. 98 SP - MITIG MEASURE 6.14-1 (cont.) RECOMMND

project:

Mitigation Measure 6.14-1 from EIR514 requires:

Prior to grading final for each implementing project, a designated parking area with a security officer shall be provided for the construction workers during grading and construction operations. A site security plan shall be prepared and submitted to the Riverside County Sherriff's Department by the contractor indicating security features that shall be incorporated on the construction site(s), such as fencing and locked entrances, and construction equipment, tools, and material shall be secured by locking or placing them within sheds and/or other inaccessible areas while not in use."

30.PLANNING. 99 SP - MITIG MEASURE 6.15-1 RECOMMND

Mitigation Measure 6.15-1 from EIR514 requires:

Prior to implementing project approval, applicant(s) for implementing project development shall pay the development impact fees at the designated level (Level I, II, or III) as set forth by the Coachella Valley Unified School District (CVUSD), at the current rate. Fees shall be paid based on the square-footage of development per single-family residential unit, multi-family residential unit, commercial unit, and secondary living unit as required by CVUSD policy in each implementing project area. Active adult residential units proposed in the specific plan shall pay the development impact fees at the designated level (Level I, II, or III) for commercial/industrial development, as set forth by the CVUSD, at the current rate.

30.PLANNING.100 SP - MITIG MEASURE 6.16-1 RECOMMND

Mitigation Measure 6.16-1 from EIR514 requires:

Prior to the implementing project approval, a final biding Memorandum of Understanding (MOU) shall be executed between the applicant and Desert Recreation District (DRD) for the maintenance and operation of parks, including regional parks, within Riverside County. For the open space areas and other public parks areas within Riverside County not included as part of the final binding MOU between the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.100 SP - MITIG MEASURE 6.16-1 (cont.) RECOMMND

applicant and DRD, the applicant shall annex into Community Service Area (CSA) 125, or other appropriate CSA, to provide for the maintenance and operation of such areas.

30.PLANNING.101 SP - MITIG MEASURE 6.18-1 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.18-1 from EIR514 requires:

Prior to grading final for each implementing project, the contractors for construction activities for the applicants of implementing projects shall prepare a construction safety plan and submit it to the appropriate County Planning Department and Fire Department for review and approval. The plan shall include provisions for safety activities, including prevention, work-related injuries, on-site safety equipment, notification procedures, and other activities to prevent, reduce, and respond to injuries during construction."

30.PLANNING.102 SP - MITIG MEASURE 6.20-1 RECOMMND

Mitigation Measure 6.20-1 from EIR514 requires:

Prior to implementing project approval, future applicants for development permits must submit plans for water delivery systems to Coachella Valley Water District (CVWD) for review and approval.

30.PLANNING.103 SP - MITIG MEASURE 6.20-2 RECOMMND

Mitigation Measure 6.20-2 from EIR514 requires:

Prior to implementing project approval, water quality testing for irrigation and fire suppression that uses nonpotable water shall submit documentation to Coachella Valley Water District (CVWD) indicating that the water quality meets the requirements of the California Department

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.103 SP - MITIG MEASURE 6.20-2 (cont.) RECOMMND

of Public Health and fire flow requirements for the Fire Department.

30.PLANNING.104 SP - MITIG MEASURE 6.22-1 RECOMMND

Mitigation Measure 6.22-1 from EIR514 requires:

Prior to implementing project approval, a Waste Recycling Plan (WRP) shall be submitted to the appropriate County Waste Management Department or Planning Department for approval. At a minimum the WRP shall identify the materials (e.g., concrete, asphalt, wood, etc.) that would be generated by construction and development, the project amounts, measures/methods that would be implemented to recycle, reuse, and/or reduce the amount of materials, the facilities and haulers that would be utilized, and the targeted recycling or reduction rates to be achieved.

30.PLANNING.105 SP - MITIG MEASURE 6.22-7 RECOMMND

Mitigation Measure 6.22-7 from EIR514 requires:

Prior to implementing project approval, applicant(s) shall submit for review and approval landscape plans that provide for the use of xeriscape landscaping and the use of drought tolerant low maintenance vegetation in all landscaped areas of the project.

30.PLANNING.106 SP - MITIG MEASURE 6.23-1 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.23-1 from EIR514 requires:

Prior to building final, residential and commercial buildings shall be conditioned to participate in any future programs, such as green pricing programs, which allow customers to support the development of renewable energy sources by paying a small premium on their electric bills,

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.106 SP - MITIG MEASURE 6.23-1 (cont.) RECOMMND

established by the Imperial Irrigation District. If the district establishes a green pricing program whereby energy generated from renewable resources either exclusively or at a higher proportion may be purchased, the proposed project shall participate in the program. Proof of participation (enrollment) shall be submitted to the Planning Department within 30 days of occupancy."

30.PLANNING.107 SP - MITIG MEASURE 6.23-2 RECOMMND

Mitigation Measure 6.23-2 from EIR514 requires:

Prior to implementing project approval, the applicant shall submit plans showing the proposed locations of electricity transmission and distribution infrastructure to the Imperial Irrigation District for review and approval.

30.PLANNING.108 SP - MITIG MEASURE 6.24-1 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-1 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide a listing of the green building practices and design elements used in the building that reduce GHG emissions to the appropriate Planning Department. The green building practices and design elements shall be consistent with the CAP and any other green building standards adopted by either Riverside County. (See, e.g., California Department of Housing and Community Development's Green Building & Sustainability Resources handbook at www.hcd.ca.gov/hpd/green_build.pdf; e.g., the American Institute of Architects at http://www.wiki.aia.org/Wiki%20Pages/Home.aspx)"

30.PLANNING.109 SP - MITIG MEASURE 6.24-2 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit,

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.109 SP - MITIG MEASURE 6.24-2 (cont.) RECOMMND

plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUILDING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-2 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence of its use of energy-efficient designs meeting and/or consistent with the standards in the CAP and any other green building standards adopted by either Riverside County to the appropriate Planning Department. In accordance with the CAP, all residential buildings shall, at a minimum, exceed Title 24 (2008) by 30 percent and all non-residential buildings shall, at a minimum, exceed Title 24 (2008) by 15 percent. This measure does not exempt buildings from meeting future energy efficiency obligations that may result from future revisions to the Title 24 standards."

30.PLANNING.110 SP - MITIG MEASURE 6.24-3 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-3 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence to the appropriate Planning Department of its use of energy efficient lighting, heating and cooling systems, appliances, equipment, and control systems, including the installation of ENERGY STAR-certified products, consistent with the standards in the CAP and any other energy efficiency standards adopted by either Riverside County or \ County. (Information about ENERGY STAR-certified products are available at http://www.energystar.gov /index.cfm?fuseaction=find_a_product; see also the California Energy Commission's database of appliances meeting federal or state energy standards at

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.110 SP - MITIG MEASURE 6.24-3 (cont.) RECOMMND

http://www.appliances .energy.ca.gov; see the Electronic Product Environmental Assessment Tool for ranking of energy efficient computer equipment at http://www.epeat.net /AboutEPEAT.aspx; see the Online Guide to Energy Efficient Commercial Equipment at http://www.aceee.org/ogeece/ch1_index .htm)"

30.PLANNING.111 SP - MITIG MEASURE 6.24-4 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-4 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence to the appropriate Planning Department of the use of "cool" roofs or "green" roofs, and cool pavements. (See Consumer Energy Center, Cool Roofs at http://www.consumerenergycenter .org/coolroof/)"

30.PLANNING.113 SP - MITIG MEASURE 6.24-5 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-5 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence to the appropriate Planning Department of the use of automatic covers, efficient pumps and motors, and solar heating for pools and spas. (See http://www.consumerenergycenter.org/home /outside/pools_spas.html)."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.114 SP - MITIG MEASURE 6.24-6 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-6 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence that the building is consistent with and/or does not conflict with the following Specific Plan-wide renewable energy targets:

-80 percent of residential units shall meet 60 percent of their baseline demand power energy needs with renewable energy; and

-80 percent of commercial building square footage shall meet 40 percent of their baseline demand power energy needs with renewable energy.

Should the individual structure not be able to demonstrate that power provided by the Imperial Irrigation District (IID) does not comply with this standard, then the individual structure shall comply by providing renewable energy power from a source within the limits of the Specific Plan. "

30.PLANNING.115 SP - MITIG MEASURE 6.24-7 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-7 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence to the appropriate Planning Department of the use of water efficient irrigation systems and devices, such as soil-based

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.115 SP - MITIG MEASURE 6.24-7 (cont.) RECOMMND

irrigation controls and use water-efficient irrigation methods consistent with measures recommended in the CAP. In accordance with the CAP, the applicant shall provide evidence that the building is consistent with the following Specific Plan-wide water conservation measures and/or does not prevent or conflict with the Specific Plan's ability to meet the following water conservation measures:

-90 percent of all builder-installed plumbing devices in each residential buildings will be low-flow and water-efficient;

-90 percent of all builder-installed plumbing devices in each non-residential buildings will be low-flow and water-efficient;

-Turf will not exceed 20 percent of the total landscaped area of each Planning Area, with the exception of parks, recreation centers, and schools;

-80 percent of public and common landscape areas will use smart irrigation systems per project; and

-80 percent of public and common landscape areas will use drought-tolerant, native, and/or water-efficient plant materials per project.

(See http://www1.eere.energy.gov/femp/program/waterefficiency_bmp5.html; see also http://www.water.ca.gov/wateruseefficiency/landscape/.)"

30.PLANNING.116 SP - MITIG MEASURE 6.24-8 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT FINAL INSPECTION, the following language shall be added to the implementing project:

Mitigation Measure 6.24-8 from EIR514 requires:

Prior to grading final for each implementing project, the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.116 SP - MITIG MEASURE 6.24-8 (cont.) RECOMMND

applicant or their contractor shall submit to the appropriate Public Works Department for review and approval of a site construction management plan for the reuse and recycle construction and demolition waste (including soil, vegetation, concrete, lumber, metal, and cardboard). (See http://www.ciwmb.ca.gov/condemo/)."

30.PLANNING.117 SP - MITIG MEASURE 6.24-9 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-9 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence to the appropriate Planning Department of reuse and recycling measures in residential, industrial, and commercial projects consistent with measures recommended in the CAP. In accordance with the CAP, the applicant shall provide evidence that the building is consistent with the following Specific

Plan-wide recycling and waste reduction measures and/or does not prevent or conflict with the Specific Plan's ability to meet the following recycling and waste reduction measures:

-Provide recycling containers within all multi-family residential communities;

-Provide recycling containers within all commercial, office, and light industrial buildings;

-Provide containers for community composting within all multi-family residential communities; and

-Provide containers for community composting within all commercial, office, and light industrial buildings.

(See http://zerowaste.ca.gov; see also http://www.ca-ilg.org/wastereduction)."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.118 SP - MITIG MEASURE 6.24-10 RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF BUIDLING PERMIT, the following language shall be added to the implementing project:

Mitigation Measure 6.24-10 from EIR514 requires:

Prior to the issuance of each building permit, the applicant shall provide evidence to the appropriate Planning Department of the use of "smart growth" principles to reduce GHG emissions (i.e., ensure mixed-use, infill and higher density projects provide alternatives to individual vehicle travel and promote efficient delivery of goods and services) consistent with measures recommended in the CAP. In accordance with the CAP, the applicant shall provide evidence that the building is consistent with the following Specific Plan-wide "smart growth" measures and/or does not prevent or conflict with the Specific Plan's ability to meet the following "smart growth" measures:

-60 percent of building frontages will have the principal functional entry facing a public space such as a street, square, park, paseo, or plaza, but not a parking lot based on type of project;

-75 percent of mixed-use streets shall have minimum 8-foot-wide sidewalks that front primarily commercial retail uses and all other areas will have minimum 4-foot-wide sidewalks;

-60 percent of all housing with a density of 7 dwelling units per acre or more will lie within 0.5 mile of a transit stop;

(See http://www.epa.gov/smartgrowth/index.htm.)"

30.PLANNING.119 SP - MITIG MEASURE 6.24-11 RECOMMND

Mitigation Measure 6.24-11 from EIR514 requires:

Prior to implementing project approval for each tract map, the applicant shall preserve existing trees, to the extent feasible and encourage the planting of new trees consistent

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.119 SP - MITIG MEASURE 6.24-11 (cont.) RECOMMND

with the final landscape palette in the Specific Plan. Removed trees shall be replaced at a minimum 1:1 ratio in accordance with acceptable tree species defined in the final landscape palette.

(See http://www.epa.gov/dced/brownfields.htm)

30.PLANNING.123 SP - TOTAL BP/DU TRKNG RECOMMND

Prior to the approval of any implementing project, the applicant shall provide a "SP375 Total Dwelling Unit Tracking Spreadsheet." This spreadsheet shall be considered part of the SPECIFIC PLAN. Over time, this spreadsheet will track per Planning Area entitled units, tentative tract map units, final map recorded units and units actually built within every Planning Area in the SPECIFIC PLAN. The purpose of this tracking sheet is to enable the Planning Department to ensure compliance with the established Planning Area development ranges as outlined in Table 3-11 of the SPECIFIC PLAN. This sheet will also be used to ensure constancy with the separate tracking spread sheet referenced in condition 10.Planning.58 DU/BUILDING PERMIT MATRIX.

This condition cannot be DEFERRED or set to NOT APPLICABLE"

30.PLANNING.124 SP - TILE DRAINS (1) RECOMMND

PRIOR TO THE APPROVAL OF ANY IMPLEMENTING PROJECT (i.e. Tentative Map, Plot Plan, Conditional Use Permit, and/or Public Use Permit), given the high ground water table in the project area, all implementing projects must provide a letter from Coachella Valley Water District (CVWD) indicating that the subsurface drainage facilities (tile drains) in the implementing project area can accommodate the new urban drainage to the satisfaction of CVWD.

30.PLANNING.125 SP - TILE DRAINS (2) RECOMMND

PRIOR TO THE APPROVAL OF ANY IMPLEMENTING PROJECT (i.e. Tentative Map, Plot Plan, Conditional Use Permit, and/or Public Use Permit), given the high ground water table in the project area, all implementing projects must provide a letter from Coachella Valley Water District (CVWD) indicating that the boundaries shown on the APPROVED TENTATIVE MAP and/or SITE PLAN shall become annexed,

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.125 SP - TILE DRAINS (2) (cont.) RECOMMND

incorporated, and/or included to the satisfaction of the Colorado River Basin Water Quality Control Board into the National Pollution Discharge Elimination System Permit (NPDES) program as detailed by CVWD and as well the project shall annexed, incorporated, and/or included to the satisfaction of the Colorado River Basin Water Quality Control Board into the Waste Discharge Requirements for the discharge of stormwater into the Whitewater River Watershed, which is known as the MS4 Permit, to the satisfaction of CVWD.

30.PLANNING.126 SP - TILE DRAINS (3) RECOMMND

PRIOR TO THE APPROVAL OF ANY IMPLEMENTING PROJECT (i.e. Tentative Map, Plot Plan, Conditional Use Permit, and/or Public Use Permit), given the high ground water table in the project area, all implementing projects must provide a letter from Coachella Valley Water District (CVWD) indicating that the boundaries shown on the APPROVED TENTATIVE MAP and/or SITE PLAN shall become annexed, incorporated, and/or included to the satisfaction of CVWD into a future district(s) for recovery of capital and operation/maintenance costs associated with any tile/subsurface drainage system, to the satisfaction of CVWD.

30.PLANNING.127 SP - COMM FACILITY FINC SEC RECOMMND

Prior to the submittal of any implementing project within a Planning Area of the SPECIFIC PLAN, as outlined in exhibit B.6.16 of the SPECIFIC PLAN, the applicant shall provide financial securities for all community facilities improvements required within the respective Planning Area. All required improvements shall be completed within five (5) years of the approval of the first implementing project within the Planning Area. If any portion of the required community facilities improvements are not completed after five (5) years the County shall use the financial securities provided by the applicant to fund the completion of the remaining improvements. If all community facilities improvements are completed prior to the five (5) year requirement, all financial securities shall be returned to the applicant in full. Satisfaction of this condition shall be at the discretion of the Planning Director. No implementing project shall be approved unless evidence of secured financial securities

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.127 SP - COMM FACILITY FINC SEC (cont.) RECOMMND

for all community facilities improvements within the Planning Area is presented.

This condition cannot be waived, DEFERRED or set to NOT APPLICABLE. The condition shall be set to MET at the project level individually for each project prior to a project approval.

30.PLANNING.128 MM - CVWD SPECIAL AGREEMENT RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"Prior to building final inspection for the first residential unit and/or commercial unit within the Riverside County portion of the proposed project, the applicant shall execute a Special Agreement, with for CVWD to design, permit, construct, operate, and maintain an expandable wastewater treatment plant and nonpotable water storage and distribution system that shall be sized to initially accommodate approximately 3.0 mgd, or as approved by CVWD. Wastewater treatment and reuse facilities are provided for in Planning Area 4-3 or alternately an off-site location as provided for in the Wastewater Master Plan (see Figure 3.0-21). The project applicant shall provide necessary funding for the construction of this facility. All wastewater treatment facilities will be creditable toward the facilities component of CVWD's Sanitation Capacity charge for all residential, commercial, and industrial structures within CVWD's portion of the project boundary. The applicant's financial responsibility for these facilities is only for those components of the wastewater treatment facilities necessary to provide wastewater treatment for the proposed project's and its associated effluent."

30.PLANNING.150 SP - ARCHAEO STUDY REQD RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO PROJECT APPROVAL, a complete archaeological study

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.150 SP - ARCHAEO STUDY REQD (cont.) RECOMMND

shall be submitted to the Planning Department for review and approval. Adequate archaeological investigation shall be conducted to provide significance evaluations pursuant to CEQA for all cultural resources identified. This condition shall be considered MET if the relevant study has been approved by the Planning Department. This condition may be considered as NOT APPLICABLE if the Planning Department determines that the required study is not necessary.

The submittal of this study mandates that a CEQA determination of an Addendum to a previously adopted EIR be made, at a minimum."

30.PLANNING.151 SP - PALEO M/M PROGRAM RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMITS, the project applicant shall enter into an agreement with a qualified paleontologist. This agreement shall include, but not be limited to, the preparation of a project specific paleontological resources impact mitigation program (PRIMP) to be implemented during the process of grading.

A copy of said agreement and PRIMP shall be submitted to the County Geologist for review. No grading permit will be issued until the project specific agreement and PRIMP is reviewed and approved by the County Geologist.

30.PLANNING.153 SP - ARCHAEO M/M PROGRAM RECOMMND

Prior to the approval of any implementing project within the SPECIFIC PLAN (i.e.: tract map, parcel map, use permit, plot plan, etc.), the following condition shall be placed on the implementing project:

"PRIOR TO THE ISSUANCE OF GRADING PERMITS, the project applicant shall enter into an agreement with a qualified archaeologist. This agreement shall include, but not be limited to, the preliminary mitigation and monitoring procedures to be implemented during the process

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.PLANNING.153 SP - ARCHAEO M/M PROGRAM (cont.) RECOMMND

of grading, as found in the Master Cultural Resources Plan for this Specific Plan. A copy of said agreement shall be submitted to the Planning Department. No grading permits will be issued unless the preliminary mitigation and monitoring procedures required prior to grading permits as described in the Master Cultural Resources Plan are substantially complied with."

TRANS DEPARTMENT

30.TRANS. 1 SP - SP375/IMPROVEMENTS RECOMMND

All roads shall be improved to the recommended General Plan or Specific Plan designation, as approved by the County Board of Supervisors, or as approved by the Transportation Department. If there is a conflict between the General Plan and Specific Plan, the General Plan designation would prevail unless specific findings are made by the County that the Specific Plan improvement is consistent with the General Plan.

30.TRANS. 2 SP - SP375/PAYMENT OF FEES RECOMMND

The project proponent shall be required to pay all applicable fees in accordance with the fee schedule in effect at the time of development.

30.TRANS. 3 SP - SP375/TS REQUIRED RECOMMND

During the District Refinement Plan (DRP) process, the project proponent shall prepare a Traffic Impact Analysis (TIA), in accordance with Riverside County guidelines, for each "Development District" within the SP. The District-level traffic analysis will be a refinement of the SP Traffic Impact Analysis and shall determine the need and timing of improvements needed to mitigate the traffic impacts of each Development District under conditions existing at the time of the DRP. In addition, TIAs for individual implementing projects may be required for individual implementing projects within the boundaries of SP00375, at the discretion of the Transportation Department. TIAs for individual implementing projects, if needed, shall identify the impacts of the implementing project and needed transportation system improvements to be constructed prior to each implementing project.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 3 SP - SP375/TS REQUIRED (cont.) RECOMMND

Site-specific focused traffic studies may be required for subsequent implementing projects within the boundaries of SP00375. These subsequent traffic studies shall identify specific project impacts and needed transportation system improvements to be constructed in conjunction with each project.

Each implementing project shall make all necessary on-site and off-site improvements to achieve/maintain adequate LOS at all locations.

If development within SP00375 occurs in a different order than stated in 10. 3 TRANS. SP - SP375/ DEFINITION OF PROJECT PHASES BY PLANNING AREA, or if phases overlap substantially, a new DRP-level or project-level TIA may be required to determine if any improvements from the prior un-built phase need to be constructed to mitigate impacts by the phase being developed.

All improvements on Caltrans facilities shall conform to Caltrans design guidelines and shall be subject to Caltrans approval.

If any improvements proposed by the applicants for individual projects are found to be infeasible, the applicants for individual projects will be required to provide alternative feasible improvements to achieve levels of service satisfactory to the County.

All intersection spacing for individual tracts, parcel maps, CUPs, or plot plans shall conform to the minimum County intersection spacing standards.

All turn pocket lengths shall conform at least to the minimum County turn pocket length standards.

30.TRANS. 4 SP-SP375/SR-86 & SR-86S ML IMP RECOMMND

Prior to the issuance of any building permit for any implementing projects within SP00375, Riverside County shall prepare a financial plan to make mainline improvements to add one lane in each direction on SR-86S/SR-86 between 62nd Avenue and Marina Drive in Imperial County and to construct interchanges at SR-86S/62nd Avenue, SR-86S/66th Avenue, SR-86S/70th Avenue, SR-86S/74th Avenue, SR-86S/81st Avenue, SR-86/Town Center

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 4 SP-SP375/SR-86 & SR-86S ML IMP (cont.) RECOMMND

Way North, SR-86/Desert Shores Drive, SR-86/Brawley Avenue, SR-86/Sea Oasis Boulevard, and SR-86/Marina Drive. The financial plan shall identify the cost of the improvements based on a Preliminary Engineering study. In addition to fair share developer contributions, the financial plan shall consider funding that may be available through CVAG, RCTC, or other agencies. The County will assist in obtaining available funding that is, or may become available, through CVAG, RCTC, and other agencies, as appropriate.

Prior to the issuance of any building permit for any implementing projects within SP00375, Riverside County shall conduct a Nexus Study, based on the financial plan, and establish an RBBD or other funding mechanism in accordance with the Nexus Study recommendations.

If the County has not formed an RBBD or other area-wide funding mechanism for SR-86/SR-86S improvements at the time the proponent of SP00375 or any subsequent implementing agencies are ready to request building permits, , the project proponent shall establish a Community Facilities District (CFD) or other funding mechanism, prior to the issuance of any building permit within SP00375, to help fund its share of the cost of SR-86S/SR-86 mainline improvements (SP00375's fair share is estimated preliminarily as 37% of the total cost of the SR86 additional lane improvements) and its share of interchange construction at SR-86S/81st Avenue and at SR-86/Town Center Way North (SP00375's share is estimated preliminarily as 95 to 100% of the total cost).

Prior to the issuance of any building permit for any implementing projects within SP00375, the project proponent shall deposit with Riverside County the funds necessary for the County to prepare the Preliminary Engineering Study, the Financial Plan, and the Nexus Study (" the studies"). The project proponent shall be eligible for fee credits, fee credits not to exceed the amount of actual costs for the Studies, after the establishment of the RBBD or other corridor-wide funding mechanism.

After building permits for 1,608 residential units have been issued, no further building permit, or permits, shall be issued for any residential or non-residential implementing project in SP00375 until the project

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 4 SP-SP375/SR-86 & SR-86S ML IMP (cont.) (cont.RECOMMND

proponent, or implementing projects within SP00375, have deposited funds for Riverside County to prepare an environmental document for adding one lane in each direction along SR-86S/SR-86 between 62nd Avenue and Marina Drive in Imperial County. The project proponent, or the implementing projects, will be eligible for fee credits, fee credits not to exceed the amount of actual costs for the Studies, after the establishment of the RBBD or other area-wide funding mechanism. Based on subsequent traffic studies and at the discretion of the Director of Transportation, the threshold number of residential units may be adjusted.

After building permits for 5,718 residential units have been issued, no further building permit, or permits, shall be issued for any residential or non-residential implementing project in SP00375 until Riverside County obtains environmental clearance to add one lane in each direction along SR-86S/SR-86 between 62nd Avenue and Marina Drive in Imperial County. Based on subsequent traffic studies and at the discretion of the Director of Transportation, the threshold number of residential units may be adjusted. TUMF credit, where eligible, shall be provided in accordance with CVAG's policies and approvals.

After building permits for 5,718 residential units have been issued, no further building permit, or permits, shall be issued for any residential or non-residential implementing project in SP00375 until SR-86 has been improved to add one lane in each direction between the northern boundary of SP00375 and Town Center Way North. Based on subsequent traffic studies and at the discretion of the Director of Transportation, the threshold number of residential units may be adjusted.

After building permits for 11,864 residential units have been issued, no further building permit, or permits, shall be issued for any residential or non-residential implementing project in SP00375 until a construction contract, or contracts shall have been let to improve SR-86S/SR-86 to add one lane in each direction between 62nd Avenue and Marina Drive in Imperial County.

After building permits for 12,788 residential units have been issued, no further building permit, or permits, shall be issued for any residential or non-residential

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 4 SP-SP375/SR-86 & SR-86S ML IMP (cont.) (cont.RECOMMND

implementing project in SP00375 until SR-86S/SR-86 shall have been constructed to provide three lanes in each direction between 62nd Avenue and Marina Drive in Imperial County. Depending on the progress of construction and at the discretion of the Director of Transportation, the threshold number of residential units may be adjusted.

30.TRANS. 5 SP-SP375/IMPVTS SR-86 & SR86S RECOMMND

Prior to the issuance of any building permit for any implementing projects within SP00375, the project proponent shall obtain Caltrans approval to install a traffic signal and construct eastbound and westbound left turn lanes at the intersection of SR-86S and 81st Avenue.

Prior to the issuance of any building permit for any implementing projects within SP00375, the project proponent shall obtain Caltrans approval to install a traffic signal at the intersection of SR-86 and Lincoln Street (between 83rd Avenue and 84th Avenue) and to provide a southbound left turn lane. The signal at this location will be temporary and shall be removed when a grade separation (no access to SR-86) is constructed at this location.

Prior to the issuance of the 659th occupancy permit within SP00375, or earlier if the need is indicated in traffic studies for implementing projects, the proponent of SP00375 and/or implementing projects shall install and activate a traffic signal at SR-86S and 81st Avenue, and shall construct eastbound and westbound left turn lanes.

Prior to the issuance of the 659th occupancy permit, or earlier if the need is indicated in traffic studies for implementing projects, the proponent of SP00375 and/or implementing projects shall install and activate a traffic signal at SR-86 and Lincoln Street, and shall provide a southbound left turn lane. Access at this location shall be temporary, and the signal at this location shall be removed when a grade separation (no access to SR-86) is constructed.

After building permits for 8,139 residential units have been issued, no further building permit, or permits, shall be issued for any residential or non-residential implementing project in SP00375 until the proponent of SP00375, and/or implementing projects within the SP, shall

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 5 SP-SP375/IMPVTS SR-86 & SR86S (cont.) RECOMMND

have constructed a new interchange on SR-86 at Town Center Way North (approximately at 85th Avenue).

Where the need is indicated in Traffic Impact Analyses (TIAs) to be conducted during the District Refinement Process (DRP) or based on TIAs for specific implementing projects, taking into consideration conditions prevailing at the time, and unless otherwise implemented by others, the proponent of SP00375 and/or implementing projects shall install and activate off-site traffic signals and construct additional turning or through lanes at intersections along SR-86S/SR-86 (between 62nd Avenue and Marina Way) when needed to mitigate the traffic impacts of implementing projects within SP00375, or shall make in lieu payments, or as approved by the Director of Transportation.

30.TRANS. 6 SP - SP375/TRAFFIC SIGNALS RECOMMND

The project proponent, or the implementing projects within the SP, shall be responsible for the design, installation and necessary modifications to all on-site traffic signals. Signals shall be installed, modified as needed, and shall be operational, or other traffic control measures, such as roundabouts shall be installed at the locations indicated in Exhibit 2.1C and Exhibits 6.2-B through 6.2-T of the TSS dated August 5, 2010.

Where the need is indicated in DRP-level or project-level TIAs and , unless the signals are designed and installed by others, the project proponent, or the implementing projects within the SP, shall also be responsible for the design, installation and necessary modifications to off-site traffic signals at the intersections listed below. Any on-site intersections on SR-86 and SR-86S are included in the "off-site" list, since they will help accommodate external traffic.

Prior to the issuance of any certificates of occupancy that would result in more than 658 dwelling units in SP00375, or sooner if the need is indicated in project-level TIAs, the following signals shall be installed and operational:

SR-86S (NS) at:
81st Avenue (EW)

SR-86 (NS) at:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 6 SP - SP375/TRAFFIC SIGNALS (cont.) RECOMMND

Lincoln Street (EW)

with no credit given for Traffic Signal Mitigation Fees

Prior to the issuance of any certificates of occupancy that would result in more than 2,600 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following signals shall be installed and operational:

81st Avenue (EW) at:
Paseo Street (NS)

Prior to the issuance of any certificates of occupancy that would result in more than 2,818 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following signals shall be installed and operational, with credit toward signal mitigation fees if the signal is included in the DIF needs list at the time of installation.

Harrison Street (NS) at:
62nd Avenue (EW)

Harrison Street (NS) at:
66th Avenue (EW)

Harrison Street (NS) at:
70th Avenue (EW)

Harrison Street (NS) at:
74th Avenue (EW)

Harrison Street (NS) at:
Pierce Street (EW)

Unless DRP-level or project-level TIAs indicate that one or more signals are not needed or can be deferred to a later stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 3,071 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level traffic studies, the following signals shall

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 6 SP - SP375/TRAFFIC SIGNALS (cont.) (cont.) RECOMMND

be installed and operational:

81st Avenue (EW) at:
Harrison Street/SR-86 (NS)

with no credit given for Traffic Signal Mitigation Fees

Prior to the issuance of any certificates of occupancy that would result in more than 3,478 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level traffic studies, the following signals shall be installed and operational:

SR-86 (NS) at:
Town Center Way (EW)

with no credit given for Traffic Signal Mitigation Fees

Prior to the issuance of any certificates of occupancy that would result in more than 5,284 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level traffic studies, the following signals shall be installed, or modified, and operational, with credit toward signal mitigation fees if the signal is included in the DIF needs list at the time of installation.

Harrison Street (NS) at:
72nd Avenue (EW)

Harrison Street (NS) at:
78th Avenue (EW)

SR-86S (NS) at:
70th Avenue (EW)

SR-86S (NS) at:
74th Avenue (EW)

SR-86 (NS) at:
Desert Shores Drive (EW)

SR-86 (NS) at:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 6 SP - SP375/TRAFFIC SIGNALS (cont.) (cont.) (cRECOMMND

Brawley Avenue (EW)

SR-86 (NS) at:
Sea Oasis Boulevard (EW)

SR-86 (NS) at:
Marina Drive (EW)

unless otherwise approved by Imperial County, or DRP-level or project-level TIAs indicate that one or more signals are not needed or can be deferred to a later stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 13,260 dwelling units in SP00375, or sooner if the need is indicated in DRP-level traffic studies, signals shall be installed, modified as needed, and shall be operational, or other traffic control measures, such as roundabouts, shall be installed at the locations indicated in Exhibit 2.1C and Exhibits 6.2-B through 6.2-T of the TSS dated August 5, 2010.

with no credit given for Traffic Signal Mitigation Fees

The modification of traffic signals to accommodate the phased improvements shall be the responsibility of the SP00375 proponent or the implementing projects.

30.TRANS. 8 SP - SP375/GEOMETRICS RECOMMND

The project proponent, or the implementing projects within the SP, shall be responsible for the necessary improvements or modifications at all on-site intersections. The improvements shall be made at the locations indicated and with the number of lanes as specified in Exhibit 2.1C and Exhibits 6.2-B through 6.2-T of the TSS dated August 5, 2010.

Where the need is indicated in DRP-level or project-level TIAs and, unless the improvements are made by others prior to the time they are needed, the project proponent, or the implementing projects within the SP, shall also be responsible for the improvements at the off-site intersections listed below. If eligible under any applicable funding programs in effect at the time of

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) RECOMMND

implementation, these improvements may qualify for fee credits. Any on-site intersections on SR-86 and SR-86S are included in the "off-site" list, since they will help accommodate external traffic.

While the intersection improvements, both on-site and off-site, may be made in phases as the need arises, all improvements shall be designed and constructed to be consistent with the ultimate configuration of the intersection. All improvements listed below can be deferred to a later stage, or accelerated to an earlier stage of development, subject to the approval of the Director of Transportation based on subsequent traffic studies. Depending on the progress of construction and at the discretion of the Director of Transportation, the threshold number of residential units may be adjusted.

Prior to the issuance of any certificates of occupancy that would result in more than 658 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of SR-86S (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one right turn lane
Southbound:One left turn lane, two through lanes, one right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

The intersection of SR-86S (N/S) and Lincoln Street (E/W) shall provide the following geometrics:

Northbound:Two through lanes, one right turn lane
Southbound:One left turn lane, two through lanes
Eastbound:N/A
Westbound:One left turn lane, one shared through/right turn lane

The intersection of Paseo Street (N/S) and 81st Avenue

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) RECOMMND

(E/W) shall provide the following geometrics:

Northbound:One shared left turn/right turn lane - stop control
Southbound:NA
Eastbound:One shared through/right turn lane
Westbound:One shared left turn/through lane

The intersection of Lincoln Street (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane
Southbound:NA
Eastbound:One right turn lane
Westbound:NA

Prior to the issuance of any certificates of occupancy that would result in more than 2,818 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following offsite intersection improvements shall be made. If eligible under any applicable funding programs in effect at the time of implementation, these improvements may qualify for fee credits.

The intersection of Harrison Street (N/S) and 62nd Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one right turn lane
Southbound:One left turn lane, one through lane, one right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

The intersection of Harrison Street (N/S) and 66th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one right turn lane
Southbound:One left turn lane, one through lane, one right turn lane
Eastbound:One left turn lane, one shared through/right turn lane

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

Westbound:One left turn lane, one shared through/right turn lane

The intersection of Harrison Street (N/S) and 70th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one shared through/right turn lane
Southbound:One left turn lane, one shared through/right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

The intersection of Harrison Street (N/S) and 74th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one right turn lane
Southbound:One left turn lane, one through lane, one right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

The intersection of Harrison Street (N/S) and Pierce Street (E/W) shall provide the following geometrics:

Northbound:One through lane, one right turn lane
Southbound:One left turn lane, one through lane
Eastbound:N/A
Westbound:One left turn lane, one right turn lane

The intersection of SR-86S (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one right turn lane
Southbound:Two left turn lanes, two through lanes, one right turn lane

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

Eastbound:One left turn lane, one through lane, one right turn lane
Westbound:One left turn lane, one through lane, one right turn lane with overlap phasing

NOTE: Signal modification will be necessary to accommodate a second southbound left turn lane, an eastbound right turn lane and a westbound right turn lane with overlap phasing.

The intersection of Paseo Street (NS) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one right turn lane
Southbound:N/A
Eastbound:One through lane, one right turn lane
Westbound:One left turn lane, one through lane

unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 2,818 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of Harrison Street/Village Way (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one right turn lane
Southbound:Two left turn lanes, one shared through/right turn lane
Eastbound:One shared left turn/through lane, one right turn lane
Westbound:Two left turn lanes, one shared through/right turn lane

unless DRP-level or project-level TIAs indicate improvements at this intersection are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 3,478 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of SR-86 (N/S) and Town Center Way North (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one shared through/right turn lane
Southbound:One left turn lane, two through lanes, one right turn lane with overlap
Eastbound:Two left turn lanes, two through lanes, one right turn lane
Westbound:One left turn lane, two through lanes, one right turn lane

unless DRP-level or project-level TIAs indicate improvements at this intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 5,284 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following offsite intersection improvements shall be made. If eligible under any applicable funding programs in effect at the time of implementation, these improvements may qualify for fee credits.

The intersection of Harrison Street (N/S) and 64th Avenue (E/W) shall provide the following geometrics:

Northbound:One shared through/right turn lane
Southbound:One shared left turn/through lane
Eastbound:NA
Westbound:One shared left turn/right turn lane - stop control

The intersection of Harrison Street (N/S) and 72nd Avenue (E/W) shall provide the following geometrics:

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

Northbound:One left turn lane, one shared through/right turn lane
Southbound:One left turn lane, one shared through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

The intersection of Harrison Street (N/S) and 74th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one right turn lane
Southbound:One left turn lane, one through lane, one right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

NOTE: Signal modification will be necessary to accommodate an eastbound left turn lane and a westbound left turn lane.

The intersection of Harrison Street (N/S) and Pierce Street (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one right turn lane
Southbound:One left turn lane, one shared through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

NOTE: Signal modification will be necessary to accommodate a northbound left turn lane.

The intersection of Harrison Street (N/S) and 78th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one right turn lane
Southbound:One left turn lane, two through lanes, one right turn lane
Eastbound:One left turn lane, one shared through/right turn lane

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

Westbound:One left turn lane, one shared through/right turn lane

The intersection of Harrison Street (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, three through lanes, one right turn lane with overlap phasing
Southbound:Two left turn lanes, two through lanes, one shared through/right turn lane
Eastbound:One left turn lane, one through lane, one shared through/right turn lane
Westbound:Two left turn lanes, one through lane, one free-flow right turn lane

NOTE: Signal modification will be necessary to accommodate three northbound through lanes, overlap phasing on the northbound approach, three southbound through lanes, and a westbound right turn lane.

The intersection of Polk Street (N/S) and 74th Avenue (E/W) shall provide the following geometrics:

Northbound:NA
Southbound:One shared left turn/right turn lane - stop control
Eastbound:One shared left turn/through lane
Westbound:One shared through/right turn lane

The intersection of Fillmore Street (N/S) and 78th Avenue (E/W) shall provide the following geometrics:

Northbound:One shared left turn/right turn lane - stop control
Southbound: NA
Eastbound:One shared through/right turn lane
Westbound:One shared left turn/through lane

The intersection of SR-86S (N/S) and 62nd Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one shared through/right turn lane
Southbound:One left turn lane, two through lanes, one

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

shared through/right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

NOTE: Signal modification will be necessary to accommodate three northbound through lanes, three southbound through lanes, an eastbound left turn lane, and a westbound left turn lane.

The intersection of SR-86S (N/S) and 66th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one shared through/right turn lane
Southbound:One left turn lane, two through lanes, one shared through/right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:Two left turn lanes, one shared through/right turn lane

NOTE: Signal modification will be necessary to accommodate three northbound through lanes, three southbound through lanes, an eastbound left turn lane, and two westbound left turn lanes.

The intersection of SR-86S (N/S) and 70th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one shared through/right turn lane
Southbound:One left turn lane, two through lanes, one shared through/right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

The intersection of SR-86S (N/S) and 74th Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one shared through/right turn lane
Southbound:One shared left turn/through lane, one through

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

lane, one shared through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

The intersection of SR-86 (N/S) and Desert Shores Drive (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one right turn lane
Southbound:One left turn lane, two through lanes, one shared through/right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn lane

The intersection of SR-86 (N/S) and Brawley Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one shared through/right turn lane
Southbound:One left turn lane, two through lanes, one right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

The intersection of SR-86 (N/S) and Sea Oasis Boulevard (E/W) shall provide the following geometrics:

Northbound:One shared left turn/through lane, one shared through/right turn lane
Southbound:One left turn lane, one through lane, one shared through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

The intersection of SR-86 (N/S) and Marina Drive (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one through lane, one shared through/right turn lane
Southbound:One left turn lane, one through lane, one shared through/right turn lane
Eastbound:One left turn lane, one shared through/right turn lane
Westbound:One left turn lane, one shared through/right turn

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

lane

The intersection of Village Way (N/S) and 82nd Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes
Southbound:Two through lanes, one right turn lane
Eastbound:One left turn lane, one right turn lane
Westbound:NA

The intersection of Travertine Estates (N/S) and Paseo Street (E/W) shall provide the following geometrics:

Northbound:One shared left turn/through/right turn lane
Southbound:One shared left turn/through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

The intersection of A Street (N/S) and Desert Shores Drive (E/W) shall provide the following geometrics:

Northbound:One shared left turn/through/right turn lane
Southbound:One shared left turn/through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

The intersection of Sea Oasis Drive (N/S) and Travertine Estates (E/W) shall provide the following geometrics:

Northbound:One shared left turn/through lane
Southbound:One shared through/right turn lane
Eastbound:One shared left turn/right turn lane
Westbound:NA

The intersection of Sea Oasis Drive (N/S) and Desert Shores Drive (E/W) shall provide the following geometrics:

Northbound:One shared left turn/through/right turn lane
Southbound:One shared left turn/through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

unless otherwise approved by Imperial County, or unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 5,464 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of Lincoln Street (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one shared through/right turn lane
Southbound:One shared left turn/through/right turn lane
Eastbound:One shared left turn/through/right turn lane
Westbound:One shared left turn/through/right turn lane

unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 5,718 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of SR-86 (N/S) and Town Center Way North (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes
Southbound:One left turn lane, two through lanes, one right turn lane with overlap
Eastbound:Two left turn lanes, one through lane, one right turn lane
Westbound:One left turn lane, one through lane, one right turn lane

unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 5,770 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of SR-86S (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, two through lanes, one shared through/right turn lane
Southbound:Two left turn lanes, three through lanes, one right turn lane
Eastbound:Two left turn lanes, two through lanes, one right turn lane
Westbound:One left turn lane, two through lanes, one right turn lane with overlap phasing

NOTE: Signal modification will be necessary to accommodate three northbound through lanes, three southbound through lanes, two eastbound left turn lanes, two eastbound through lanes, and two westbound through lanes.

unless DRP-level or project-level TIAs indicate improvements at this intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

Prior to the issuance of any certificates of occupancy that would result in more than 8,139 dwelling units in SP00375, or sooner if the need is indicated in DRP-level or project-level TIAs, the following intersection improvements shall be made:

The intersection of Paseo Street (N/S) and 81st Avenue (E/W) shall provide the following geometrics:

Northbound:One left turn lane, one shared left turn/through/right turn lane
Southbound:One left turn lane, one shared through/right turn lane
Eastbound:One left turn lane, one through lane, one right

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.)RECOMMND

turn lane
Westbound:One left turn lane, one shared through/right turn lane

unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

NOTE: Signal modification will be necessary to accommodate a northbound left turn lane, the southbound approach, eastbound left turn and right turn lanes, and the westbound left turn lane.

The intersection of SR-86 Southbound Ramps (N/S) and Town Center Way (E/W) shall provide the following geometrics:

Northbound:NA
Southbound:Two left turn lanes, two right turn lanes
Eastbound:Two through lanes, two right turn lanes
Westbound:Two through lanes, one right turn lane

unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

The intersection of SR-86 Northbound Ramps (N/S) and Town Center Way (E/W) shall provide the following geometrics:

Northbound:Two left turn lanes, one right turn lane
Southbound:NA
Eastbound:Two through lanes, two right turn lanes
Westbound:Two through lanes, two right turn lanes

unless DRP-level or project-level TIAs indicate improvements at one or more intersections are not needed, or fewer lanes are needed, or improvements can be deferred to a later stage of development, subject to approval by the Director of Transportation.

All improvements on Caltrans facilities shall conform to Caltrans design guidelines and shall be subject to Caltrans

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 8 SP - SP375/GEOMETRICS (cont.) (cont.) (cont.) RECOMMND

approval.

All improvements listed are requirements for interim conditions only. Full right-of-way and roadway half sections adjacent to the SP00375 property for the ultimate roadway cross-section per the County's Road Improvement Standards and Specifications must be provided.

All implementing projects within the SP00375 shall be subject to a condition of approval providing that: Any off-site widening required to provide these geometrics shall be the responsibility of the landowner/developer, consistent with Riverside County Ordinance 460 Section 3.2J.

30.TRANS. 9 SP - SP375/PEDESTRIAN PATHS RECOMMND

The project proponent and individual implementing projects within SP00375 shall implement the system of Travertine Point Walkways/Pedestrian Paths as illustrated in Exhibits 3.1-A and 3.1-B of the TSS.

30.TRANS. 10 SP - SP375/BIKEWAYS RECOMMND

The project proponent and individual implementing projects within SP00375 shall implement the system of Travertine Point Bikeways Plan as illustrated in Exhibits 3.2-A and 3.2-B of the TSS.

30.TRANS. 11 SP - SP375/TRANSIT FEATURES RECOMMND

The project proponent and individual implementing projects within SP00375 shall implement the Travertine Point Transit Features as illustrated in Exhibits 4.1-A nd 4.1-B of the TSS.

30.TRANS. 12 SP - SP375/NEV ACCOMMODATIONS RECOMMND

The project proponent and individual implementing projects within SP00375 shall implement the Travertine Point Neighborhood Electrical Vehicle Accommodations as illustrated in Exhibit 6.1-I of the TIA. State legislation will be required to allow NEVs to use roadways that have a speed limit higher than 35 mph. The applicant shall assist the County in obtaining legislative approval.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

30. PRIOR TO ANY PROJECT APPROVAL

30.TRANS. 13 SP - SP375/DRAINAGE STUDIES RECOMMND

Drainage studies will be required for all subsequent development proposals within the boundaries of Specific Plan No. 375 as approved by the Transportation Department.

30.TRANS. 14 SP - SP375/TUMF RECOMMND

Prior to the issuance of a building permit, the applicant shall pay the Transportation Uniform Mitigation Fee (TUMF) in accordance with the fee schedule in effect at the time of issuance, pursuant to Ordinance No. 673.

100. PRIOR TO ISSUE GIVEN BLDG PRMT

PLANNING DEPARTMENT

100.PLANNING. 2 SP - COUNT RES BUILD PERMITS RECOMMND

This condition is applied to assist the Planning Department with tracking the build-out of the SPECIFIC PLAN by automatically counting all the issuance of all new residential building permits on the County's Land Management System which are electronically associated with the Specific Plan. Accordingly, this condition will not allow more than 16650 residential building permits to be issued within the SPECIFIC PLAN.

100.PLANNING. 3 SP -* COUNT RES PRMTS IN DRP RECOMMND

This Condition is applied to assist the Planning Department with tracking the build-out of each DISTRICT within the SPECIFIC PLAN.

Each DISTRICT within the SPECIFIC PLAN shall receive a different development level designation when the DISTRICT REFINEMENT PLAN application is filed. All subsequent implementing projects, including any processed concurrently with the DISTRICT REFINEMENT PLAN shall be attached to the development level designation for the corresponding DISTRICT REFINEMENT PLAN. This condition shall be applied to each DISTRICT REFINEMENT PLAN to automatically count the development of all new residential dwelling units for that DISTRICT on the County's Land Management System. Accordingly, this condition will not allow more than _____ residential dwelling units to be issued within DISTRICT _____.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 3 SP -* COUNT RES PRMTS IN DRP (cont.) RECOMMND

The total dwelling unit count shall be tracked in a separate spreadsheet by the Planning Director and updated by the applicants for each new project. This is part of the application submittal requirements per the SPECIFIC PLAN.

100.PLANNING. 4 SP - AFFORDABILITY REQ (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 3,133rd building permit within the SPECIFIC PLAN, at least 117 affordable housing units shall have been constructed and operating per the requirements of SPECIFIC PLAN section 3.13.1 subsection 5.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 5 SP - AFFORDABILITY REQ (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 6,658th building permit within the SPECIFIC PLAN, at least 317 affordable housing units shall have been constructed and operating per the requirements of SPECIFIC PLAN section 3.13.1 subsection 5.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 6 SP - AFFORDABILITY REQ (3) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 6 SP - AFFORDABILITY REQ (3) (cont.) RECOMMND

UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 9,628th building permit within the SPECIFIC PLAN, at least 833 affordable housing units shall have been constructed and operating per the requirements of SPECIFIC PLAN section 3.13.1 subsection 5.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 7 SP - AFFORDABILITY REQ (4) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 15,160th building permit within the SPECIFIC PLAN, at least 1,416 affordable housing units shall have been constructed and operating per the requirements of SPECIFIC PLAN section 3.13.1 subsection 5.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 8 SP - AFFORDABILITY REQ (5) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 16,405th building permit within the SPECIFIC PLAN, at least 1,666 affordable housing units shall have been constructed and operating per the requirements of SPECIFIC PLAN section 3.13.1 subsection 5.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 9 SP - NONRES JOBS REQ (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 3,250th building permit within the SPECIFIC PLAN, at least 89,000 square feet of nonresidential development shall have been constructed and occupied per the requirements of SPECIFIC PLAN section 3.13.8 subsection 2. The intent of this condition of approval is to assure that an adequate number of jobs will be provided for the project. Shell buildings, or construction alone shall not satisfy this condition of approval. Planning Department inspection of operating uses within the 89,000 square feet may be required.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 10 SP - NONRES JOBS REQ (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 6,500th building permit within the SPECIFIC PLAN, a cumulative total of at least 529,000 square feet of nonresidential development (an addition of 440,000 square feet over the requirement shown in condition of approval number 100.Planning.9) shall have been constructed and occupied per the requirements of SPECIFIC PLAN section 3.13.8 subsection 2. The intent of this condition of approval is to assure that an adequate number of jobs will be provided for the project. Shell buildings, or construction alone shall not satisfy this condition of approval. Planning Department inspection of operating uses within the additional 440,000 square feet may be required.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 11 SP - NONRES JOBS REQ (3) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 9,500th building permit within the SPECIFIC PLAN, a cumulative total of at least 1,629,500 square feet of nonresidential development (an addition of 1,100,000 square feet over the requirement shown in condition of approval number 100.Planning.10) shall have been constructed and occupied per the requirements of SPECIFIC PLAN section 3.13.8 subsection 2. The intent of this condition of approval is to assure that an adequate number of jobs will be provided for the project. Shell buildings, or construction alone shall not satisfy this condition of approval. Planning Department inspection of operating uses within the additional 1,100,000 square feet may be required.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 12 SP - NONRES JOBS REQ (4) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 13,500th building permit within the SPECIFIC PLAN, a cumulative total of at least 4,029,500 square feet of nonresidential development (an addition of 2,400,000 square feet over the requirement shown in condition of approval number 100.Planning.11) shall have been constructed and occupied per the requirements of SPECIFIC PLAN section 3.13.8 subsection 2. The intent of this condition of approval is to assure that an adequate number of jobs will be provided for the project. Shell buildings, or construction alone shall not satisfy this condition of approval. Planning Department inspection of operating uses within the additional 2,400,000 square feet may be required.

To track total dwelling unit counts see condition

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 12 SP - NONRES JOBS REQ (4) (cont.) RECOMMND

"10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 13 SP - NONRES JOBS REQ (5) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 15,000th building permit within the SPECIFIC PLAN, a cumulative total of at least 5,029,500 square feet of nonresidential development (an addition of 1,000,000 square feet over the requirement shown in condition of approval number 100.Planning.12) shall have been constructed and occupied per the requirements of SPECIFIC PLAN section 3.13.8 subsection 2. The intent of this condition of approval is to assure that an adequate number of jobs will be provided for the project. Shell buildings, or construction alone shall not satisfy this condition of approval. Planning Department inspection of operating uses within the additional 1,000,000 square feet may be required.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 14 SP - FIRE STATIION REQ (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 2,000th building permit within the SPECIFIC PLAN, or to the satisfaction of the RCFD, a fire station for the RCFD within the Riverside County portion of the proposed project shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 15 SP - FIRE STATION REQ (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 4,000th building permit within the SPECIFIC PLAN, or to the satisfaction of the RCFD, a second fire station for the RCFD within the Riverside County portion of the proposed project shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 16 SP - SHERIFF STATION REQ (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 3,249th building permit within the SPECIFIC PLAN, or to the satisfaction of the RCSD, a sheriff's substation for the RCSD within the Riverside County portion of the proposed project shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 17 SP - SHERIFF STATION REQ (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 6,857th building permit within the SPECIFIC PLAN, or to the satisfaction of the RCSD, a second sheriff's substation for the RCSD within the Riverside County portion of the proposed project shall be constructed and operating.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 17 SP - SHERIFF STATION REQ (2) (cont.) RECOMMND

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 18 SP - PARK PLANS REQ (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 2,250th building permit within the SPECIFIC PLAN, detailed plans for a minimum of 43 additional acres of park (representing 5 acres per thousand) shall be approved by the Planning Department. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 19 SP - PARK CONST (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 3,250th building permit within the SPECIFIC PLAN a minimum of 43 acres of park land shall be constructed and opened.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 20 SP - PARK PLANS REQ (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 5,500th building permit within

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 20 SP - PARK PLANS REQ (2) (cont.) RECOMMND

the SPECIFIC PLAN, detailed plans for a minimum of 48 additional acres of park (for a total of 91 acres representing 5 acres per thousand) shall be approved by the Planning Department. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 21 SP - PARK CONST (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 6,500th building permit within the SPECIFIC PLAN, detailed plans for a minimum of 48 additional acres of park (for a total of 91 acres representing 5 acres per thousand) shall be approved by the Planning Department. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 22 SP - PARK PLANS REQ (3) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 9,000th building permit within the SPECIFIC PLAN, detailed plans for a minimum of 47 additional acres of park (for a total of 138 acres representing 5 acres per thousand) shall be approved by the Planning Department. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 22 SP - PARK PLANS REQ (3) (cont.) RECOMMND

"10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 23 SP - PARK CONST (3) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 10,000th building permit within the SPECIFIC PLAN a minimum of 47 acres of park land (for a total of 138 acres) shall be constructed and opened.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 24 SP - PARK PLANS REQ (4) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 12,500th building permit within the SPECIFIC PLAN, detailed plans for a minimum of 68 additional acres of park (for a total of 206 acres representing 5 acres per thousand) shall be approved by the Planning Department. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 25 SP - PARK CONST (4) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 13,500th building permit within the SPECIFIC PLAN a minimum of 68 acres of park land

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 25 SP - PARK CONST (4) (cont.) RECOMMND

(for a total of 206 acres) shall be constructed and opened.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 26 SP - LIBRARY PLANS REQ (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 2,500th building permit within the SPECIFIC PLAN, detailed plans for an estimated 5,000-square-foot library facility shall be approved by the Planning Department in coordination with the Riverside County Library System. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 27 SP - LIBRARY CONST (1) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 3,500th building permit within the SPECIFIC PLAN for an estimated 5,000-square-foot library facility shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 28 SP - LIBRARY PLANS REQ (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 28 SP - LIBRARY PLANS REQ (2) (cont.) RECOMMND

PRIOR TO THE ISSUANCE OF THE 6,000th building permit within the SPECIFIC PLAN, detailed plans for an estimated 5,000-square-foot library facility (in addition to library space previously required) shall be approved by the Planning Department in coordination with the Riverside County Library System. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 29 SP - LIBRARY CONST (2) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 7,000th building permit within the SPECIFIC PLAN for an estimated 5,000-square-foot library facility (in addition to library space previously required) shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 30 SP - LIBRARY PLANS REQ (3) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 9,500th building permit within the SPECIFIC PLAN, detailed plans for an estimated 5,000-square-foot library facility (in addition to library space previously required) shall be approved by the Planning Department in coordination with the Riverside County Library System. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 30 SP - LIBRARY PLANS REQ (3) (cont.) RECOMMND

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 31 SP - LIBRARY CONST (3) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 10,500th building permit within the SPECIFIC PLAN an estimated 5,000-square-foot library facility (in addition to library space previously required) shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 32 SP - LIBRARY PLANS REQ (5) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 13,000th building permit within the SPECIFIC PLAN, detailed plans for an estimated 5,000-square-foot library facility (in addition to library space previously required) shall be approved by the Planning Department in coordination with the Riverside County Library System. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

This last library may be in Imperial County as opposed to Riverside County. The Plans shall be coordinated with the Riverside County Library System and/or the Imperial County Free Library System. The applicant shall execute a joint Memorandum of Understanding with both the Riverside County Library System and Imperial County Free Library System that provides for the location of this library site in either Riverside or Imperial County and that this library will provide services to both systems. Regardless of the location of this library, the applicant shall participate

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 32 SP - LIBRARY PLANS REQ (5) (cont.) RECOMMND

in development fees for library services as required by each County. In the event that the library is located in Imperial County, this condition of approval shall be set to NOT APPLY.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 33 SP - LIBRARY CONST (5) RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 14,000th building permit within the SPECIFIC PLAN an estimated 5,000-square-foot library facility (in addition to library space previously required) shall be constructed and operating. This structure may, alternatively, be located in Imperial County in which case this condition of approval shall be set to NOT APPLY.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 34 SP - URGENT CARE PLANS REQ RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 1,500th building permit within the SPECIFIC PLAN, detailed plans for an urgent care medical facility within the Travertine Point Specific Plan area shall be approved by the Planning Department. All designs shall substantially conform to the design criteria as specified in the DISTRICT REFINEMENT PLAN for the respective DISTRICT.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 35 SP - URGENT CARE CONST RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 2,500th building permit within the SPECIFIC PLAN an urgent care medical facility shall be constructed and operating.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 37 SP - HOSPITAL SITE RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

PRIOR TO THE ISSUANCE OF THE 5,000th building permit within the SPECIFIC PLAN, a site for a hospital within the Travertine Point Specific Plan area or other nearby location acceptable to the Planning Director shall be identified and approved by the Planning Department. The development of such site shall be subject to an agreement with a health care provider to construct and operate a hospital at such time as a provider determines there is sufficient need to make the construction and operation of a hospital financially feasible. The design shall substantially conform to the design criteria as specified in the district refinement plan for the respective district.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

100.PLANNING. 38 SP - HOSPITAL CONST RECOMMND

Whenever a condition of approval uses the term "building permit" to trigger an event or to cause another action to take place, the condition shall be interpreted to mean "Dwelling Units" as enumerated within the TOTAL DWELLING UNIT TRACKING MATRIX.

SPECIFIC PLAN Case #: SP00375 Parcel: 755-310-045

100. PRIOR TO ISSUE GIVEN BLDG PRMT

100.PLANNING. 38 SP - HOSPITAL CONST (cont.) RECOMMND

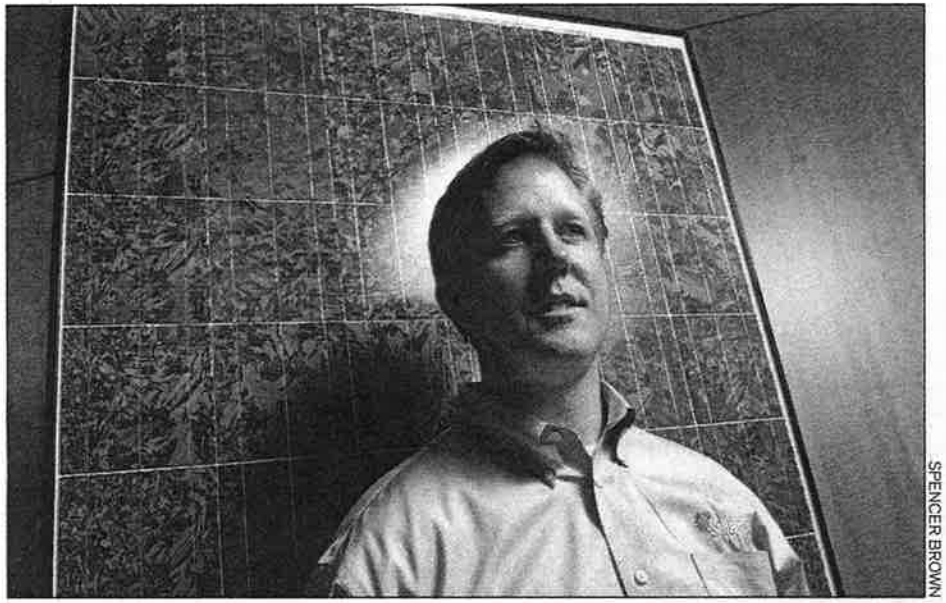
PRIOR TO THE ISSUANCE OF THE 15,000th building permit within the SPECIFIC PLAN a structure for a hospital shall be constructed and operational.

To track total dwelling unit counts see condition "10.Planning.58 DU/BUILDING PERMIT MATRIX."

Exhibit N
Shea Homes zero energy homes

Zero-net-energy homes: More feasible, still rare

BY BLANCA TORRES
San Francisco Business Times


SPENCER BROWN

Solar City's Walter Cuculic says buyers have a choice about where to buy electricity.

California lawmakers set an ambitious goal to have all new homes achieve zero net energy use by 2020. With less than a decade to go, homebuilders have a lot of catching up to do.

So far, only one developer, Shea Homes, offers its "no-electric-bill home" model through its SheaXero brand — which it launched last year, but only in communities aimed at retirees.

The technology to make homes generate more energy than they consume has been available for years. While many homebuilders boast of energy-efficient homes or solar panels as an option, getting down to zero net energy is still rare. That may change very quickly thanks to a drop in the cost of solar panels as well as growing consumer demand.

For Shea, the goal was to help the environment, but more importantly to reduce energy bills for its buyers who tend to live on fixed incomes and want to live in sustainable homes.

"Yes, (zero net energy) increases the costs for the homebuilder, but you're saving money over time," said Jason Enos, general manager for Shea Homes. "Sometime in the future, solar will be a standard feature like a microwave or air conditioning."

Shea started offering the Xero homes in early 2012 in California, Washington, Arizona, Nevada and Florida, and has sold close to 1,000 units. In the Bay Area, Shea builds those models at its Trilogy development in Brentwood in east Contra Costa County that is restricted to homeowners age 55 and older.

The homes were designed to cut energy usage while generating energy, mostly via solar panels.

Shea spent more than a year researching how its homes could achieve zero net energy, which Enos said cost about 10 to 12 percent more to produce. Shea buyers won't notice a difference in price for a Xero home, Enos said, but will save hundreds of dollars per year on energy. In the Bay Area, buyers pay a connection fee to Pacific Gas & Electric, about $4 per month or $48 a year.

To develop its Xero line, Shea partnered with San Mateo-based SolarCity, a provider of clean energy services.

Walter Cuculic, national manager of SolarCity's homebuilding program, said the company has worked with numerous owners of custom homes to achieve zero net energy, but Shea was the first large-scale builder. The company is now developing similar programs for other builders such as Toll Brothers, Pulte Homes, Del Webb Corp. and Taylor Morrison. Shea has launched its Xero brand in 10 communities and plans six more this year.

"(Zero net energy homes) are truly giving the homebuyer more choice about where you buy power," Cuculic said. "You're either going to buy it from the builder or the utility. It's about who provides the better price for the energy."

Cuculic is surprised it has taken so long for zero-net-energy homes to gain traction with homebuilders, especially with California and the U.S. Department of Energy calling for all new homes to reach zero net energy by 2030.

Solar prices have come down. "It's much more feasible than people thought," to reach those goals, Cuculic said. "If you can incorporate (zero net energy) into new construction, the cost is much lower than retrofitting existing homes."

In Vermont, a company called Vantem just rolled out its Smarthouze line of homes built in a factory and assembled onsite that are designed to achieve zero net energy. The company produced energy-efficient insulation and walls before shifting toward complete homes — a move that attracted an investment from Transformative Energy and Materials Capital LLC.

Roger Berry, a partner with the investor, said zero-net-energy homes will do for home building what the Toyota Prius did for cars — turning a luxury or cost-prohibitive technology into an industry standard.

"(We) feel that a real paradigm shift is needed ... to get all the way to zero energy," Berry said. "Halfway steps in this market don't reallly change consumer behavior in fundamental ways."

btorres@bizjournals.com / 415-288-4960

Polaris predicted the resurgence of condo market

Exhibit O
Traffic Noise reduction in Europe

CE Delft
Solutions for environment, economy and technology

Oude Delft 180
2611 HH Delft
The Netherlands
tel: +31 15 2150 150
fax: +31 15 2150 151
e-mail: ce@ce.nl
website: www.ce.nl
KvK 27251086

Traffic noise reduction in Europe

Health effects, social costs and technical and policy options to reduce road and rail traffic noise

Report

Delft, August 2007

Authors: L.C. (Eelco) den Boer
A. (Arno) Schroten

Publication Data

Bibliographical data:
L.C. (Eelco) den Boer, A. (Arno) Schroten
Traffic noise reduction in Europe
CE Delft, March 2007

Traffic / Noise / Reduction / Health / Effects / Costs / Technology / Policy / Road / Railways /

Publication code: 07.4451.27

CE Delft publications are available from www.ce.nl

Commissioned by: T&E Brussels

For further information on this study, contact Eelco den Boer at CE.

© copyright, CE, Delft

CE Delft
Solutions for environment, economy and technology

CE Delft is an independent research and consultancy organisation specialised in developing structural and innovative solutions to environmental problems. CE Delfts solutions are characterised in being politically feasible, technologically sound, economically prudent and socially equitable.

This report is printed on 100% recycled paper.

Preface

Millions of people in Europe are affected by transport noise. Transport noise annoys people, causes stress and illness and may sometimes even have a fatal impact. As a result, noise is very costly to society.

There are numerous cheap and relatively easy ways to reduce transport noise significantly. First of all, noise should be taken as seriously as other forms of pollution, as it is similarly damaging to human health. This year, 2007, is an important one for the future of noise policy. The European Commission is presenting a proposal for tightening car tyre noise emission limits, and in June 2007 the first noise maps of large agglomerations, main roads and railways were to be submitted to the Commission under the terms of the Environmental noise directive.

This reports describes the health effects of rail and road transport noise and presents a number of recommendations as to how to address them.

We would like to kindly thank the people who reviewed this report for their contributions. The comments of Rokho Kim of the WHO and Tor Kihlman of the Chalmers Institute of Technology were especially helpful in improving the overall quality of the report. We also thank Nigel Harle for his careful editing of the English.

Eelco den Boer
Arno Schroten

Contents

Summary 1

1 Introduction 3

2 The health effects of traffic noise 5
- 2.1 WHO Community Noise Guidelines 5
- 2.2 The relation between noise and human health 6
- 2.3 Review of health effects 7
  - 2.3.1 Annoyance 7
  - 2.3.2 Sleep disturbance 8
  - 2.3.3 Impaired cognitive functioning 9
  - 2.3.4 Cardiovascular disease 10
  - 2.3.5 Mental illness 11
- 2.4 Traffic noise especially harmful to vulnerable groups 11
- 2.5 Over 210 million in EU25 exposed to harmful traffic noise 12
- 2.6 Health of millions of Europeans affected by traffic noise 13
- 2.7 Effects on animals and ecosystems 19

3 The social costs of traffic noise 21
- 3.1 Valuing the health effects of traffic noise 21
- 3.2 Social cost of traffic noise in EU22 over € 40 billion a year 21
- 3.3 Passenger cars and lorries responsible for bulk of costs 23
- 3.4 Benefits of noise reduction 23

4 Noise reduction options 25
- 4.1 At-source versus end-of pipe measures 25
- 4.2 Transport noise regulation: the legal framework 28
- 4.3 Vehicle noise regulation failed 29
- 4.4 Tyre noise limits too high to be effective 32
- 4.5 Low-noise road pavements 35
- 4.6 Speed reduction and traffic management 36
- 4.7 Anti-propagation measures (noise barriers, insulation) 37
- 4.8 Rail transport noise 38
- 4.9 Two-wheeled vehicle noise 40

5 Recommendations for action 43

Literature 45

A Exposure to traffic noise 57

B Social costs for traffic noise 61

C Vehicle noise emission trends 63

Summary

The main conclusions of this report are as follows:

Health effects and social costs

- Traffic noise has a variety of adverse impacts on human health. Community noise, including traffic noise, is already recognised as a serious public health problem by the World Health Organization, WHO.
- Of all the adverse effects of traffic noise the most widespread is simply annoyance.
- There is also substantial evidence for traffic noise disturbing sleep patterns, affecting cognitive functioning (especially in children) and contributing to certain cardiovascular diseases. For raised blood pressure, the evidence is increasing. For mental illness, however, the evidence is still only limited.
- The health effects of noise are not distributed uniformly across society, with vulnerable groups like children, the elderly, the sick and the poor suffering most.
- In 2000, more than 44% of the EU25[1] population (about 210 million people) were regularly exposed to over 55 dB of road traffic noise, a level potentially dangerous to health. In addition, 35 million people in the EU25 (about 7%) are exposed to rail traffic noise above 55 dB. Millions of people indeed experience health effects due to traffic noise. For example, about 57 million people are annoyed by road traffic noise, 42% of them seriously.
- A preliminary analysis shows that each year over 245,000 people in the EU25 are affected by cardiovascular diseases that can be traced to traffic noise. About 20% of these people (almost 50,000) suffer a lethal heart attack, thereby dying prematurely.
- The annual health loss due to traffic noise increased between 1980 and 2000 and is expected to increase up to 2020. In contrast, traffic safety has improved, following implementation of a variety of policy measures.
- At a conservative estimate, the social costs of traffic noise in the EU22[2] amount to at least € 40 billion per year (0.4% of total GDP). The bulk of these costs (about 90%) are caused by passenger cars and lorries.

Noise reduction options

- If noise-related problems are to be alleviated, they must be the subject of greater political focus. Vehicle noise emission limits have not been technology-forcing since their introduction and were last tightened in 1995. This means these limits have not been updated for twelve years, in stark contrast to vehicle air pollution emission standards, which have been tightened three times over the same period.
- Consequently, there has been no reduction in community exposure to noise. This is due to the lax limits in the EU Motor vehicle sound emission directive

[1] EU25 refers to EU27 except Cyprus and Malta.

[2] EU22 refers to EU27 except Cyprus, Estonia, Latvia, Lithuania and Malta.

and the Tyre/road directive, the fact that changes in test conditions have in practice led to even weaker limits, and increased traffic volumes.

- There is plenty of scope for reducing ambient noise levels by at least 3-4 dB(A) in the short term using currently available technology. Beyond 2012, year-on-year improvement targets (x dB(A) every y years) should be introduced, outlined well in advance to give industry time to adapt.
- In the case of both road and rail traffic, there are already vehicles/rolling stock available that are well within current noise standards. Besides the vehicles themselves, examples of silent tyres/wheels and road pavements/tracks show also room for noise reduction. At noise 'hotspots' additional, local measures can be implemented.
- The most cost-effective measures are those addressing the noise at-source. This includes noise from the engine, exhaust, mechanical systems and contact between tyres and road, or wheels and track. The associated costs are generally limited, for vehicles and tyres at least. There are signs that use of composite brake blocks on rail wagons also comes at a modest cost.
- Although an optimal noise control regime will always be a mix of local and at-source measures, the Commission should take responsibility for ensuring that the noise emissions of cars, tyres and railways are reduced significantly. These are the most cost-effective measures and their impact will be felt across Europe.
- When it comes to tightening noise standards and improving test procedures, prolonged discussions and political procedures are costing Europe dearly. If the EU does not come up with better policies soon, local measures will need to be taken, which are considerably more expensive than measures taken across the EU.

1 Introduction

Noise pollution consistently ranks high on the list of citizens' concerns. It is estimated that over half of Europe's population is exposed to unacceptable noise levels. Noise from road transport is the major source, followed by aircraft and railway noise. In its 6th Environmental Action Programme (2002-2012) the EU has set itself the objective of substantially reducing the number of people regularly affected by long-term average levels of noise. The aim of reducing noise exposure to acceptable levels has been repeated in the renewed Sustainable Development Strategy as well as in the transport White paper and its mid-term review. Despite all efforts in this direction, however, EU policy does not seem to recognise that noise is first and foremost a major environmental health issue.

Vehicle noise regulation is important, especially in light of growing traffic volumes and the proximity between transport infrastructure and residential and living areas. Every doubling of transport intensity increases noise levels by 3 dB(A). Vehicle noise regulation goes back to the 1970s, with tyre/road noise regulation added in 2001 and thereafter. In their present form, however, both sets of legislation are too liberal to have had any significant effect and the number of people exposed to ambient noise has consequently increased rather than declined.

This report highlights the scale and scope of the traffic noise problem, which affects a very substantial proportion of the European populace. It serves as a background report to a T&E brochure and is based on a thorough literature review. The report covers health effects and social costs, and reviews noise reduction policies and measures to reduce noise exposure. In conclusion, a number of recommendations for action are given. The report focuses on road and rail transport.

2 The health effects of traffic noise

In this chapter we first discuss the health impact of traffic noise, describing the various effects signalled and discussing the scientific evidence for each. We then report on the number of people exposed to traffic noise and the number likely to be affected by the respective health effects. Finally, we briefly review the evidence for traffic noise having an impact on animals and ecosystems.

2.1 WHO Community Noise Guidelines

Traffic is the most widespread source of environmental noise. Exposure to traffic noise is associated with a wide range of effects on human health and well-being. The World Health Organisation (WHO) recognises community noise, including traffic noise, as a serious public health problem, prompting it to publish guidelines on community noise in 1999 (Berglund et al., 1999). These guidelines present noise levels above which a significant impact on human health and/or well-being is to be expected. In 2007 an extension of the guidelines was published (WHO, 2007), focusing on the health impacts of night-time noise. Table 1 presents the relevant guideline values for specific environments. When multiple adverse health effects are identified for a given environment, the guideline values are set at the level of the lowest adverse health effect (the 'critical health effect').

Table 1 Selected values from the WHO Community Noise Guidelines and WHO Night Noise Guidelines

Specific environment	Critical health effect	Day: L_{Aeq} (dB(A)) Night: L_{night} (dB(A))	Time base (hours)
Day-time and evening noise			
Outdoor living area	Serious annoyance, daytime and evening Moderate annoyance, daytime and evening	55 50	16 16
Dwellings, indoor	Speech intelligibility and moderate annoyance, daytime and evening	35	16
School class rooms, and pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	During class
School playground, outdoor	Annoyance	55	During play
Hospital ward rooms, indoors	Sleep disturbance, daytime and evenings	30	16
Hospital, treatment rooms, indoors	Interference with rest and recovery	a	
Night-time noise			
At the façade, outside	Body movements, awakening, self-reported sleep disturbance	30	During the night

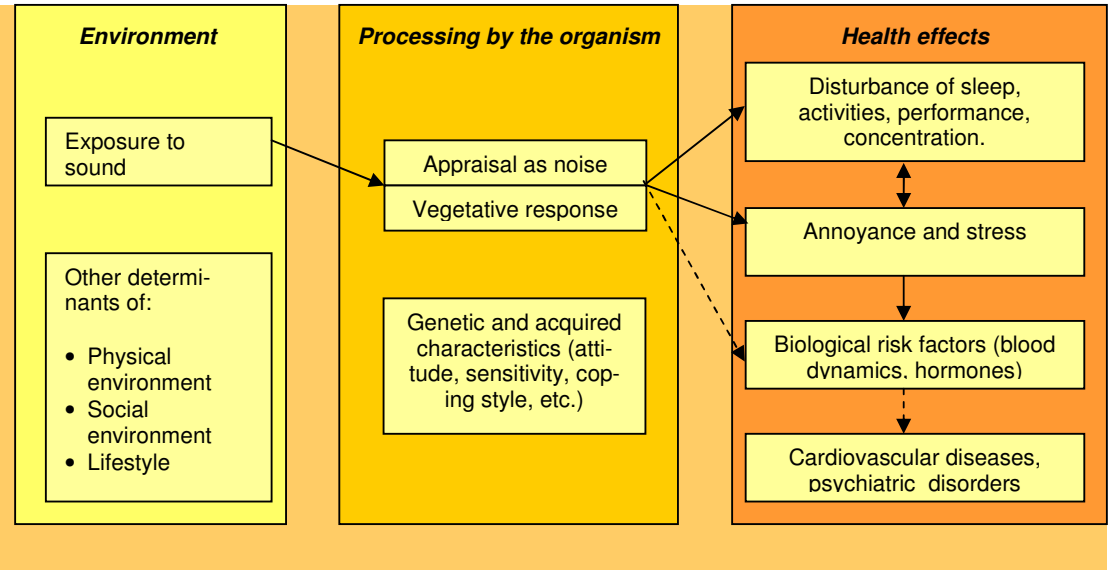
[a] As low as possible.

2.2 The relation between noise and human health

Traffic noise frequently exceeds the guideline values published by the WHO and those exposed to traffic noise consequently suffer an array of adverse health effects. These include socio-psychological responses like annoyance and sleep disturbance, and physiological effects such as cardiovascular diseases (heart and circulatory problems) and impacts on mental health (RIVM, 2004). In addition, traffic noise may also affect children's learning progress. Finally, prolonged, cumulative exposure to noise levels above 70 dB(A), common along major roads, may lead to irreversible loss of hearing (Rosenhall et al., 1990).

Figure 1 summarises the potential mechanisms of noise-induced health effects and their interactions. In the first place, noise exposure can lead to disturbance of sleep and daily activities, to annoyance and to stress. This stress can in turn trigger the production of certain hormones (e.g. cortisol, noradrenalin and adrenaline), which may lead to a variety of intermediate effects, including increased blood pressure. Over a prolonged period of exposure these effects may in their turn increase the risk of cardiovascular disease and psychiatric disorders. The degree to which noise leads to disturbance, annoyance and stress depends partly on individual characteristics, in particular a person's attitude and sensitivity to noise. Finally, the relation between noise and personal health and well-being is also influenced by external factors like physical and social environment and lifestyle.

Figure 1 The mechanisms of noise-induced health effects



Source: HCN (Health Council of the Netherlands), 1999.

2.3 Review of health effects

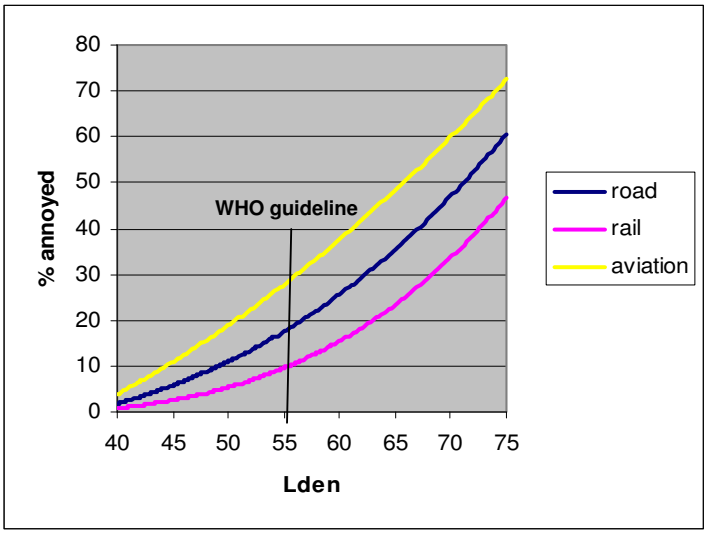
From Figure 1 and the discussion thus far we can identify the following potential health effects due to exposure to traffic noise:

- Annoyance.
- Sleep disturbance.
- Disturbed cognitive functioning (learning and understanding).
- Cardiovascular disease.
- Adverse effects on mental health.

2.3.1 Annoyance

The most widespread problem created by noise is quite simply annoyance. Annoyance can be defined as a general feeling of displeasure or adverse reaction triggered by the noise. Among the ways it can express itself are fear, uncertainty and mild anger (Stansfeld & Matheson, 2003; RIVM, 2005). In the human environment (which also includes neighbours, industry, etc.) traffic is the single most important source of noise annoyance (Niemann & Maschke, 2004; RIVM, 2004). As Figure 2 shows, aircraft noise is perceived as more annoying than road and rail traffic noise at the same volume. At a noise level of 55 dB(A), the guideline limit set by the WHO, approximately 30% of those exposed are annoyed by aircraft noise, about 20% by road traffic noise and about 10% by rail traffic noise. Some people begin to experience annoyance at traffic noise from noise levels of 40 dB(A) upwards.

Figure 2 Percentage of people annoyed as a function of noise exposure of dwellings (Lden in dB(A))



Source: Miedema & Oudshoorn (2001).

The degree of annoyance triggered by traffic noise is determined first of all by the noise level. The higher the level, the more people are annoyed and the greater the severity of perceived annoyance (Ellebjerg Larsen et al., 2002; RIVM, 2005).

The degree of annoyance depends on other noise characteristics, too (London Health Commission, 2003). The higher the pitch of the noise, the greater the annoyance. Duration and intermittency also influence the degree of annoyance.

However, traffic noise-induced annoyance is governed by more than just acoustic factors, with personal and situational factors also coming into play, as well as a person's relationship to the source of the noise. In a familiar illustration, a mosquito may not make much of a noise, but during the night it can cause considerable annoyance. Feelings of annoyance depend in the first place on an individual's sensitivity to noise (Ouis, 2001; RIVM, 2004). The fact that noise is a form of harm that can be avoided contributes to people's perception of noise as annoyance (London Health Commission, 2003). Another important determinant of perceived annoyance is fear of the noise's source (RIVM, 2004). People who feel they have no control over the situation, or believe authorities are failing to control it, are likely to experience a greater level of annoyance. Annoyance at noise depends also on how the noise interferes with everyday life (London Health Commission, 2003; Stansfeld & Matheson, 2003). People will be more annoyed when noise affects activities that involve talking and listening, such as conversations, listening to music, watching television and so on. Finally, noise in situations where it is expected is less annoying than noise in circumstances anticipated to be quiet. For this reason noise at night-time (the buzzing of a mosquito, as cited, but also traffic noise) is more annoying than during the day.

To some extent, people frequently exposed to traffic noise develop strategies of adapting and coping with the problem (London Health Commission, 2003). The problem still remains, however: subconscious physical reactions, such as raised blood pressure, and levels of annoyance due to chronic noise will not diminish over time unless the noise itself is abated.

2.3.2 Sleep disturbance

Traffic noise is the main cause of sleep disturbance (Niemann & Maschke, 2004). This effect of noise on sleep has important health effects, since uninterrupted sleep is known to be a prerequisite for proper physiological and mental functioning in healthy people (WHO, 2007). Three types of effects of noise on sleep can be distinguished: effects on sleeping behaviour (primary effects), effects on performance and mood through the following day (secondary effects) and long-term effects on well-being and health:

- *Sleeping behaviour*. Night-time noise can increase the arousal of the human body, i.e. lead to activation of the nervous system, which may result in a person awakening or prevent them from falling asleep (Ising et al., 2004; TNO Inro, 2002; WHO, 2007). However, this arousal response to noise is often more subtle than mere awakening and may involve a change from a deeper to lighter sleep, an increase in body movements, a temporary increase in heart rate and changes in (stress) hormone levels (RVIM, 2003; HCN, 2004; WHO, 2007). Finally, there is also some evidence that blood pressure is affected by traffic noise during sleep (WHO, 2007).

- *Effects on performance and mood through the following day.* The secondary effects of sleep disturbance include reduced perceived sleep quality and increased drowsiness, tiredness and irritability (HCN, 2004). While there are also indications of other effects such as depressed mood and decreased performance (Ouis, 2001), the available evidence is still inconclusive (HCN, 2004; WHO, 2007).
- *Long-term effects on well-being.* In the long-term, night-time noise can lead to insomnia and increased medication use (HCN, 2004; WHO, 2007). It may also result in chronic annoyance (Berglund et al., 1999; RIVM, 2004). Furthermore, an increased risk of cardiovascular disease due to night-time noise is plausible, although there is only limited evidence for this effect (TNO Inro, 2002; WHO, 2007). Finally, there are certain indications that night-time noise can contribute to mental illness (WHO, 2007)

The effects of night-time traffic noise on sleep disturbance begin at fairly low volumes and become more likely as the intensity of the noise increases. Changes between sleep stages, increased body movements and heart-rate acceleration start at noise levels around 32-42 dB(A) (WHO, 2007). In addition, reported sleep quality is likely to be affected at noise levels above 40 dB(A) (RIVM, 2004; Ising et al., 2004; WHO, 2007). Night-time awakenings also start at levels above 40 dB(A) (WHO, 2007). However, sleep disturbance is influenced by other noise characteristics, too. People are far more sensitive to intermittent noise than continuous noise (Prasher, 2003). For example, an accelerating car will disturb a person's sleep more than a continuous traffic flow. In addition, the alarm function of the sense of hearing may lead to awakening if the noise contains information perceived to be of relevance, even if the noise level is low. This means that unfamiliar noises are far more likely to disturb sleep than familiar, regular patterns of noise. Finally, personal characteristics like noise sensitivity influence the relation between night-time noise and sleep disturbances (Ouis, 2001).

People are good at adapting to nocturnal noise. However, there is never complete habituation, particularly with respect to heart-rate acceleration (Stansfeld & Matheson, 2003; WHO, 2007).

2.3.3 Impaired cognitive functioning

Exposure to traffic noise can impair an adult's cognitive functioning (information processing, understanding and learning) (Stansfeld & Matheson, 2003). To have this effect, though, noise levels must be high, or the task complex or cognitively demanding (Prasher, 2003). Repetitive and simple tasks are unaffected by (traffic) noise. The influence of noise on cognitive functioning depends on a person's perceived control of the noise and its predictability.

In the literature there is a prominent focus on the influence of traffic noise on the cognitive functioning of children. Although most of the studies are concerned with the impact of aircraft noise in this respect, some of them consider road and rail traffic noise, too. According to Bistrup et al. (2001), the adverse effects of road traffic noise exceed those of rail traffic noise.

In general, the following effects have been found for children exposed to high levels of traffic noise (Bistrup et al., 2001; Clark et al., 2005; RIVM, 2005):

- Difficulty sustaining attention.
- Difficulty concentrating.
- Poorer discrimination between sounds and poorer perception of speech.
- Difficulty remembering, especially complex issues.
- Poorer reading ability and school performance.

A hypothesis frequently stated to explain the impact of chronic exposure to noise on the cognitive development of children is that noise affects the intelligibility of speech communication (Bistrup et al., 2001; RIVM, 2005). Ambient noise leads to a loss in the content of a teacher's instruction, and consequently children may have problems with speech perception and language acquisition. This, in turn, can lead to impairment of children's reading skills and vocabulary, and eventually to difficulties with other, higher-level processes, such as long-term memory for complex issues. Closely related to this process is the so-called 'tuning out' response: to adapt to noise interferences during activities, children filter out the unwanted noise stimuli (RIVM, 2005). However, researchers suggest that children generalise this strategy to other situations where noise is not present, with adverse effects on their understanding and learning performance.

Although there has been little research into the impact of noise reduction in this context, there is evidence that reduced noise levels can relieve cognitive problems within about a year (London Health Commission, 2003).

2.3.4 Cardiovascular disease

Exposure to traffic noise is associated with changes in blood pressure and increased risk of various types of heart disease (e.g. ischemic heart diseases, angina pectoris, myocardial infraction). Noise-induced cardiovascular diseases are considered to be the consequence of stress (Babisch, 2006; Ising et al., 2004; Prasher, 2003; RIVM, 2004). Exposure to noise triggers the production of (stress) hormones like cortisol, noradrenaline and adrenaline. It does so both directly and indirectly, through disturbance of activities. These hormones may cause changes in the values of a number of biological risk factors, such as hypertension (high blood pressure), blood lipids (e.g. cholesterol) and blood glucose. These risk factors can increase the risk of cardiovascular disease (Babisch, 2006; Ising et al., 2004). Persistent exposure to environmental noise could therefore result in permanent changes to the vascular system, with elevated blood pressure and heart diseases as potential outcomes. The magnitude of these effects will be partly determined by individual characteristics, lifestyle behaviours and environmental conditions (Berglund et al., 1999).

Sufficient evidence can be found in the literature for the relation between traffic noise and heart diseases like myocardial infarction and ischemic heart diseases (Babisch, 2006; Babisch et al., 2005; Ising et al., 2004; Prasher, 2003). Higher risks of heart disease are found for those living in streets with average noise levels above 65-70 dB(A). For these people the risk of heart disease is approximately 20% higher than for those living in quieter areas (Babisch, 2006). This risk

increases with noise level. Again, the risk is also influenced by personal characteristics. For example, Babisch et al. (2005) found that only men are at higher risk of heart attack due to traffic noise. This risk is also dependent on the number of years of exposure to the traffic noise, moreover. The longer people are exposed to a high level of traffic noise, the greater the likelihood of it having an impact and increasing the risk of a heart attack.

There is a growing body of evidence for a higher risk of hypertension in people exposed to high levels of traffic noise (Babisch, 2006). For example, a recent study by Bluhm et al. (2006) suggests the existence of a relation between residential exposure to road traffic noise and hypertension. However, earlier studies (e.g. Babisch, 1998; RIVM, 2005) show less evidence for this relationship, and according to Babisch (2006) these studies cannot be neglected in the overall judgement process. Hence more research into the relation between traffic noise and hypertension is needed.

There has been hardly any research into the impact of night-time noise exposure on cardiovascular health outcomes (Babisch, 2006). One exception is UBA (2003), who showed that night-time noise exposure was more strongly associated with medical treatment for hypertension than day-time noise exposure.

In contrast to the subjective perception of noise, which adapts within a few days through habituation (see paragraph 2.3.1), none of the cardiovascular diseases show habituation to noise after prolonged exposure (WHO, 2007).

2.3.5 Mental illness

A small number of studies have presented limited evidence for a link between traffic noise and mental illness (Prasher, 2003; Stansfeld & Matheson, 2003; WHO, 2007). The clear association between noise and annoyance does not necessarily translate into a more serious relationship with mental health (London Health Commission, 2003). However, noise may well accelerate and intensify the development of latent mental disorder. Even so, people already suffering mental problems are likely to be more sensitive to being annoyed or disturbed by traffic noise than the general population.

2.4 Traffic noise especially harmful to vulnerable groups

The health effects of road and rail traffic noise are not distributed uniformly across society, with vulnerable groups like children, the elderly and the sick affected most. In addition, poorer people are more likely to suffer the health effects of transport noise than the better off. This might be explained by lower quality housing with poor noise insulation and the proximity of housing for lower income groups to noisy transport infrastructure.

Children are likely to be a group that is particularly vulnerable to the health effects of noise. They have less cognitive capacity to understand and anticipate it and lack well-developed coping strategies (Stansfeld & Matheson, 2003). As

children are still developing both physically and cognitively, moreover, in this group there is a potential risk of chronic noise having irreversible negative consequences. The impact of traffic noise on children's cognitive development has already been briefly discussed. Noise may also possibly affect foetal development, by way of (stress) effects on expectant mothers (EPA, 1978). However, a more recent study questions this impact on foetal development, although such effects are not completely ruled out (Bistrup et al., 2001). Additionally, children do not appear to be at particular risk with respect to cardiovascular disease, especially through high blood pressure (Babisch, 2006). At the same time, though, traffic noise exposure from an early age may have cumulative health effects in later life, which once more include cardiovascular disease. This also holds for the negative effects of sleep disturbance. In the short term, however, children are less severely affected by sleep disturbance than adults (RIVM, 2004), as evidenced by fewer awakenings and changes between sleep stages. With respect to annoyance due to traffic noise, finally, children do not differ from adults.

The elderly and the sick are two other groups that may be especially vulnerable to the effects of traffic noise. There has not been much research into this area, however. One of the rare findings is that both the elderly and those already ill are more affected by sleep disturbance - especially awakenings - than the general population (HCN, 2004; Ouis, 2001). Also, those already suffering from sleep disturbance are more severely affected by traffic noise. With regard to cardiovascular disease, Babisch (2006) shows that people with prevalent chronic diseases have a slightly higher probability of contracting certain heart diseases as a result of traffic noise than those without. For the elderly, there is no consistent evidence that the effect of traffic noise on cardiovascular diseases is greater than for younger people. Finally, traffic noise may aggravate the psychological problems of people with existing health problems (London Health Commission, 2003).

The price of houses exposed to high levels of traffic noise will be lower than that of similar houses in quieter areas (Soguel, 1994; Theebe, 2004). Those living on lower household incomes are therefore more likely to be exposed to traffic noise than those with higher incomes, and will hence have more noise-related health problems. For the Dutch region 'Rijnmond' this relationship between household income and exposure to noise was confirmed by RIVM (2004).

2.5 Over 210 million in EU25 exposed to harmful traffic noise

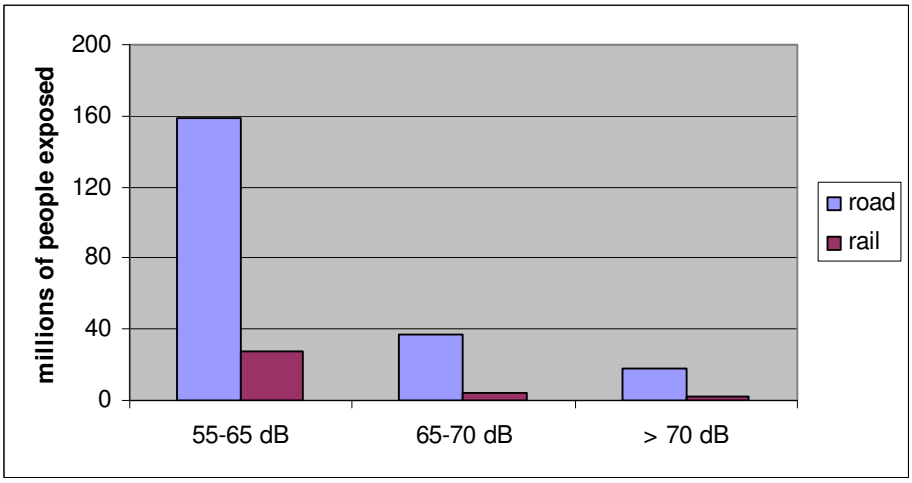
In the year 2000 about 44% of the population of the EU25[3] (over 210 million people) were exposed to road traffic noise levels above 55 dB(A). This is the WHO guideline value for outdoor noise levels and the threshold for 'serious annoyance'. More than 54 million people were exposed to road traffic noise levels over 65 dB(A), which is ten times louder than the WHO guideline value. Rail traffic noise is a burden to fewer people. Nonetheless, 35 million people in the EU25 (about 7%) were exposed to rail traffic noise above 55 dB in 2000, with 7 million of them exposed to noise over 65 dB from this source.

[3] EU27 except Cyprus and Malta.

In most European countries the number of people exposed to noise levels below 55 dB are not reported on. As already discussed, though, noise below 55 dB may still trigger adverse effects like annoyance, sleep disturbance and reduced cognitive ability. The actual number of people exposed to levels of traffic noise that are potentially dangerous to their health will thus be higher than the figures presented in Figure 3.

The data in this figure are for the year 2000. Given traffic growth and the fact that legislation and standards have hardly changed in the meantime, these exposure figures probably underestimate the true extent of the problem.

Figure 3 Number of people exposed to road and rail traffic noise in 25 EU countries in 2000



Note: This figure covers the EU27 except Cyprus and Malta.
Source: INFRAS/IWW (2004), OECD/INFRAS/Herry (2002), calculations by CE Delft (for Estionia, Latvia, Lithuania).

These figures for the number of people exposed to traffic noise are based mainly on data from INFRAS/IWW (2004) (West European countries) and OECD/INFRAS/Herry (2002) (East European countries). Link (2000) also presents estimates for the number of people exposed to traffic noise in certain West European countries. Although in some cases the results for individual countries (including the Netherlands) differ considerably between the first and last of these studies, the aggregate numbers are comparable, with a difference of only about 3% between the two. Since INFRAS/IWW (2004) covers more countries and uses more up-to-date data, we chose to present these figures here.
The reliability of these data sets is discussed in appendix A.

2.6 Health of millions of Europeans affected by traffic noise

Although not all people exposed to road or rail noise will experience health effects (see also appendix A), a significant fraction will. Beyond investigations of the absolute number of people suffering from various health effects due to traffic noise, however, not much research has been undertaken in this area. In this sec-

tion, therefore, we cannot do much more than provide an estimate of the number of people affected by cardiovascular disease. In addition, figures on the number of people experiencing annoyance at traffic noise in Europe are presented. Finally, the health impact of traffic noise is compared to the health impact of two other social problems: air pollution and traffic accidents.

Fatal heart attack and ischemic heart diseases

The annual count of people suffering a (fatal) heart attack due to traffic noise is known for three countries only (see Table 2). For two of these, Denmark and Germany, the annual count for ischemic heart diseases (IHD) is also known.

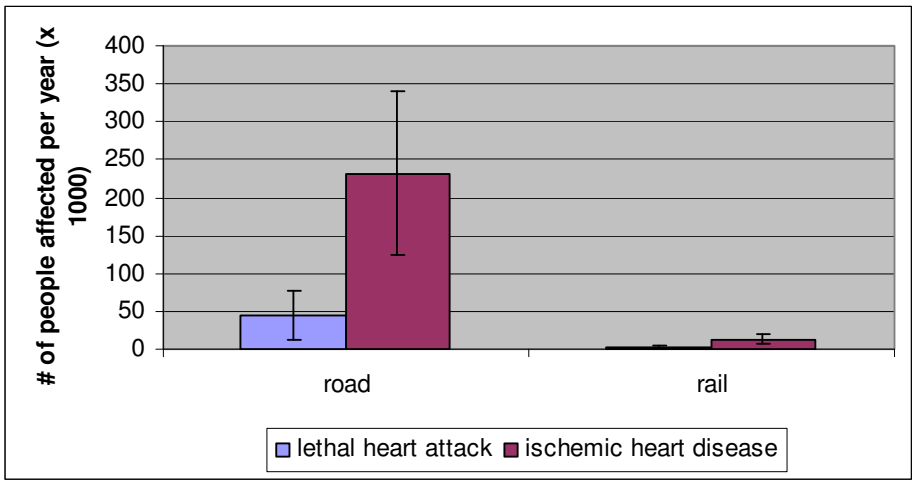
Table 2 Number of people affected by heart diseases and the probability of heart diseases due to traffic noise in three European countries

Country	Annual count of people suffering a lethal heart attack	Annual count of people affected by IHD	Probability of a lethal heart attack for people exposed to > 60 dB	Probability of IHD for people exposed to > 60 dB
Denmark	200 - 500	800 - 2200	0.00026 - 0.00065	0.001 - 0.003
Germany	4,289	27,366	0.00017	0.001
Netherlands	300 - 1000	-	0.00016 - 0.00053	-

Sources: Babish, 2006; Danish, 2003; RIVM, 2005; probabilities calculated by CE Delft.

Based on these figures and the number of people exposed to noise levels above 60 dB(A) in the relevant countries, we estimated the probability of a fatal heart attack or ischemic heart disease and used these probabilities to estimate the number of people likely to be affected by these diseases in the EU25 annually. To this end, for each country we multiplied the number of people exposed to noise levels over 60 dB(A) by the respective probabilities of the heart diseases. The aggregate results of this estimation procedure are shown in Figure 4.

Figure 4 Indication of number of people affected by an ischemic heart disease or suffering a lethal heart attack due to traffic noise in the EU25 (2000)



Note: This figure covers the EU27 except Cyprus and Malta.

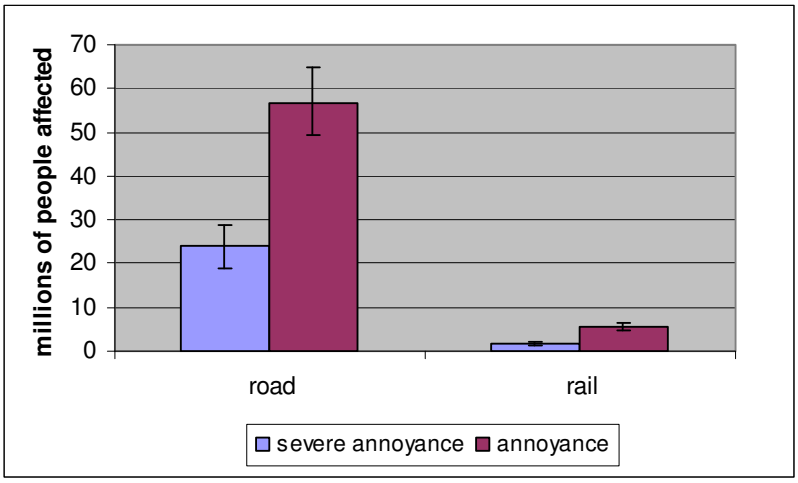
To estimate the number of people affected by heart diseases the average of the probabilities from Table 2 were used, with the upper and lower bounds of the band width estimated using the highest and lowest probability, respectively.

We can conclude that over 245,000 people in the EU25 are affected by an ischemic heart disease due to traffic noise annually, of whom 94% (approx. 231,000) due to road traffic noise. About 20% (almost 50,000) of these people suffer fatal heart attacks. Road and rail traffic noise are thus responsible for around 50,000 premature deaths per year in Europe.

Annoyance

To estimate the number of people experiencing annoyance at traffic noise, we used exposure-response relationships. Miedema & Oudshoorn (2001) have estimated the percentage of people annoyed as a function of both road and rail traffic. Their exposure-response functions have already been presented in paragraph 2.3.1. These researchers derived exposure-response functions for both severe annoyance and annoyance and these curves have been recommended for use in EU legislation on noise (EC, 2001). Figure 5 shows the number of people experiencing (severe) annoyance at road and rail traffic noise in the EU25.

Figure 5 Number of people affected by (severe) annoyance due to road and rail traffic noise in the EU25 in 2000



Note: This figure covers the EU27 except Cyprus and Malta.

To estimate the number of people affected by (severe) annoyance, the exposure data from paragraph 2.5 were used. These exposure data are related to L_{Aeq} noise levels, while the exposure-response functions of Miedema & Oudshoorn are defined for L_{den} noise levels. For this reason the exposure data were translated using a rule of thumb: noise levels expressed in L_{den} are approximately 2 dB(A) lower than those expressed in L_{Aeq}. To express the uncertainty in the estimates a band width for the results is shown. The upper and lower bound of this band width were estimated by varying the exposure figures by 2 dB(A).

Around 57 million people in the EU25 are annoyed by road traffic noise, 42% of whom (approximately 24 million) are severely annoyed. This means that about 12% of the European population suffers annoyance due to road traffic noise. Rail traffic noise causes annoyance to about 5.5 million Europeans (about 1% of the total European population), of whom about 2 million are severely annoyed.

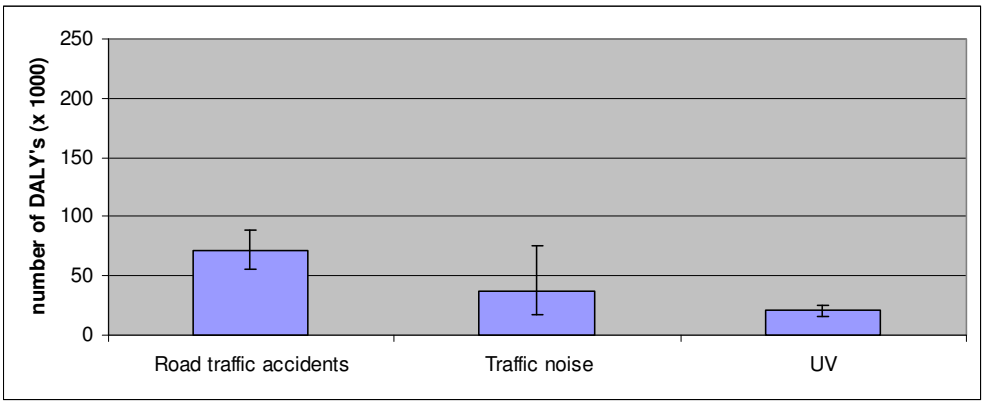
Comparison with health impact of other environmental problems

Disability-adjusted life years (DALY) is a measure used to quantify the overall 'burden of disease' on a population. It does so by combining the impact of premature death (mortality; life years lost) and disability (morbidity; life years lived with disability or disease) into a single, comparable measure. DALYs represent the total number of years of life lost due to premature death and of years lived with a reduced level of health, weighted by the seriousness of the health impairment suffered (SAEFL, 2003). Below, we use DALYs to summarise the health impact of an external environmental influence, traffic noise. By using this concept it is possible to compare the total impact of several health effects of traffic noise and, moreover, to compare the magnitude of these effects with that of other problems affecting society, such as air pollution and traffic accidents.

The WHO is currently working on an estimate of DALYs for traffic noise for Europe. To date, however, there is only country for which such an estimate is publicly available: the Netherlands. For this country, RIVM (2005) present DALYs for several environmental vectors of disease: see Figure 6. The DALYs for traffic

noise take the following health effects into account: mortality (through stress, hypertension and cardiovascular diseases), severe annoyance and severe sleep disturbance. These health effects are the major determinants of DALYs caused by traffic noise. Including other health effects, such as the adverse impact on cognitive functioning and hearing impairment, will not significantly change the order of magnitude of DALYs related to traffic noise.

Figure 6 Burden of disease due to several problems in the Netherlands in 2000, in DALYs



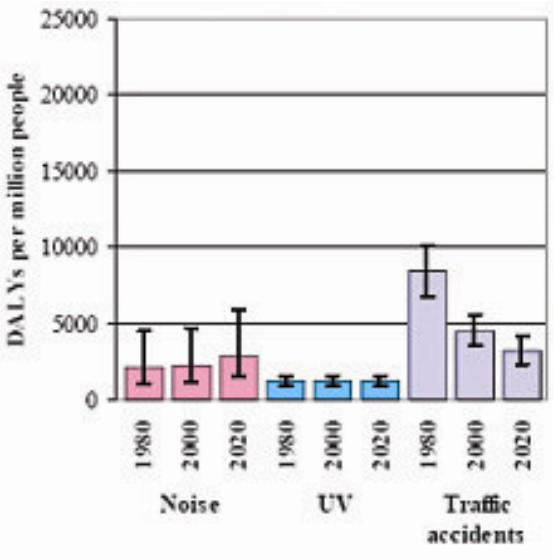
Note: The 90% prediction intervals around the respective DALY values are indicated by a band width. The figures for traffic noise include road, rail and air traffic noise.
Source: RIVM, 2005.

The annual health loss associated with traffic noise is approximately half the health loss due to traffic accidents.

The number of DALYs related to traffic noise presented in Figure 6 also includes the noise of air traffic. The latter is only a very minor source of health loss (see Figure 8), as airport noise affects only relatively few people. However, the exposure of these people is likely to be severe, and so will their health loss.

RIVM (2005) also present trends in the environmental burden of disease in the Netherlands for the period 1980-2020. Figure 7 presents trends in DALYs due to three environmental problems.

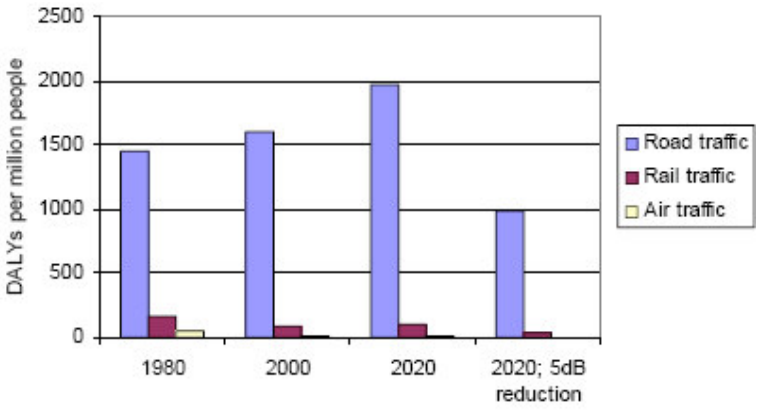
Figure 7 Trends in DALYs per million people in the Netherlands for the period 1980-2020



Source: RIVM, 2005.

In contrast to problems like traffic accidents, the number of DALYs due to traffic noise rose between 1980 and 2000. With policy as it stands today, this disease burden will continue to grow in the coming years, while that of traffic accidents will continue to fall. RIVM (2005) also report on the potential decrease in disease burden if noise levels are reduced by around 5 dB(A) for every source by 2020. Such a reduction could almost halve the number of annoyance and sleep disturbance-related DALYs (see Figure 8).

Figure 8 DALYs per million caused by severe annoyance and severe sleep disturbance due to raod, train and air traffic noise, for 1980, 2000 and 2020, including an alternative scenario for 2020 (with 5 dB(A) noise exposure reduction for road and rail traffic)



Source: RIVM (2005).

In Chapter 4 we demonstrate that a 3-4 dB(A) reduction of road and railway noise is easily feasible in the short term using currently available technologies.

2.7 Effects on animals and ecosystems

It is not only humans but also animals that are affected by traffic noise. When exposed to man-made noise they may suffer both physiological and behavioural effects (Kaseloo and Tyson, 2004). With regard to the former, an animal's response may range from mild annoyance to panic and escape behaviour. These responses are manifestations of stress, which may harm an animal's health, growth and reproductive fitness. For example, energy losses due to escape and panic responses could result in impaired growth and health. For some animals, traffic noise also interferes with communication (Kaseloo, 2005). Bats, for example, a species group totally reliant on echo location, are unable to find food if noise levels are too high.

In terms of behaviour, animals may avoid places with high levels of traffic noise. In the case of birds it has been found that sound levels above 40 - 45 dB(A) influence species distribution; as the noise level at a given spot increases, fewer birds will visit the spot (Kaseloo, 2005; RIVM, 2002). For animals like the mountain goat and white-tailed deer, too, evidence has been found for the avoidance of noisy areas around busy roads (Kaseloo & Tyson, 2004).

The effects of traffic noise on animals vary markedly among as well as within species, owing to a variety of factors (such as age, sex, prior exposure, etc.). It is therefore hard to draw any general conclusions about the effects of traffic noise on animals. Further research on this topic is certainly needed. Nevertheless, from the evidence presented here it is reasonable to say that traffic noise interferes with animals' feeding, hunting and breeding behaviour and performance.

3 The social costs of traffic noise

3.1 Valuing the health effects of traffic noise

The loss of well-being due to exposure to traffic noise can be expressed in monetary terms. The amount of money people are willing to pay to avoid traffic noise provides a good estimate of the loss of well-being people experience. In some instances the market will provide reliable estimates of people's willingness to pay (WTP). For example, the price of sleeping pills provides an estimate of the WTP to fall asleep and avoid night-time awakenings.

For many of the health effects of noise, however, there are no such market prices. To estimate the WTP to avoid these effects various methods are available. Generally speaking, there are two relevant valuation methods: hedonic pricing and contingent valuation. The hedonic pricing method examines variations in housing prices due to traffic noise. These differences can be seen as the WTP to avoid the adverse effects (especially annoyance) of noise. The contingent valuation method, on the other hand, involves asking people directly in a survey how much they would be willing to pay to avoid certain health effects associated with noise. Both methods are used for placing a value on the effects of traffic noise.

To value mortality due to traffic noise means assigning a monetary value to a human life. In the field of environmental valuation this has always been a controversial topic, for the WTP to avoid the loss of one's life is infinite, is it not? Nonetheless, in their everyday lives people make plenty of choices that influence their risk of mortality. For example, we may choose to drive a motorcycle despite being aware that this involves a greater risk of lethal accident than driving a car. With the aid of this kind of information on risk behaviour a value can be determined for a *statistical* human life.

Additional information on attributing a monetary value to traffic noise is provided in appendix B.

3.2 Social cost of traffic noise in EU22 over € 40 billion a year

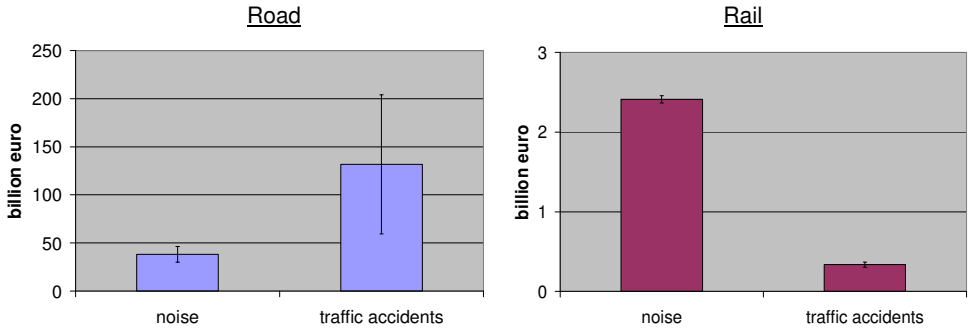
The social cost of road traffic noise in the EU22[4] is estimated to be at least €38 (30 - 46) billion per year, which is approximately 0.4% of total GDP in the EU22. For rail, estimates of social costs due to noise are about € 2.4 (2.3 - 2.5) billion per year (about 0.02% of total EU22 GDP). It should be noted that this takes into account only effects related to noise levels above 55 dB(A), while people may also be adversely affected by noise below this level. Hence, the social cost estimates presented here probably underestimate the actual costs.

The social costs of road traffic noise in the EU22 are almost one-third of those associated with road traffic accidents; see Figure 9. In the case of rail traffic,

[4] EU27 except Cyprus, Estonia, Latvia, Lithuania and Malta.

though, the social costs of noise are approximately seven times those of accidents.

Figure 9 Social costs of traffic noise in the EU22 compared to those of traffic accidents (2006 price level)



Note : This figure covers the EU27 except Cyprus, Estonia, Latvia, Lithuania and Malta and hence covers 98.4% of the EU27's population.

Sources: INFRAS/IWW (2004), OECD/INFRAS/Herry (2002), Link (2000).

These social cost estimates are based on valuation studies by INFRAS/IWW (2004), OECD/INFRAS/Herry (2002) and Link (2000). INFRAS/IWW and Link provide cost estimates for West European countries, while cost estimates for East European countries are provided by OECD/INFRAS/Herry. INFRAS/IWW and Link cover partly the same countries, with the two studies presenting somewhat different estimates for some of them. A brief explanation for these differences is given in appendix B. As it is not clear which of the studies presents the most reliable estimates, in calculating total social noise costs in the EU22 the average of the two has been used for the relevant countries. For these countries minimum and maximum estimates were also determined, which were used to estimate band width. Note that the band width for the estimated social costs of traffic noise in the EU22 is based on minimum and maximum estimates for just 9 countries. For the other 13 countries, only a single estimate was available.

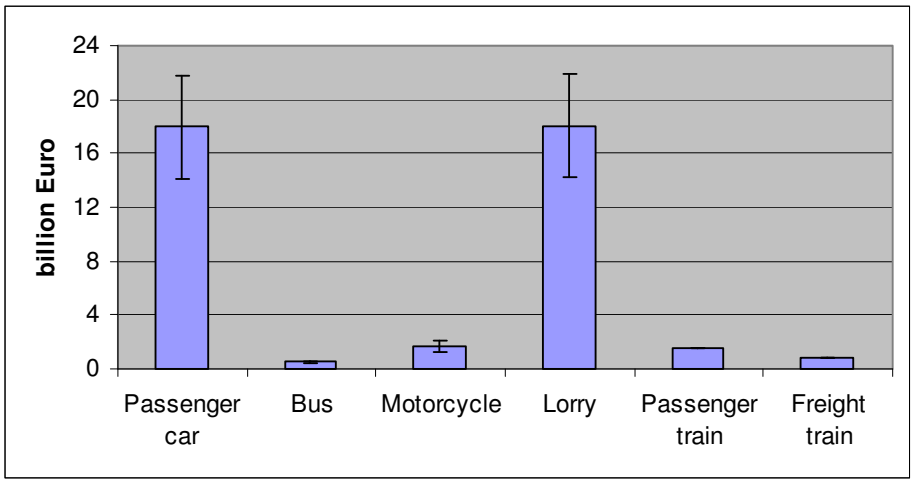
Another way to estimate the social costs of traffic noise is by valuating the associated DALYs (see previous chapter). As mentioned, the WHO is currently working on an estimate of DALYs due to traffic noise in Europe and certain preliminary results of this study have already been presented in the EU's Noise Steering Group[5]. These tentative results show that the total number of DALYs depends heavily on how the DALYs due to annoyance are calculated. Differences in measuring method yield estimates differing by a factor 2. If we value the WHO's conservative estimate of DALYs (assumption: 1 DALY equals € 78,500 (VITO, 2003)), the social costs of traffic noise are found to be comparable to the figure obtained by using the results of INFRAS/IWW, OECD/INFRAS/Herry and Link. The social cost estimates presented above would therefore appear to be robust, but conservative.

[5] See: http://circa.europa.eu/Public/irc/env/noisedir/library?l=/health_effects_noise/who&vm=detailed&sb=Title

3.3 Passenger cars and lorries responsible for bulk of costs

Passenger cars and lorries are responsible for 90% of the total social costs of road and rail traffic noise in Europe; see Figure 10. This is due above all to the large number of vehicles and kilometres driven on European roads.

Figure 10 Distribution of social costs due to traffic noise in the EU22 over transport modes (2006 price level)



Note : This figure covers the EU27 except Cyprus, Estonia, Latvia, Lithuania and Malta.
Sources: INFRAS/IWW (2004), OECD/INFRAS/Herry (2002), Link (2000).

This distribution of social costs over transport modes is again based on the valuation studies by INFRAS/IWW (2004), OECD/INFRAS/Herry (2002) and Link (2000). To derive average figures for the EU22 the same methodology was used as in section 3.2.

3.4 Benefits of noise reduction

Noise abatement policies will have major economic benefits. Less people will be annoyed by traffic noise and the incidence of health problems will decline. With their sleep less disturbed, people may also be more productive at work. The latter effect may be reinforced by improved cognitive performance, moreover. According to Navrud (2002) the perceived benefit of noise reduction is € 25 per household per decibel per year. This estimate is based on a thorough review of the literature on this topic. The EU working group 'Health and Socio-Economic Aspects' (2003) also recommends using this figure to value noise reduction.

Noise abatement policies will generate cost savings for government, too. Expenditures on the health system will be lower due to a decline in noise-related health problems. In addition, if noise is reduced at its source (i.e. on vehicles, road surfaces and rail tracks), then local and national authorities can reduce the funds currently spent on building and maintaining noise barriers and insulation. The Dutch government's Noise Innovation Programme (IPG) has calculated that for every decibel of noise reduction at-source €100 million in expenditures on end-of-

pipe measures such as noise barriers and insulation will be saved (IPG, 2007). This calculation only takes major interurban roads and railways into account. Actual savings will probably be even greater, because other regions and urban areas will also benefit from such noise reduction via at-source measures. From a social perspective there is also a preference for at-source over end-of-pipe measures, the latter being considerably less cost-effective (see Chapter 4).

Exhibit P
Riverside General Plan (Noise Section)

Chapter 7: Noise Element

TABLE OF CONTENTS

Definitions

Introduction

- Addressing Noise Issues
- Setting

Noise Sensitive Land Uses

- Noise Compatibility
- Noise Mitigation Strategies

Noise Producers

- Location of Noise Producers
- Agriculture
- Stationary Noise
- Community Noise Inventory
- Wind Energy Conversion Systems (WECS)
- Mobile Noise
- Transportation
  - Airports
  - Vehicular
  - Mass Transit
  - Rail

Building and Design

- Natural Barriers and Landscaping
- Temporary Construction
- Building and Design Techniques
- Mixed Use

Vibration

Noise Information Management

Mapping

Noise Data Management

Public Noise Information

LIST OF FIGURES

N-1: Common Noise Sources and Noise Levels

LIST OF TABLES

N-1: Land Use Compatibility for Community Noise Exposure

N-2: Stationary Source Land Use Noise Standards

N-3: Human Reaction to Typical Vibration Levels

Chapter 7: Noise Element

Definitions

Following is a list of commonly used terms and abbreviations that may be found within this element or when discussing the topic of noise. This is an abbreviated glossary to be reviewed prior to reading the element. It is important to become familiar with the definitions listed in order to better understand the importance of the Noise Element within the County of Riverside General Plan. Since the disbanding of the State Office of Noise Control in the mid-1990, the State of California Office of Planning and Research General Plan Guidelines can offer further information on other noise-related resources.

Ambient Noise: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL (Community Noise Equivalent Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

dB (Decibel): The unit of measure that denotes the ratio between two quantities that are proportional to power; the number of decibels corresponding to the ratio of the two amounts of power is based on a logarithmic scale.

dBA (A-weighted decibel): The A-weighted decibel scale discriminates upper and lower frequencies in a manner approximating the sensitivity of the human ear. The scale is based on a reference pressure level of 20 micropascals.

Intrusive Noise: That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency and time of occurrence, and tonal or informational content as well as the prevailing noise level.

** The level of sound that impacts a property varies greatly during the day. As an example, the sound near an airport may be relatively quiet when no airplane is taking off or landing, but will be extremely loud as a plane*

takes off. In order to deal with these variations, several noise indices have been developed, which measure how loud each sound is, how long it lasts, and how often the sound occurs. The indices express all the sound occurring during the day as a single average level, which if it occurred all day would convey the same sound energy to the site.

L_{10}: The A-weighted sound level exceeded ten percent of the sample time. Similarly, L_{50}, L_{90}, etc.

L_{eq} (Equivalent energy level): The average acoustic energy content of noise during the time it lasts. The L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure, no matter what time of day they occur. The County of Riverside uses a 10-minute L_{eq} measurement.

L_{dn} (Day-Night Average Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m. Note: CNEL and Ldn represent daily levels of noise exposure averaged on an annual or daily basis, while Leq represents the equivalent energy noise exposure for a shorter time period, typically one hour.

Micropascal: The international unit for pressure, similar to pounds per square inch. 20 micropascals is the human hearing threshold. The scale ranges from zero for the average least perceptible sound to about 130 for the average pain level

Noise Contours: Lines drawn around a noise source indicating equal levels of noise exposure. CNEL and Ldn are the metrics used in this document to describe annoyance due to noise and to establish land use planning criteria for noise.

Introduction

"It is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare."

-Noise Control Act of 1972

Before the alarm clock sounds, the lawn mower next door begins to roar. Then, while listening to the morning news on the radio, an airplane flies overhead and deadens all sound in the neighborhood. Once outside, the neighbor's stereo can be heard a block away. And during the morning commute, car horns, rumbling mufflers, and whirring motorcycles serenade motorists on the highway. Even in the most rural areas of Riverside County, the eternal battle between the efficiency of technology, and the noise it can create cannot be avoided.

***Sound** refers to anything that is or may be perceived by the ear.*

***Noise** is defined as "unwanted sound" because of its potential to disrupt sleep, rest, work, communication, and recreation, to interfere with speech communication, to produce physiological or psychological damage, and to damage hearing.*

***Tinnitus:** The perception of ringing, hissing, or other sound in the ears or head when no external sound is present. For*

As modern transportation systems continue to develop and human dependence upon machines continues to increase, the general level of noise in our day to day living environment rises. In Riverside County, residential areas near airports, freeways, and railroads are being adversely affected by annoying or hazardous noise levels. Other activities such as construction, operation of household power tools and appliances, and industry, also contribute to increasing background noise.

Addressing Noise Issues

The Noise Element is a mandatory component of the General Plan pursuant to the California Planning and Zoning Law, Section 65302(f). The element must recognize the guidelines adopted by the Office of Planning and Research pursuant to Section 46050.1 of the Health and Safety Code. It also can be utilized as a tool for compliance with the state's noise insulation standards.

The General Plan Noise Element provides a systematic approach to identifying and appraising noise problems in the community; quantifying existing and

some people, tinnitus is just a nuisance. For others, it is a life-altering condition. In the United States, an estimated 12 million people have tinnitus to a distressing degree.

projected noise levels; addressing excessive noise exposure; and community planning for the regulation of noise. This element includes policies, standards, criteria, programs, diagrams, a reference to action items, and maps related to protecting public health and welfare from noise.

Setting

Riverside County is a continuously evolving group of communities that relies heavily upon the modern technological conveniences of American society to thrive and succeed as a pleasant and desirable place to live and work. Without such necessities as air-conditioning, heating, generators, and cars, living in an urban, suburban, rural, desert, or mountainous environment becomes difficult, if not impossible. Fortunately, these amenities are available to the residents of Riverside County and are used everyday, often all day long. Unfortunately, these technological advances can come at a high price to residents' and visitors' ears.

The philosophical view commonly held by Riverside County staff and residents is that noise, which may be perceived by some to be annoying, may not be noticed at all by others. It is also important to note that people who move into an area where a noise source already exists (such as near an existing highway) are often more tolerant of that noise source than when a new noise generator locates itself in an established area that may be noise-sensitive (such as a stadium that is constructed near an established community).

Noise within Riverside County is generated by numerous sources found near places where people live and work. These sources are of particular concern when the noise they generate reaches levels above the prevailing background noise. There are many different types of noise, including mobile, stationary, and construction-related, that affect noise-sensitive receptors such as residences, schools, and hospitals. Figure 1, Common Noise Sources and Noise Levels, illustrates some noise producers that can be found within Riverside County, as well as their corresponding noise measurement. The following sections contain policies that address the issues of noise producers and their effects on noise-sensitive land uses.

Figure N-1: Common Noise Sources and Noise Levels

Noise Sensitive Land Uses

A series of land uses have been deemed sensitive by the State of California. These land uses require a serene environment as part of the overall facility or residential experience. Many of these facilities depend on low levels of sound to promote the well being of the occupants. These uses include, but are not necessarily limited to; schools, hospitals, rest homes, long term care facilities, mental care facilities, residential uses, places of worship, libraries, and passive recreation areas. Activities conducted in proximity to these facilities must consider the noise output, and ensure that they don't create unacceptable noise levels that may unduly affect the noise-sensitive uses. The following policies

address issues related to noise-sensitive land uses.

Noise Compatibility

The Noise Element of the General Plan is closely related to the Land Use Element because of the effects that noise has on sensitive land uses. Noise-producing land uses must be compatible with adjacent land uses in order for the Land Use Plan to be successful. Land uses that emit noise are measured in A-weighted decibels (dBA) or Community Noise Equivalent Level (CNEL). If existing land uses emit noise above a certain level, they are not compatible with one another, and therefore noise attenuation devices must be used to mitigate the noise to acceptable levels indoors and outdoors. In cases of new development, the placement of noise-sensitive land uses is integral to a successful community. Table 1, Land Use Compatibility for Community Noise Exposure, reveals the noise acceptability levels for different land uses. Areas around airports may have different or more restrictive noise standards than those cited in Table 1 (See Policy N 1.3 below).The following policies protect noise-sensitive land uses from noise emitted by outside sources, and prevent new projects from generating adverse noise levels on adjacent properties.

Policies:

N 1.1 Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or blockwalls shall be used. (AI 107)

N 1.2 Guide noise-tolerant land uses into areas irrevocably committed to land uses that are noise-producing, such as transportation corridors or within the projected noise contours of any adjacent airports. (AI 107)

N 1.3 Consider the following uses noise-sensitive and discourage these uses in areas in excess of 65 CNEL:

- Schools;
- Hospitals;
- Rest Homes;
- Long Term Care Facilities;
- Mental Care Facilities;
- Residential Uses;
- Libraries;
- Passive Recreation Uses; and
- Places of worship

The General Plan policy and implementation item reference system:

Identifies which element contains the Policy, in this case the Land Use Element, and the sequential number.

LU 1.3

Neighborhood

commercial uses should be located near residential uses.

(AI 1 and AI 4)

Reference to the relevant Action Items contained in the Implementation Program.

Unregulated noise sources such as household power tools often emit more noise than regulated noise producers.

Please contact the Office of Industrial Hygiene for more information on acoustical specialists.

According to the State of California Office of Planning and Research General Plan Guidelines, an acoustical study may be required in cases where these noise-sensitive land uses are located in an area of 60 CNEL or greater. Any land use that is exposed to levels higher than 65 CNEL will require noise attenuation measures.

Areas around airports may have different noise standards than those cited above. Each Area Plan affected by a public-use airport includes one or more Airport Influence Areas, one for each airport. The applicable noise compatibility criteria are fully set forth in Appendix L and summarized in the Policy Area section of the affected Area Plan. (AI 105)

N 1.4 Determine if existing land uses will present noise compatibility issues with proposed projects by undertaking site surveys. (AI 106, 109)

N 1.5 Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County. (AI 105, 106, 108)

N 1.6 Minimize noise spillover or encroachment from commercial and industrial land uses into adjoining residential neighborhoods or noise-sensitive uses. (AI 107)

N 1.7 Require proposed land uses, affected by unacceptably high noise levels, to have an acoustical specialist prepare a study of the noise problems and recommend structural and site design features that will adequately mitigate the noise problem. (AI 106, 107)

N 1.8 Limit the maximum permitted noise levels that cross property lines and impact adjacent land uses, except when dealing with noise emissions from wind turbines. Please see the Wind Energy Conversion Systems section for more information. (AI 108)

Table N-1
Land Use Compatibility for Community Noise Exposure

Noise Mitigation Strategies

Many land uses emit noise above state-mandated acceptable levels. The noise emitted from a land use must be mitigated to acceptable levels indoors and outdoors in order for other, more noise-sensitive land uses to locate in proximity to these noise producers. There are a number of ways to mitigate noise and the following policies suggest some possible solutions to noise problems.

Policies:

N 2.1 Create a County Noise Inventory to identify major noise generators and

noise-sensitive land uses, and to establish appropriate noise mitigation strategies. (AI 105)

N 2.2 Require a qualified acoustical specialist to prepare acoustical studies for proposed noise-sensitive projects within noise impacted areas to mitigate existing noise. (AI 105, 107)

N 2.3 Mitigate exterior and interior noises to the levels listed in the table below to the extent feasible, for stationary sources: (AI 105)

Table N-2
Stationary Source Land Use Noise Standards [1]

Land Use	Interior Standards	Exterior Standards
Residential 10:00 p.m. to 7:00 a.m. 7:00 a.m. to 10:00 p.m.	 40 L_{eq} (10 minute) 55 L_{eq} (10 minute)	 45 L_{eq} (10 minute) 65 L_{eq} (10 minute)

[1]These are only preferred standards; final decision will be made by the Riverside County Planning Department and Office of Public Health.

Noise Producers

Location of Noise Producers

"Good neighbors keep their noise to themselves."

The communities of Riverside County need a variety of land uses in order to thrive and succeed. These land uses may provide jobs, clean water, ensure safety, ship goods, and ease transportation woes. But they may also emit high levels of noise throughout the day. These noise-producing land uses can complement a community when the noise they emit is properly mitigated. The following policies suggest a series of surveys and analyses to correctly identify the proper noise mitigating procedures in order to promote the continued success of the communities of Riverside County.

Agriculture

One of the major economic thrusts of Riverside County is the agricultural industry. The Riverside County Right-to-Farm Ordinance conserves, protects, and encourages the development, improvement, and continued viability of agricultural land and industries for the long-term production of food and other agricultural products, and for the economic well-being of the County's residents. The Right-to-Farm Ordinance also attempts to balance the rights of farmers to produce food and other agricultural products with the rights of non-farmers who own, occupy, or use land within or adjacent to agricultural areas. The Riverside County Right-to-Farm Ordinance also works to reduce the burden of the County's agricultural resources by limiting the circumstances under which agricultural operations may be deemed a nuisance. Policies within this section address the potential noise issues that may be raised in regards to agricultural production.

Policies:

N 3.1 Protect Riverside County's agricultural resources from noise complaints

that may result from routine farming practices, through the enforcement of the Riverside County Right-to-Farm Ordinance. (AI 105, 107)

N 3.2 Require acoustical studies and subsequent approval by the Planning Department and the Office of Industrial Hygiene, to help determine effective noise mitigation strategies in noise-producing areas. (AI 105)

N 3.3 Ensure compatibility between industrial development and adjacent land uses. To achieve compatibility, industrial development projects may be required to include noise mitigation measures to avoid or minimize project impacts on adjacent uses. (AI 107)

N 3.4 Identify point-source noise producers such as manufacturing plants, truck transfer stations, and commercial development by conducting a survey of individual sites. (AI 106)

N 3.5 Require that a noise analysis be conducted by an acoustical specialist for all proposed projects that are noise producers. Include recommendations for design mitigation if the project is to be located either within proximity of a noise-sensitive land use, or land designated for noise-sensitive land uses. (AI 109)

N 3.6 Discourage projects that are incapable of successfully mitigating excessive noise. (AI 107)

N 3.7 Encourage noise-tolerant land uses such as commercial or industrial, to locate in areas already committed to land uses that are noise-producing. (AI 107)

Stationary Noise

A stationary noise producer is any entity in a fixed location that emits noise. Stationary noise producers are common in many noise-sensitive areas. Motors, appliances, air conditioners, lawn and garden equipment, power tools, and generators are often found in residential neighborhoods, as well as on or near the properties of schools, hospitals, and parks. These structures are often a permanent fixture and are required for the particular land use. Industrial and manufacturing facilities are also stationary noise producers that may affect sensitive land uses. Furthermore, while noise generated by the use of motor vehicles over public roads is preempted from local regulation, the County considers the use of these vehicles to be a stationary noise source when operated on private property such as at a truck terminal or warehousing facility. The emitted noise from the producer can be mitigated to acceptable levels either at the source or on the adjacent property through the use of proper planning, setbacks, blockwalls, acoustic-rated windows, dense landscaping, or by changing the location of the noise producer. The following policies identify mechanisms to measure and mitigate the noise emitted from stationary noise producers.

Community Noise Inventory

There are a series of noise producers within Riverside County that bear special

The cumulative noise created by truck transfer stations can reach excessive levels when noise sensitive uses are located nearby.

recognition. These uses may be important parts of the economic health of the County, but they still emit noise from time to time. Some of the special noise producers within the County include, but are not limited to the Riverside Raceway, surface mining, truck transfer stations in the Mira Loma area, manufacturing facilities, and natural gas transmission pipelines.

Three high pressure natural gas transmission pipelines are located in the community of Cabazon (within the Pass Area Plan), and a series of valve stations are placed along the pipeline throughout the community. The pipelines supply a major portion of the non-transportation energy supply for southern California. The depressurization of mainline valves at the valve stations for emergency or maintenance reasons can result in noise levels exceeding 140 dB L_{eq} at a distance of 50 feet from the source for more than an hour at a time. The pipelines are not located in heavily populated areas; however, should higher-intensity uses be approved in the area in the future, possible relocation of one or more pipelines or valves may be necessary.

Policies:

N 4.1 Prohibit facility-related noise, received by any sensitive use, from exceeding the following worst-case noise levels: (AI 105)

a. 45 dBA-10-minute L_{eq} between 10:00 p.m. and 7:00 a.m.

b. 65 dBA-10-minute L_{eq} between 7:00 a.m. and 10:00 p.m.

N 4.2 Develop measures to control non-transportation noise impacts. (AI 105)

N 4.3 Ensure any use determined to be a potential generator of significant stationary noise impacts be properly analyzed, and ensure that the recommended mitigation measures are implemented. (AI 105, 106, 109)

N 4.4 Require that detailed and independent acoustical studies be conducted for any new or renovated land uses or structures determined to be potential major stationary noise sources. (AI 105)

N 4.5 Encourage major stationary noise-generating sources throughout the County of Riverside to install additional noise buffering or reduction mechanisms within their facilities to reduce noise generation levels to the lowest extent practicable prior to the renewal of Conditional Use Permits or business licenses or prior to the approval and/or issuance of new Conditional Use Permits for said facilities. (AI 105, 107)

*A **pure tone** is a single frequency tone with no harmonic content (e.g. hum).*

N 4.6 Establish acceptable standards for residential noise sources such as, but not limited to, leaf blowers, mobile vendors, mobile stereos and stationary noise sources such as home appliances, air conditioners, and swimming pool equipment. (AI 105)

N 4.7 Evaluate noise producers for the possibility of pure-tone producing noises. Mitigate any pure tones that may be emitted from a noise source. (AI 106, 107)

N 4.8 Require that the parking structures, terminals, and loading docks of commercial or industrial land uses be designed to minimize the potential noise impacts of vehicles on the site as well as on adjacent land uses. (AI 106, 107)

Wind Energy Conversion Systems (WECS)

Wind energy is a unique resource found only in a portion of Riverside County. Wind Energy Conversion Systems (WECS) are used to harness the energy found in strong gusts of wind. In order to fully capitalize on this special commodity, a large number of wind turbines have been placed in a portion of the Coachella Valley and San Gorgonio Pass within Riverside County. There are some residential areas spread throughout the County that may also capitalize on wind-generated power. Though there is minimal residential development in the immediate areas where these windmills are located, the potential for noise and ground-borne vibration in neighboring developed areas may occur. The Wind Implementation Monitoring Program, designed and implemented by Riverside County, guides the policy direction for this area.

Policies:

N 5.1 Enforce the Wind Implementation Monitoring Program (WIMP).

N 5.2 Encourage the replacement of outdated technology with more efficient technology with less noise impacts. (AI 105)

Mobile Noise

*Please see the **Circulation Element** for further policies regarding transportation and noise related issues.*

Mobile noise sources may be one of the most annoying noise producers in a community because they are louder than background noises and more intense than many acceptable stationary noise sources. Though the noise emitted from mobile sources is temporary, it is often more disturbing because of its abruptness, especially single noise-producing events such as vehicle backfires. Common mobile noise sources include on-road vehicles, aircraft, and trains. The policies in this section identify common mobile noise sources, and suggest mitigation techniques to reduce the annoyance and burden of mobile noise sources on noise-sensitive receptors.

Policies:

N 6.1 Consider noise reduction as a factor in the purchase of County maintenance equipment and their use by County contractors and permittees. (AI 108)

N 6.2 Investigate the feasibility of retrofitting current County-owned vehicles and mechanical equipment to comply with noise performance standards consistent with the best available noise reduction technology. (AI 108)

Commercial Airliners are mobile noise sources that contribute to noise pollution.

N 6.3 Require commercial or industrial truck delivery hours be limited when adjacent to noise-sensitive land uses unless there is no feasible alternative or there are overriding transportation benefits. (AI 105, 107)

N 6.4 Restrict the use of motorized trail bikes, mini-bikes, and other off-road vehicles in areas of the County except where designated for that purpose. Enforce strict operating hours for these vehicles in order to minimize noise impacts on sensitive land uses adjacent to public trails and parks. (AI 105, 108)

Transportation

The most common mobile noise sources in the County are transportation-related. Motor vehicle noise is of concern because it is characterized by a high

number of individual events, which often create a higher sustained noise level in proximity to areas sensitive to noise exposure. Rail and aircraft operations, though less frequent, may generate extremely high noise levels that can be disruptive to daily activities. Though mass transit has not yet been developed within Riverside County, it is important to consider the noise that may be generated from transit service.

Airports

The following airports are located within or have a direct effect on Riverside County. Please see Appendix I for a map with each airport's noise contours. Also see the area plans and airport land use plans for more specific airport-related policies:

- *Banning Municipal Airport*
- *Bermuda Dunes Airport*
- *Blythe Airport*
- *Chino Airport*
- *Corona Municipal Airport*
- *Chiriaco Summit Airport*
- *Desert Center Airport*
- *Desert Resorts Regional Airport*
- *Flabob Airport*
- *French Valley Airport*
- *Hemet-Ryan Airport*
- *March Inland Port*
- *Palm Springs Regional Airport*
- *Perris Valley Airport*
- *Riverside Municipal Airport*
- *Skylark Airport*

With the dynamic growth in aviation, aircraft noise will remain a challenging environmental problem and one that will affect an increasing number people as air traffic routes and procedures change in the future. Aircraft noise appears to produce the greatest community anti-noise response, although the duration of the noise from a single airplane is much less, for example, than that from a freight train. There is great economic benefit to gain from airports of any size, although living in proximity to an airport may bring about expected aircraft noise.

There are 15 (fifteen) airports that are located within or have a direct effect on Riverside County. The land under the flight paths of each airport was monitored to determine the amount of noise emitted by common aircraft taking-off and landing at any given airport. Noise contours were created based on the measurements from the monitoring program. The CNEL noise contour(s) for the following airports have been depicted in the applicable Area Plan's Airport Influence Area section:

- Banning Municipal Airport
- Bermuda Dunes Airport
- Blythe Airport
- Chino Airport
- Chiriaco Summit Airport
- Corona Municipal Airport
- Desert Center Airport
- Desert Resorts Regional Airport
- Flabob Airport
- French Valley Airport
- Hemet Ryan Airport
- Riverside Municipal Airport

An Airport Land Use Plan has been created for each airport within Riverside County, and it should be referenced for further information regarding airports. Helicopters and heliports are also potential sources of noise, but due to the relatively low frequency and short duration of their operation in most

circumstances, these operations do not significantly affect average noise levels within the County. The following general policies address the noise that comes from airports and the aircraft they service.

Policies:

N 7.1

New land use development within Airport Influence Areas shall comply with airport land use noise compatibility criteria contained in the corresponding airport land use compatibility plan for the area. Each Area Plan affected by a public-use airport includes one or more Airport Influence Areas, one for each airport. The applicable noise compatibility criteria are fully set forth in Appendix L and summarized in the Policy Area section of the affected Area Plan.

N 7.2 Adhere to applicable noise compatibility criteria when making decisions regarding land uses adjacent to airports. Refer to the Airports section of the Land Use Element (Page LU-32) and the Airport Influence Area sections of the corresponding Area Plans.

N 7.3 Prohibit new residential land uses, except construction of a single-family dwelling on a legal residential lot of record, within the current 60 dB CNEL contours of any currently operating public-use, or military airports. The applicable noise contours are as defined by the Riverside County Airport Land Use Commission and depicted in Appendix L, as well as in the applicable Area Plan's Airport Influence Area section.

N 7.4 Check each development proposal to determine if it is located within an airport noise impact area as depicted in the applicable Area Plan's Policy Area section regarding Airport Influence Areas. Development proposals within a noise impact area shall comply with applicable airport land use noise compatibility criteria.

N 7.5 Revise the Riverside County Zoning Code to reflect aircraft noise-impacted areas around the County's major airports. (AI 109)

Vehicular

*Please see the **Circulation Element** for more in-depth information regarding Level of Service Standards, Average Daily Trips, and other information related to vehicular circulation.*

Roadway traffic is one of the most pervasive sources of noise within Riverside County. Traffic noise varies in how it affects land uses depending upon the type of roadway, and the distance of the land use from that roadway. Some variables that affect the amount of noise emitted from a road are speed of traffic, flow of traffic, and type of traffic (e.g. tractor trailers versus cars). Another variable affecting the overall measure of noise is a perceived increase in sensitivity to vehicular noise at night. Appendix I contains tables and figures that illustrate existing and forecasted noise from roadways throughout the County. The existing noise measurements were obtained by measuring noise at different points adjacent to the roadway. The future noise contours along freeways and major highways, also located in Appendix I, were created from the results of traffic modeling to project the noise of major roadways in the future. The following policies address the issues of roadway traffic noise, and suggest methods to reduce the noise impact of roads on adjacent and nearby land uses.

Policies:

N 8.1 Enforce all noise sections of the State Motor Vehicle Code.

N 8.2 Ensure the inclusion of noise mitigation measures in the design of new roadway projects in the County. (AI 105)

Off-road and all-terrain vehicles must obey strict operating hours when noise-sensitive land uses are nearby or adjacent to trails and open space.

N 8.3 Require development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses to provide for appropriate mitigation measures. (AI 106)

N 8.4 Require that the loading and shipping facilities of commercial and industrial land uses, which abut residential parcels be located and designed to minimize the potential noise impacts upon residential parcels. (AI 105)

N 8.5 Employ noise mitigation practices when designing all future streets and highways, and when improvements occur along existing highway segments. These mitigation measures will emphasize the establishment of natural buffers or setbacks between the arterial roadways and adjoining noise-sensitive areas. (AI 105)

"Calling noise a nuisance is like calling smog an inconvenience. Noise must be considered a hazard to the health of people everywhere."

-The Surgeon General

N 8.6 Require that all future exterior noise forecasts use Level of Service C, and be based on designed road capacity or 20-year projection of development (whichever is less) for future noise forecasts. (AI 106)

N 8.7 Require that field noise monitoring be performed prior to siting to any sensitive land uses along arterial roadways. Noise level measurements should be of at least 10 minutes in duration and should include simultaneous vehicle counts so that more accurate vehicle ratios may be used in modeling ambient noise levels. (AI 106)

Mass Transit

*Please see the **Circulation Element** for additional policies related to transit development and rail systems.*

Currently, the County does not participate in or provide any rail transit services though public transportation is becoming a more desirable option for many travelers and commuters in Riverside County. Transit can be an alternative to driving a car through congested Riverside County freeways. Currently, the noise generated by public transportation within Riverside County affects only a very small percentage of the total residential population. As years pass, and the need for public transportation increases, there will be a greater number of residents affected by the noise that buses, transit oases shuttles, light rail, and trains will produce. The following policies address the issues of noise related to public transit.

Policies:

N 9.1 Encourage local and regional public transit providers to ensure that the equipment they operate and purchase is state-of-the-art and does not generate excessive noise impacts on the community. (AI 108)

N 9.2 Encourage the use of quieter electric-powered vehicles. (AI 108)

N 9.3 Encourage the development and use of alternative transportation modes including bicycle paths and pedestrian walkways to minimize vehicular noise within sensitive receptor areas.

N 9.4 Actively participate in the development of noise abatement plans for freeways and rapid transit. (AI 108)

Rail

The rail system within Riverside County criss-crosses its way through communities, industrial areas, rural areas, and urban centers. Trains carry passengers, freight, and cargo to local and regional destinations day and night.

*An **at-grade railroad crossing** is one where the street and the rail line form an intersection, and physically cross one-another.*

Rail transportation may become more popular in the future if a mass public transportation system is implemented within Riverside County. Currently, daily train traffic produces noise that may disrupt activities in proximity to railroad tracks. For instance, trains are required to sound their horns at all at-grade crossings, and they may also be required to slow their speed through residential areas. These types of noise disturbances can interfere with activities conducted on noise-sensitive land uses. Exhibits showing existing railroad noise contours can be found in Appendix I. These exhibits provide purely illustrative contours along rail lines throughout the County. The following policies suggest actions that could minimize the impacts of train noise on noise-sensitive land uses.

Policies:

N 10.1 Check all proposed projects for possible location within railroad noise contours using typical noise contour diagrams. (AI 106, 109)

N 10.2 Minimize the noise effect of rail transit (freight and passenger) on residential uses and other sensitive land uses through the land use planning process. (AI 106, 109)

N 10.3 Locate light rail and fixed rail routes and design rail stations in areas that are accessible to both residential and commercial areas, but also minimize noise impacts on surrounding residential and sensitive land uses. (AI 106, 109)

N 10.4 Install noise mitigation features where rail operations impact existing adjacent residential or other noise-sensitive uses. (AI 108)

N 10.5 Restrict the development of new sensitive land uses to beyond the 65 decibel CNEL contour along railroad rights-of-way. (AI 106, 109)

Building and Design

One of the most effective means of reducing noise in a sensitive area is to construct and design buildings in such a way that the noise is deflected in such a way that it does not affect the occupants. If the building has already been constructed, then landscaping and design techniques can be used to tastefully absorb the noise emitted from mobile or stationary sources. These building and design techniques should serve two purposes; to mitigate noise to acceptable indoor and outdoor levels, and to enhance the community character rather than detract from its surroundings. The following policies have been included in the Noise Element to ensure that the character of each community within Riverside County is preserved while minimizing noise to acceptable levels.

Natural Barriers and Landscaping

Policies:

N 11.1 Utilize natural barriers such as hills, berms, boulders, and dense vegetation to assist in noise reduction. (AI 108)

N 11.2 Utilize dense landscaping to effectively reduce noise. However, when there is a long initial period where the immaturity of new landscaping makes this approach only marginally effective, utilize a large number of highly dense species planted in a fairly mature state, at close intervals, in conjunction with earthen berms, setbacks, or block walls. (AI 108)

Temporary Construction

Policies:

N 12.1 Minimize the impacts of construction noise on adjacent uses within acceptable practices. (AI 105, 108)

N 12.2 Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas. (AI 105, 108)

N 12.3 Condition subdivision approval adjacent to developed/occupied noise-sensitive land uses (see policy N 1.3) by requiring the developer to submit a construction-related noise mitigation plan to the County for review and approval prior to issuance of a grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of this project, through the use of such methods as

a. Temporary noise attenuation fences;

b. Preferential location of equipment; and

c. Use of current noise suppression technology and equipment. (AI 107)

N 12.4 Require that all construction equipment utilizes noise reduction features (e.g. mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer. (AI 105, 108)

Building and Design Techniques

Policies:

N 13.1 Enforce the California Building Standards that sets standards for building construction to mitigate interior noise levels to the tolerable 45 CNEL limit. These standards are utilized in conjunction with the Uniform Building Code by the County's Building Department to ensure that noise protection is provided to the public. Some design features may include extra-dense insulation, double-paned windows, and dense construction materials.

** Non-habitable areas within a home include:*

- *kitchens*
- *bathrooms*
- *hallways*
- *garages*
- *closets*

N 13.2 Continue to develop effective strategies and mitigation measures for the abatement of noise hazards reflecting effective site design approaches and state-of-the-art building technologies. (AI 108)

N 13.3 Incorporate acoustic site planning into the design of new development, particularly large scale, mixed-use, or master-planned development, through

measures which may include:

- separation of noise-sensitive buildings from noise-generating sources;
- use of natural topography and intervening structure to shield noise-sensitive land uses; and
- adequate sound proofing within the receiving structure. (AI 106)

• *utility rooms*

• *laundry rooms*

N 13.4 Consider and, when necessary to lower noise to acceptable limits, require noise barriers and landscaped berms. (AI 108)

N 13.5 Consider the issue of adjacent residential land uses when designing and configuring all new, non-residential development. Design and configure on-site ingress and egress points that divert traffic away from nearby noise-sensitive land uses to the greatest degree practicable. (AI 106, 107)

N 13.6 Prevent the transmission of excessive and unacceptable noise levels between individual tenants and businesses in commercial structures and between individual dwelling units in multi-family residential structures. (AI 105, 108)

N 13.7 Assist the efforts of local homeowners living in high noise areas to noise attenuate their homes through funding assistance and retrofitting program development, as feasible. (AI 105, 108)

N 13.8 Review all development applications for consistency with the standards and policies of the Noise Element of the General Plan.

N 13.9 Mitigate 600 square feet of exterior space to 65 dB CNEL when new development is proposed on residential parcels of 1 acre or greater.

Mixed Use

Policies:

N 14.1 Minimize the potential adverse noise impacts associated with the development of mixed-use structures where residential units are located above or adjacent to commercial uses. (AI 106, 107, 108)

N 14.2 Require that commercial and residential mixed-use structures minimize the transfer or transmission of noise and vibration from the commercial land use to the residential land use. (AI 105)

N 14.3 Minimize the generation of excessive noise level impacts from entertainment and restaurant/bar establishments into adjacent residential or noise-sensitive uses. (AI 105, 107)

Vibration

Another community annoyance related to noise is vibration. As with noise, vibration can be described by both its amplitude and frequency. Amplitude may be characterized by displacement, velocity, and/or acceleration. Typically, particle velocity (measured in inches or millimeters per second) and/or acceleration (measured in gravities) are used to describe vibration.

***Amplitude**-the distance that a vibrating particle travels from a fixed point.*

***Frequency**-the number of wave*

cycles that occur in 1 second.

***Hertz (Hz)**-the unit by which frequency is measured.*

***Displacement**-a measure of the distance that a vibrated particle travels from its original position.*

***Velocity**-the rate of speed at which particles move in inches per second or millimeters per second.*

***Acceleration-**the rate of change in velocity with respect to time.*

Vibration can be felt outdoors, but the perceived intensity of vibration impacts are much greater indoors, due to the shaking of the structure. Some of the most common sources of vibration come from trains and/or transit vehicles, construction equipment, airplanes, and large vehicles. Several land uses are especially sensitive to vibration, and therefore have a lower vibration threshold. These uses include, but are not limited to, concert halls, hospitals, libraries, vibration-sensitive research operations, residential areas, schools, and offices.

Table 3, Human Reaction to Typical Vibration Levels, presents the human reaction to various levels of peak particle velocity. Typical construction vibrations fall in the 10 to 30 Hz range and usually occur around 15 Hz. Traffic vibrations exhibit a similar range of frequencies. However, due to their suspension systems, city buses often generate frequencies around 30 Hz at high vehicle speeds. It is more uncommon, but possible, to measure traffic frequencies above 30 Hz.

Table N-3
Human Reaction to Typical Vibration Levels

Vibration Level Peak Particle Velocity (inches/second)	Human Reaction
0.0059-0.0188	Threshold of perception, possibility of intrusion
0.0787	Vibrations readily perceptible
0.0984	Continuous vibration begins to annoy people
0.1968	Vibrations annoying to people in buildings
0.3937-0.5905	Vibrations considered unpleasant when continuously subjected and unacceptable by some walking on bridges.
Source: Caltrans, 1992	

Policies:

N 15.1 Restrict the placement of sensitive land uses in proximity to vibration-producing land uses. (AI 105)

N 15.2 Consider the following land uses sensitive to vibration:

- Hospitals;
- Residential Areas;
- Concert Halls;
- Libraries;
- Sensitive Research Operations;
- Schools; and
- Offices

N 15.3 Prohibit exposure of residential dwellings to perceptible ground vibration from passing trains as perceived at the ground or second floor. Perceptible motion shall be presumed to be a motion velocity of 0.01 inches/second over a range of 1 to 100 Hz.

Noise Information Management

*Please see **Table N-1** for more information in order to determine a noise threshold necessary for creating a noise database.*

Current and projected noise data and maps for Riverside County require constant updating and review in order for the information to remain correct as well as accurate. Currently, there is no central noise information database available for the County staff or residents to reference when noise inquiries arise. This information is necessary and should be easily accessible when reviewing potential development plans, building a new home, siting an industrial area, evaluating circulation routes, or conducting other advanced planning activities. The following policies guide the County to create a database, or central location, where up-to-date information can be accessed by County Staff or residents.

Mapping

Policies:

N 16.1 Identify, quantify, and map noise producers and provide noise contour diagrams as is practical. (AI 109)

N 16.2 Identify and map noise-sensitive land uses throughout the County. (AI 109)

N 16.3 Identify and map point-source noise producers such as surface mines, wind turbines, manufacturing plants, truck transfer stations, active recreational facilities, and amphitheaters. (AI 109)

Noise Data Management

Policies:

N 17.1 Maintain baseline information, on an ongoing basis, regarding ambient and stationary noise sources. (AI 105)

N 17.2 Monitor and update available data regarding the community's existing and projected ambient stationary noise levels.

N 17.3 Assure that areas subject to noise hazards are identified, quantified, and mapped in a form that is available to decisionmakers. (AI 109)

N 17.4 Develop and maintain a detailed, comprehensive noise data base. (AI 106)

N 17.5 Develop and update County Noise Inventories using the following steps.

a. Identify Noise Sources and Noise-sensitive Land Uses

b. Continue to identify various agency responsibilities; review noise complaint files; and conduct noise surveys and monitoring as needed.

N 17.6 Identify those areas of the County affected by high noise levels. (AI

106, 107, 109)

N 17.7 Evaluate current land uses to identify potential noise conflict areas. (AI 106, 107, 109)

N 17.8 Gather activity operations' data of noise sources; prepare analytical noise exposure models to develop existing and projected noise contours around major noise sources down to 50 CNEL. (AI 109)

N 17.9 Encourage greater involvement of other County departments in the identification, measurement, and reduction of noise hazards throughout the County, including: Building and Safety Department, Aviation Department, and the Department of Public Health-Office of Industrial Hygiene.

Public Noise Information

Policies:

N 18.1 Provide information to the public regarding the health effects of high noise levels and means of mitigating such levels. (AI 109)

N 18.2 Cooperate with industry to develop public information programs on noise abatement. (AI 108)

N 18.3 Condition that prospective purchasers or end users of property be notified of overflight, sight, and sound of routine aircraft operations by all effective means, including:a.requiring new residential subdivisions that are located within the 60 CNEL contour or are subject to overflight, sight, and sound of aircraft from any airport, to have such information included in the State of California Final Subdivision Public Report.

> b. requiring that Declaration and Notification of Aircraft Noise and Environmental Impacts be recorded and made available to prospective purchasers or end users of property located within the 60 CNEL noise contour for any airport or air station or is subject to routine aircraft overflight. (AI 109)

N 18.4 Promote increased awareness concerning the effects of noise and suggest methods by which the public can be of assistance in reducing noise.

N 18.5 Require new developments that have the potential to generate significant noise impacts to inform impacted users on the effects of these impacts during the environmental review process. (AI 106, 107)

Exhibit Q
Absorptive vs. Reflective Noise Barriers

Sound Fighter® Systems, LLC
P.O. Box 7216
Shreveport, LA 71137
Phone: (318) 861-6640
Fax: (318) 865-7373
Web: www.soundfighter.com

Contact: Murray Stacy

Sound Walls: Absorptive versus reflective design and effectiveness

ABSTRACT

The overlap of commercial development and urban residential sprawl has created an intense awareness of noise in America, and a demand for better noise abatement practices. The primary noise sources which elicit the most fervent public resistance are road & traffic noise, and commercial developments including the explosive trend in Big Box stores. Sound barrier walls have been one of the most common and effective abatement treatments for such applications. Due to the availability and relatively low cost, reflective materials like concrete, brick or block have been the traditional manufacturing components of sound walls. As the public's knowledge of noise and noise treatments has evolved, however, so has its demand for more efficient sound wall performance. As a result, sound walls comprised of absorptive materials have grown in popularity amongst architects, developers, contractors and the general public. Thus there is an ongoing, vigorous discussion on the differences between absorptive and reflective sound walls, and which type is best suited for specific applications.

1 INTRODUCTION

Sound barriers are an effective means to reduce the noise impact from sound sources affecting sound-sensitive receivers. Common sound sources include roads & highways, retail and big-box developments, mechanical & hvac equipment, construction sites, etc. Receivers may include homes or apartments, schools, hospitals, office buildings or even public parks. When noise becomes an issue between such sources and receivers, the use of sound barriers may be an ideal solution.

Sound walls are use in many applications around the world, including DOT projects and "big-box" stores.

2 SOUND BARRIERS – REALISTIC EXPECTATIONS

Although often overlooked, sound barriers can be an effective sound attenuation and noise reduction option. Sound barriers are most effective at mid- and high-frequencies, while low frequency sounds may require the use of longer and taller sound walls for mitigation.

While the sound insertion loss of a sound barrier can be limited, it can be often optimized to provide sufficient reduction of the offensive sounds. The height and length relationship of sound barriers is well documented. At a minimum, the sound barrier should at least block the line-of-sight between the sound source and the receiver. Additionally, the sound waves that travel around the ends and over the top of the sound barrier can be significant, as well as the sound waves reflecting off of other nearby buildings and structures as shown in Figure 1.

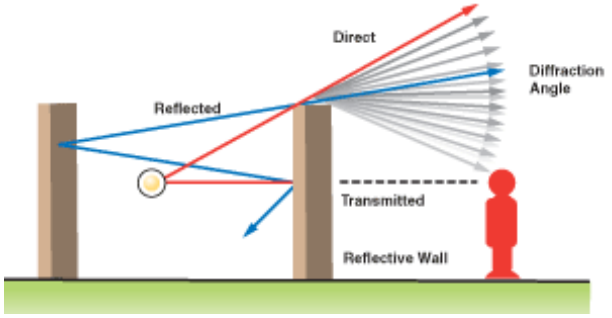


Figure 1: Sound waves not directly blocked by sound wall can travel around and over to the Receiver.

The key noise mitigation factor of a sound wall is the mass of the wall structure. It must be sufficiently dense to eliminate sound waves from traveling through it. Since design factors such as wind-loading inherently contribute to the mass of the wall's design, most of today's top-performing sound walls meet this minimum-mass level. This leaves only the noise that travels over or around the wall to contend with. As long as the sound transmitted through the barrier is at least 10 decibels (dB) below what is diffracted and transmitted over the top, the sound barrier has sufficient mass.

In general, the rules of thumb for sound barriers are easy to remember and fairly accurate: Up to 10 dB of sound reduction is fairly straightforward to obtain. A range of 15-17 dB is practical to obtain. But more than 20 dB of reduction is difficult to obtain, and more than 25 dB is impossible to obtain.

3 BENEFITS OF SOUND ABSORPTION ON SOUND BARRIERS

A key factor that is often overlooked on sound barrier selection is the effect of the surface design on overall performance. Most common building materials such as wood, metal and masonry have hard surfaces and thus reflect sound. i.e. they are considered "Reflective" barriers. Thus when sound strikes the surface of a reflective barrier, some energy is transmitted through the wall but the bulk is reflected back in the general direction of the noise source. Depending upon the roughness and shape of the surface, (and the wavelength of the sound), the sound may be fractured in different directions.

As with interior building materials, the use of sound absorptive materials in a sound wall can be beneficial in eliminating unwanted noise. Additionally, the physical geometry and location of the barriers can impact sound mitigation. For example, having two reflective sound walls – one on each side of a roadway – forms a "sound canyon" resonating with reflective sound from and between each wall, see Figure 2. The same configuration using absorptive sound walls eliminates such reflected noise. This is an obvious example of an application where the use of an absorptive sound wall should be considered.

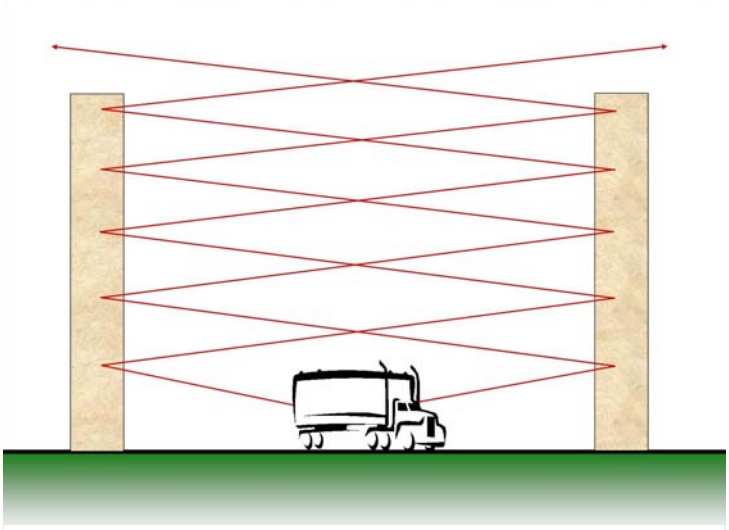


Figure 2: Reflective parallel barriers cause sound to reverberate between them; a process which is eliminated with the use of absorptive barriers.

And there are other situations favoring the use of absorptive barriers that are not quite as obvious. Here are two such examples:

3.1 Service Drive and Roadway Sound Barriers

Consider the placement of a sound barrier between some houses and the back of a shopping center, see Figure 3. The drives behind the stores are often used for deliveries by medium "bob tail" trucks and heavy delivery or even over the road "semi" trucks with tall side trailers. The truck engine and running gear are perhaps at a nominal 6' tall but the trailers are 10 to 12' tall. Thus as truck moves through one of the drives the sound reflects between the side of the truck and trailer and the sound barrier wall. Sound travels at over 1,000 fps so there will be multiple reflections of sound between the two that produces a reverberant sound buildup. Thus the sound levels are increased and also the height of the sound source is effectively increased.

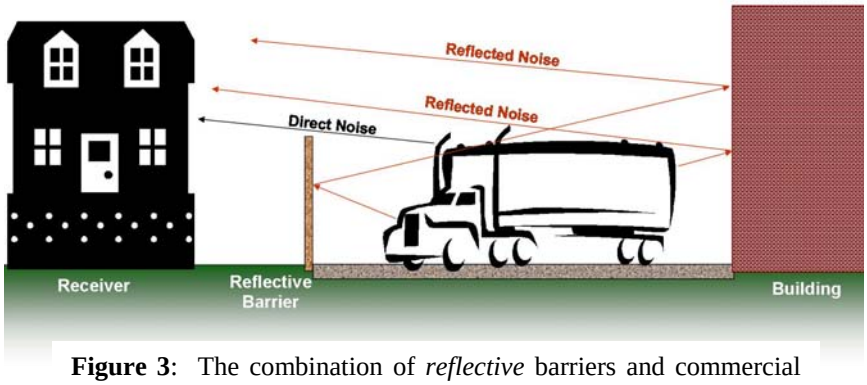


Figure 3: The combination of *reflective* barriers and commercial buildings often increase noise to the Receiver via unintended reflective sound waves.

Reflection is a critical factor when the vehicle is almost as tall as the wall or, in many cases, taller than the wall. The sound levels at the receiver can be easily increased perhaps 3 to 5 dB, and some times up to 7 dB via reflective noise. Therefore the designed sound barrier provided only 3 to 5 dB of sound attenuation in the field, where more than 10 dB was expected. Use of acoustical absorption on the source side of the sound barrier wall would have provided the desired level of performance, see Figure 4. The same type of condition would apply to a roadway barrier with semi truck traffic on the street or highway and houses on the receiver side of the wall.

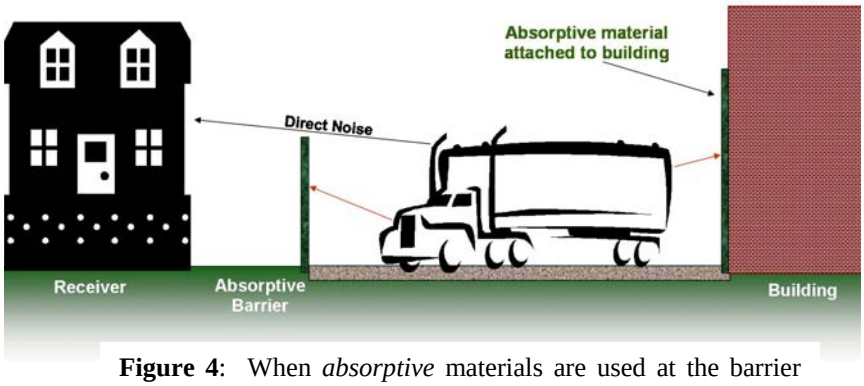


Figure 4: When *absorptive* materials are used at the barrier and on the building, reflected sound is minimized, significantly reducing noise at the Receiver.

3.2 Mechanical Equipment Noise

Consider the placement of mechanical and hvac equipment such as air cooled outdoor chillers, cooling towers, and emergency engine/generators. Often the pieces of equipment are placed behind or beside an industrial, hospital, educational or commercial building. This equipment is usually close to a property line. When residential homes and apartments are adjacent to such commercial property, specific (low) sound levels are mandated due to zoning regulations. Sound level limits in the 45 to 50 dBA range at night are not unusual. Many times simply meeting zoning requirement is not enough to eliminate nuisance complaints from neighbors, so sound levels approaching the general background sounds are desired.

In many cases, screen walls are typically used to hide the equipment, see Figure 5. Since there is a significant amount of sound reduction needed, these walls also need to serve double-duty as a sound barrier. Screen walls comprised of reflective materials like concrete, metal, wood or brick will often create sound buildup in the receiver's area due to sound reflecting off of the screen walls and the sides of the building, which are typically reflective and much taller than the screen wall.

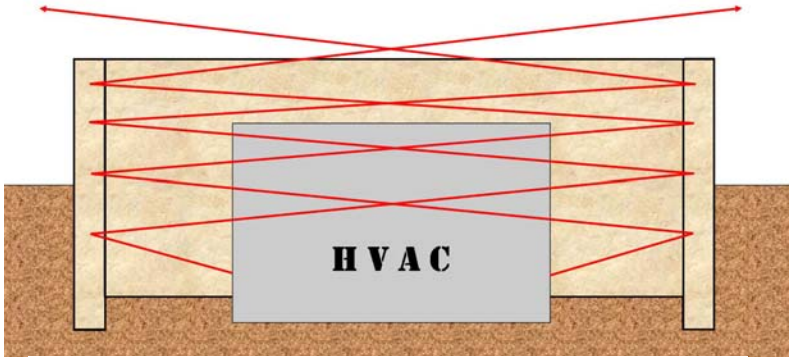


Figure 5: Reflective sound enclosures and architectural screens simply redirect unwanted sound waves, and can actually *increase* noise via unintentional redirected sound

It is imperative to use acoustical absorption on the source side of such enclosures, see Figure 6. In addition, supplemental use of acoustical absorption on the side of the building may also be required. Reflection of 3 to 5 dB or higher is often generated off the building. If that reflection is removed, that is sound that the sound barrier itself does not have to overcome.

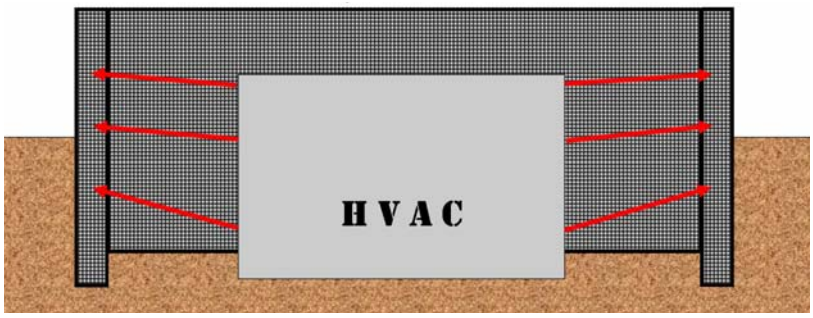


Figure 6: *Absorptive* sound enclosures and architectural screens actually absorb sound waves, minimizing the affect of unintentional, unwanted noise.

4 ABSORPTIVE SOUND BARRIERS

There are several varieties of sound absorptive barriers. Most consist of a hard material such as HDPE, wood, sheet metal and masonry for the basic construction to provide the sound transmission loss. The acoustical absorptive materials are also varied. The majority make use of fibrous material such as fiberglass and mineral wool. These products will not “wick or wet” and retain moisture. Thus even when rained upon the surface will dry. Provisions must be made in the panel design not to trap water in formed channels or elsewhere in the wall. The acoustical absorptive material can be selected to provide a significant amount of sound absorption on a wide frequency range, with 2” to 4” being perhaps typical thicknesses, see Figure 7. The amount of lower frequency sound absorption increases with increased thicknesses. Use of un-faced materials are probably best so as not to reduce the higher frequency absorption.

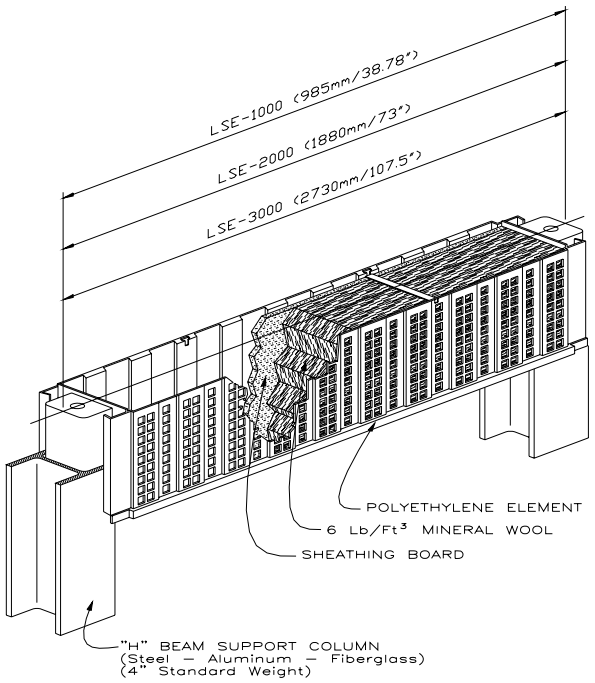


Figure 7: The design of an absorptive sound wall includes multiple elements engineered to dampen incoming sound waves..

5 SUMMARY

There are many designs and variances of sound barrier wall design, material and construction. As with any other building material, the cost and benefits must be considered. The use of acoustical absorptive sound barriers is a cost effective solution where reverberant and reflective sound reduction is needed to maximize overall noise mitigation.

6 ACKNOWLEDGMENTS

Sound Fighter Systems, LLC would like to acknowledge Mr. Ted Carnes with the Acoustic Consultancy of Pelton, Marsh, Kinsella for his contributions to this presentation.

Sound Fighter Systems, LLC would like to than HINS, Inc. for their graphic and textual contributions to this presentation.

DRAFT
Master Environmental Impact Report
General Plan and Development Code Update
City of Fresno, Fresno County, California

Prepared for:

City of Fresno
2600 Fresno Street
Fresno, CA 93721

Contact: Jennifer Clark, AICP

Prepared by:

FirstCarbon Solutions
1234 O Street
Fresno, CA 93721
888.826.5814

Contact: Michael Houlihan, AICP

July 22, 2014

Table of Contents

Section 1: Introduction 1-1
1.1 - Purpose of this EIR 1-1
1.2 - Type of EIR 1-2
1.3 - Role of this Master EIR 1-2
1.4 - Limitations on the Use of this Master EIR 1-4
1.5 - Scope of this Master EIR 1-4
1.6 - Organization of this Draft Master EIR 1-15
1.7 - Project Applicant and Lead, Responsible, and Trustee Agencies 1-16
1.8 - Incorporation by Reference 1-17
1.9 - Review of this Draft Master EIR 1-17

Executive Summary 2-1
2.1 - Purpose 2-1
2.2 - Project Summary 2-1
2.3 - Summary of Project Alternatives 2-5
2.4 - Areas of Controversy 2-7
2.5 - Public Review of the Draft EIR 2-8
2.6 - Executive Summary Matrix 2-9

Section 3: Project Description 3-1
3.1 - Project Location 3-1
3.2 - Project Characteristics 3-1
3.3 - Comparison of Proposed General Plan Update to Existing 2025 General Plan 3-24
3.4 - Population Projection for Planning Area under General Plan Update 3-25
3.5 - Infill Areas 3-26
3.6 - Growth Areas 3-29
3.7 - Development Areas 3-29
3.8 - North Area 3-29
3.9 - Subsequent Projects 3-29
3.10 - Project Objectives 3-41
3.11 - Intended Uses of This Document, Responsible Agencies, and Approvals Needed 3-42

Section 4: General Description of Environmental Setting 4-1
4.1 - Project Environmental Setting 4-1
4.2 - Cumulative Environmental Setting 4-1

Section 5: Environmental Impact Analysis 5-1
Approach to Environmental Analysis 5-1
Environmental Topics 5-2
Level of Significance 5-3
Format Used for Impact Analysis and Mitigation Measures 5-3
5.1 - Aesthetics 5.1-1
5.2 - Agricultural Resources 5.2-1
5.3 - Air Quality 5.3-1
5.4 - Biological Resources 5.4-1
5.5 - Cultural Resources 5.5-1
5.6 - Geology and Soils 5.6-1
5.7 - Greenhouse Gases 5.7-1

5.8 - Hazards and Hazardous Materials 5.8-1
5.9 - Hydrology and Water Quality 5.9-1
5.10 - Land Use and Planning 5.10-1
5.11 - Noise 5.11-1
5.12 - Population and Housing 5.12-1
5.13 - Public Services 5.13-1
5.14 - Transportation and Traffic 5.14-1
5.15 - Utilities and Service Systems 5.15-1
5.16 - Energy Conservation 5.16-1

Section 6: Other CEQA Considerations 6-1
6.1 - Growth Inducing Impacts 6-1
6.2 - Significant Irreversible Changes 6-3
6.3 - Significant and Unavoidable Impacts 6-4

Section 7: Alternatives to the Proposed Project 7-1
7.1 - Introduction 7-1
7.2 - Alternatives Considered But Rejected 7-3
7.3 - Alternatives Considered and Evaluated 7-5
7.4 - Environmentally Superior Alternative 7-17

Section 8: Effects Found Not To Be Significant 8-1
8.1 - Mineral Resources 8-1

Section 9: Information Resources 9-1
9.1 - Report Preparation Personnel 9-1
9.2 - Organizations and Persons Consulted 9-2
9.3 - References 9-3

Appendices

Appendix A: Notice of Preparation and Scoping
A.1 - Notice of Preparation and Initial Study
A.2 - Public Notice for Notice of Preparation and Notice of Public Scoping Meeting
A.3 - Comments Received on Notice of Preparation and Initial Study
A.4 - Scoping Meeting Sign-In Sheet
A.5 - Transcript of Meeting

Appendix B: Air Quality
B.1 - Criteria Pollutant Modeling

Appendix C: Biological Resources
C.1 - Vegetation Communities Mapping
C.2 - California Native Plant Society Inventory of Rare and Endangered Plants
C.3 - California Natural Diversity Database

Appendix D: Cultural Resources
D.1 - Paleontological Resources Review
D.2 - Native American Consultation

Appendix E: Geology and Soils
E.1 - Geologic Hazards Investigation

Appendix F: Greenhouse Gas
F.1 - Greenhouse Gas Emission Reduction and Modeling Results
F.2 - Greenhouse Gas Reduction Plan

Appendix G: Storm Drainage
G.1 - Storm Drainage Technical Report

Appendix H: Traffic Data
H.1 - Planning Area Exhibits – Existing Roadway Functional Classifications
H.2 - Planning Area Exhibits - Existing Roadway Number of Lanes
H.3 - Planning Area Exhibits – AM Peak Hour Volumes and LOS – Existing Year Conditions
H.4 - Planning Area Exhibits – PM Peak Hour Volumes and LOS – Existing Year Conditions
H.5 - Traffic Analysis Zones and Travel Demand Forecasting Model Inputs
H.6 - Planning Area Exhibits – Roadway Functional Classifications
H.7 - Planning Area Exhibits – Planned Roadway Number of Lanes
H.8 - Planning Area Exhibits – AM Peak Hour Volumes and LOS – Existing + Project Conditions
H.9 - Planning Area Exhibits – PM Peak Hour Volumes and LOS – Existing + Project Conditions
H.10 - Planning Area Exhibits – AM Peak Hour Volumes and LOS – Cumulative Conditions
H.11 - Planning Area Exhibits – PM Peak Hour Volumes and LOS – Cumulative Conditions
H.12 - Other Exhibits

Appendix I: Noise
I.1 - Noise Modeling

Appendix J: Utilities and Service Systems
J.1 - Wastewater Technical Report

List of Tables

Table 1-1: Summary of Notice of Preparation and Scoping Comments 1-5

Table 2-1: Executive Summary Matrix 2-10

Table 3–1: Proposed Zone District Revisions for the Planning Area Excluding the Downtown 3-20

Table 3–2: General Plan Land Use and Zoning Consistency for Downtown Area 3-23

Table 3–3: Incremental Development for Buildout of Fresno General Plan and Development Code Update 3-24

Table 3–4: Existing General Plan and General Plan Update Comparison 3-25

Table 3–5: Population Estimate for City of Fresno Planning Area 3-25

Table 3–6: Subsequent Projects Land Uses 3-29

Table 5-1: Environmental Issue Abbreviations 5-5

Table 5.2-1: Description of Farmland Classifications 5.2-2

Table 5.2-2: Farmland Designations within the Planning Area per the Farmland Mapping and Monitoring Program 5.2-3
Table 5.2-3: Farmland Under Williamson Act Contracts within the Planning Area 5.2-7
Table 5.3-1: Air Quality Monitoring Summary 5.3-4
Table 5.3-2: Fresno County Emissions 5.3-7
Table 5.3-3: San Joaquin Valley Air Basin Attainment Status 5.3-8
Table 5.3-4: Description of Air Pollutants 5.3-10
Table 5.3-5: Recommendations on Siting New Sensitive Land Uses Near Toxic Air Contaminant Sources 5.3-19
Table 5.3-6: Screening Levels for Potential Odor Sources 5.3-31
Table 5.3-7: City of Fresno Planning Area Annual Carbon Monoxide and Sulfur Dioxide Emissions 5.3-36
Table 5.3-8: City of Fresno Planning Area Construction Emissions 5.3-40
Table 5.3-9: City of Fresno Planning Area Annual Air Pollutant Emissions 5.3-42
Table 5.3-10: Top Three Stationary/Area Source Emitters in City of Fresno Planning Area (2010) 5.3-47
Table 5.3-11: City of Fresno Planning Area Highest Emitting Toxic Air Contaminant Stationary Sources 5.3-53
Table 5.3-12: Odor Complaints in City of Fresno Planning Area 2009-2011 ..... 5.3-63
Table 5.4-1: Vegetation Communities within the City of Fresno Planning Area 5.4-3
Table 5.5-1: Known Cultural Resources within the Planning Area, SSJVIC Records Search 5.5-12
Table 5.7–1: Description of Greenhouse Gases 5.7-2
Table 5.7–2: City of Fresno Planning Area 2010 Baseline and 2020 Business as Usual Greenhouse Gas Emissions 5.7-45
Table 5.7–3: Emission Reductions from State of California Regulations for Fresno Business as Usual Inventory 5.7-48
Table 5.7–4: City of Fresno Planning Area 2020 Emissions Reductions Compared to Business as Usual 5.7-49
Table 5.7–5: City of Fresno Planning Area 2035 Greenhouse Gas Emissions 5.7-50
Table 5.7–6: Emissions in 2050 and at Project Buildout in 2056 ..... 5.7-51
Table 5.7–7: Scoping Plan Reduction Measures 5.7-57
Table 5.8-1: Facilities in the City of Fresno Listed on the DTSC EnviroStor Database 5.8-4
Table 5.8-2: Waste Management Units 5.8-5
Table 5.8-3: Facilities in the City of Fresno Listed on the Water Board List of “Active” CDO and CAOs 5.8-6
Table 5.8-4: Airport Land Use Safety Compatibility Criteria 5.8-26

Table 5.8-5: Airport/Land Use Compatibility Criteria 5.8-36
Table 5.10-1: Existing Land Uses within the City of Fresno Planning Area 5.10-1
Table 5.11-1: Representative Environmental Noise Levels 5.11-1
Table 5.11-2: Noise Reduction Afforded by Common Building Construction 5.11-5
Table 5.11-3: Damage Potential to Buildings at Various Groundborne Vibration Levels 5.11-7
Table 5.11-4: Annoyance Potential to People at Various Groundborne Vibration Levels 5.11-7
Table 5.11-5: Measured Existing Noise Levels from General Plan Update 5.11-9
Table 5.11-6: Additional Measured Existing Noise Levels 5.11-9
Table 5.11-7: Maximum Allowable Noise Exposure for Noise-Sensitive Land Uses 5.11-14
Table 5.11-8: Maximum Allowable Noise Exposure-Stationary Noise Sources 5.11-18
Table 5.11-9: Typical Construction Noise Levels 5.11-24
Table 5.11-10: Traffic Noise Contours prior to Mitigation 5.11-26
Table 5.11-11: Mitigated Traffic Noise Contours 5.11-28
Table 5.11-12: Representative Vibration Source Levels for Construction Equipment 5.11-35
Table 5.11-13: Project Traffic Noise Contributions 5.11-37
Table 5.11-14: Cumulative Plus Project Traffic Noise Contributions 5.11-39
Table 5.12-1: Population Estimate for the County of Fresno and the City of Fresno Planning Area 5.12-2
Table 5.12-2: Employees per Occupied Housing Unit in Fresno County 5.12-3
Table 5.12-3: Number of Jobs per Housing Unit in Fresno County 5.12-4
Table 5.12-4: Number of Jobs per Housing Unit in the City of Fresno Planning Area in 2010 ..... 5.12-4
Table 5.12-5: Projected Jobs to Housing Ratio for the City of Fresno Planning Area 5.12-10
Table 5.12-6: Projected Occupied Housing Units and Employees Residing in Fresno County and the City of Fresno Planning Area 5.12-11
Table 5.13-1: City of Fresno Fire Department Statistics 1980-2011 ..... 5.13-3
Table 5.13-2: Existing City of Fresno Fire Stations 5.13-4
Table 5.13-3: Capacity and Enrollment Figures for K-12 School in the City of Fresno Planning Area 5.13-6
Table 5.13-4: City of Fresno Maintained Parks and Community Facilities 5.13-8
Table 5.13-5: City of Fresno Existing Open Space 5.13-9
Table 5.13-6: City of Fresno Planning Area Existing Open Space 5.13-10
Table 5.13-7: Libraries Currently in the Planning Area 5.13-12
Table 5.13-8: Hospitals in the City of Fresno Planning Area 5.13-13

Table 5.13-9: Generation of Additional Students under the City of Fresno General Plan Update 5.13-30
Table 5.14-1: City of Fresno Roadway Hierarchy 5.14-2
Table 5.14-2: Roadway Functional Class and Peak Hour Level-of-Service Thresholds 5.14-7
Table 5.14-3: VMT Comparison - Existing Conditions and General Plan Update 5.14-30
Table 5.15-1 Available Surface Water Supplies to the City of Fresno during Normal Years 5.15-5
Table 5.15-2: Water Supply Sources for Planning Area 5.15-42
Table 5.15-3: Estimated Waste Generation 5.15-48
Table 5.16-1: Year 2010 Electrical Demand within City of Fresno Planning Area 5.16-2
Table 5.16-2: Year 2010 Natural Gas Demand within City of Fresno Planning Area 5.16-2
Table 5.16-3: Year 2010 Fuel Consumption within City of Fresno Planning Area 5.16-3
Table 5.16-4: Buildout (Year 2056) Electrical Demand within City of Fresno Planning Area 5.16-9
Table 5.16-5: Buildout (Year 2056) Natural Gas Demand within City of Fresno Planning Area 5.16-10
Table 5.16-6: Buildout (Year 2056) Fuel Consumption within City of Fresno Planning Area 5.16-11
Table 7-1: Comparison Summary of Impacts between the Proposed Project and Project Alternatives 7-6

List of Exhibits

Exhibit 3-1: Regional Location Map 3-3
Exhibit 3-2: Local Vicinity Map, Topographic Base 3-5
Exhibit 3-3: Planning Area 3-7
Exhibit 3-4: Planned Land Use 3-11
Exhibit 3-5: Infill Areas 3-27
Exhibit 3-6: Growth Areas 3-35
Exhibit 3-7: Development Areas 3-37
Exhibit 3-8: Subsequent Project Areas 3-39
Exhibit 5.2-1: Farmland Classifications 5.2-5
Exhibit 5.2-2: Williamson Act Contracts 5.2-9
Exhibit 5.3-1: San Joaquin Valley Inversion 5.3-3
Exhibit 5.3-2: Ultrafine Particles 5.3-16
Exhibit 5.3-3: San Joaquin Valley NO_x Emissions Forecast 5.3-21
Exhibit 5.3-4: Carbon Monoxide and Sulfur Dioxide Emissions in Fresno Planning Area 5.3-37
Exhibit 5.3-5: City of Fresno Planning Area Particulate Matter Emissions 5.3-45

Exhibit 5.3-6: City of Fresno Planning Area Ozone Precursor Emissions 5.3-46
Exhibit 5.3-7: ARB Diesel Risk Reduction Plan Reductions 5.3-59
Exhibit 5.4-1: Vegetation Communities Map 5.4-5
Exhibit 5.8-1: Fresno Yosemite National Airport Zones 5.8-29
Exhibit 5.8-2: Fresno-Chandler Downtown Airport Zones 5.8-33
Exhibit 5.8-3: Sierra Sky Park Airport Zones 5.8-39
Exhibit 5.9-1: 100-Year Flood Zones 5.9-9
Exhibit 5.11-1: 100-Year Flood Zones 5.11-15
Exhibit 5.14-1: Existing Roadway Number of Lanes 5.14-5
Exhibit 5.14-2: AM Peak Hour LOS-Base Year Conditions 5.14-9
Exhibit 5.14-3: PM Peak Hour LOS-Existing Conditions 5.14-11
Exhibit 5.14-4: Planned Roadway Number of Lanes 5.14-13
Exhibit 5.14-5: AM Peak Hour LOS-Existing + Project Conditions 5.14-33
Exhibit 5.14-6: PM Peak Hour LOS-Existing + Project Conditions 5.14-35
Exhibit 5.14-7: AM Peak Hour LOS-Cumulative Conditions 5.14-37
Exhibit 5.14-8: PM Peak Hour LOS-Cumulative Conditions 5.14-39

SECTION 1: INTRODUCTION

The City of Fresno proposes to update their General Plan and Development Code and this Master Environmental Impact Report (Master EIR) has been prepared to assess the potential impacts of those actions on the environment. The General Plan Update includes a comprehensive update of the existing General Plan and includes the following elements: (1) Economic Development and Fiscal Sustainability, (2) Urban Form, Land Use and Design, (3) Mobility and Transportation, (4) Parks, Open Space and Schools, (5) Public Utilities and Services, (6) Resource Conservation and Resilience, (7) Historic and Cultural Resources, (8) Noise and Safety, (9) Healthy Communities, and (10) Implementation.

As a component of the General Plan Update, the City includes amendments to various existing plans including: Bullard Community Plan (this will be renamed to the Pinedale Neighborhood Plan), Sierra Sky Park Land Use Policy Plan, Fresno-Chandler Downtown Airport Master and Environs Specific Plan (formatting revisions for consistency with the ALUC's Plan), Tower District Specific Plan, Butler-Willow Specific Plan, North Avenue Industrial Plan, Sun Garden Acres Specific Plan, Hoover Community Plan (this will be renamed the El Dorado Park Neighborhood Plan). Another component of the General Plan Update includes the repeal of existing plans including: the West Area Community Plan, Roosevelt Community Plan, Fulton/Lowell Specific Plan, Woodward Park Community Plan, Central Area Community Plan, McLane Community Plan, Fresno-High Roeding Plan, Yosemite School Area Specific Plan, Dakota-First Street Specific Plan, Edison Community Plan, Civic Center Master Plan, and the Highway City Specific Plan. The Update to the General Plan also includes a Greenhouse Gas Reduction Plan.

As a component of the Development Code Update, the City includes the repeal of Chapter 12 of the City of Fresno Municipal Code, amendments and repeal of portions of the City of Fresno Municipal Code including Chapter 12, and the inclusion of Chapter 15 of the City of Fresno Municipal Code including the Zone District Consistency Table.

The City of Fresno General Plan, which was last updated in 2002, is a set of policies and programs that form a blueprint for the physical development of the City of Fresno. The General Plan Update is a collaborative effort between the City and its residents to create a vision and a blueprint for development through buildout of the General Plan land uses. The Development Code (i.e., zoning ordinance) is the City of Fresno's most effective legal tool for implementing consistent land use policy. The City has developed an updated zoning code to facilitate revitalization, infill, transit-oriented development, and more sustainable development practices.

1.1 - Purpose of this EIR

The California Environmental Quality Act (CEQA) requires that all state and local government agencies consider the environmental consequences of programs and projects over which they have discretionary authority before taking action on them. This environmental impact report (EIR) has been prepared in accordance with CEQA to evaluate the potential environmental impacts associated

with the implementation of the proposed City of Fresno General Plan and Development Code Update. This EIR has been prepared in conformance with CEQA, California Public Resources Code Section 21000 et seq; the California CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq); and the rules, regulations, and procedures for implementing CEQA as adopted by the City of Fresno.

This EIR is intended to serve as an informational document for the public agency decision-makers and the public regarding the potential environmental impacts associated with the implementation of the City of Fresno General Plan and Development Code Update. In addition to identifying potential environmental impacts, this EIR also identifies the goals, objectives, policies, and standards that are part of the General Plan and Development Code Update that will reduce potential significant environmental impacts and identifies potential mitigation measures and alternatives, where feasible to reduce potential impacts.

This EIR is the primary reference document for the formulation and implementation of a mitigation monitoring program for the proposed General Plan and Development Code Update. Environmental impacts cannot always be mitigated to a level that is considered less than significant. In accordance with Section 15093(b) of the State CEQA Guidelines, if a lead agency such as the City of Fresno approves a project (i.e., General Plan and Development Code Update) that has significant impacts that are not substantially mitigated (i.e., significant unavoidable impacts), the agency shall state in writing the specific reasons for approving the project, based on the final CEQA documents and any other information in the public record for the project. This is termed in Section 15093 of the state of CEQA Guidelines, "a statement of overriding considerations." For the proposed General Plan and Development Code Update, the following impacts were found to be significant and unavoidable: aesthetics, agriculture, air quality, cultural resources, greenhouse gases, noise, transportation, and utilities and service systems.

1.2 - Type of EIR

The CEQA Guidelines provide information on the types of environmental analysis that can be used to analyze a project, and one of these is a Master EIR. According to the CEQA Guidelines (Section 15175), the Master EIR procedure is an alternative to preparing a project EIR, staged EIR, or program EIR for certain projects which form the basis for later decision making. This Master EIR is an alternative to preparing a Program EIR for the City of Fresno General Plan and Development Code Update. This Master EIR addresses a series of actions that can be characterized as one large project or series of actions that are linked geographically; logical parts of a chain of contemplated events; rules, regulations, or plans that govern the conduct of a continuing program; or individual activities carried out under the same authorizing statutory authority and having generally similar environmental effects that can be mitigated in similar ways.

1.3 - Role of this Master EIR

This Master EIR assesses the level of development within the City of Fresno Planning Area based on reasonable assumptions for development activity anticipated to occur through buildout of the Planning Area. To determine reasonable assumptions for the amount of new residential uses,

employment uses, and population growth, the City assumed various factors such as physical capacity of the General Plan Land Use Diagram, the specific policy direction in the plan, and socioeconomic trends. The results of this analysis include forecasts of the number of new residences, amount of new employment, and increase in population anticipated to occur under buildout of the Planning Area. This Master EIR addresses environmental effects based on the potential development within the Planning Area through buildout of the General Plan Update land uses.

In accordance with Section 15176 of the CEQA Guidelines, this Master EIR includes a description of anticipated subsequent projects that are within the scope of the Master EIR, including information regarding the kind, size, intensity, and location of the subsequent projects. These subsequent projects are described in Section 3.5 of this Master EIR. In addition, there are specific land uses proposed within the Planning Area that are not within an area identified specifically as a subsequent project on Exhibit 3-5 in Section 3.5. These specific land uses for specific parcels could be considered as subsequent projects in accordance with Section 15176(d) of the CEQA Guidelines if the specific type, maximum and minimum intensity, location, and a description of any capital outlay or capital improvement program that may be required to reduce potential significant impacts is provided even if not specifically identified or listed by name in this Master EIR.

After a Master EIR has been prepared and certified, the role of the Master EIR is to streamline the environmental review process for future development projects. As future subsequent projects are proposed, the lead agency will need to determine if the project is within the scope of the Master EIR. If the project is within the scope of the Master EIR, the project will be subject to only limited environmental review. The lead agency for the subsequent project can be lead agency or any responsible agencies identified in the Master EIR. The lead agency for a subsequent project will be required to prepare an initial study that includes written findings to analyze whether the subsequent project was described in the Master EIR and whether the subsequent project may cause any additional significant effect on the environment that was not previously examined in the Master EIR.

After the evaluation, if the lead agency determines that the subsequent project will not result in any additional significant environmental effect or no new mitigation measures or alternatives are required, the lead agency can complete the evaluation. The lead agency shall incorporate all applicable and feasible mitigation measures into written findings for the subsequent project. Once completed, the initial study, which includes the written findings, shall be distributed for public review by the lead agency. Responses to substantive comments received on the evaluation of the subsequent project would be provided to the decision making body prior an action taken on the subsequent project.

If the lead agency cannot make a determination that the subsequent project is within the scope of the Master EIR and the lead agency determines that the cumulative impacts, growth inducing impacts and irreversible significant effects addressed in the Master EIR are adequate for the subsequent project, the lead agency can prepare a mitigated negative declaration or a focused EIR. A mitigated negative declaration could be prepared if any new significant impact can be reduce to less than significant with previously identified mitigation measures in the Master EIR or new mitigation measures not identified in the Master EIR (see CEQA Guidelines Section 15178 [b]). A

focused EIR could be prepared if: (1) substantial new or additional information shows that the adverse environmental effect may be more significant than was described in the Master EIR, or (2) substantial new or additional information shows that mitigation measures or alternatives which were previously determined to be infeasible are feasible and will avoid or reduce the significant effects of the subsequent project to less than significant (see CEQA Guidelines Section 15178 [c]). Such circumstances include a new significant impact that cannot be reduced to less than significant with a mitigation measure or measures.

If the lead agency determines that the cumulative impacts, growth inducing impacts and irreversible significant effects analysis in the Master EIR is inadequate for the subsequent project, the subsequent project is no longer eligible for the limited environmental review available under the Master EIR process. Under these conditions, a new EIR will be required for the subsequent project. The lead agency can tier the project specific EIR upon the Master EIR to the extent feasible under the tiering provisions in Section 15152 of the CEQA Guidelines.

1.4 - Limitations on the Use of this Master EIR

According to Section 15179 of the CEQA Guidelines, a certified Master EIR shall not be used for a subsequent project described in the Master EIR if the Master EIR was certified more than five years prior to the filing of an application for a subsequent project except this period may be extended when the lead agency makes certain findings or updates the document as allowed by Section 15179 of the CEQA Guidelines. In addition, a certified Master EIR shall not be used if a project that is not described in the certified Master EIR as an anticipated subsequent project is approved and the approved project affects the adequacy of the Master EIR for future subsequent projects described in the Master EIR (i.e., affects the adequacy of the cumulative analysis). A Master EIR that was certified more than five years prior to the filing of an application for a subsequent project can be used only if the lead agency reviews the adequacy of the Master EIR in accordance with Section 15179(b) of the CEQA Guidelines.

1.5 - Scope of this Master EIR

The scope of this Master EIR includes issues identified by the City of Fresno during the preparation of the Initial Study and Notice of Preparation (IS/NOP) for the proposed project and issues raised by agencies and the general public in response to the IS/NOP and during the scoping meeting that were held for the project. In addition, the City of Fresno consulted with staff from the California Department of Transportation (Caltrans), the Fresno Council of Governments, and the Fresno County Airport Land Use Commission to identify issues and analytical approaches to evaluate potential impacts.

1.5.1 - IS/NOP

In accordance with Section 15063 of the CEQA guidelines, an Initial Study (IS) was prepared to determine if the project may have a significant effect on the environment. The IS prepared for the project identified that an EIR was required and assisted with identifying the effects determined to be significant and effects determined not to be significant.

After completion of the IS, a Notice of Preparation (NOP) was prepared in accordance with Section 15082 of the CEQA Guidelines. The purpose of the NOP is to provide the responsible and trustee agencies and the State Office of Planning and Research with sufficient information describing the project and the potential environmental effects to assist the agencies to provide a meaningful response.

The NOP, which included the IS, was circulated for agency review as well as public review on November 6, 2012 (see Appendix A-1). In addition, a public notice of the NOP and a Notice of Public Scoping Meeting was published in the Fresno Bee on November 6, 2012 (see Appendix A-2). Responses to the NOP were requested within 30 days after receiving the NOP, or no later than December 6, 2012.

1.5.2 - Scoping Meeting

Since the proposed project includes a General Plan and Development Code Update, the project is considered to be of regional or area-wide significance in accordance with Section 15206 of the CEQA Guidelines. For projects of regional or area-wide significance, at least one scoping meeting is required as identified in Section 15082(c) (1) of the CEQA guidelines. During the agency and public review period for the NOP, the City of Fresno held a public scoping meeting on November 27, 2012 at the City of Fresno Council Chambers.

1.5.3 - Agency and Public Comments on EIR Scope

Comments on the environmental issues to be addressed in the EIR were provided on the NOP/IS (see Appendix A-3) and during the public scoping meeting (see Appendix A-4). There were 17 comment letters on the NOP/IS that were received and six people from the public provided comments on the scope of the EIR. Table 1-1 provides a summary listing of the comments that were provided on the EIR scope.

Table 1-1: Summary of Notice of Preparation and Scoping Comments

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
Governor's Office of Planning and Research, State Clearinghouse and Planning Unit	No comment on environmental issues addressed in the NOP/IS. Provided confirmation on the receipt of NOP and distributed NOP to state agencies.	Not Applicable
Native American Heritage Commission	Evaluate the potential effects and significance of historical resources including archaeological resources.	See Section 5.5, Cultural Resources
	Request a Sacred Lands File search	See Section 5.5, Cultural Resources
	Conduct early consultation with Native American tribes	See Section 5.5, Cultural Resources

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
California Department of Transportation	Caltrans requests the opportunity to remain involved throughout the process.	See Section 5.14, Transportation and Traffic
California Department of Conservation	Requests the agricultural setting of the Planning Area be provided by identifying the location and extent of the Farmland Mapping and Monitoring Program (FMMP) Important Farmland.	See Section 5.2, Agricultural Resources
	Provide data on the types of crops grown.	See Section 5.2, Agricultural Resources
	Provide a discussion of the agricultural resource value of the soils.	See Section 5.2, Agricultural Resources
	Determine potential impact of prime agricultural resources	See Section 5.2, Agricultural Resources
	Determine the project and cumulative impacts of the conversion of Important Farmland	See Section 5.2, Agricultural Resources
	Quantify the conversion of Important Farmland	See Section 5.2, Agricultural Resources
	Provide a discussion of potential impacts on Williamson Act contracted land.	See Section 5.2, Agricultural Resources
	Provide feasible mitigation measures	See Section 5.2, Agricultural Resources.
San Joaquin Valley Air Pollution Control District	Provide a discussion of existing and post-project emissions including construction and operational emissions	See Section 5.3, Air Quality
	CalEEMod needs to be used to conduct the emissions analysis	See Section 5.3, Air Quality
	Qualitatively evaluate nuisance odors	See Section 5.3, Air Quality
	Evaluate health impacts through an analysis of toxic air contaminants	See Section 5.3, Air Quality
	Include a discussion of the	See Section 5.3, Air

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
	methodology, model assumptions, inputs and result that are used to characterizing the potential project impact on air quality	Quality
	Provide mitigation for future development projects that exceeds the District's thresholds	See Section 5.3, Air Quality
Fresno County Department of Public Health	Concurs with the probable environmental effects outlined in the NOP and has not additional comments	Not Applicable
Madera County Resource Management Agency – Planning Department	Evaluate the potential impacts on the existing visual character of Madera County and in proximity of the San Joaquin River	See Section 5.2, Aesthetics
	Evaluate the addition of light and glare in the vicinity of Madera County properties and residents	See Section 5.2, Aesthetics
	Evaluate air quality impacts on sensitive receptors	See Section 5.3, Air Quality
	Evaluate air quality impacts from mobile sources on Madera County	See Section 5.3, Air Quality
	Evaluate the potential effects on biological resources associated with the off-site infrastructure requirements from growth inducement.	See Section 5.4, Biological Resources
	Evaluate the potential effects on cultural resources associated with the off-site infrastructure requirements.	See Section 5.5, Cultural Resources
	Requests a discussion of project plan conflicts related to Madera County General Plan Air Quality element	See Section 6.2, Growth Inducing Impacts
	Assess the potential impacts to Madera County's adopted emergency response and evacuation plans.	See Section 5.8, Hazards and Hazardous Materials
	Address the potential hydrological and water quality impacts upon the San Joaquin River Restoration Project	See Section 5.9, Hydrology and Water Quality

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
	Address the potential impacts on future development from subsidence within the water basin	See Section 5.6, Geology and Soils
	Address the jobs to housing ratio	See Section 5.12, Population and Housing
	Provide a plan consistency analysis with land use plans that regulate development within the Planning Area	See Section 5.10, Land Use and Planning
	Provide a detailed explanation of the proposed amendments and approvals considered for the project	See Section 3, Project Description
	Address impacts upon the regional mineral resources	See Section 8, Effects Found Not to Be Significant
	Evaluate the potential noise effects related to future traffic generated by the project on Madera County roadways	See Section 5.11, Noise
	Evaluate the impacts of the General Plan Update on the County's transportation infrastructure. Address the regional traffic impacts.	See Section 5.14, Transportation and Traffic
	Address internal capture rates	See Section 5.14, Transportation and Traffic
	Evaluate the potential inducement of population beyond the implementation of the General Plan and Development Code Update.	See Section 5.12, Population and Housing
	Request a review of a new bridge crossing San Joaquin River	See Section 5.14, Transportation and Traffic
	Evaluate project impact on emergency medical access along State Route 41	See Section 5.14, Transportation and Traffic

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
City of Clovis Department of Planning and Development Services	Requests a clarification of the North Growth Area and its relationship to the Planning Area and the future sphere-of-influence	See Section 3, Project Description
Mark Reitz, PE	Requests a specific land use with the South East Growth Area	See Section 3, Project Description
Jeffrey T. Roberts & Granville Homes	Recommended evaluation of Alternative "D" in the Alternatives Section of the Master EIR. Concerned with repeal of Zoning Ordinance and requests an evaluation of the No Project Alternative to not include the repeal of the Zoning Ordinance Asked about the origin of the population estimate for the Planning Area Asked why the environmental review needs to address the projected population of 970,000 persons Requests an alternative to the street and sidewalk standards to incentivize construction of "infill" development. Requests that the sound level standard be raised from 60 dB to 65 dB. Stated that agricultural impacts do not need to be evaluated because the 2025 General Plan and the current General Plan Update do not designate any agricultural land within the Planning Area The reference to the Dry Creek Dam in the impact discussion in the Initial Study is incorrect.	See Section 7, Alternatives to the Proposed Project See Section 7, Alternatives to the Proposed Project See Section 3, Project Description See Section 5, Environmental Impact Analysis See Section 7, Alternatives to the Proposed Project for range of alternatives See Section 5.11, Noise See Section 5.2, Agricultural Resources. See Section 8, Effects Found Not to Be Significant
Baker Manock & Jensen	Concern with the realignment of Golden State Boulevard with the implementation of the High Speed Rail (HSR) project	The realignment is required with the construction of the HSR project. Environmental issues such as traffic

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
		access, circulation, and drainage would need to be specifically evaluated when the specific realignment plans are proposed to determine the level of impact. The HSR project is considered a cumulative project as discussed in Section 4, General Description of Environmental Setting and qualitatively evaluated in Section 5, Environmental Impact Analysis.
Wild, Carter & Tipton	Concern with the realignment of Golden State Boulevard	See above regarding the realignment of Golden State Boulevard.
Leland Parnagian	Requests that the Buffer designation be reduced in width as an alternative and extend planned uses west of the Buffer designation into the Buffer designation	Based on a qualitative review, the land uses west of the proposed Buffer designation is primarily residential. Increasing residential uses would increase the number of units and increase traffic, air quality, and noise impacts. This alternative would not reduce potential impacts associated with the project, which is one of the primary purposes of an alternative analysis.
Parga Partners	Request that the EIR evaluate alternative land uses on Parga Partners properties as shown on the map provided. Parga Partners also requests an evaluation of alternative land use designations for additional parcels listed in the correspondence to the City.	See Section 7, Alternatives to the Proposed Project for the alternatives considered and evaluated.
P-R Farms	Request the possibility of a mixed-use designation for the northwest corner of Shepard and Willow (APN 568-010-	See Section 7, Alternatives to the Proposed Project

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
	20) be evaluated and consider the possibility of a commercial land use designation on the northwest corner of Shepard and Willow, as well as the mixed-use designations mentioned above.	
Allen Matkins	Concerned that the project description is incomplete Questioned whether the General Plan Land Use Diagram dated August 2012 is the Preferred Plan. Requests a description of traffic impacts and mitigation measures Requested that the transportation modeling for the project is consistent with regional approaches that are consistent with Senate Bill (SB) 375.	See Section 3, Project Description The proposed project includes the land uses within the August 2012 Land Use Diagram. See Section 5.14, Transportation and Traffic See Section 5.14, Transportation and Traffic
Friant Ranch L.P.	Request an evaluation of an alternative that reduces loss of prime farmland, unique farmland, and farmland of statewide importance Discuss impacts on grazing land Discuss impacts on Storm water detention and percolation, wastewater treatment, and water supply Discuss adequacy of water supply Discuss water quality impacts Discuss impacts on groundwater	See Section 7, Alternatives to the Proposed Project See Section 5.2, Agricultural Resources See and Section 5.15, Utilities and Service Systems See Section 5.9, Hydrology and Water Quality and Section 5.15, Utilities and Service Systems See Section 5.9, Hydrology and Water Quality See Section 5.9, Hydrology and Water Quality

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
	Discuss the effects of adding impervious surfaces on groundwater recharge	See Section 5.9, Hydrology and Water Quality
	Evaluate air quality impacts, potential alteration of long-term local and regional air quality conditions, exposure of increased air pollutant concentrations on sensitive receptors and toxic air contaminate impacts	See Section 5.3, Air Quality
	Evaluate air quality impacts from potential construction activities and provide mitigation	See Section 5.3, Air Quality
	Assess the effect on air quality with the overlapping of construction and operational emissions occurring	See Section 5.3, Air Quality
	Evaluate the potential impacts to sensitive habitats and species	See Section 5.4, Biological Resources
	Assess the potential impacts on wetland areas	See Section 5.4, Biological Resources
	Evaluate potential impacts to vernal pools and provide mitigation	See Section 5.4, Biological Resources
	Provide a discussion of housing demand	See Section 5.12, Population and Housing
	Evaluate the potential impacts on existing recreational facilities due to an increase in population	See Section 5.13, Public Services
	Evaluate potential effects associated with long-term energy supply	See Section 5.16, Energy
	Discuss regulations on greenhouse gas emissions, potential impacts associated with greenhouse gas emissions, and provide feasible mitigation measures	See Section 5.7, Greenhouse Gases and the Greenhouse Gas Reduction Plan in Appendix F-2
	Evaluate cumulative utilities/service system impacts	See Section 5.15, Utilities and Service Systems

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
Vince Correll	Where do you address the transmission of fluids and electricity?	See Section 5.15, Utilities and Service Systems and Section 5.16, Energy
David Wells	Will High Speed Rail be addressed in the Master EIR?	See Sections 4.2, Related Projects. Development of all related projects are addressed in the cumulative analyses of each environmental issue in Section 5, Environmental Impact Analysis
	.	
	Status of the High Speed Rail Project.	See Section 4.2, Related Projects
	Address noise from the High Speed Rail Project	See Section 5.11, Noise
	Location of Big Dry Creek Dam	See Section 5.9, Hydrology and Water Quality
	Potential impacts on historic structures and historic districts	See Section 5.5, Cultural Resources
	Annexation of land into the City	See Section 3, Project Description for Annexation discussion
Paul Negrete Jose Luis Barraza	Requests noise standard to change to 65 dB	See Section 5.11, Noise
	Agricultural mitigation	See Section 5.2, Agricultural Resources
	High Speed Rail noise	See Section 5.11, Noise
	Noise levels from freeways	See Section 5.11, Noise
	Truck routes	See Section 5.14, Transportation and Traffic
Dennis Koplis	Request to include an alternative that would reduce impacts to farmland	See Section 7, Alternatives to the See Section 5.9, Proposed

Commenter	Summary of Environmental Issues Raised in Comment Letter	Section Where Addressed
		Project
	Water availability Groundwater impacts	See Section 5.9, Hydrology and Water Quality
	Water quality impacts from percolation of wastewater affluent to rivers	See Section 5.9, Hydrology and Water Quality
	Population projections of 790,000 and 970,000	See Section 3, Project Description
Jeff Roberts	Asked if the City is rezoning to be consistent with the General Plan Update	See Section 3, Project Description
	Would like to see public rapid transit	See Section 3, Project Description
David Wells		
Source: FirstCarbon Solutions, 2014.		

1.5.4 - Effects Found Not to be Significant

Based on the analysis and findings in the NOP/IS as well as the comments that were received during the scoping process, there was only one environmental issue, mineral resources, that has been scoped out of the Master EIR. A discussion of this issue is provided in Section 8 and Appendix A-1 of this Master EIR.

1.5.5 - Effects Determined to be Potentially Significant

Based on the analysis and findings in the NOP/IS as well as the comments that were received during the scoping process, there are environmental issues that will be required to be addressed in the Master EIR. Following are the environmental issues.

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic
- Utilities and Service Systems
- Energy Conservation

This Master EIR addresses Recreation in the Parks discussion of the Public Services topic due to the relationship of recreational facilities and parks within the Planning Area.

1.6 - Organization of this Draft Master EIR

This Master EIR is organized into the following sections, which contain the contents of an EIR as required by Sections 15120 through 15132 of the CEQA Guidelines.

- **Section 1: Introduction.** This section includes an introduction and overview describing the purpose of this Draft Master EIR, along with its scope and components.
- **Section 2: Executive Summary.** This section provides a summary of the project and the project alternatives that will be addressed in this Master EIR, including a summary table of project and cumulative impacts, recommended mitigation measures, and the level of significance after mitigation for each environmental issue. This section includes the project and cumulative issues addressed in Section 5, Environmental Impact Analysis.
- **Section 3: Project Description.** This section provides a detailed description of the project, including the location and project characteristics. A discussion of the intended uses of this Draft EIR, project background, project objectives, and project approvals needed for the project are also included.
- **Section 4: Overview of Environmental Setting.** This section provides an overview of the project and cumulative environmental setting. The project setting focuses on the environmental conditions within the Planning Area. The cumulative setting identifies the environmental conditions within the cumulative study area. Since the proposed project is a General Plan and Development Code Update, a summary of projections contained in adopted local, regional, or related document will be the basis for the cumulative impact evaluation. This section will include the appropriate projection summaries
- **Section 5: Environmental Impact Analysis.** This section analyzes the environmental impacts of the project. Impacts are organized into major topical areas. Each topical area includes a description of the environmental setting, regulatory setting, significance criteria, project impacts, cumulative impacts, mitigation measures, and level of significance after mitigation.
- **Section 6: Other CEQA Considerations.** This section provides a summary of significant environmental impacts, including those that are significant prior to mitigation, significant and unavoidable, growth-inducing, and irreversible impacts.
- **Section 7: Alternatives to the Proposed Project.** This section includes a discussion of potential alternatives that could meet the basic objectives of the project and reduce potential significant environmental impacts of the proposed project.
- **Section 8: Effects Found Not To Be Significant.** This section includes a discussion of the environmental issues that were found to be less than significant during the scoping process.

- **Section 9: Information Resources.** This section provides a list of personnel who prepared this EIR, the organizations and persons consulted during the preparation of this EIR, a listing of the references used to prepare this EIR, and a listing of the acronyms and abbreviations used within this EIR.
- **Appendices.** The appendices contain the NOP/IS, comments on the NOP/IS, and the technical studies and information that were prepared and used to support the analyses and conclusions in this EIR.

The Final Master EIR will be prepared after the public review period for this Draft Master EIR has been completed. The Final Master EIR will include comments and recommendations received on the Draft Master EIR during the public review period; a list of persons, organizations, and public agencies commenting on the Draft Master EIR; written responses to significant environmental issues identified in the comments received; and any other information added by the City of Fresno.

1.7 - Project Applicant and Lead, Responsible, and Trustee Agencies

The project applicant and lead agency for the General Plan and Development Code Update is the City of Fresno. The City is the public agency that has the principal responsibility for carrying out or disapproving the project.

The responsible agencies are state and local public agencies other than the lead agency that have authority to carry out or approve a project or that are required to approve a portion of a project for which the lead agency is preparing or has prepared an EIR or Negative Declaration. There are no agencies other than the City of Fresno that have approval or permitting authority for the adoption of the General Plan and Development Code Update. Implementation of the project would involve many responsible agencies depending upon the specifics of the subsequent projects. Following are some of the agencies that could be required to act as responsible agencies for subsequent projects:

- Caltrans including the Division of Aeronautics
- California Air Resources Board
- California Department of Fish and Wildlife
- California Department of Forestry and Fire Protection
- California Department of Housing and Community Development
- California Department of Parks and Recreation
- California Department of Toxic Substances Control
- California Public Utilities Commission
- California State Office of Historic Preservation
- California State Lands Commission
- California State University, Fresno
- California State Water Resources Control Board
- Central Valley Regional Water Quality Control Board
- County of Fresno
- County of Fresno Local Agency Formation Commission
- Fire Districts (Various)

- Fresno Airport Land Use Commission
- Fresno Council of Governments
- Fresno Metropolitan Flood Control District
- Fresno Irrigation District
- San Joaquin River Conservancy
- San Joaquin Valley Air Pollution Control District
- School Districts (Various)
- Sewer Districts (Various)
- Water Districts (Various)

The trustee agencies under CEQA are public agencies with legal jurisdiction over natural resources that are held in trust for the people of California and that would be affected by a project, whether or not the agencies have authority to approve or implement a project. It is anticipated that development under the General Plan and Development Code Update could affect lands under the jurisdiction of a Trustee Agency such as the California Department of Fish and Wildlife, California State Lands Commission, and the California State Department of Parks and Recreation.

1.8 - Incorporation by Reference

Section 15150 of the CEQA Guidelines permits documents of lengthy technical detail to be incorporated by reference in an EIR. Section 15150 states that an EIR may "incorporate by reference all or portions of another document which is a matter of public record or is generally available to the public…" Incorporated documents are to be briefly summarized in the EIR and made available to the public for inspection or reference. The City of Fresno General Plan and Development Code Update Master EIR incorporates by reference the documents identified below and are available for review at the City of Fresno, City Clerk, 2600 Fresno Street, Fresno, CA 93721. Summaries of important parts of these documents will be provided throughout this Master EIR in appropriate places.

- City of Fresno 2025 General Plan
- City of Fresno 2025 General Plan Master EIR
- City of Fresno 2008 Urban Water Management Plan
- City of Fresno 2010 Urban Water Management Plan
- City of Fresno 2006 Wastewater Collection System Master Plan
- 2012 City of Fresno Metropolitan Water Resources Management Plan
- Fresno Metropolitan Flood Control District Storm Drainage Master Plan
- Fresno Metropolitan Flood Control District 2004 District Services Plan Master EIR
- City of Fresno 2009 Sewer System Management Plan

1.9 - Review of this Draft Master EIR

Upon completion of this Draft Master EIR, the City of Fresno prepared and filed a Notice of Completion (NOC) with the California Office of Planning and Research/State Clearinghouse to begin the public review period (Public Resources Code, Section 21161). Concurrent with the NOC, the City of Fresno distributed a Notice of Availability (NOA) in accordance with Section 15087 of the CEQA

Guidelines. The NOA was mailed to the organizations and individuals who previously requested such a notice to comply with Public Resources Code Section 21092(b)(3). This Draft Master EIR was distributed to the California Office of Planning and Research/State Clearinghouse and the Fresno Council of Governments in accordance with Section 15206 of the CEQA Guidelines. This Draft Master EIR was also published in the Fresno bee newspaper to comply with Section 15087(a) of the State CEQA Guidelines and was distributed to affected agencies, surrounding cities and municipalities, and all interested parties. During the public review period, this Draft Master EIR, including the appendices, is available for review at the following locations:

City of Fresno
Development and Resources Management Department
2600 Fresno Street, Room 3043, at the Front Counter
Fresno, CA 93721
Monday through Friday: 8:00 a.m. to 5:00 p.m.
Saturday and Sunday: Closed

City of Fresno Central Library
2420 Mariposa Street
Fresno, CA 93721
Monday through Thursday: 10:00 a.m. to 7:00 p.m.
Friday and Saturday: 10:00 a.m. to 5:00 p.m.
Sunday: 12:00 p.m. to 5:00 p.m.

In addition, the Draft Master EIR, including the appendices, is available for review at the following City of Fresno website.

http://www.fresno.gov/Government/DepartmentDirectory/DARM/AdvancedPlanning/Downloads.htm

In addition, the documents identified in Section 1.8, Incorporated by Reference, are available for review at the City of Fresno Development and Resources Management Department at the addressed shown above.

Agencies, organizations, individuals, and all other interested parties not previously contacted, or who did not respond to the NOP/IS or attended the scoping meeting, currently have the opportunity to comment on this Draft Master EIR during the 45-day public review period. Written comments on this Draft Master EIR should be addressed to:

Eric VonBerg, Planner III
City of Fresno
DARM, Long Range Planning
2600 Fresno Street
Fresno, CA 93721

Comments may also be sent by email to Eric VonBerg at:

Email: Eric.VonBerg@fresno.gov

Upon completion of the public review period, written responses to all substantive environmental issues raised will be prepared and made available for review at least 10 days prior to the public hearing on the project before the City of Fresno City Council, at which the certification of the Final Master EIR will be considered. Comments received and the responses to comments will be included as part of the record for consideration by decision-makers for the project.

EXECUTIVE SUMMARY

2.1 - Purpose

This Draft Master Environmental Impact Report (Draft Master EIR) has been prepared in accordance with the California Environmental Quality Act (CEQA) to evaluate the potential environmental impacts associated with the implementation of the proposed City of Fresno General Plan and Development Code Update (State Clearinghouse No. 2012111015). This Draft Master EIR has been prepared in conformance with CEQA (California Public Resources Code, Section 21000, et seq.); the CEQA Guidelines (California Code of Regulations, Title 14, Section 15000, et seq.); and procedures for implementing CEQA as adopted by the City of Fresno.

The purpose of this Draft MEIR is to inform public agency decision-makers, representatives of affected and responsible agencies, the public, and other interested parties of the potential environmental effects that may result from implementation of the City of Fresno General Plan and Development Code Update. In addition to identifying potential environmental effects, this Draft Master EIR also identifies methods by which these impacts can be mitigated, reduced, minimized, or avoided.

This Master EIR assesses the level of development within the City of Fresno Planning Area based on reasonable assumptions for development activity anticipated to occur through buildout of the Planning Area. To determine reasonable assumptions for the amount of new residential uses, employment uses, and population growth, the City assumed various factors such as physical capacity of the General Plan Land Use Diagram, the specific policy direction in the plan, and socioeconomic trends. The results of this analysis include forecasts of the number of new residences, amount of new employment, and increase in population anticipated to occur under buildout of the Planning Area. This Master EIR addresses environmental effects based on the potential development within the Planning Area through buildout of the General Plan Update land uses.

2.2 - Project Summary

2.2.1 - Project Location

The City of Fresno is located in Fresno County, which is in central San Joaquin Valley. The City is located approximately 200 miles north of the Los Angeles and 170 miles south of Sacramento. The City is located on State Route (SR) 99 corridor that links it to other Central Valley cities. To the north of Fresno is Madera County. The City of Clovis is located northwest and adjacent to the City. East, south, and west of the City is unincorporated land.

The Planning Area is the geographic area for which the General Plan establishes policies about future growth. The boundary of the Planning Area was determined in response to State law (California Government Code Section 65300) requiring each city to include in its General Plan all territory within the boundaries of the incorporated area as well as “any land outside its boundaries which in the planning agency’s judgment bears relation to its planning”. The Planning Area established by the City of Fresno includes all areas within the City’s current City limits, including the Fresno-Clovis Regional

Wastewater Reclamation Facility (RWRF), the areas within the current Sphere of Influence (SOI), and an area north of the City's most northeasterly portion of the City.

The SOI is a boundary that encompasses lands that are expected to ultimately be annexed into the City, although until annexed, the lands fall under the jurisdiction of the County of Fresno. Within the Planning Area, the current SOI covers approximately 100,249 acres or approximately 157 square miles, but does not include the 3,292-acre RWRF and an additional 2,486 acres for the North Area. The Planning Area encompasses approximately 106,027 acres, or approximately 166 square miles of both incorporated (approximately 72,244 acres) and unincorporated (approximately 33,783 acres) land bearing relation to the City's future growth. The Planning Area is generally located within the San Joaquin River to the north, American Avenue to the south, Garfield Avenue to the west, and McCall Avenue to the east, with the RWRF generally located with Jensen Avenue to the north, American Avenue to the south, South Chateau Fresno Avenue, and Cornelia Avenue to the east. The Planning Area includes various unincorporated islands surrounded by the City's limits.

2.2.2 - Project Description

The proposed project is comprised of two components: the General Plan Update and the Development Code Update. The updates will accommodate projected growth and development through the buildout of the General Plan and Development Code which will be approximately the year 2056. The anticipated population at buildout is approximately 970,000 people in the Planning Area.

The General Plan Update includes a comprehensive update of the existing General Plan and includes the following elements: (1) Economic Development and Fiscal Sustainability, (2) Urban Form, Land Use and Design, (3) Mobility and Transportation, (4) Parks, Open Space and Schools, (5) Public Utilities and Services, (6) Resource Conservation and Resilience, (7) Historic and Cultural Resources, (8) Noise and Safety, (9) Healthy Communities, and (10) Implementation. The General Plan Update also includes a consistency update for the Housing Element. As a component of the General Plan Update, the City includes amendments to various existing plans including: Bullard Community Plan (this will be renamed to the Pinedale Neighborhood Plan), Sierra Sky Park Land Use Policy Plan, Fresno-Chandler Downtown Airport Master and Environs Specific Plan (formatting revisions for consistency with the ALUC's Plan), Tower District Specific Plan, Butler-Willow Specific Plan, North Avenue Industrial Plan, Sun Garden Acres Specific Plan, Hoover Community Plan (this will be renamed the El Dorado Park Neighborhood Plan). Another component of the General Plan Update includes the repeal of existing plans including: the West Area Community Plan, Roosevelt Community Plan, Fulton/Lowell Specific Plan, Woodward Park Community Plan, Central Area Community Plan, McLane Community Plan, Fresno-High Roeding Plan, Yosemite School Area Specific Plan, Dakota-First Street Specific Plan, Edison Community Plan, Civic Center Master Plan, and the Highway City Specific Plan. The Update to the General Plan also includes a Greenhouse Gas Reduction Plan.

As a component of the Development Code Update, the City includes the repeal of Chapter 12 of the City of Fresno Municipal Code, amendments and repeal of portions of the City of Fresno Municipal Code including Chapter 12, and the inclusion of Chapter 15 of the City of Fresno Municipal Code including the Zone District Consistency Table.

The projected population estimate under buidlout conditions within the Planning Area is 970,000 persons.

The potential new development associated with the proposed General Plan Update includes approximately 145,000 residential units, 63.3 million square feet (msf) of commercial/office/public facility uses, 20.8 msf of mixed use, and 40.5 msf of industrial uses. With the increase in development, the amount of existing vacant land and open space will be reduced within the Planning Area and the existing agricultural uses will be eventually removed. This potential development is projected to be built out by the year 2056.

2.2.3 - Project Objectives

The objectives of the proposed General Plan and Development Code Update are as follows:

1. Increase opportunity, economic development, business and job creation.
2. Support a successful and competitive Downtown.
3. Emphasize conservation, successful adaptation to climate and changing resource conditions, and performance effectiveness in the use of energy, water, land, buildings, natural resources, and fiscal resources required for the long-term sustainability of Fresno.
4. Emphasize achieving healthy air quality and reduced greenhouse gas emissions.
5. Support agriculture as an integral industry and sustainable food production system.
6. Protect, preserve, and enhance natural, historic, and cultural resources.
7. Provide for a diversity of districts, neighborhoods, housing types (including affordable housing), residential densities, job opportunities, recreation, open space, and educational venues that appeal to a broad range of people throughout the City.
8. Develop “complete neighborhoods” and districts with a compact and diverse mix of residential densities, building types, and affordability, which are designed to be healthy, attractive, and centered by schools, parks, public and commercial services to provide a sense of place and that meet daily needs within walking distance.
9. Promote a city of healthy communities and improve quality of life in existing neighborhoods.
10. Emphasize increased land use intensity and mixed-use development at densities supportive of greater use of transit in Fresno.
11. Emphasize and plan for all modes of travel on local and major streets in Fresno.
12. Resolve existing public infrastructure and service deficiencies, make full use of existing infrastructure, and invest in improvements to increase competitiveness and promote economic growth.
13. Emphasize the City as a role model for growth management planning, regional cooperation, collaborative planning, efficient processing and permit streamlining, public-private

partnerships and shared financing, sustainable urban development policies, environmental quality, and a strong economy, and work with other jurisdictions and institutions to further these values throughout the region.

14. Provide a network of safe, well-maintained parks, open spaces, athletic facilities, and walking and biking trails connecting the city's districts and neighborhoods to attract and retain a broad range of individuals, benefit the health of residents, and provide the level of public amenities required to encourage and support development of higher density urban living and transit use.
15. Improve Fresno's visual image, enhance its form, and function through urban design strategies and effective maintenance.
16. Protect and improve public health and safety.
17. Recognize, respect, and plan for Fresno's cultural, social, and ethnic diversity, and foster an informed and engaged citizenry.
18. Retain the existing sphere-of-influence.
19. Provide project development direction for future annexations within the existing sphere-of-influence.
20. Encourage development within urban infill areas.

2.2.4 - Significant Unavoidable Adverse Impacts

The proposed General Plan and Development Code Update would result in the following significant unavoidable impacts:

- Aesthetics – visual character and illumination of the dark sky.
- Agricultural Resources – loss of farmland and removal of Williamson Act Contract land.
- Air Quality – criteria pollutant emissions and toxic air contaminants pollutant concentrations.
- Cultural Resources – potential removal of historic resources.
- Greenhouse Gases – increase in greenhouse gas emissions beyond the year 2020.
- Noise – exceed noise standards and substantial permanent increases in noise levels.
- Transportation and Traffic – potentially exceed thresholds of levels of service on roadways under the jurisdictions of the County of Fresno, City of Clovis, and Caltrans.
- Utility and Service Systems – construction of water, wastewater, and drainage facilities that could cause substantial impacts associated with loss of agriculture and increases in air emissions.

2.2.5 - Lead Agency, Responsible and Trustee Agencies

The project applicant and lead agency for the General Plan and Development Code Update is the City of Fresno. The City is the public agency that has the principal responsibility for carrying out or disapproving the project.

The responsible agencies are state and local public agencies other than the lead agency that have authority to carry out or approve a project or that are required to approve a portion of a project for which the lead agency is preparing or has prepared an EIR or Negative Declaration. There are no agencies other than the City of Fresno that have approval or permitting authority for the adoption of the General Plan and Development Code Update. Implementation of the project would involve many responsible agencies depending upon the specifics of the subsequent projects. Following are some of the agencies that could be required to act as responsible agencies for subsequent projects:

- Caltrans including the Division of Aeronautics
- California Air Resources Board
- California Department of Fish and Wildlife
- California Department of Forestry and Fire Protection
- California Department of Housing and Community Development
- California Department of Parks and Recreation
- California Department of Toxic Substances Control
- California Public Utilities Commission
- California State Office of Historic Preservation
- California State Lands Commission
- California State University, Fresno
- California State Water Resources Control Board
- Central Valley Regional Water Quality Control Board
- County of Fresno
- County of Fresno Local Agency Formation Commission
- Fire Districts (Various)
- Fresno Airport Land Use Commission
- Fresno Council of Governments
- Fresno Metropolitan Flood Control District
- Fresno Irrigation District
- San Joaquin River Conservancy
- San Joaquin Valley Air Pollution Control District
- School Districts (Various)
- Sewer Districts (Various)
- Water Districts (Various)

2.3 - Summary of Project Alternatives

Below is a summary of the alternatives to the General Plan and Development Code Update that have been considered but rejected as well as those alternatives that have been considered and evaluated in Section 5, Alternatives to the Proposed Project.

2.3.1 Alternatives Considered but Rejected

There were five alternatives that were considered but rejected. These alternatives were developed for the General Plan Citizens Committee in March 2012. One of the alternatives, The Boulevard Plan, included slightly higher gross residential density and slightly more residential units compared to the proposed project. This alternative would not avoid any of the significant and unavoidable environmental effects of the project, but could meet all of the project objectives. Since this alternative could not reduce the significant and unavoidable impacts of the project, this alternative was rejected. The four remaining alternatives were found to have similar project components as the Growth Area Expansion Alternative that is one of the alternatives considered and evaluated. Each of these alternatives included a lower gross residential density per acre and more residential units compared to the proposed project. Three of the alternatives also included expansion of the sphere-of-influence to accommodate the lower density and increase in residential units. Since these four alternatives have similar components as the Growth Area Expansion Alternative, these alternatives have been rejected.

2.3.2 Alternatives Considered and Evaluated

Following are the four alternatives that were considered and evaluated.

No Project/No Development Alternative

Under the No Project/No Development Alternative (No Project Alternative), the Planning Area would remain unchanged and no new development would occur onsite. The Planning Area would continue to have 545,000 people and include 186,840 dwelling units. No additional land uses would be developed. The existing agricultural uses within the Planning Area would continue their operations.

No Project/Development in Accordance with the Existing General Plan

The No Project/Development in Accordance with the Existing General Plan would result in development occurring within the 106,027-acre Planning Area. This alternative would include a population of 790,000 people and a total of approximately 260,000 housing units. Substantially less non-residential development would be developed under this alternative compared to the proposed project. This alternative contemplated buildout of the Planning Area by the year 2025 and due to the economic recession during the past decade, the current estimate of buildout of this alternative is the year 2035. The projected residential density of new residential units after the year 2010 is 6.09 under this alternative.

Growth Area Expansion

The Growth Area Expansion Alternative incorporates components that were identified in the Growth Area Plan, The Expanded SOI Plan, and The Hybrid Plan that were developed for the General Plan Citizens Committee in March 2012 and are discussed in Section 7.2, above. The Growth Area Expansion Alternative includes an average residential density of 5.3 units per gross acre for new residential development and an approximately four percent increase in new residential development compared to the proposed project. The total new residential development beyond the existing units in the year 2010 is approximately 151,000 dwelling units compared to the proposed project's

145,164 new residential units. With a decrease in density within the Planning Area, new residential communities would be required to be constructed outside of the Planning Area. These new communities would occur contiguous to the Planning Area boundary and within the current jurisdiction of the County of Fresno. Based on no new residential designations within the Planning Area compared to the proposed project, a four percent increase in new residential units compared to the proposed project, and a 5.3 units per gross acre for the approximately 151,000 new dwelling units, a total of approximately 15,000 acres would be required outside of the Planning Area. This new area would also accommodate uses that would support the residential communities. The total population that would be accommodated under this alternative would be approximately 988,000 people which would be approximately 18,000 more people and less than a two percent increase compared to the proposed project.

Growth Area Reduction

The Growth Area Reduction Alternative would remove future development within the area known as the Southeast Development Area (SEDA), but would include this area as part of the Planning Area. Therefore, the Planning Area would remain 106,027 acres. With the removal of future development within SEDA, the existing rural uses including agricultural uses would remain. This alternative would accommodate approximately 850,000 people which would be approximately 120,000 less people compared to the proposed project. A total of approximately 286,000 residential units would be included under this alternative. This includes approximately 99,000 new residential units within the Planning Area at an average density of approximately 8.4 units per gross acre. This density would be less than the average density of 9.12 units per gross acre under the proposed project; however, since the residential densities in SEDA were higher than the average residential density for the proposed project, the average density of residential units would be less under this alternative. Outside of SEDA, the densities throughout the Planning Area under this alternative would be the same densities as proposed under the proposed project.

2.4 - Areas of Controversy

Pursuant to CEQA Guidelines Section 15123(b), a summary section includes a discussion of areas of controversy known to the lead agency, including issues raised by agencies and the public. Following are the known areas of controversy.

- Aesthetics – alterations of the visual character and increase in lighting
- Agriculture – removal of farmland
- Air Quality – increases in air emissions and increases in concentrations of toxic air contaminants
- Biological Resources – impacts on habitat and species
- Cultural Resources – effects on historic buildings
- Greenhouse Gases – increases in greenhouse gas emissions
- Noise – increases in noise levels

- Traffic – increases in traffic within and outside of the Planning Area
- Utilities and Service Systems – availability of water supplies
- Growth – Expansion of the sphere-of-influence

2.5 - Public Review of the Draft EIR

Upon completion of this Draft Master EIR, the City of Fresno prepared and filed a Notice of Completion (NOC) with the California Office of Planning and Research/State Clearinghouse to begin the public review period (Public Resources Code, Section 21161). Concurrent with the NOC, the City of Fresno distributed a Notice of Availability (NOA) in accordance with Section 15087 of the CEQA Guidelines. The NOA was mailed to the organizations and individuals who previously requested such a notice to comply with Public Resources Code Section 21092(b)(3). This Draft Master EIR was distributed to the California Office of Planning and Research/State Clearinghouse and the Fresno Council of Governments in accordance with Section 15206 of the CEQA Guidelines. This Draft Master EIR was also published in the Fresno bee newspaper to comply with Section 15087(a) of the State CEQA Guidelines and was distributed to affected agencies, surrounding cities and municipalities, and all interested parties. During the public review period, this Draft Master EIR, including the appendices, is available for review at the following locations:

City of Fresno
Development and Resources Management Department
2600 Fresno Street, Room 3043, at the Front Counter
Fresno, CA 93721
Monday through Friday: 8:00 a.m. to 5:00 p.m.
Saturday and Sunday: Closed

City of Fresno Central Library
2420 Mariposa Street
Fresno, CA 93721
Monday through Thursday: 10:00 a.m. to 7:00 p.m.
Friday and Saturday: 10:00 a.m. to 5:00 p.m.
Sunday: 12:00 p.m. to 5:00 p.m.

In addition, the Draft Master EIR, including the appendices, is available for review at the following City of Fresno website.

http://www.fresno.gov/Government/DepartmentDirectory/DARM/AdvancedPlanning/Downloads.htm

In addition, the documents identified in Section 1.8, Incorporated by Reference, are available for review at the City of Fresno Development and Resources Management Department at the addressed shown above.

Agencies, organizations, individuals, and all other interested parties not previously contacted, or who did not respond to the NOP/IS or attended the scoping meeting, currently have the opportunity to

comment on this Draft Master EIR during the 45-day public review period. Written comments on this Draft Master EIR should be addressed to:

Eric VonBerg, Planner III
City of Fresno
DARM, Long Range Planning
2600 Fresno Street
Fresno, CA 93721

Comments may also be sent by email to Eric VonBerg at:

Email: Eric.VonBerg@fresno.gov

Upon completion of the public review period, written responses to all substantive environmental issues raised will be prepared and made available for review at least 10 days prior to the public hearing on the project before the City of Fresno City Council, at which the certification of the Final Master EIR will be considered. Comments received and the responses to comments will be included as part of the record for consideration by decision-makers for the project.

2.6 - Executive Summary Matrix

Table 2-1 below summarizes the impacts, mitigation measures, and resulting level of significance after mitigation for the relevant environmental issue areas evaluated for the proposed City of Fresno General Plan and Development Code Update. Table 2-1 is intended to provide an overview; narrative discussions for the issue areas are included in the corresponding sections of this Draft Master EIR. Table 2-1 is included in the Draft Master EIR pursuant to CEQA Guidelines Section 15123(b)(1).

Table 2-1: Executive Summary Matrix

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Section 5.1 – Aesthetics			
Impact AES-1. The project would not have a substantial adverse effect on a scenic vista.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact AES-2. The project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway.	**Project-Specific** No impact. **Cumulative** No impact.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** No impact. **Cumulative** No impact.
Impact AES-3. The project would substantially degrade the existing visual character or quality of the site and its surroundings.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.
Impact AES-4. The project would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM AES-1** Lighting systems for street and parking areas shall include shields to direct light to the roadway surfaces and parking areas. Vertical shields on the light fixtures shall also be used to direct light away from adjacent light sensitive land uses such as residences. **MM AES-2** Lighting systems for public facilities such as active play areas shall provide adequate illumination for the activity; however, low intensity light fixtures and shields shall be used to minimize spillover light onto adjacent properties. **MM AES-3** Lighting systems for non-residential uses, not including public facilities, shall provide shields on the light fixtures and orient the lighting system away from adjacent properties.	**Project-Specific** Lighting on properties adjacent to lighting systems: Less than significant. Glare impacts: Less than significant. Illumination of night sky: Significant and unavoidable. **Cumulative** Lighting on properties adjacent to lighting systems: Less than significant. Glare impacts: Less than significant. Illumination of night sky: Significant and unavoidable.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Low intensity light fixtures shall also be used if excessive spillover light onto adjacent properties will occur. **MM AES-4** Lighting systems for freestanding signs shall not exceed 100 foot Lamberts (FT-L) when adjacent to streets which have an average light intensity of less than 2.0 horizontal footcandles and shall not exceed 500 FT-L when adjacent to streets which have an average light intensity of 2.0 horizontal footcandles or greater. **MM AES-5** Materials used on building facades shall be non-reflective. **Cumulative** Implementation of **Mitigation Measures AES-1** through **AES-5** is required.	
Section 5.2 – Agricultural Resources			
Impact AG-1. The project would convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.
Impact AG-2. The project would conflict with existing zoning for agricultural use, or a Williamson Act contract.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.
Impact AG-3. The project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.	**Project-Specific** No impact. **Cumulative** No impact.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** No impact. **Cumulative** No impact.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Section 5.3 – Air Quality			
Impact AIR-1. The project would not conflict with or obstruct implementation of the applicable air quality plan.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact AIR-2. The project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact AIR-3. The project would result in a considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.
Impact AIR-4. The project could expose sensitive receptors to substantial pollutant concentrations.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM AIR-1** Projects that include five or more heavy-duty truck deliveries per day with sensitive receptors located within 300 feet of the truck loading area shall provide a screening analysis to determine if the project has the potential to exceed criteria pollutant concentration based standards and thresholds for NO2 and PM2.5. If projects exceed screening criteria, refined dispersion modeling and health risk assessment shall be accomplished and if needed, mitigation measures to reduce impacts shall be included in the project to reduce the impacts to the extent feasible. Mitigation measures include but are not limited to: • Locate loading docks and truck access routes as far from sensitive receptors as reasonably possible considering site design limitations to comply with other	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		City design standards. • Post signs requiring drivers to limit idling to 5 minutes or less. **MM AIR-2** Projects that result in an increased cancer risk of 10 in a million or exceed criteria pollutant ambient air quality standards shall implement site-specific measures that reduce TAC exposure to reduce excess cancer risk to less than 10 in a million. Possible control measures include but are not limited to: • Locate loading docks and truck access routes as far from sensitive receptors as reasonably possible considering site design limitations to comply with other City design standards. • Post signs requiring drivers to limit idling to 5 minutes or less • Construct block walls to reduce the flow of emissions toward sensitive receptors • Install a vegetative barrier downwind from the TAC source that can absorb a portion of the diesel PM emissions • For projects proposing to locate a new building containing sensitive receptors near existing sources of TAC emissions, install HEPA filters in HVAC systems to reduce TAC emission levels exceeding risk thresholds. • Install heating and cooling services at truck stops to eliminate the need for idling during overnight stops to run onboard systems. • For large distribution centers where the	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		owner controls the vehicle fleet, provide facilities to support alternative fueled trucks powered by fuels such as natural gas or bio-diesel. • Utilize electric powered material handling equipment where feasible for the weight and volume of material to be moved. **Cumulative** **MM AIR-3** Require developers proposing projects on ARB's list of projects in its Air Quality and Land Use Handbook (Handbook) warranting special consideration to prepare a cumulative health risk assessment when sensitive receptors are located within the distance screening criteria of the facility as listed in the ARB Handbook. **MM AIR-4** Require developers of projects containing sensitive receptors to provide a cumulative health risk assessment at project locations exceeding ARB Land Use Handbook distance screening criteria or newer criteria that may be developed by the SJVAPCD. Implementation of **Mitigation Measure AIR-1 and AIR-2 i**s also required.	
Impact AIR-5. The project could create objectionable odors affecting a substantial number of people.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM AIR-5** Require developers of projects with the potential to generate significant odor impacts as determined through review of SJVAPCD odor complaint history for similar facilities and consultation with the SJVAPCD to prepare an odor impact assessment and to implement odor control measures recommended by the SJVAPCD or the City to the extent needed to reduce the impact to less than significant.	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Cumulative Implementation of **Mitigation Measure AIR-5** is required.	
Section 5.4 – Biological Resources			
Impact BIO-1. The project could have a substantial adverse effect, either directly or through habitat modifications, on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM BIO-1** Construction of a proposed project should avoid, where possible, vegetation communities that provide suitable habitat for a special-status species known to occur within the Planning Area. If construction within potentially suitable habitat must occur, the presence/absence of any special-status plant or wildlife species must be determined prior to construction, to determine if the habitat supports any special-status species. If a special-status species are determined to occupy any portion of a project site, avoidance and minimization measures shall be incorporated into the construction phase of a project to avoid direct or incidental take of a listed species to the greatest extent feasible. **MM BIO-2** Direct or incidental take of any state or federally listed species should be avoided to the greatest extent feasible. If construction of a proposed project will result in the direct or incidental take of a listed species, consultation with the resources agencies and/or additional permitting may be required. Agency consultation through the CDFW 2081 and USFWS Section 7 or Section 10 permitting processes must take place prior to any action that may result in the direct or incidental take of a listed species. Specific mitigation measures for direct or incidental impacts to a listed species will be determined on a case-by-case basis through agency consultation. **MM BIO-3** Development within the Planning Area should avoid, where possible,	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		special-status natural communities and vegetation communities that provide suitable habitat for special-status species. If a proposed project will result in the loss of a special-status natural community or suitable habitat for special-status species, compensatory habitat-based mitigation is required under CEQA and CESA. Mitigation will consist of preserving on-site habitat, restoring similar habitat or purchasing off-site credits from an approved mitigation bank. Compensatory mitigation will be determined through consultation with the City and/or resource agencies. An appropriate mitigation strategy and ratio will be agreed upon by the developer and lead agency to reduce project impacts to special-status natural communities to a less than significant level. Agreed-upon mitigation ratios will depend on the quality of the habitat and presence/absence of a special-status species. The specific mitigation for project level impacts will be determined on a case-by-case basis. **MM BIO-4** Proposed projects within the Planning Area should avoid, if possible, construction within the general nesting season of February through August for avian species protected under Fish and Game Code 3500 and the Migratory Bird Treaty Act (MBTA), if it is determined that suitable nesting habitat occurs on a project site. If construction cannot avoid the nesting season, a pre-construction clearance survey must be conducted to determine if any nesting birds or nesting activity is observed on or within 500-feet of a project site. If an active nest is observed during the survey, a biological monitor must be on site to ensure that no proposed project activities would impact the active nest. A suitable buffer will be established around the active nest until the nestlings have fledged and the	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		nest is no longer active. Project activities may continue in the vicinity of the nest only at the discretion of the biological monitor. **Cumulative** Implementation of **Mitigation Measures BIO-1** through **BIO-4** is required.	
Impact BIO-2. The project may have a substantial adverse effect on any riparian habitat or other special-status natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM BIO-5** If a proposed project will result in the removal or impact to any riparian habitat and/or a special-status natural community with potential to occur in the Planning Area, compensatory habitat-based mitigation shall be required to reduce project impacts. Compensatory mitigation must involve the preservation or restoration or the purchase of off-site mitigation credits for impacts to riparian habitat and/or a special-status natural community. Mitigation must be conducted in-kind or within an approved mitigation bank in the region. The specific mitigation ratio for habitat-based mitigation will be determined through consultation with the appropriate agency (i.e., CDFW or USFWS) on a case-by-case basis. **MM BIO-6** Project impacts that occur to riparian habitat may also result in significant impacts to streambeds or waterways protected under Section 1600 of Fish and Wildlife Code and Section 404 of the CWA. CDFW and/or USACE consultation, determination of mitigation strategy, and regulatory permitting to reduce impacts, as required for projects that remove riparian habitat and/or alter a streambed or waterway, shall be implemented. **MM BIO-7** Project-related impacts to riparian habitat or a special-status natural community may result in direct or incidental	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		impacts to special-status species associated with riparian or wetland habitats. Project impacts to special-status species associated with riparian habitat shall be mitigated through agency consultation, development of a mitigation strategy, and/or issuing incidental take permits for the specific special-status species, as determined by the CDFW and/or USFWS. **Cumulative** Implementation of **Mitigation Measures BIO-5** through **BIO-7** is required.	
Impact BIO-3. The project could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM BIO-8** If a proposed project will result in the significant alteration or fill of a federally protected wetland, a formal wetland delineation conducted according to USACE accepted methodology is required for each project to determine the extent of wetlands on a project site. The delineation shall be used to determine if federal permitting and mitigation strategy are required to reduce project impacts. Acquisition of permits from USACE for the fill of wetlands and USACE approval of a wetland mitigation plan would ensure a "no net loss" of wetland habitat within the Planning Area. Appropriate wetland mitigation/creation shall be implemented in a ratio according to the size of the impacted wetland. **MM BIO-9** In addition to regulatory agency permitting, Best Management Practices identified from a list provided by the USACE shall be incorporated into the design and construction phase of the project to ensure that no pollutants or siltation drain into a federally protected wetland. Project design features such as fencing, appropriate drainage and incorporating detention basins shall assist in ensuring project-related	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		impacts to wetland habitat are minimized to the greatest extent feasible. **Cumulative** Implementation of **Mitigation Measures BIO-8** and **BIO-9** is required.	
Impact BIO-4. The project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact BIO-5. The project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact BIO-6. The project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	**Project-Specific** No impact. **Cumulative** No impact.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** No impact. **Cumulative** No impact.
Section 5.5 – Cultural Resources			
Impact CUL-1. The project could cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM CUL-1** If previously unknown resources are encountered before or during grading activities, construction shall stop in the immediate vicinity of the find and a qualified historical resources specialist shall be consulted to determine whether the resource requires further study. The qualified historical resources specialist shall make recommendations to the City on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines and the City's Historic	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Preservation Ordinance. If the resources are determined to be unique historical resources as defined under Section 15064.5 of the CEQA Guidelines, measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any historical artifacts recovered as a result of mitigation shall be provided to a City-approved institution or person who is capable of providing long-term preservation to allow future scientific study. **Cumulative** Implementation of **Mitigation Measure CUL-1** is required.	
Impact CUL-2. The project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM CUL-2** Subsequent to a preliminary City review of the project grading plans, if there is evidence that a project will include excavation or construction activities within previously undisturbed soils, a field survey and literature search for prehistoric archaeological resources shall be conducted. The following procedures shall be followed. If prehistoric resources are not found during either the field survey or literature search, excavation and/or construction activities can commence. In the event that buried prehistoric archaeological resources are discovered during excavation and/or construction activities, construction shall stop in	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		the immediate vicinity of the find and a qualified archaeologist shall be consulted to determine whether the resource requires further study. The qualified archaeologist shall make recommendations to the City on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines. If the resources are determined to be unique prehistoric archaeological resources as defined under Section 15064.5 of the CEQA Guidelines, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any prehistoric archaeological artifacts recovered as a result of mitigation shall be provided to a City-approved institution or person who is capable of providing long-term preservation to allow future scientific study. If prehistoric resources are found during the field survey or literature review, the resources shall be inventoried using appropriate State record forms and submit the forms to the Southern San Joaquin Valley Information Center. The resources shall be evaluated for significance. If the resources are found to be significant, measures shall be identified by the qualified archaeologist. Similar to above, appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		of the finds. In addition, appropriate mitigation for excavation and construction activities in the vicinity of the resources found during the field survey or literature review shall include an archaeological monitor. The monitoring period shall be determined by the qualified archaeologist. If additional prehistoric archaeological resources are found during excavation and/or construction activities, the procedure identified above for the discovery of unknown resources shall be followed. **Cumulative** Implementation of **Mitigation Measure CUL-2** is required.	
Impact CUL-3. The project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM CUL-3** Subsequent to a preliminary City review of the project grading plans, if there is evidence that a project will include excavation or construction activities within previously undisturbed soils, a field survey and literature search for unique paleontological/geological resources shall be conducted. The following procedures shall be followed: If unique paleontological/geological resources are not found during either the field survey or literature search, excavation and/or construction activities can commence. In the event that unique paleontological/geological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified paleontologist shall be consulted to determine whether the resource requires further study. The qualified paleontologist shall make recommendations to the City on the measures that shall be implemented to protect the discovered resources, including but not limited to, excavation of the finds and evaluation of the finds. If the resources are	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		determined to be significant, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any paleontological/geological resources recovered as a result of mitigation shall be provided to a City-approved institution or person who is capable of providing long-term preservation to allow future scientific study. If unique paleontological/geological resources are found during the field survey or literature review, the resources shall be inventoried and evaluated for significance. If the resources are found to be significant, mitigation measures shall be identified by the qualified paleontologist. Similar to above, appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. In addition, appropriate mitigation for excavation and construction activities in the vicinity of the resources found during the field survey or literature review shall include a paleontological monitor. The monitoring period shall be determined by the qualified paleontologist. If additional paleontological/geological resources are found during excavation and/or construction activities, the procedure identified above for the discovery of unknown resources shall be followed.	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Cumulative Implementation of **Mitigation Measure CUL-3** is required.	
Impact CUL-4. The project could disturb human remains, including those interred outside of formal cemeteries.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM CUL-4** In the event that human remains are unearthed during excavation and grading activities of any future development project, all activity shall cease immediately. Pursuant to Health and Safety Code (HSC) Section 7050.5, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98(a). If the remains are determined to be of Native American descent, the coroner shall within 24 hours notify the Native American Heritage Commission (NAHC). The NAHC shall then contact the most likely descendent of the deceased Native American, who shall then serve as the consultant on how to proceed with the remains. Pursuant to PRC Section 5097.98(b), upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment. **Cumulative** Implementation of **Mitigation Measure CUL-4** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Section 5.6 – Geology and Soils			
Impact GEO-1. The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact GEO-2. The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving strong seismic ground shaking.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact GEO-3. The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving seismic-related ground failure, including liquefaction.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact GEO-4. The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving landslides.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact GEO-5. The project would not result in substantial soil erosion or the loss of topsoil.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact GEO-6. The project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact GEO-7. The project could be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), however, substantial risks to life or property	**Project-Specific** Less than significant.	**Project-Specific** No mitigation measures are required.	**Project-Specific** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
would not be created.	**Cumulative** Less than significant.	**Cumulative** No mitigation measures are required.	**Cumulative** Less than significant.
Impact GEO-8. The project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	**Project-Specific** No impact. **Cumulative** No impact.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** No impact. **Cumulative** No impact.
Section 5.7 – Greenhouse Gases			
Impact GHG-1. The project would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.
Impact GHG-2. The project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.8 – Hazards and Hazardous Materials			
Impact HAZ-1. The project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HAZ-2. The project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HAZ-3. The project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact HAZ-4. The project would be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, but would not create a significant hazard to the public or the environment.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HAZ-5. The project is located within an airport land use plan and within two miles of a public airport or public use airport, and the project could not result in a safety hazard for people residing or working in the project area.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM HAZ-1** Re-designate the existing vacant land proposed for low density residential northwest of the intersection of E Garland Avenue and N Dearing Avenue and located within Fresno Yosemite International Airport Zone 1- RPZ to Open Space. **MM HAZ-2** Limit the proposed low density residential at 1-3 dwelling units per acre located northwest of the airport and located within Fresno Yosemite International Airport Zone 3-Inner Turning to 2 dwelling units per acre or less. **MM HAZ-3** Re-designate the current area within Fresno Yosemite International Airport Zone 5-Sideline located northeast of the airport to Public Facilities-Airport or Open Space. **MM HAZ-4** Redesignate the current vacant lots at the northeast corner of Kearney Boulevard and Thorne Avenue to Public Facilities-Airport or Open Space. **MM HAZ-5** Prohibit residential uses within Safety Zone 1 northwest of the W. Hawes Avenue and Thorne Avenue intersection **Cumulative** Implementation of **Mitigation Measures HAZ-1** through **HAZ-5** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HAZ-6. The project is within the vicinity of a private airstrip, and the project would not result in a safety hazard for people residing or working in the project	**Project-Specific** Less than significant. **Cumulative**	**Project-Specific** No mitigation measures are required. **Cumulative**	**Project-Specific** Less than significant. **Cumulative**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
area.	Less than significant.	No mitigation measures are required.	Less than significant.
Impact HAZ-7. The project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM HAZ-6** Establish an alternative Emergency Operations Center in the event the current Emergency Operations Center is under redevelopment or blocked. **Cumulative** Implementation of **Mitigation Measure HAZ-6** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HAZ-8. The project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.9 – Hydrology and Water Quality			
Impact HYD-1. The project would not violate any water quality standards or waste discharge requirements.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HYD-2. The project could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM HYD-1.** The City shall develop and implement water conservation measures to reduce the per capita water use to 215 gallons per capita per day. **MM HYD-2.** The City shall continue to be an active participant in the Kings Water Authority and the implementation of the Kings Basin IRWMP. Implementation of **Mitigation Measures USS-5 and USS-17** is required. **Cumulative** Implementation of **Mitigation Measures USS-5, USS-17, HYD-1, and HYD-2** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact HYD-3 The project would not substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HYD-4. The project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HYD-5. The project could create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM HYD-5.1.** The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan collection systems to less than significant. Implement the existing Storm Drainage Master Plan (SDMP) for collection systems in drainage areas where the amount of imperviousness is unaffected by the change in land uses. Update the SDMP in those drainage areas where the amount of imperviousness increased due to the change in land uses to determine the changes in the collection systems that would need to occur to provide adequate capacity for the stormwater runoff from the increased imperviousness. Implementation of the updated SDMP to provide stormwater collection systems that have sufficient capacity to convey the peak runoff rates from the areas of increased imperviousness. Require developments that increase site imperviousness to install, operate, and maintain	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		FMFCD approved on-site detention systems to reduce the peak runoff rates resulting from the increased imperviousness to the peak runoff rates that will not exceed the capacity of the existing stormwater collection systems. **MM HYD-5.2.** The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan retention basins to less than significant. Update the SDMP to analyze the impacts to existing and planned retention basins to determine remedial measures required to reduce the impact on retention basin capacity to less than significant. Remedial measures would include: 1. Increase the size of the retention basin through the purchase of more land or deepening the basin or a combination for planned retention basins. 2. Increase the size of the emergency relief pump capacity required to pump excess runoff volume out of the basin and into adjacent canal that convey the stormwater to a disposal facility for existing retention basins. 3. Require developments that increase runoff volume to install, operate, and maintain, Low Impact Development (LID) measures to reduce runoff volume to the runoff volume that will not exceed the capacity of the existing retention basins.	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		MM HYD-5.3. The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan urban detention (stormwater quality) basins to less than significant. Updating the SDMP to determine the impacts to the urban detention basin weir overflow rates and determine remedial measures required to reduce the impact on the detention basin capacity to less than significant. Remedial measures would include: 1. Modify overflow weir to maintain the suspended solids removal rates adopted by the FMFCD Board of Directors. 2. Increase the size of the urban detention basin to increase residence time by purchasing more land. The existing detention basins are already at the adopted design depth. 3. Require developments that increase runoff volume to install, operate, and maintain, Low Impact Development (LID) measures to reduce peak runoff rates and runoff volume to the runoff rates and volumes that will not exceed the weir overflow rates of the existing urban detention basins. **MM HYD-5.4.** The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan pump disposal systems to less than significant. 1. Update the SDMP to determine the extent and degree to which the capacity	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		of the existing pump system will be exceeded. 2. Require new developments to install, operate, and maintain FMFCD design standard on-site detention facilities to reduce peak stormwater runoff rates to existing planned peak runoff rates. **3.** Provide additional pump system capacity to maximum allowed by existing permitting to increase the capacity to match or exceed the peak runoff rates determined by the SDMP update. **MM HYD-5.5.** The City shall develop and adopt a storm drainage master plan update to the SDMP for the Southeast Development Area that is designed to collect, convey and dispose of runoff rates and volumes based on the planned land uses of the General Plan Update. **Cumulative** Implementation of **Mitigation Measures HYD-5.1 through HYD-5.5** shall be implemented.	
Impact HYD-6. The project would not otherwise substantially degrade water quality.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HYD-7. The project would not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HYD-8. The project would not place within a 100-year flood hazard area structures which would impede or redirect flood flows.	**Project-Specific** Less than significant. **Cumulative**	**Project-Specific** No mitigation measures are required. **Cumulative**	**Project-Specific** Less than significant. **Cumulative**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
	Less than significant.	No mitigation measures are required.	Less than significant.
Impact HYD-9. The project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact HYD-10. The project would not create inundation by seiche, tsunami, or mudflow.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.10 – Land Use and Planning			
Impact LUP-1. The project would not physically divide an established community.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact LUP-2. The project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact LUP-3. The project would not conflict with any applicable habitat conservation plan or natural communities conservation plan.	**Project-Specific** No impact. **Cumulative** No impact.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** No impact. **Cumulative** No impact.
Section 5.11 – Noise			
Impact NOI-1. The project would result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact NOI-2. The project would not result in expose persons to or generation of excessive groundborne vibration or groundborne noise levels.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact NOI-3. The project would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** No feasible mitigation measures are available. **Cumulative** No feasible mitigation measures are available.	**Project-Specific** Significant and unavoidable. **Cumulative** Significant and unavoidable.
Impact NOI-4. The project would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact NOI-5. The project is located within an airport land use plan and within two miles of a public airport or public use airport, but the project would not expose people residing or working in the project area to excessive noise levels.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact NOI-6. The project is within the vicinity of a private airstrip, but the project would not expose people residing or working in the project area to excessive noise levels.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.12 – Population and Housing			
Impact PH-1. The project would not induce substantial population growth in an area, either directly or indirectly.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact PH-2. The project would not displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative**	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		No mitigation measures are required.	
Impact PH-3. The project would not displace substantial numbers of people necessitating the construction of replacement housing elsewhere.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.13 – Public Services			
Impact PS-1. The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered fire protection facilities to maintain acceptable service ratios, response times or other performance objectives for fire protection, and the construction of the facilities could cause significant environmental impacts.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM PS-1** As future fire facilities are planned, the fire department shall evaluate if specific environmental effects would occur. Typical impacts from fire facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes: • *Noise:* Barriers and setbacks on the fire department sites. • *Traffic:* Traffic devices for circulation and a "keep clear zone" during emergency responses. • *Lighting:* Provision of hoods and deflectors on lighting fixtures on the fire department sites. **Cumulative** Implementation of **Mitigation Measure PS-1** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact PS-2. The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered police protection facilities to maintain acceptable service ratios, response times or other performance objectives for police protection, and the construction of the facilities could cause significant environmental impacts.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM PS-2** As future police facilities are planned, the police department shall evaluate if specific environmental effects would occur. Typical impacts from police facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		• *Noise:* Barriers and setbacks on the police department sites. • *Traffic:* Traffic devices for circulation. • *Lighting:* Provision of hoods and deflectors on lighting fixtures on the fire department sites. **Cumulative** Implementation of **Mitigation Measure PS-2** is required.	
Impact PS-3. The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered school facilities to maintain acceptable service ratios or other performance objectives for schools, and the construction of the facilities could cause significant environmental impacts.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM PS-3** As future school facilities are planned, the school districts shall evaluate if specific environmental effects would occur. Typical impacts from school facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes: • *Noise:* Barriers and setbacks placed on school sites. • *Traffic:* Traffic devices for circulation. • *Lighting:* Provision of hoods and deflectors on lighting fixtures for stadium lights. **Cumulative** Implementation of **Mitigation Measure PS-3** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact PS-4. The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered park and recreational facilities to maintain acceptable service ratios or other performance objectives for parks and recreation, and the construction of the facilities could cause significant environmental impacts.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM PS-4** As future parks and recreational facilities are planned, the City shall evaluate if specific environmental effects would occur. Typical impacts from school facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		• *Noise:* Barriers and setbacks placed on school sites. • *Traffic:* Traffic devices for circulation. • *Lighting:* Provision of hoods and deflectors on lighting fixtures for stadium lights. **Cumulative** Implementation of **Mitigation Measure PS-4** is required.	
Impact PS-5. The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered public facilities to maintain acceptable service ratios or other performance objectives for other public facilities, and the construction of the facilities could cause significant environmental impacts.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM PS-5** As future court, library, and hospital facilities are planned, the appropriate agencies shall evaluate if specific environmental effects would occur. Typical impacts from court, library, and hospital facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes: • *Noise:* Barriers and setbacks placed on school sites. • *Traffic:* Traffic devices for circulation. • *Lighting:* Provision of hoods and deflectors on lighting fixtures for stadium lights. **Cumulative** Implementation of **Mitigation Measure PS-5** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.14 – Transportation and Traffic			
Impact TRANS-1. The project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and	**Project-Specific** City of Fresno – Less than significant. County of Fresno – Significant. City of Clovis – Significant	**Project-Specific** No mitigation measures beyond the proposed policies are feasible. **Cumulative** No mitigation measures beyond the proposed	**Project-Specific** City of Fresno – Less than significant. County of Fresno – Significant. City of Clovis – Significant Caltrans – Significant

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	Caltrans – Significant Other Counties - Speculative **Cumulative** City of Fresno – Less than significant. County of Fresno – Significant. City of Clovis – Significant Caltrans – Significant Other Counties - Speculative	policies are feasible.	Other Counties - Speculative **Cumulative** City of Fresno – Less than significant. County of Fresno – Significant. City of Clovis – Significant Caltrans – Significant Other Counties - Speculative
Impact TRANS-2. The project would not conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact TRANS-3. The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact TRANS-4. The project would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact TRANS-5. The project would not result in inadequate emergency access.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact TRANS-6. The project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Section 5.15 – Utilities and Service Systems			
Impact USS-1. The project would exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM USS-1** The City shall develop and implement a wastewater master plan update. **MM USS-2** Prior to exceeding existing wastewater treatment capacity, the City shall evaluate the wastewater system and shall not approve additional development that contributes wastewater to the wastewater treatment facility that could exceed capacity until additional capacity is provided. By approximately the year 2025, the City shall construct the following improvements. • Construct an approximately 70 MGD expansion of the Regional Wastewater Treatment Facility and obtain revised waste discharge permits as the generation of wastewater is increased. • Construct an approximately 0.49 MGD expansion of the North Facility and obtain revised waste discharge permits as the generation of wastewater is increased. **MM USS-3** Prior to exceeding existing wastewater treatment capacity, the City shall evaluate the wastewater system and shall not approve additional development that contributes wastewater to the wastewater treatment facility that could exceed capacity until additional capacity is provided. After approximately the year 2025, the City shall construct the following improvements. • Construct an approximately 24 MGD Wastewater Treatment Facility within the Southeast Development Area and	**Project-Specific** Less than significant **Cumulative** Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		obtain revised waste discharge permits as the generation of wastewater is increased. • Construct an approximately 9.6 MGD expansion of the Regional Wastewater Treatment Facility and obtain revised waste discharge permits as the generation of wastewater is increased. **Cumulative** Implementation of **Mitigation Measures USS-1** through **USS-3** is required.	
Impact USS-2. The project would require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM USS-4** A Traffic Control/Traffic Management Plan to address traffic impacts during construction of water and sewer facilities shall be prepared and implemented subject to approval by the City prior to construction. The plan shall identify hours of construction and for deliveries, include haul routes, identify access and parking restrictions, plan for notifications, identify pavement markings and signage, and a plan for coordination with emergency service providers and schools. **MM USS-5** Prior to exceeding existing water supply capacity, the City shall evaluate the water supply system and shall not approve additional development that demand additional water until additional capacity is provided. By approximately the year 2025, the following capacity improvements shall be provided. • Construct an approximately 80 million gallon per day (MGD) surface water treatment facility near the intersection of Armstrong and Olive Avenues, in accordance with Chapter 9 and Figure 9-	**Project-Specific** *Facilities construction:* Significant and unavoidable. *Water / Sewer facilities capacity:* Less than significant. **Cumulative** *Facilities construction:* Significant and unavoidable. *Water / Sewer facilities capacity:* Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		1 of the City of Fresno Metropolitan Water Resources Management Plan Update Phase 2 Report, January 2012 (2012 Metro Plan Update). • Construct an approximately 30 MGD expansion of the existing northeast surface water treatment facility for a total capacity of 60 MGD, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct an approximately 20 MGD surface water treatment facility in the southwest portion of the City, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. **MM USS-6** Prior to exceeding capacity within the existing wastewater collection system facilities, the City shall evaluate the wastewater collection system and shall not approve additional development that would generate additional wastewater and exceed the capacity of a facility until additional capacity is provided. By approximately the year 2025, the following capacity improvements shall be provided. • Orange Avenue Trunk Sewer: This facility shall be improved between Dakota and Jensen Avenues. Approximately 37,240 feet of new sewer main shall be installed and approximately 5,760 feet of existing sewer main shall be rehabilitated. The size of the new sewer main shall range from 27-inches to 42-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are RS03A, RL02, C01-REP, C02-REP, C03-	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		REP, C04-REP, C05-REP, C06-REL and C07-REP. • Marks Avenue Trunk Sewer: This facility shall be improved between Clinton Avenue and Kearney Boulevard. Approximately 12,150 feet of new sewer main shall be installed. The size of the new sewer main shall range from 33-inches to 60-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CM1-REP and CM2-REP. • North Avenue Trunk Sewer: This facility shall be improved between Polk and Fruit Avenues and also between Orange and Maple Avenues. Approximately 25,700 feet of new sewer main shall be installed. The size of the new sewer main shall range from 48-inches to 66-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CN1-REL1 and CN3-REL1. • Ashlan Avenue Trunk Sewer: This facility shall be improved between Hughes and West Avenues and also between Fruit and Blackstone Avenues. Approximately 9,260 feet of new sewer main shall be installed. The size of the new sewer main shall range from 24-inches to 36-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CA1-REL and CA2-REP. **MM USS-7** Prior to exceeding capacity within the existing 28 pipeline segment shown on	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Figures 1 and 2 in Appendix -, the City shall evaluate the wastewater collection system and shall not approve additional development that would generate additional wastewater and exceed the capacity of one of the 28 pipeline segments until additional capacity is provided. **MM USS-8** Prior to exceeding capacity within the existing water conveyance facilities, the City shall evaluate the water conveyance system and shall not approve additional development that would demand additional water and exceed the capacity of a facility until additional capacity is provided. The following capacity improvements shall be provided by approximately 2025. • Construct 65 new groundwater wells, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct a 2.0 million gallon potable water reservoir (Reservoir T2) near the intersection of Clovis and California Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct a 3.0 million gallon potable water reservoir (Reservoir T3) near the intersection of Temperance and Dakota Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct a 3.0 million gallon potable water reservoir (Reservoir T4) in the Downtown Planning Area, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct a 4.0 million gallon potable	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		water reservoir (Reservoir T5) near the intersection of Ashlan and Chestnut Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct a 4.0 million gallon potable water reservoir (Reservoir T6) near the intersection of Ashlan Avenue and Highway 99, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct 50.3 miles of regional water transmission mains ranging in size from 24-inch to 48-inch, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. • Construct 95.9 miles of 16-inch transmission grid mains, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update. **MM USS-9** Prior to exceeding capacity within the existing water conveyance facilities, the City shall evaluate the water conveyance system and shall not approve additional development that would demand additional water and exceed the capacity of a facility until additional capacity is provided. The following capacity improvements shall be provided after approximately the year 2025 and additional water conveyance facilities shall be provided prior to exceedance of capacity within the water conveyance facilities to accommodate full buildout of the General Plan Update. • Construct a 4.0 million gallon potable water reservoir (SEDA Reservoir 1)	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		within the northern part of the Southeast Development Area. • Construct a 4.0 million gallon potable water reservoir (SEDA Reservoir 2) within the southern part of the Southeast Development Area. Additional water conveyance facilities shall be provided prior to exceedance of capacity within the water conveyance facilities to accommodate full buildout of the General Plan Update. Implementation of **Mitigation Measures AIR-1** through **AIR-5**, **AES-1** through **AES-5**, **BIO-1** through **BIO-14**, and **CUL-1** through **CUL-4** is also required. **Cumulative** Implementation of **Mitigation Measures USS-4** through **USS-9**, **AIR-1** through **AIR-5**, **AES-1** through **AES-5**, **BIO-1** through **BIO-14**, and **CUL-1** through **CUL-4** is required.	
Impact USS-3. The project would require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** *Hydrology and Water Quality* **MM USS-10** Maintain operational intermittent flows during the dry season within define channel capacity and downstream capture capabilities for recharge. *Biological Resources* **MM USS-11** (a) The FMFCD shall conduct preliminary investigations on undeveloped lands outside of highly urbanized areas. These investigations shall examine wetland hydrology, vegetation and soil types. These preliminary investigations shall be the basis for making a determination on whether or not more in-depth wetland studies shall be necessary. If the proposed	**Project-Specific** *Agricultural resources:* Significant and unavoidable. *Air quality:* Significant and unavoidable. *All other impacts:* Less than significant. **Cumulative** *Agricultural resources:* Significant and unavoidable. *Air quality:* Significant and unavoidable. *All other impacts:* Less than significant.

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		project site does not exhibit wetland hydrology, support a prevalence of wetland vegetation and wetland soil types then no further action is required. (b) Where proposed activities could have an impact on areas verified by the Corps as jurisdictional wetlands or waters of the U.S. (urban and rural streams, seasonal wetlands, and vernal pools), FMFCD shall obtain the necessary Clean Water Act, Section 404 permits for activities where fill material shall be placed in a wetland, obstruct the flow or circulation of waters of the United States, impair or reduce the reach of such waters (as part of the FMFCD's CDFG Memorandum of Understanding (MOU), Section 404 and 401 permits would be obtained from the U.S. Army Corps of Engineers and Regional Water Quality Control Board for any activity involving filling of jurisdictional waters). At a minimum, to meet "no net policy", the permits shall require replacement of wetland habitat at a 1:1 ratio. (c) Where proposed activities could have an impact on areas verified by the Corps as jurisdictional wetlands or waters of the U.S. (urban and rural streams, seasonal wetlands, and vernal pools), FMFCD shall submit and implement a wetland mitigation plan based on the wetland acreage verified by the U.S. Army Corps of Engineers. The wetland mitigation plan shall be prepared by a qualified biologist or wetland scientist experienced in wetland creation, and shall include the following or equally effective elements: i. Specific location, size, and existing hydrology and soils within the wetland creation area.	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		ii. Wetland mitigation techniques, seed source, planting specifications, and required buffer setbacks. In addition, the mitigation plan shall ensure adequate water supply is provided to the created wetlands in order to maintain the proper hydrologic regimes required by the different types of wetlands created. Provisions to ensure the wetland water supply is maintained in perpetuity shall be included in the plan. iii. A monitoring program for restored, enhanced, created, and preserved wetlands on the project site. A monitoring program is required to meet three objectives; 1) establish a wetland creation success criteria to be met, 2) to specify monitoring methodology, 3) to identify as far as is possible, specific remedial actions that will be required by Fresno Metropolitan Flood Control District in order to achieve the success criteria, and 4) to document the degree of success achieved in establishing wetland vegetation. (d) A monitoring plan shall be developed and implemented by a qualified biologist to monitor results of any on-site wetland restoration and creation for five years. The monitoring plan shall include specific success criteria, frequency and timing of monitoring, and assessment of whether or not maintenance activities are being carried out and how these shall be adjusted if necessary. If monitoring reveals that success criteria are not being met, remedial habitat creation or restoration should be designed and implemented by a qualified biologist and subject to five years of	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		monitoring as described above. Or (e) In lieu of developing a mitigation plan that outlines the avoidance, purchase, or creation of wetlands, the FMFCD could purchase mitigation credits through a Corps approved Mitigation Bank. **MM USS-12** (a) During facility design and prior to initiation of ground disturbing activities in areas that support seasonal wetlands or vernal pools, the FMFCD shall conduct a preliminary rare plant assessment. The assessment will determine the likelihood on whether or not the project site could support rare plants. If it is determined that the project site would not support rare plants then no further action required. However, if the project site has the potential to support rare plants; then a rare plant survey shall be conducted. Rare plant surveys shall be conducted by qualified biologists in accordance with the most current CDFG/USFWS guidelines or protocols and shall be conducted at the time of year when the plants in question are identifiable. (b) Based on the results of the survey, prior to design approval, the FMFCD shall coordinate with CDFG and/or implement a Section 7 consultation with USFWS, shall determine whether the project facility would result in a significant impact to any special status plant species. Evaluation of project impacts shall consider the following: • The status of the species in question (e.g., officially listed by the State or Federal Endangered Species Acts). • The relative density and distribution of the on-site occurrence versus typical	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		occurrences of the species in question. • The habitat quality of the on-site occurrence relative to historic, current or potential distribution of the population. (c) Prior to design approval, the FMFCD in consultation with the CDFG and/or the USFWS, shall prepare and implement a mitigation plan, in accordance with any applicable State and/or federal statutes or laws, that reduces impacts to a less than significant level. **MM USS-13** (a) During facility design and prior to initiation of ground disturbing activities in areas that support seasonal wetlands or vernal pools, the FMFCD shall conduct a preliminary survey to determine the presence of listed vernal pool crustaceans. (b) If potential habitat (vernal pools, seasonally inundated areas) or fairy shrimp exist within areas proposed to be disturbed, FMFCD shall complete the first and second phase of fairy shrimp presence or absence surveys. If an absence finding is determined and accepted by the USFWS, then no further mitigation shall be required for fairy shrimp. (c) If fairy shrimp are found to be present within vernal pools or other areas of inundation to be impacted by the implementation of storm drainage facilities, FMFCD shall mitigate impacts on fairy shrimp habitat in accordance with the USFWS requirements of the Programmatic Biological Opinion. This shall include on-site or off-site creation and/or preservation of fairy shrimp habitat at ratios ranging from 3:1 to 5:1 depending on the habitat impacted and the choice of on-site	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		or off-site mitigation. Or mitigation shall be the purchase of mitigation credit through an accredited mitigation bank. **MM USS-14** (a) During facility design and prior to initiation of construction activities, the FMFCD shall conduct a project-specific survey for all potential Valley Elderberry Longhorn Beetle (VELB) habitats (elderberry shrubs), including a stem count and an assessment of historic or current VELB habitat. (b) The FMFCD shall avoid and protect all potential identified VELB habitat where feasible. (c) Where avoidance is infeasible, develop and implement a VELB mitigation plan in accordance with the most current USFWS mitigation guidelines for unavoidable take of VELB habitat pursuant to either Section 7 or Section 10(a) of the Federal Endangered Species Act. The mitigation plan shall include, but might not be limited to, relocation of elderberry shrubs, planting of elderberry shrubs, and monitoring of relocated and planted elderberry shrubs. **MM USS-15** Prior to ground disturbing activities during nesting season (March through July) for a project that supports bird nesting habitat, the FMFCD shall conduct a survey of trees. If nests are found during the survey, a qualified biologist shall assess the nesting activity on the project site. If active nests are located, no construction activities shall be allowed within 250 feet of the nest until the young have fledged. If construction activities are planned during the no n-breeding period (August through February), a nest survey is not necessary. **MM USS-16** (a) FMFCD shall conduct a pre-construction breeding-season survey	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		(approximately February 1 through August 31) of proposed project sites in suitable habitat (levee and canal berms, open grasslands with suitable burrows) during the same calendar year that construction is planned to begin. If phased construction procedures are planned for the proposed project, the results of the above survey shall be valid only for the season when it is conducted. (b) During the construction stage, FMFCD shall avoid all burrowing owl nest sites potentially disturbed by project construction during the breeding season while the nest is occupied with adults and/or young. The occupied nest site shall be monitored by a qualified biologist to determine when the nest is no longer used. Avoidance shall include the establishment of a 160-foot diameter non-disturbance buffer zone around the nest site. Disturbance of any nest sites shall only occur outside of the breeding season and when the nests are unoccupied based on monitoring by a qualified biologist. The buffer zone shall be delineated by highly visible temporary construction fencing. Based on approval by CDFG, pre-construction and pre-breeding season exclusion measures may be implemented to preclude burrowing owl occupation of the project site prior to project-related disturbance. Burrowing owls can be passively excluded from potential nest sites in the construction area, either by closing the burrows or placing one-way doors in the burrows according to current CDFG protocol. Burrows shall be examined not more than 30 days before construction to ensure that no owls have recolonized the area of construction. For each burrow destroyed, a new burrow shall be created (by installing artificial	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		burrows at a ratio of 2:1 on protected lands nearby. **MM USS-17** (a) FMFCD shall not conduct instream activities in the San Joaquin River between October 15 and April 15. If this is not feasible, FMFCD shall consult with the National Marine Fisheries Service and CDFG on the appropriate measures to be implemented in order to protect listed salmonids in the San Joaquin River. (b) Riparian vegetation on the levee shading the main channel that is removed or damaged as a result of levee raising shall be replaced at a ratio and quantity sufficient to maintain the existing shading of the channel. The location of replacement trees on or within the levees, detention ponds or channels shall be approved by the FMFCD and State Reclamation Board. *Recreation/Trails* **MM USS-18** (a) Prior to final design approval of all elements of the District Services Plan, the FMFCD shall consult with Fresno County, City of Fresno, and City of Clovis to determine if any element would temporarily disrupt or permanently displace adopted existing or planned trails and associated recreational facilities as a result of the proposed District Services Plan. If the proposed project would not temporarily disrupt or permanently displace adopted existing or planned trails, no further mitigation is necessary. If the proposed project would have an effect on the trails and associated facilities, the FMFCD shall implement the following. (b) If short-term disruption of adopted existing or planned trails and associated recreational facilities occur, the FMFCD shall consult and coordinate	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		with Fresno County, City of Fresno, and City of Clovis to temporarily re-route the trails and associated facilities. (c) If permanent displacement of the adopted existing or planned trails and associated recreational facilities occur, the appropriate design modifications to prevent permanent displacement shall be implemented in the final project design or the FMFCD shall replace these facilities. *Agricultural Resources* No feasible mitigation measures are available. *Air Quality* **MM USS-19** (a) Minimize idling time of construction equipment vehicles to no more than ten minutes, or require that engines be shut off when not in use. (b) Construction shall be curtailed as much as possible when the Air Quality Index (AQI) is above 150. AQI forecasts can be found on the SJVAPCD web site. (c) Off-road trucks should be equipped with on-road engines if possible. (d) Construction equipment should have engines that meet the current off-road engine emission standard (as certified by CARB), or be re-powered with an engine that meets this standard. *Adequate Storm Water Drainage Facilities* **MM USS-20** Prior to exceeding capacity within the existing storm water drainage facilities, the City shall coordinate with the Fresno Metropolitan Flood Control District to evaluate the storm water drainage system and shall not	

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		approve additional development that would convey additional storm water to a facility that would experience an exceedance of capacity until the additional capacity is provided. **Cumulative** Implementation of **Mitigation Measures USS-10** through **USS-20** is required.	
Impact USS-4. The project would not have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** **MM USS-21** Prior to exceeding existing water supply capacity, the City shall evaluate the water supply system and shall not approve additional development that demand additional water until additional capacity is provided. By approximately the year 2025, the City shall construct an approximately 25,000 AF/year tertiary recycled water expansion to the Fresno-Clovis Regional Wastewater Reclamation Facility in accordance with the January 2012 City of Fresno Metropolitan Water Resources Management Plan. Implementation of **Mitigation Measure USS-5** is also required prior to approximately the year 2025. **Cumulative** Implementation of **Mitigation Measures USS-5** and **USS-21** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact USS-5. The project would not result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	**Project-Specific** Significant. **Cumulative** Significant.	**Project-Specific** Implementation of **Mitigation Measures USS-1** through **USS-3** is required. **Cumulative** Implementation of **Mitigation Measures USS-1** through **USS-3** is required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Impact USS-6. The project would not be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.	**Project-Specific** Significant. **Cumulative**	**Project-Specific** **MM USS-22** Prior to exceeding landfill capacity, the City shall evaluate additional landfill	**Project-Specific** Less than significant. **Cumulative**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
	Significant.	locations and shall not approve additional development that could contribute solid waste to a landfill that is at capacity until additional capacity is provided. **Cumulative** Implementation of **Mitigation Measure USS-22** is required.	Less than significant.
Impact USS-7. The project would comply with federal, state, and local statutes and regulations related to solid waste.	**Project-Specific** Less than significant. **Cumulative** Less than significant.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** Less than significant. **Cumulative** Less than significant.
Section 5.16 – Energy Conservation			
Impact EC-1. The project would not result in the inefficient, wasteful and unnecessary consumption of energy.	**Project-Specific** No impact. **Cumulative** No impact.	**Project-Specific** No mitigation measures are required. **Cumulative** No mitigation measures are required.	**Project-Specific** No impact. **Cumulative** No impact.

SECTION 3: PROJECT DESCRIPTION

3.1 - Project Location

The City of Fresno is located in Fresno County, which is in central San Joaquin Valley. The City is located approximately 200 miles north of the Los Angeles and 170 miles south of Sacramento. The City is located on State Route (SR) 99 corridor that links it to other Central Valley cities. Exhibit 3-1 shows the City of Fresno in its regional context. To the north of Fresno is Madera County. The City of Clovis is located northwest and adjacent to the City. East, south, and west of the City is unincorporated land. Exhibit 3-2 illustrates the local vicinity.

The Planning Area is the geographic area for which the General Plan establishes policies about future growth. The boundary of the Planning Area was determined in response to State law (California Government Code Section 65300) requiring each city to include in its General Plan all territory within the boundaries of the incorporated area as well as "any land outside its boundaries which in the planning agency's judgment bears relation to its planning". The Planning Area established by the City of Fresno includes all areas within the City's current City limits, including the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF), the areas within the current Sphere of Influence (SOI), and an area north of the City's most northeasterly portion of the City.

The SOI is a boundary that encompasses lands that are expected to ultimately be annexed into the City, although until annexed, the lands fall under the jurisdiction of the County of Fresno. Within the Planning Area, the current SOI covers approximately 100,249 acres or approximately 157 square miles, but does not include the 3,292-acre RWRF and an additional 2,486 acres for the North Area. The Planning Area encompasses approximately 106,027 acres, or approximately 166 square miles of both incorporated (approximately 72,244 acres) and unincorporated (approximately 33,783 acres) land bearing relation to the City's future growth. The Planning Area is generally located within the San Joaquin River to the north, American Avenue to the south, Garfield Avenue to the west, and McCall Avenue to the east, with the RWRF generally located with Jensen Avenue to the north, American Avenue to the south, South Chateau Fresno Avenue, and Cornelia Avenue to the east. The Planning Area includes various unincorporated islands surrounded by the City's limits. A detailed map depicting the precise location and boundaries of the Planning Area can be found at Exhibit 3-3.

3.2 - Project Characteristics

The proposed project is comprised of two components: the General Plan Update and the Development Code Update. The implementation of these two components will result in an increase in development within the Planning Area. Following is a description of the proposed General Plan Update and Development Code Update followed by a discussion of the proposed project that will be evaluated in this Master EIR.

3.2.1 - The City of Fresno General Plan Update

The City of Fresno is comprehensively updating its General Plan that was last updated in 2002. The General Plan is a set of policies and programs that form a blueprint for the physical development of the City. The City of Fresno General Plan Update includes a Greenhouse Reduction Plan that is located in Appendix F-2 as well as the following elements.

General Plan Elements

Economic Development and Fiscal Sustainability Element - This element relates the long-term economic development and job potential to the fiscal health and sustainability over the long-term.

Urban Form, Land Use, and Design Element **-** This element provides policy direction on urban form and provides a basis for land use decision-making. It also establishes a land use classification system, intensity and height standards, and citywide and area-specific land use policies.

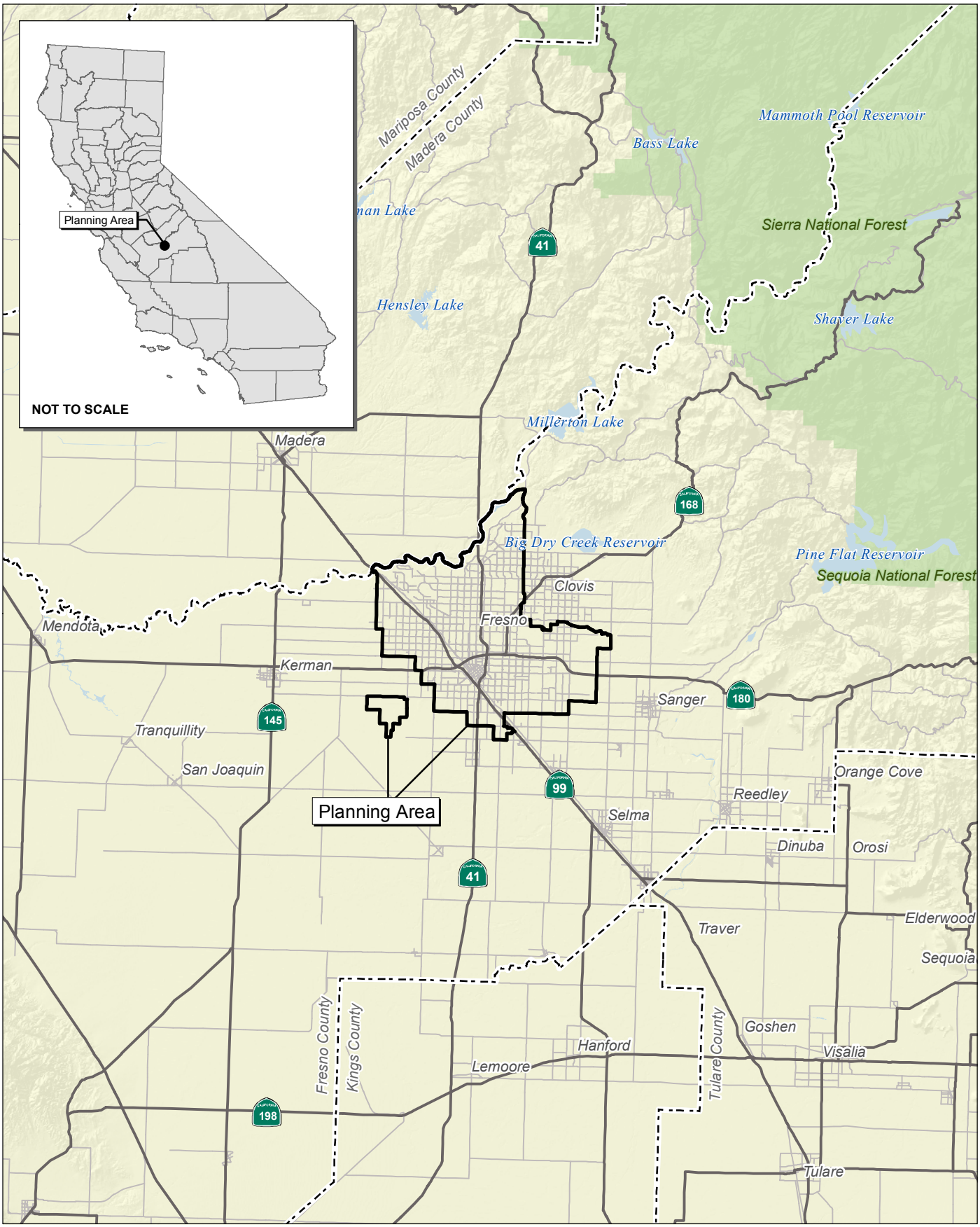
Mobility and Transportation Element **-** This element addresses the multi-modal transportation needs throughout the Planning Area including all users of streets and highways, transit, sidewalks and trails, and bicycle transportation modes.

Parks, Open Space, and Schools Element - This element provides guidance for green spaces and community facilities in the Planning Area such as parks, recreation, open space, biological resources, and schools.

Public Utilities and Services Element - This element addresses public facilities and services including police, fire protection, potable water, sewage collection and treatment, solid waste, and storm drainage/flood control.

Resource Conservation and Resilience Element - This element establishes policies for the conservation of natural resources, land resources including air quality and greenhouse gas emissions, water resources including groundwater and waterways, energy resources and farmland, urban agriculture, food system resources, and mineral resources.

Historic and Cultural Resources Element **-** This element establishes policies to address historic and cultural resources within the Planning Area.

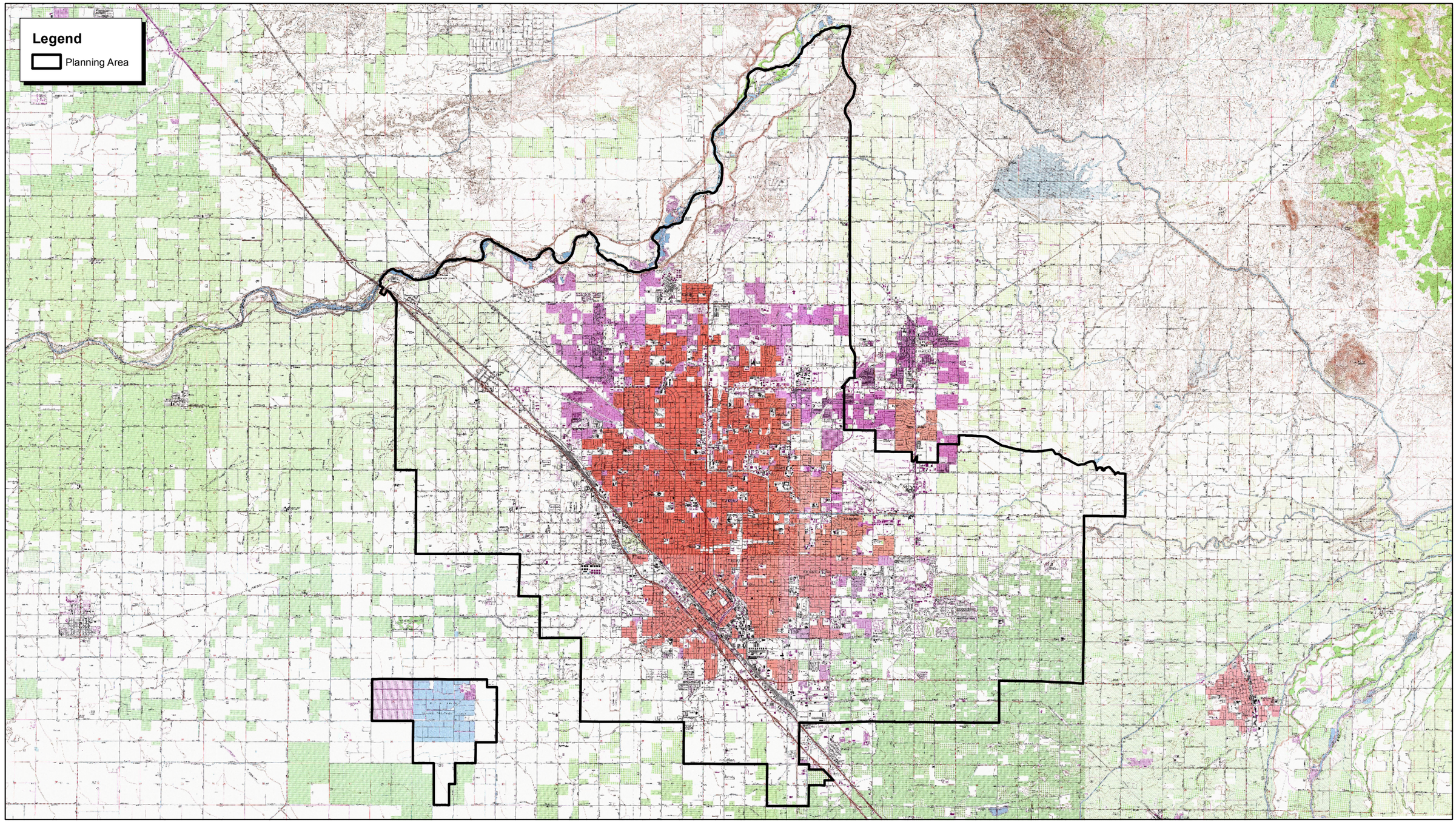


Source: Census 2000 Data, The CaSIL.

FirstCarbon® SOLUTIONS

10 5 0 10 Miles

Exhibit 3-1
Regional Location Map

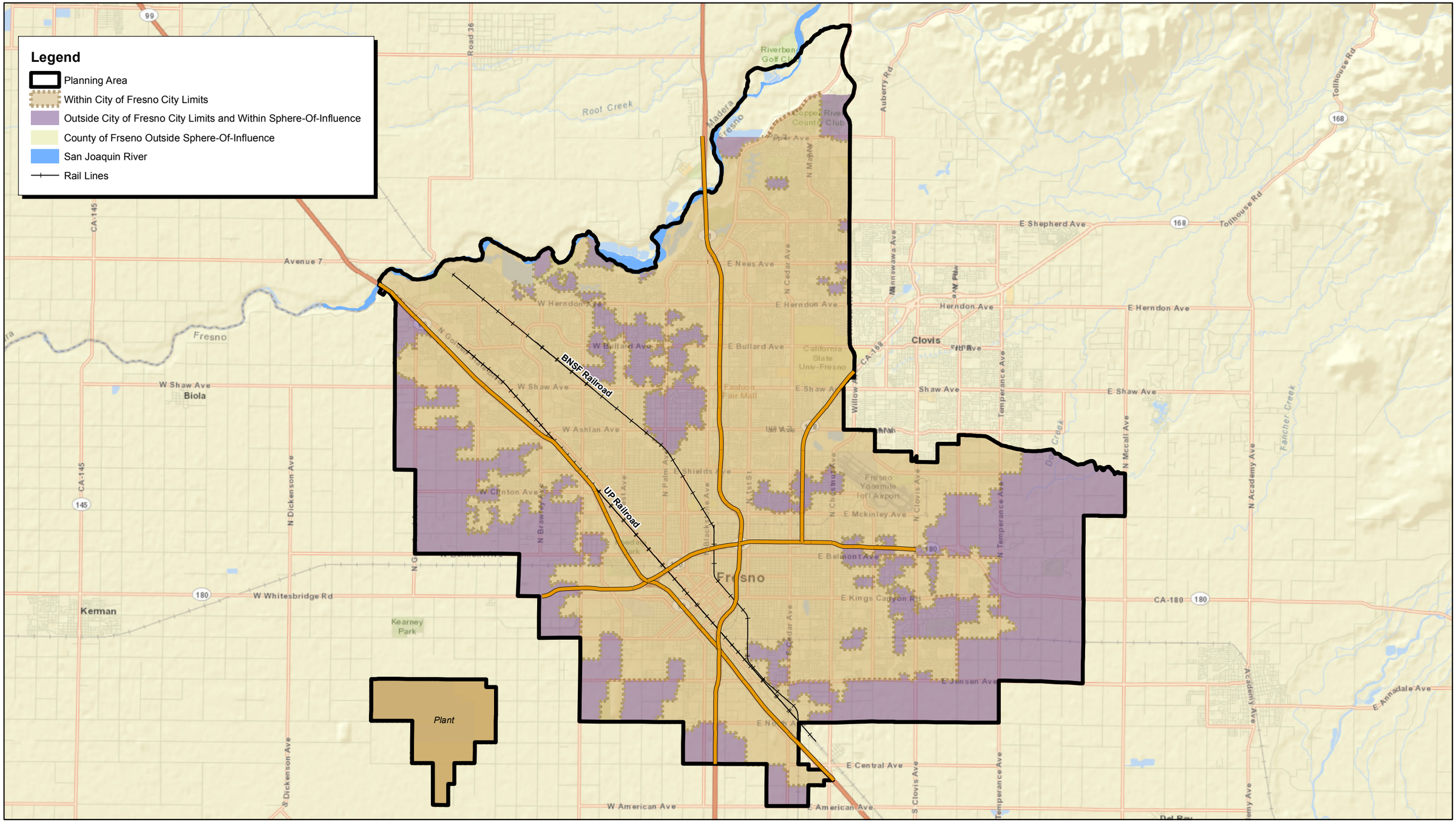


Source: TOPO! USGS Lanes Bridge (1973), Friant (1964), Herndon (1978), Fresno North (1978), Clovis (1978), Kearney Park, Fresno South (1978), Malaga (1978) 7.5' DRG.

FirstCarbon SOLUTIONS

2.2 1.1 0 2.2
Miles

Exhibit 3-2
Local Vicinity Map



Source: Boundary and circulation information, City of Fresno Development And Resource Management Department, 2010; World Street Map, developed by Esri using DeLorme basemap layers, Automotive Navigation Data, USGS, UNEP-WCMC, Tele Atlas Dynamap, 2009

FirstCarbon® SOLUTIONS

2.2 1.1 0 2.2 Miles

Exhibit 3-3
Planning Area

***Noise and Safety Element* -** This element identifies the natural and man-made public health and safety hazards that exist within the Planning Area, and establishes preventative and responsive objectives and policies and programs to mitigate their potential impacts.

***Healthy Communities Element* -** This element discusses the relationships between the built, natural, and social environments and community health and wellness outcomes, such as death, chronic disease, and effects of drug abuse and crime.

***Housing Element Consistency* -** The Housing Element was adopted by the City in 2008 and is required to be updated within 18 months of the Fresno Council of Governments adopts the 2014 Regional Transportation Plan. Therefore, the proposed City of Fresno General Plan Update does not include a comprehensive update to the Housing Element, but provides the necessary information to demonstrate consistency between the General Plan and the 2008 adopted Housing Element.

***Implementation Element* -** This element describes the implementation process in general terms and the major actions to be undertaken by the City; the implementing policies in each element of the City of Fresno General Plan Update provide details that will guide program development.

Community Plans and Specific Plans

The City of Fresno proposes amendments to and repeal of the community plans and specific plans outlined in Section 1.5 of this Initial Study.

Greenhouse Gas Reduction Plan

The City of Fresno is preparing a Greenhouse Gas Reduction Plan to inventory existing and projected greenhouse gases and establish targets to demonstrate consistency with Assembly Bill 32 (California Global Warming Solutions Act of 2006). Strategies will be proposed for existing development and future development in accordance with the City of Fresno General Plan and Development Code Update to meet greenhouse gas reduction targets established by Assembly Bill 32.

Proposed Land Use Diagram

The City of Fresno is proposing to update the current City of Fresno 2025 Land Use and Circulation Map with the proposed Land Use Diagram to accommodate future growth (see Exhibit 3-4). In the past, growth has been mostly of a suburban style development that relies heavily on the automobile as the single means of mobility. This has created a condition of sprawl, sometimes leaving neglected neighborhoods and districts, and vacant or underutilized land. To address this issue, the proposed Land Use Diagram maintains the same Sphere-of-Influence (SOI) as established in the current General Plan, with an exception to potentially include the High Speed Train (HST) maintenance facility if located near the City. At this time, the SOI remains the same and the specific location of a future SOI amendment for the HST maintenance facility is unknown and speculative. The proposed land use pattern and policies will encourage infill development and revitalization of the Downtown Planning Area, older neighborhoods, and along established major street corridors as well as development of compact and complete communities in Development Areas located on the outer areas of the Planning Area.

Following is a discussion of the land use categories throughout the Planning Area. Exhibit 3-4 illustrates the location of the land use categories. Below, these land use categories are divided into (1) the Planning Area excluding The Downtown Planning Area and (2) the Planning Area exclusive to the Downtown Planning Area.

Planning Area Excluding The Downtown Planning Area

Residential

Residential land use provide for a wide range of neighborhoods and housing types, anywhere from larger lot single-family residential (SFR) development to neighborhoods with a mix of houses and townhouse/duplexes, to high density apartment communities.

Single-family residential development is typically arranged as stand-alone detached units, or attached as duplexes or triplexes. They may range in density from 1 to 12 units per acre. Garages may be accessed from the front or from alleys.

Townhomes or row homes are typically clustered in groups of four to six units. They range from two to three stories in height and from seven to 16 units per acre. Where possible, garage access should be from the rear of the site.

Multi-family residential buildings may be multiple (up to eight) stories while garage spaces should be integrated into the ground level of the development or below grade.

Residential land uses also allow for neighborhood-serving community facilities such as parks, churches, schools, family day care, libraries, community gardens, and farmers markets. Residential uses are designated by density as follows:

Low Density

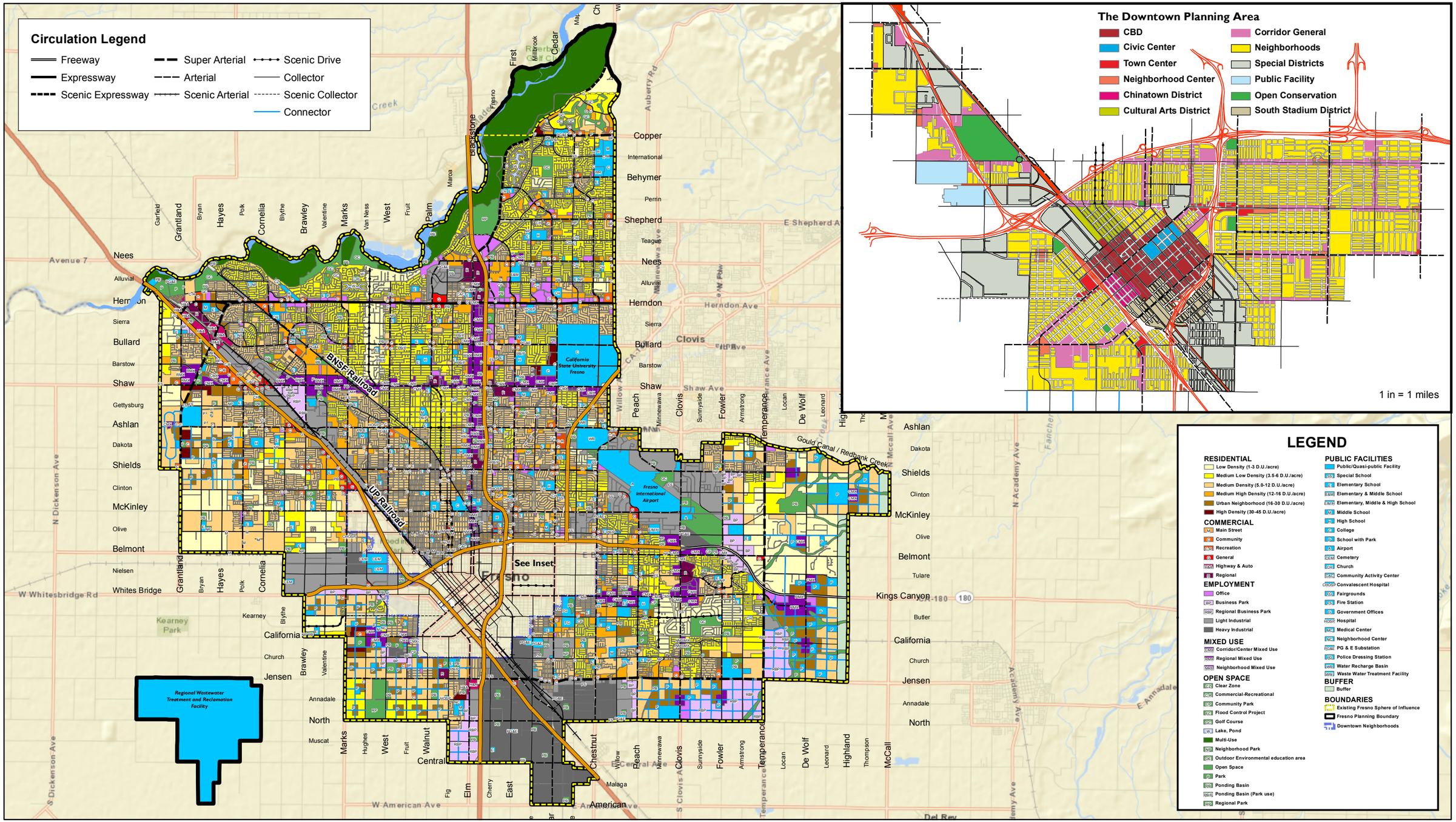
This designation is intended to provide for large lot residential development. Low Density residential allows one to 3.5 housing units per acre. The resulting land use pattern is large lot residential in nature, such as rural residential, ranchettes, or estate homes, with densities up to 3.5 units per acre.

Medium Low Density

The Medium Low Density designation is intended to provide for single-family detached housing with densities of 3.5 to 6 units per acre.

Medium Density

Medium Density residential covers developments of 5 to 12 units per acre and is intended for areas with predominantly single-family residential development, but can also accommodate a mix of housing types, from small-lot starter homes, zero-lot-line developments, and duplexes, to townhouses. Much of the city's existing neighborhoods fall within this designation.



Source: Boundary and circulation information, City of Fresno Development And Resource Management Department, 2010; World Street Map, developed by Esri using DeLorme basemap layers, Automotive Navigation Data, USGS, UNEP-WCMC, Tele Atlas Dynamap, 2009

FirstCarbon SOLUTIONS

Exhibit 3-4
Planned Land Use

Medium High

Medium High Density residential is intended for neighborhoods with a mix of single-family residences, townhomes, garden apartments, and multi-family units intended to support a fine-grain, pedestrian scale. This land use accommodates densities from 12 to 16 units per acre overall—individual parcels may have densities outside of that range so long as a master planned neighborhood has an average density that conforms.

Urban Neighborhood

Urban Neighborhood residential covers densities from 16 to 30 units per acre, which will require multi-family dwellings but still allows for a mix of housing types including single-family houses. This land use is intended to provide for a compact community that includes community facilities, walkable access to parkland and commercial services, and supports efficient, frequent transit service. Urban Neighborhood is designated for targeted areas with complementary land uses adjacent.

High Density

High Density residential is intended to accommodate attached homes, two- to four-plexes, and apartment buildings, supported by walkable access to frequent transit, retail and services, and community facilities such as parks and schools. High Density allows for 30 to 45 units per acre.

Commercial

Commercial land use designations allow a wide range of retail and service establishments intended to serve local and regional needs. Only mixed-use designations allow residential with a commercial component.

Main Street

Main Street commercial encourages a traditional "Main Street" character with active storefronts, outdoor seating, and pedestrian-oriented design. This designation promotes primarily one to two story retail uses, with moderate office and minimal multi-family as supportive uses. It also preserves small-scale, fine-grain character in neighborhoods where single-family residential and townhomes are predominant. The maximum Floor Area Ratio (FAR) is 1.0. A FAR is the ratio of a building's total floor area to the size of a site. An example is a 3-acre site with a 1.0 FAR could have up to approximately 130,000 square feet of floor area within a building (equivalent to 3 acres or one to one ratio).

Community

Community commercial is intended for pedestrian-oriented commercial development that primarily serves local needs such as convenience shopping and offices. Many of the city's current commercial districts fall into this designation. Specific uses allowed include medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores and supporting uses. The maximum FAR is 1.0.

Recreation

The recreation designation is intended for areas of private commercial recreation uses such as bowling alleys, family entertainment centers, and golf driving ranges. The maximum FAR is 0.5.

General

This designation is intended for a range of retail and service uses that are not appropriate in other areas because of higher volumes of vehicle traffic and potential adverse impacts on other uses. Development such as strip malls would fall into this designation. Examples of allowable uses include: building materials, storage facilities with active storefronts, equipment rental, wholesale businesses, and specialized retail not normally found in shopping centers. The maximum FAR is 2.0.

Highway & Auto

The Highway & Auto land use designation is intended for limited areas near a freeway to accommodate uses that depend on or are supported by freeway access but do not generate a large volume of traffic. Hotels, restaurants, and auto malls are typical land uses. The maximum FAR is 0.75.

Regional

This land use designation is intended to meet local and regional retail demand, such as large-scale retail, office, civic and entertainment uses, shopping malls, with large format or "big-box" retail, are allowed, as are supporting uses such as gas stations, and hotels. Buildings are typically larger-footprint and urban-scaled. Development and design standards will create a pedestrian orientation within centers and along major corridors, with parking generally on the side or rear of major buildings, but automobile-oriented uses also will be accommodated on identified streets and frontages. The maximum FAR is 1.0.

Employment

Office

The Office land use designation is intended for administrative, financial, business, professional, medical, and public offices. This designation is mainly intended to apply to existing office uses on smaller lots, generally located on arterial roadways. This designation is also considered compatible with existing residential neighborhoods given the smaller level of noise and traffic generation than commercial uses. Retail uses would be limited to business services and food service and convenience goods for those who work in the area. The maximum FAR is 2.0.

Business Park

The Business Park designation provides for office/business parks in campus-like setting that is well suited for large offices or multi-tenant buildings. This designation is intended to accommodate and allow for the expansion of small businesses with limited outdoor storage proximate to residential uses, thus adequate landscaping is imperative. Typical land uses include research and development, laboratories, administrative and general offices, medical offices and clinics, professional offices, prototype manufacturing, testing, repairing, packaging, and printing. No freestanding retail is permitted, except for small uses serving businesses and employees. The maximum FAR is 1.0.

Regional Business Park

The Regional Business Park land use designation is intended for large or campus-like office and technology development that includes office, research and development, manufacturing, and other large-scale, professional uses, with limited and properly screened outdoor storage. Permitted uses

include incubator-research facilities prototype manufacturing, testing, repairing, packaging, and printing as well as offices and research facilities. Small-scale retail and service uses serving local employees and visitors are permitted as secondary uses. The maximum FAR is 1.0.

Light Industrial

The Light Industrial designation accommodates a diverse range of light industrial uses, including limited manufacturing and processing, research and development, fabrication, utility equipment and service yards, wholesaling, warehousing, and distribution activities. Small-scale retail and ancillary office uses are also permitted. Light Industrial areas may serve as buffers between Heavy Industrial and other land uses and otherwise are generally located in areas with good transportation access, such as along railroads and freeways. The maximum FAR is 1.5.

Heavy Industrial

The Heavy Industrial designation accommodates the broadest range of industrial uses including manufacturing, assembly, wholesaling, distribution, and storage activities that are essential to the development of a balanced economic base. Small-scale commercial services and ancillary office uses are also permitted. The maximum FAR is 1.5.

Mixed Use

Mixed-use land use designations are based on commercial uses and require a residential component.

Corridor/Center Mixed Use

The Corridor/Center Mixed Use designation is higher intensity than Neighborhood Mixed Use, and is intended to allow for either horizontal or vertical mixed-use development in multiple story buildings along key circulation corridors in the city where height and density can be easily accommodated. Ground-floor retail and upper-floor residential or offices are the primary uses, with personal and business services and public and institutional space as supportive uses. Development will facilitate the transformation of existing transportation corridors into vibrant, highly walkable areas with broad, pedestrian-friendly sidewalks, trees, landscaping, and local-serving uses with new buildings that step down in relationship to the scale and character of adjacent neighborhoods. This designation will largely apply along arterial streets, at targeted locations between regional activity centers. Residential densities range between 16 and 30 units per acre with a minimum 40 percent residential uses and the maximum FAR is 1.5.

Regional Mixed Use

This land use designation is intended to accommodate mixed-use development in urban-scale buildings and retail establishments that serve residents and businesses of the region at large. Medium-scale retail, housing, office, civic and entertainment uses, and shopping malls, with large format or “big-box” retail, are allowed, as are supporting uses such as gas stations and hotels and residential in mixed use or single use buildings. Design standards will support a pedestrian orientation within centers and along major corridors, with parking on the side or rear in general, but automobile-oriented uses also will be accommodated on identified streets and frontages. Residential densities range between 30 and 45 units per acre with a minimum 30 percent residential uses and the maximum FAR is 2.0.

Neighborhood Mixed Use

The Neighborhood Mixed Use designation is similar to the Main Street and Community commercial land use designations, however it allows a minimum of 50 percent residential uses, whereas the commercial districts do not allow residential uses. This designation provides for mixed-use districts of local-serving, pedestrian-oriented commercial development, such as convenience shopping and professional offices in two- to three-story buildings. Development is expected to include ground-floor neighborhood retails uses and upper-level housing or offices, with a mix of small lot single family houses, townhomes, and multi-family dwelling units on side streets, in a horizontal or vertical mixed-use orientation. The built form will have a scale and character that is consistent with pedestrian-orientation, to attract and promote a walk-in clientele, with small lots and frequent roadway and pedestrian connections permitting convenient access from residences to commercial space. Automobile-oriented uses are not permitted. Residential densities range between 12 and 16 units per acre and the maximum FAR is 1.5.

Open Space

These designations apply to open space areas that are not parks or trails, such as riparian corridors, the clear zone around Fresno-Yosemite International Airport, and the San Joaquin River bottom, which is primarily designated as open space even though it includes a limited number of existing homes. Within open space, there is a Multi-Use designation that is located along the San Joaquin River Corridor that allows parks, open space, bathroom, launch areas for canoes, parking, and sand/gravel facilities.

Public Facilities

These designations apply to lands owned by public entities, including City Hall and other City buildings, county buildings, schools, colleges, the municipal airport and hospitals. They also include public facilities such as fire and police stations, City-operated recycling centers and sewage treatment facilities. In addition, these designations apply to public facilities, including neighborhood, community and regional parks, recreational centers, and golf courses. It also applies to multi-purpose trails that serve both regional and neighborhood level needs, some of which are paved while others, in particular those found along the San Joaquin River Bluff Environs, may be unpaved.

Buffer

This designation is intended to separate urban uses from long-term agricultural uses in order to preserve long-term viable agricultural areas and intensive farming operations adjoining but outside the Planning Area. The Buffer designation will serve to prevent urban residential and related uses from developing near agricultural operations and infringing on full operation of important farmland. A variety of uses are compatible with the purpose of the Buffer, which will be defined in detail in the Development Code. General categories include environmental habitats; water conveyance, retention and recharge; preservation and preparation of gravel resources for beneficial uses related to permanent water resource facilities; limited agriculture and necessary supportive uses, such as agricultural processing, excluding animal processing or uses that have the potential to create nuisances; and residential uses with 20 acres of land required per residence. Planning Area Exclusive to the Downtown Planning Area (Downtown).

These land use classifications are specific to just the Downtown Planning Area portion of the Planning Area as depicted in the inset to Exhibit 3-4. It is anticipated the land use classifications may be further refined in community or specific plans such as the proposed Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan, which may be adopted by the City.

Central Business District (CBD)

The CBD (Central Business District) is the cultural, civic, shopping, and transit center of Fresno and the region. This designation is applied to areas of the Downtown Core bounded by Stanislaus Street, the Union Pacific tracks, Inyo Street, and the alley between Van Ness Avenue and L Street. New buildings will be at least two stories, up to 15 stories in height, and located at or near the sidewalk. Buildings will be occupied with ground floor commercial, retail, and office activity to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will accommodate a wide variety of office, civic, lodging, housing, or additional commercial uses.

Civic Center

The Civic Center is intended for civic and office uses, including numerous public buildings containing City, County, State, and Federal uses. This designation is applied to properties currently fronting Mariposa Street and the south side of Fresno Street and the north side of Tulare Street between Van Ness Avenue and Q Street. New buildings will be block-scale, up to 10 stories in height and set back from the sidewalk along a continuous build-to line to maintain a formal alignment and arrangement of building frontages. Upper stories will be expressed in volumes that enhance and support the civic presence of buildings along these streets. A full range of civic and office uses, including ground floor retail, are envisioned to support active streetscapes and walking. Upper floors will have office and civic uses.

Town Center

The Town Center designation is applied to nodes at major intersections along roadway and is intended for medium-scale retail, housing, office, civic, and entertainment uses that serve several neighborhoods. New buildings will be block-scale, up to five stories in height and located at or near the sidewalk to generate focused and active, commercial activity along corridors. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Ground floor uses will include commercial, retail, and office uses to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will have office, civic, residential or additional commercial uses.

Neighborhood Center

The Neighborhood Center designation is applied to nodes at secondary intersections along corridors and is comprised of primarily small-scale neighborhood uses such as retail, office, civic, and entertainment, including housing. New buildings will be block and house-scale, up to three stories in height, completely compatible in scale with adjacent single-family houses, and located at or near the sidewalk to generate pedestrian activity. Upper stories will be expressed in volumes compatible with adjacent houses. Buildings will have ground floor commercial, retail, and office uses to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will have office, civic, residential or additional commercial uses.

Chinatown District

The Chinatown District designation is applied to the areas bounded by the Union Pacific Railroad tracks, State Route 99, Stanislaus Street, and Inyo Street. Its close proximity to State Route 99 and the Downtown Core create the unique opportunity to introduce buildings and uses that serve both the region and the surrounding neighborhoods. F Street is preserved and developed as Chinatown's "main street." New buildings will be block-scale, up to 3 stories in height and located at the sidewalk to activate the sidewalk with pedestrian-oriented commercial activity. Most upper stories will be expressed in single volumes to enhance the small scale of this urban neighborhood and historic Main Street. Ground floor uses will include commercial, retail, civic or office uses to support active streetscapes and walking. Upper floors and the space behind shop fronts will have offices, housing or additional commercial uses.

Cultural Arts District

This designation is applied to the area immediately north of the CBD that is undergoing transformation into a thriving artist community. This designation is intended to encourage the area's transformation by encouraging mixed-use buildings comprised primarily of small-scale retail, office, industrial, and multi-family housing. New buildings will be block scale, up to five stories tall that will be located at or near the sidewalk to generate an active public realm and support walking. Buildings will have ground floor retail uses, live-work, and uses such as art galleries on key streets to support active streetscapes and walking.

Corridor General

This designation is applied to areas fronting on corridors including Belmont Avenue, East Kings Canyon Road, Blackstone Avenue, Abby Street, and North Fresno Street. It is intended for moderate intensity housing and neighborhood services, while also accommodating automobile-oriented commercial uses. New buildings will be block-scale and house-scale, up to three stories in height located at or near the sidewalk to generate more pedestrian activity. Buildings will vary in size and type, but be compatible in massing and scale with adjacent buildings. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Living rooms, dining rooms, and other formal rooms will face the street. Ground floor uses will include housing as well as commercial, retail and office uses. Upper floors will be for housing, office, or additional commercial uses.

Downtown Neighborhoods

This designation is applied to areas outside of the Downtown Core, including the Lowell neighborhood, much of the Southwest and Southeast neighborhoods, the "L" Street area and to Huntington Boulevard area east of Downtown, the Jefferson Neighborhood, areas south of Elm and B Streets in Southwest, several Southeast neighborhoods adjacent to State Route 180, and areas west of State Route 99 including the Jane Addams area. New buildings will be house-scale up to two stories in height and some buildings may be up to two and one-half stories. All buildings will set back from the sidewalk to provide a buffer between the sidewalk and the dwellings. Living rooms, dining rooms, and other formal rooms will face and activate the street. Other house-scale buildings are compatible in these neighborhoods when scaled and massed in relation to the predominant

single-family houses. Buildings will be occupied with residential uses, limited live/work uses and home occupation activity.

Special Districts

The Special Districts designation is applied to areas that are best suited for a variety of moderate to intense industrial and manufacturing activity. These areas are comprised primarily of large and varied building sizes with substantial activity from large cargo vehicles. New buildings will be block-scale, up to three stories in height and located with a portion or all of their frontage at or near or the sidewalk. Ground floor activity will range from industrial and manufacturing uses and outdoor assembly to offices. Included in the Special Districts designation are (1) the Chandler Airport area between Kearney Boulevard, and Thorne and Whitesbridge Avenues and (2) Downtown Hospital district, including the hospital campus as well as on surrounding streets such as Fresno Street, Illinois Avenue, Clark Street, and Divisadero Street.

Public Facility

This designation applies to lands owned by public entities, including City Hall and other City buildings, county buildings, schools, the municipal airport and hospitals. They also include public facilities such as fire and police stations, and City-operated recycling centers. In addition, this designation applies to public facilities, including neighborhood and community parks and recreational centers.

Open Conservation

This designation is intended to provide for permanent open spaces, and does not include neighborhood and community parks and recreational center.

South Stadium District

This designation is applied to the areas immediately to south of the CBD, including the Monterrey and Los Angeles Street areas, and is intended for small-scale retail, office, industrial and multi-family housing. New buildings will be block-scale, with non-industrial buildings up to five stories in height located at or near the sidewalk to generate an active public realm. Secondary streets and upper floors will have residential and office uses. Industrial buildings may have larger footprints and may be up to two stories tall.

3.2.2 - The Development Code Update

The citywide Development Code Update was initiated to comprehensively re-evaluate the City of Fresno's regulation of land use and development that is included in the Zoning Ordinance of the City of Fresno and subdivision regulations contained in Title 12 of the Fresno Municipal Code. The Development Code Update incorporates contemporary planning and business practices, procedures, sets objective criteria for new development and streamlines the entitlement process while also providing incentives for development by offering flexible property development standards. The Development Code will better address ever-changing market demands and implement the City's vision as outlined in the City of Fresno General Plan Update. The Development Code includes an update to the Zoning Ordinance of the City of Fresno that was last updated comprehensively in the early 1960s and is the regulatory tool that outlines how development occurs. The Zoning Ordinance

of the City of Fresno is required to implement and be consistent with the vision delineated in the City of Fresno General Plan Update. The current Zoning Ordinance of the City of Fresno has been adapted over the years from the adoption of the original Zoning Ordinance of the City of Fresno in 1962. The proposed Development Code Update will be easier to understand and use compared to the current Zoning Ordinance of the City of Fresno.

The project also includes retaining the current Zoning Ordinance of the City of Fresno, with minor amendments to synchronize it with the updated designations for planned land uses, for the Downtown Planning Area (approximately 7,237 acres) in the inset as depicted on Exhibit 3-4 (Downtown). The City of Fresno General Plan Update anticipates this area may be further refined in community or specific plans that may be adopted by the City along with any appropriate development code update specific to the Downtown.

The proposed revisions to the Zone Districts for the Planning Area excluding the Downtown Planning Area are shown in Table 3–1. The Zone Districts are categorized in Residential, Commercial, Employment, Mixed Use, and Other. As shown in Table 3–1, there are existing Zone Districts that do not have a corresponding proposed Zone District, and there are proposed Zone Districts that do not have a corresponding existing Zone District.

The Zone Districts for the Downtown Planning Area will essentially remain the same, as they currently exist within the Zoning Ordinance of the City of Fresno, except for amendments to synchronize it with the updated designations for planned land uses. A land use and zoning consistency table is provided in Table 3–2 and identifies the corresponding existing Zone District to the Downtown Planning Area land use categories proposed in the City of Fresno General Plan Update.

Table 3–1: Proposed Zone District Revisions for the Planning Area Excluding the Downtown

Existing Zone District		Proposed Zone District	
Residential Districts			
	No Corresponding District	RE	Residential Estate
R-1-E and R-1-EH	Single-family Residential Estate District	RS-36	Single-family 36,000 sf/unit
R-A	Single-family Residential-Agricultural	RS-36	Single-family Res-36,000sf
R-1-A	Single-family Residential	RS-20	Single-family 20,000 sf/unit
R-1-AH	Single-family Residential (Horses)	RS-20	Single-family 20,000 sf/unit
R-1-B	Single-family Residential	RS-12	Single-family 12,000 sf/unit
R-1-C	Single-family Residential	RS-9	Single-family 9,000 sf/unit
R-1	Single-family Residential	RS-5	Single-family 5,000 sf/unit
	No Corresponding District	RS-2.5	Single-family 2,500 sf/unit

Existing Zone District		Proposed Zone District	
R-2-A	Low Density Multiple-family Residential District One Story	RM-2.5	Multiple-family 2,500 sf/unit
R-2	Low Density Multiple-family Residential	RM-2.5	Multiple-family 2,500 sf/unit
R-3	Medium Density Multiple-family Residential	RM-1.5	Multiple-family 1,500 sf/unit
R-4	High Density Multiple-family Residential	RM-1	Multiple-family 1,000 sf unit
T-P	Trailer Park Residential		No Corresponding District
MH	Mobile Home Single-family Residential	RM-MH	Mobile Home Park
Commercial			
	No Corresponding District	MSC	Main Street Commercial
C-1	Neighborhood Shopping Center	CC	Community Commercial
C-2	Community Shopping Center	CC	Community Commercial
C-3	Regional Shopping Center	RC	Regional Commercial
C-4	Central Trading		No Corresponding District
C-5	General Commercial	GC	General Commercial
C-6	Heavy Commercial	GC	General Commercial
C-R	Commercial Recreation	CR	Commercial Recreation
C-L	Limited Neighborhood Shopping Center		No Corresponding District
	No Corresponding District	HAC	Highway and Auto
Employment			
CC	Civic Center		No Corresponding District
RP-L	Residential and Professional Limited Office	O	Office
R-P	Residential and Professional Office	O	Office
C-P	Administrative and Professional Office	O	Office
C-M	Commercial and Light Manufacturing		No Corresponding District
M-1-P	Industrial Park Manufacturing	RBP, BP	Business Park, Regional Business Park
M-1	Light Manufacturing	IL	Light Industrial
S-L	Storage/Limited, Mini Storage Facility	GC	General Commercial

Existing Zone District		Proposed Zone District	
M-2	General Industrial	IH	Heavy Industrial
M-3	Heavy Industrial	IH	Heavy Industrial
Mixed Use			
	No Corresponding District	NMX	Neighborhood Mixed Use
	No Corresponding District	CMX	Corridor /Center Mixed Use
	No Corresponding District	RMX	Regional Mixed Use
Other			
O	Open Conservation	OS	Open Space
	No Corresponding District	PK	Park
	No Corresponding District	PI	Public and Institutional
AE-20	Exclusive Twenty Acre Agricultural		No Corresponding District
AE-5	Exclusive Five Acre Agricultural		No Corresponding District
P	Off-Street Parking District		No Corresponding District
	No Corresponding District	B	Buffer
Overlay District			
BA	Boulevard Area	BA	Boulevard Area
CCO	Civic Center Area Modifying		No Corresponding District
R-M	Residential Modifying	RM	Residential Modifying
BP	Bluff Preservation Overlay	BP	Bluff Protection
EA	Expressway Area Overlay	S	Special Setback
ANX	Annexed Rural Residential Transitional Overlay	ANX	Annexed Rural Residential Transitional Overlay
	No Corresponding District	PD	Planned Development

Notes:
sf = square feet
Source: City of Fresno Development and Resource Management Department, 2012.

Table 3–2: General Plan Land Use and Zoning Consistency for Downtown Area

City of Fresno General Plan Update Downtown Planning Area Land Use	Implementing Existing Zone Districts
CBD	Central Trading District
Civic Center	CC, Civic Center District
Town Center	C-2, Community Shopping Center District; and C-6, Heavy Commercial District
Neighborhood Center	C-1, Neighborhood Shopping Center District; C-2, Community Shopping Center District; and C-5, General Commercial District
Chinatown District	C-4, Central Trading District
Cultural Arts District	C-4, Central Trading District
Corridor General	C-1, Neighborhood Shopping Center District; C-2, Community Shopping Center District; and C-5, General Commercial District
Neighborhoods	R-1, Single-Family Residential District; R-2, Low Density Multiple Family Residential District; R-3, Medium Density Multiple Family Residential District; and R-4, High Density Multiple Family Residential District
Special District	C-M, Commercial and Light Manufacturing; and M-1, Light Manufacturing District
Public Facility	O, Open Conservation District
Open Conservation	O, Open Conservation District
South Stadium District	C-M, Commercial and Light Manufacturing
Source: City of Fresno Development and Resource Management Department, 2012.	

3.2.3 - Comparison of Existing Development to the City of Fresno General Plan Update

Exhibit 3-4 illustrates the distribution of land uses proposed under the City of Fresno General Plan Update. Table 3–3 identifies general land use categories for existing development and the full buildout development that ultimately could occur under the City of Fresno General Plan Update. The incremental increase in development is identified by general land use category for the Planning Area. Table 3–4 includes units and acre figures for the residential categories and square footage and acres for the non-residential categories. The column depicting incremental increase represents the amount of development that is projected to occur beyond existing development with full buildout of the General Plan and Development Code Update. Full buildout is projected to occur in approximately 2056 as discussed in Section 3.4, Population Projection for Planning Area under General Plan Update.

Table 3–3: Incremental Development for Buildout of Fresno General Plan and Development Code Update

Land Use	Existing Development units in msf (acres)	General Plan and Development Code Update units in msf (acres)	Incremental Increase units in msf (acres) [1]
Single-Family Residential	118,897 (26,147)	179,523 (38,961)	60,626 (12,814)
Multiple-Family Residential	67,943 (3,496)	152,481 (6,605)	84,538 (3,109)
Commercial/Office/Public Facility	66.4 (14,804)	129.7 (26,517)	63.3 (11,713)
Mixed Use	0.1 (10)	20.9 (4,223)	20.8 (4,213)
Industrial	72.8 (6,765)	113.3 (9,578)	40.5 (2,813)
Open Space	(12,288)	(1,546)	(-10,742)[2]
Agriculture	(11,714)	(736)[3]	(-10,978)
Vacant	(12,522)	(0)	(-12,522)
Other[4]	(18,281)	(17,861)	(-420)
TOTAL	**(106,027)**	**(106,027)**	**(0)**
Populations (persons)	545,000	970,000[5]	425,000

Notes:
units - dwelling units msf - million square feet

[1] The incremental increase is the amount of additional development that could occur within the Planning Area above the existing development. This additional development is assumed to be full buildout within the Planning Area. Full buildout is projected to occur in approximately year 2056.

[2] The acreage of Open Space is projected to substantially decrease due to a difference in the definition of Open Space between Open Space under existing development and Open Space under the City of Fresno General Plan Update. The Open Space under existing development is characterized as ponding basins, recreational use, clear zone, flood control, golf course, canals, parks, recharge basins, and open space. Open Space under the City of Fresno General Plan Update is categorized as ponding basins, commercial recreation, clear zones, flood control, and open space. The primary reason for the substantial reduction is the categorizing of parks from Open Space to Public Facilities.

[3] This Agriculture land use includes the Buffer area within the Southeast Growth Area (SEGA) because agricultural uses will be allowed in the "Buffer" category of the General Plan and Development Code Update.

[4] The "Other" category includes roads, canals, railroads, etc.

[5] The population identified for the City of Fresno General Plan Update represents full buildout of the Planning Area. Full buildout is projected to occur in approximately year 2056.

Source: City of Fresno Development and Resource Management Department, 2012 and FirstCarbon Solution, 2014

3.3 - Comparison of Proposed General Plan Update to Existing 2025 General Plan

The differences in general land use categories within the Planning Area between the City of Fresno 2025 General Plan and the City of Fresno General Plan Update are detailed in Table 3–4 with regard to acreage and population. The Planning Area encompasses the City's current City limits, including the City's Regional Wastewater Reclamation Facility, the current Sphere of Influence, and an area north of the City's most northeasterly portion of the City.

Table 3–4: Existing General Plan and General Plan Update Comparison

Land Use Designation	City of Fresno 2025 General Plan Acreage	City of Fresno General Plan Update Acreage	Change in Acreage
Residential	41,688	46,043[1]	4,355
Commercial	6,456	6,913	457
Industrial	12,072	9,578	-2,494
Mixed use	557	4,223	3,666
Public facilities[2]	17,329	19,127	1,798
Open space[3]	1,665	1,546	-119
Other	26,260[4]	18,597[5]	-7,663
TOTAL	**106,027**	**106,027**	**0**
Population	790,000	970,000[6]	180,000

[1] The residential designation includes all designations that allow residential units except for Mixed use. The Neighborhoods designation in the Downtown Area primarily allows residences. There are 477 acres in this designation that allow schools and other public facilities.
[2] Public facilities include parks, schools, and other facilities publicly owned.
[3] Open space includes ponding basins, commercial recreation, clear zones, flood control facilities, and Open space
[4] The "Other" category for existing General Plan includes agriculture, the entire Southeast Growth Area (SEGA) because no specific land uses have been approved, and "Other" such as roads, canals, railroads, etc.
[5] The "Other" category for the General Plan Update does not include SEGA because the individual land uses are included in the land use designations. This category includes roads canals, railroads, etc. and the buffer area designated in Southeast Development Area.
[6] The population identified for the City of Fresno General Plan Update represents full buildout of the Planning Area. Full buildout is projected to occur in approximately year 2056.
Source: City of Fresno Development and Resource Management Department, 2012 and FirstCarbon Solution, 2014

3.4 - Population Projection for Planning Area under General Plan Update

As shown above in Table 3–5, the projected population estimate under buildout conditions within the Planning Area is 970,000 persons. The population growth within the Planning Area is estimated from projections that were identified in the San Joaquin Valley Demographic Forecasts 2010 to 2050 prepared for the Fresno Council of Governments in March 2012. Following are population projections in five-year increments.

Table 3–5: Population Estimate for City of Fresno Planning Area

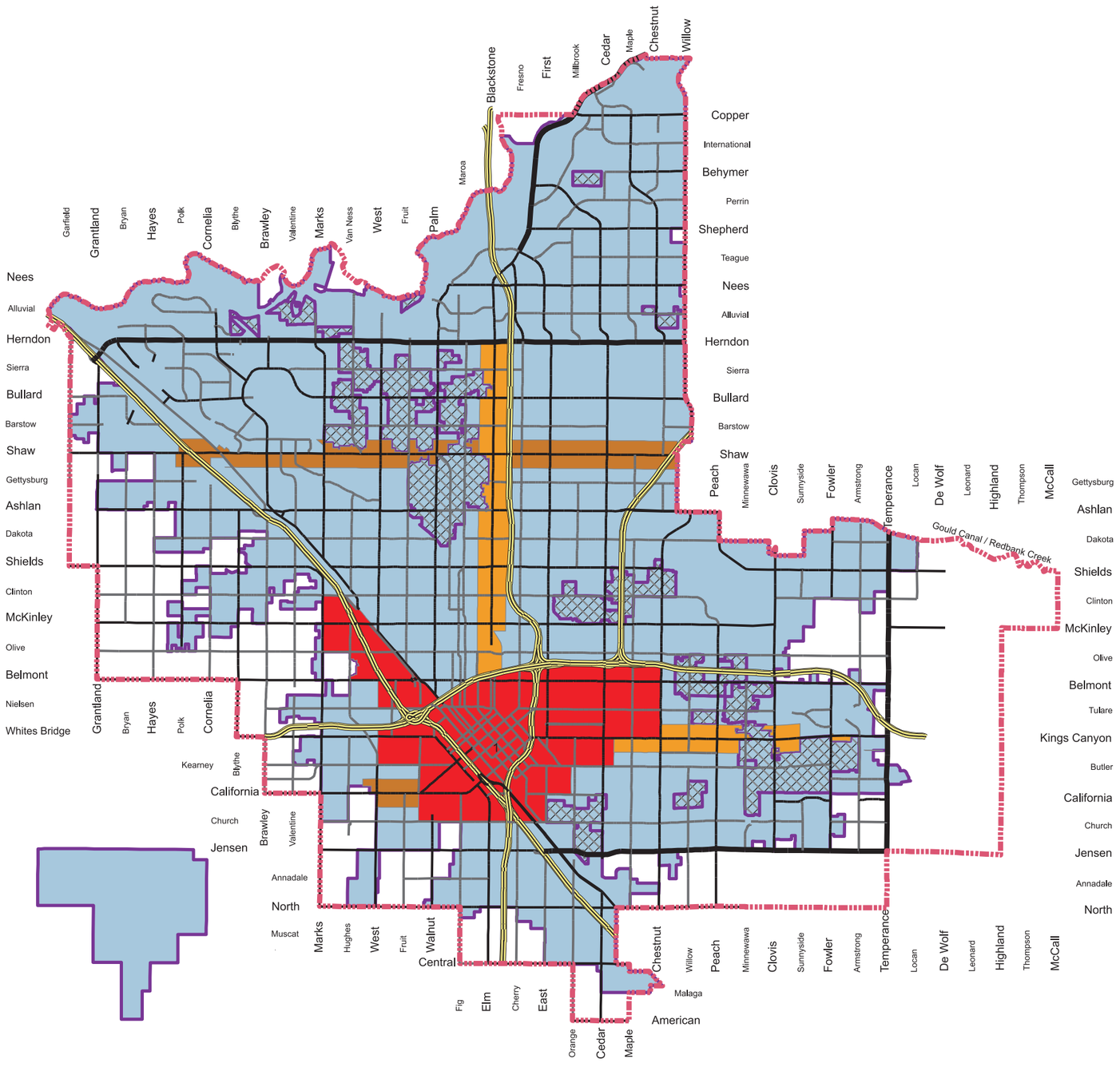
Year	Population Estimate	
	County of Fresno	City of Fresno Planning Area
2010	930,000[1]	545,000[2]
2015	1,010,000[3]	606,000[4]
2020	1,082,000[1]	649,200[4]

Year	Population Estimate	
	County of Fresno	City of Fresno Planning Area
2025	1,155,000[3]	693,000[4]
2030	1,228,000[1]	736,800[4]
2035	1,301,000[3]	780,600[4]
2040	1,374,000[1]	824,400[4]
2045	1,447,000[3]	868,200[4]
2050	1,521,000[1]	912,600[4]
2055	1,600,000[5]	960,000[4]
2056	1,616,667[6]	970,000[4]

[1] San Joaquin Valley Demographics Forecasts 2010 to 2050, Fresno Council of Governments, page 18.
[2] 2010 base is 58.6 percent. The population for 2010 was estimated by City of Fresno staff.
[3] Estimates based on 50 percent of the ten years of growth during the decade.
[4] Planning Area population estimate is 60 percent of the County's population
[5] Estimated County Population in 2055 based upon previous 5 year growth increments of 5.1% to 5.2%.
[6] The one-year growth increment used for 2056 was approximately 1.04%, which was generally a similar increment if the growth increment was extended over 5-years, and it was based upon the previous 5-year growth increments generally ranging from approximately 5.1% to 5.2%.
Source: FirstCarbon Solutions 2014

3.5 - Infill Areas

Infill is the development of new housing or other buildings on scattered vacant lots in a predominantly developed area or on new building parcels created by permitted lot splits. The proposed General Plan Update identifies primary areas of infill (see Exhibit 3-5). They include the Downtown Planning Area that will be further refined through specific and community plans such as the Downtown Neighborhoods Community Plan (DNCP) and the Fulton Corridor Specific Plan (FCSP). These areas encompass approximately 7,290 acres. Another area of primary infill is the Bus Rapid Transit (BRT) Corridors and Centers. The corridors include the Blackstone Avenue Corridor, Ventura Avenue – Kings Canyon Road Corridor, Clovis Avenue – State Route 180/Belmont Corridor, Shaw Avenue Corridor, and the California Avenue and West Shaw Avenue Corridors. The specific locations of these corridors are depicted on Figure IM-1 in the Fresno General Plan. Finally, the Non-Corridor Infill Areas are located throughout the City and not within the infill areas identified above.



Legend

Downtown

BRT Corridors - Phase 1

- Blackstone BRT Corridor
- Ventura-Kings Canyon BRT Corridor

BRT Corridors - Phase 2

- Shaw BRT Corridor
- California BRT Corridor

Non-Corridor Infill

- City Limits
- County Island
- Sphere of Influence

0 0.5 1 2 3 4

Miles

Source: DARM; Infill/InfillAreas-MEIR

FirstCarbon® SOLUTIONS

Exhibit 3-5
Infill Areas

3.6 - Growth Areas

The Growth Areas are defined as those areas located outside the existing City limits and within the Planning Area as shown on Exhibit 3-6. In addition, the Growth Areas do not include existing County islands or the North Area. Two categories of growth areas are identified. Growth Area 1 includes areas where future growth could occur based on planned infrastructure expansion, public service capacity, and fiscal considerations. Growth Area 2 includes area that require critical infrastructure improvements and the City does not anticipate that funding for these area can be committed in the near-term.

3.7 - Development Areas

There are three general areas defined as Development Areas. These areas are shown on Exhibit 3-7. The Development Areas include areas contemplated for Complete Neighborhoods that are connected with a range of housing types, employment, supporting retail and service uses, parks and open space, and public/civic uses. The Development Areas include: the West Development Area, the Southwest Development Area, and the Southeast Development Area.

3.8 - North Area

The North Area is located outside of the existing City limits and located outside of the existing Sphere-of-Influence. This area is located along the San Joaquin River Corridor north of the City limits and west of Friant Road. The area is under the jurisdiction of the County of Fresno, and the City of Fresno has included this area as part of the Planning Area because the City believes that this area bears relation to its planning as allowed under California Government Code Section 65300.

3.9 - Subsequent Projects

The City has identified 17 subsequent projects within the Planning Area. The subsequent projects range in size from 103 acres to 7,290 acres as depicted in Table 3–6 and illustrated on Exhibit 3-8. Each subsequent project is identified by a number which corresponds to the number on Exhibit 3-8. The total number of residential units, non-residential building square footage, and acreage of open space and public facilities are provided for each subsequent project.

Table 3–6: Subsequent Projects Land Uses

Subsequent Project Area/Land Use	Acres	Total Dwelling Units	Total Building Square Feet
1 Downtown	7,290		
Single Family Residential		2,000	
Multiple Family Residential		8,000	
Commercial			1,950,000
Employment			8,950,000
Open Space	64		

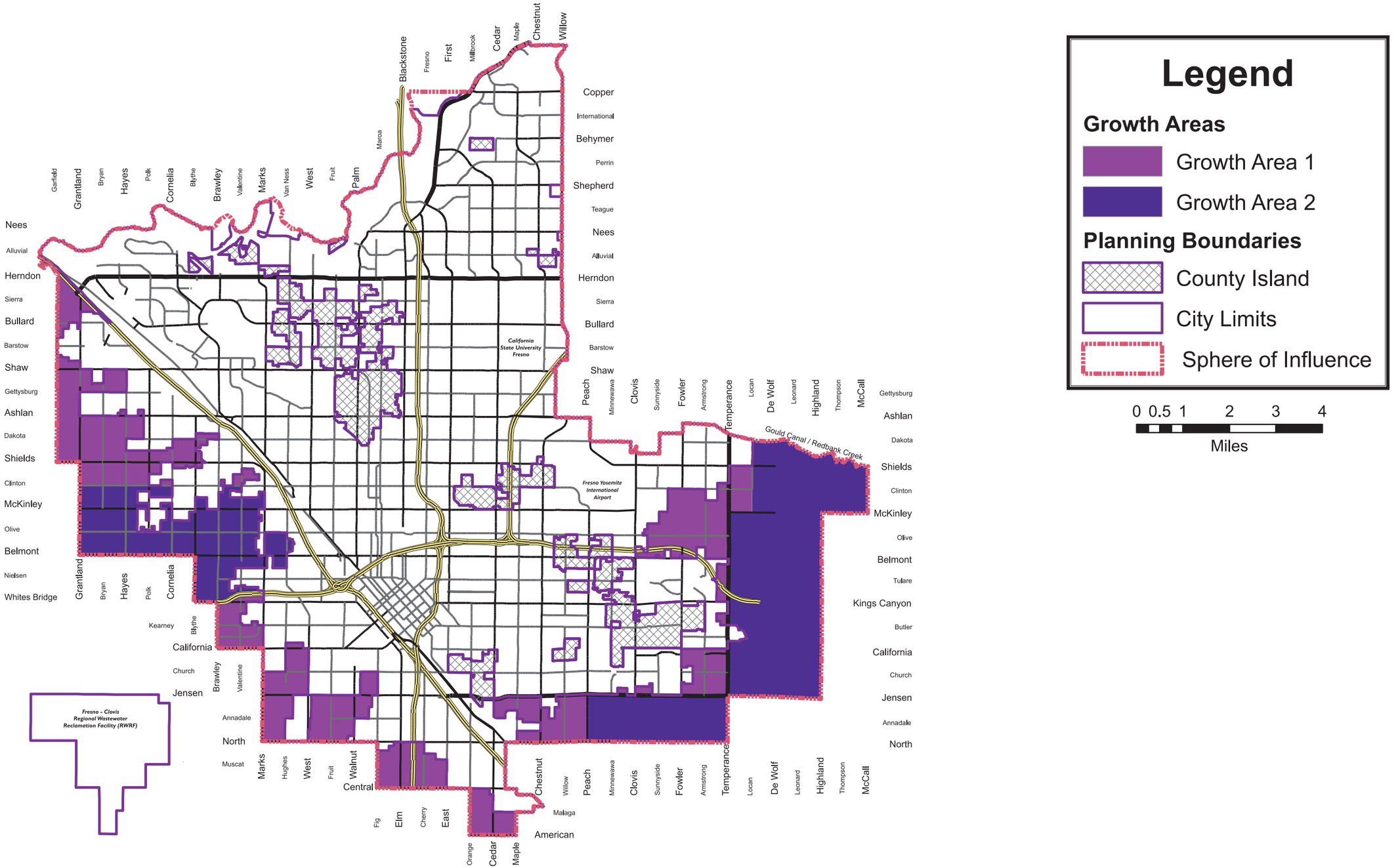
Subsequent Project Area/Land Use	Acres	Total Dwelling Units	Total Building Square Feet
2 BRT Corridors	103		
Single Family Residential		1	
Multiple Family Residential		1	
Mixed Use		75	21,974
Commercial			985,094
3 West Shaw	839		
Single Family Residential		949	
Multiple Family Residential		3,673	
Mixed Use		1,598	1,039,626
Commercial			815,076
Employment			48
Open Space	43		
Public Facility	17		
4 Grantland Avenue Transit Village	248		
Single Family Residential		449	
Multiple Family Residential		3,409	
Open Space	4		
5 Grantland East Avenue Communities	963		
Single Family Residential		3,632	
Multiple Family Residential		3,323	
Commercial			106,350
Open Space	55		
Public Facility	29		
6 California Avenue and Kearney Boulevard Neighborhood Area	1,363		
Single Family Residential		2,828	
Multiple Family Residential		1,238	
Mixed Use		817	
Commercial			706,291
Employment			337,278
Open Space	128		
Public Facility	31		
7 MLK Church Regional Center	138		

Subsequent Project Area/Land Use	Acres	Total Dwelling Units	Total Building Square Feet
Single Family Residential		143	
Multiple Family Residential		968	
Commercial			544,079
Open Space	19		
8 South of Church Neighborhoods	2,109		
Single Family Residential		1,634	
Multiple Family Residential		4,854	
Commercial			455,788
Employment			5,828,356
Open Space	219		
Public Facility	66		
9 South Industrial Center	1,745		
Single Family Residential		2	
Commercial			3,810
Employment			22,120,735
Open Space	37		
Public Facility	15		
10 Peach-Jensen Neighborhoods	376		
Single Family Residential		1,286	
Multiple Family Residential		1,315	
Employment			1,662,080
Open Space	13		
11 SEDA South 1	640		
Single Family Residential		1,363	
Multiple Family Residential		2,362	
Mixed Use		354	231,298
Employment			2,774,836
Public Facility	165		
12 SEDA South 2	900		
Single Family Residential		306	
Multiple Family Residential		1,832	
Mixed Use		274	231,298
Employment			2,774,836

Subsequent Project Area/Land Use	Acres	Total Dwelling Units	Total Building Square Feet
Open Space	44		
Public Facility	16		
13 SEDA North 1	977		
Single Family Residential		2,223	
Multiple Family Residential		1,837	
Mixed Use		496	323,869
Open Space	346		
Public Facility	22		
14 SEDA Central 1	1,234		
Single Family Residential		2,967	
Multiple Family Residential		4,117	
Mixed Use		550	351,322
Employment			6,556,428
Open Space	119		
Public Facility	117		
15 SEDA North 2	1,001		
Single Family Residential		3,981	
Multiple Family Residential		2,428	
Mixed Use		446	291,626
Open Space	106		
Public Facility	180		
16 SEDA Central 2	1,297		
Single Family Residential		1,605	
Multiple Family Residential		7,445	
Mixed Use		2,357	945,809
Employment			2,880,923
Open Space	150		
Public Facility	69		
17 SEDA Central 3	1,692		
Single Family Residential		2,818	
Multiple Family Residential		5,164	
Mixed Use		877	571,968
Open Space	81		

Subsequent Project Area/Land Use	Acres	Total Dwelling Units	Total Building Square Feet
Public Facility	97		

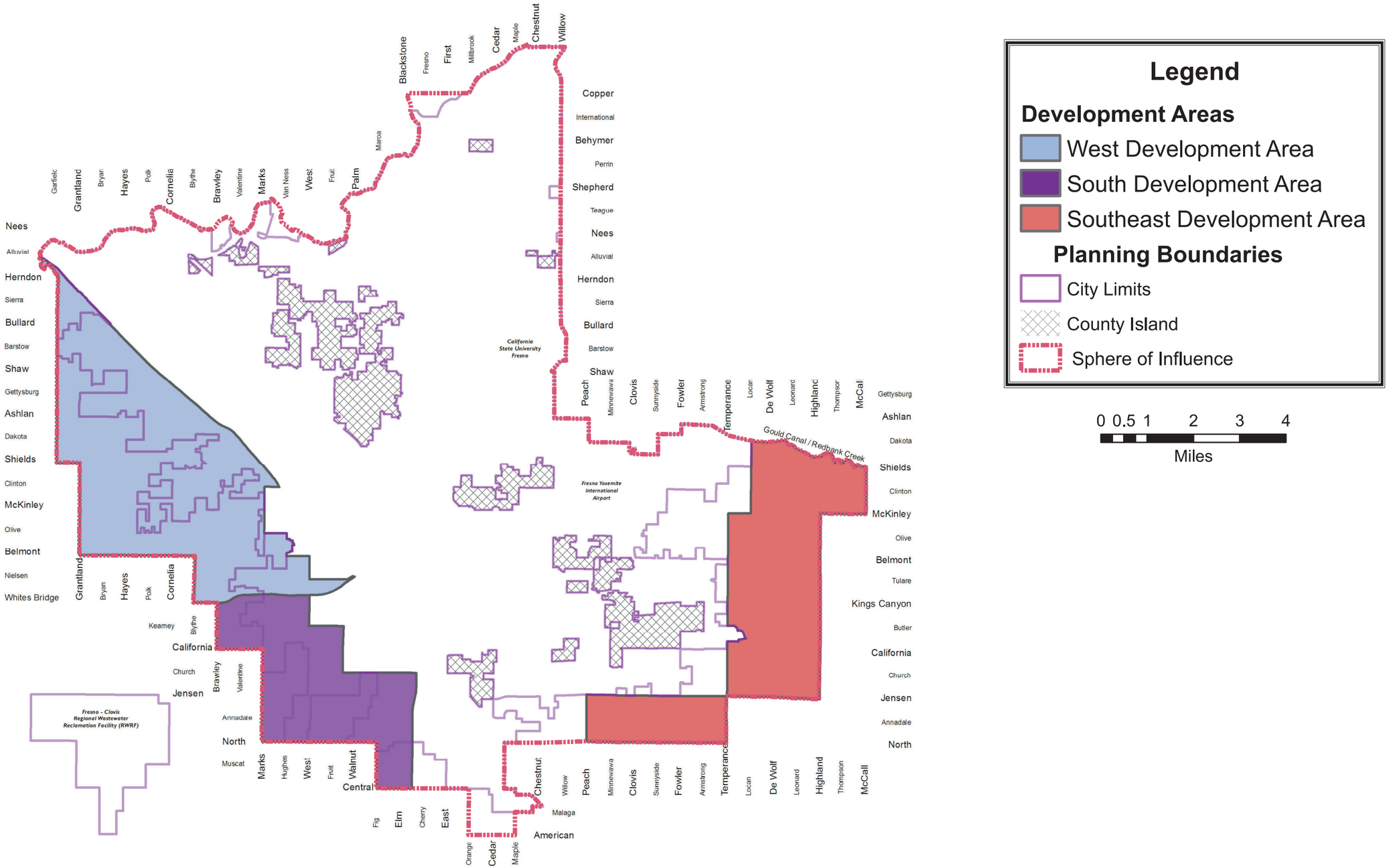
Notes: Single-family residential uses include low density (1.0 to 3.0 du/acre), medium low density (3.5 to 6.0 du/acre), and medium density (5.0 to 12.0 du/acre) residential uses. Multiple family residential uses include medium high (12.0 to 16.0 du/acre), urban neighborhood (16.0 to 30 du/acre), and high density residential uses (30 to 45 du/acre).
All values are rounded to the nearest one.
Source: City of Fresno Development and Resource Management Department 2013 and FirstCarbon Solutions 2013.



Source: Fresno GIS. DARM; Infill/Growth Areas

FirstCarbon SOLUTIONS

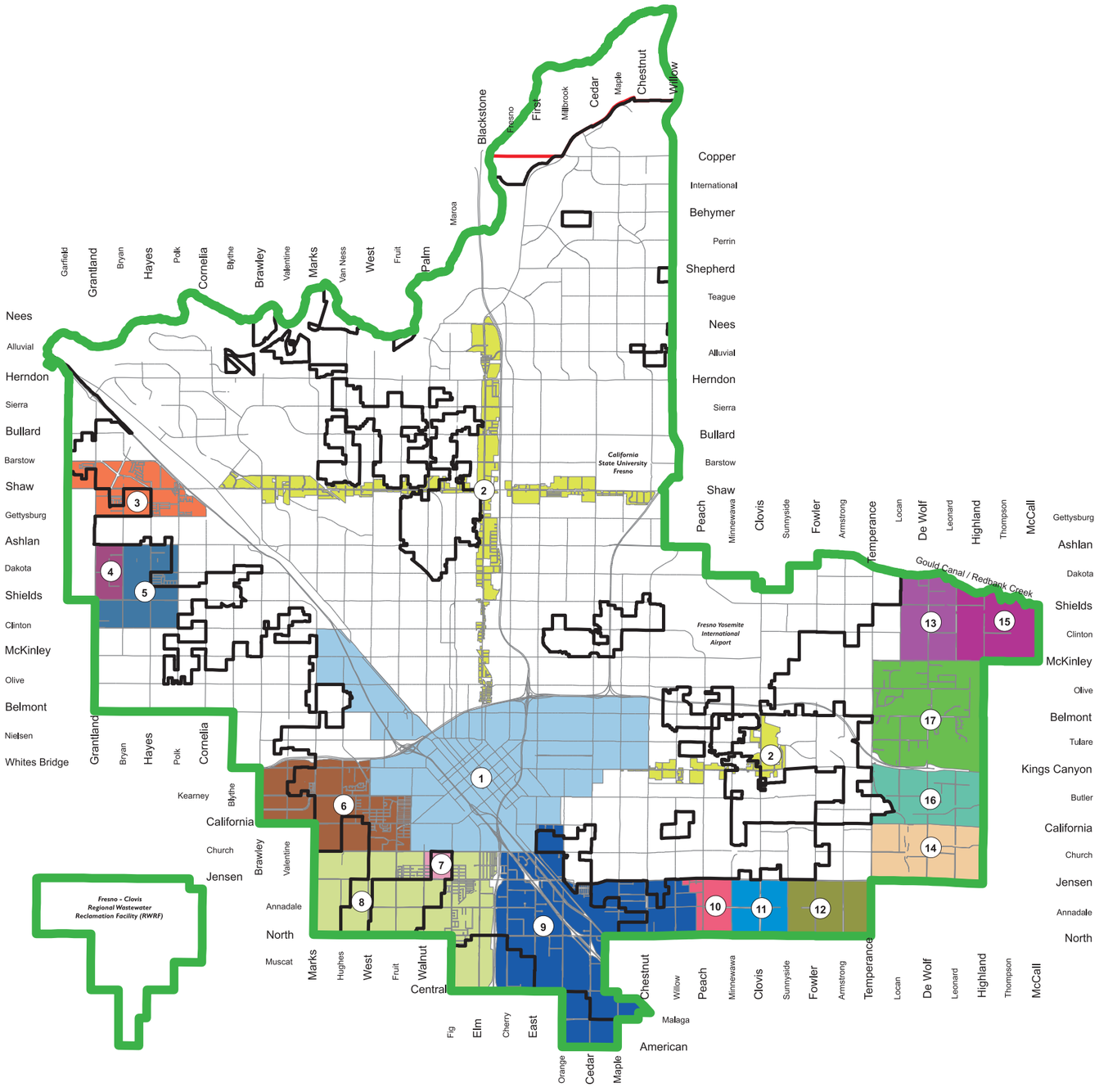
Exhibit 3-6
Growth Areas



Source: DARM; Infill/DevelopmentAreas.

FirstCarbon® SOLUTIONS

Exhibit 3-7
Development Areas



Legend

Subsequent Project Areas

- 01 Downtown (Non-Vacant Land Infill)
- 02 BRT Corridors (Non-Vacant Land Infill)
- 03 West Shaw
- 04 Grantland Avenue Transit Village
- 05 Grantland East Communities
- 06 California Ave and Kearney Blvd Neighborhood Area
- 07 MLK Church Regional Center
- 08 South of Church Neighborhoods
- 09 South Industrial Cluster
- 10 Peach-Jensen Neighborhoods
- 11 SEDA South 1
- 12 SEDA South 2
- 13 SEDA North 1
- 14 SEDA Central 1
- 15 SEDA North 2
- 16 SEDA Central 2
- 17 SEDA Central 3

Boundaries

- City Limits
- Planning Boundary
- Sphere of Influence

N

City of Fresno Development and Resource Management Department
Planning Division July 15, 2014.

NOTICE: This map is believed to be an accurate representation of the City of Fresno GIS data, however we make no warranties either express or implied for the correctness of this data. This map is a draft work in progress and may contain errors or omissions.

Source: City of Fresno Development and Resource Management Department Planning Division July 15, 2014.

FirstCarbon® SOLUTIONS

Exhibit 3-8
Subsequent Project Areas

3.10 - Project Objectives

Objectives of the proposed City of Fresno General Plan and Development Code Update are as follows:

1. Increase opportunity, economic development, business and job creation.
2. Support a successful and competitive Downtown.
3. Emphasize conservation, successful adaptation to climate and changing resource conditions, and performance effectiveness in the use of energy, water, land, buildings, natural resources, and fiscal resources required for the long-term sustainability of Fresno.
4. Emphasize achieving healthy air quality and reduced greenhouse gas emissions.
5. Support agriculture as an integral industry and sustainable food production system.
6. Protect, preserve, and enhance natural, historic, and cultural resources.
7. Provide for a diversity of districts, neighborhoods, housing types (including affordable housing), residential densities, job opportunities, recreation, open space, and educational venues that appeal to a broad range of people throughout the City.
8. Develop “complete neighborhoods” and districts with a compact and diverse mix of residential densities, building types, and affordability, which are designed to be healthy, attractive, and centered by schools, parks, public and commercial services to provide a sense of place and that meet daily needs within walking distance.
9. Promote a city of healthy communities and improve quality of life in existing neighborhoods.
10. Emphasize increased land use intensity and mixed-use development at densities supportive of greater use of transit in Fresno.
11. Emphasize and plan for all modes of travel on local and major streets in Fresno.
12. Resolve existing public infrastructure and service deficiencies, make full use of existing infrastructure, and invest in improvements to increase competitiveness and promote economic growth.
13. Emphasize the City as a role model for growth management planning, regional cooperation, collaborative planning, efficient processing and permit streamlining, public-private partnerships and shared financing, sustainable urban development policies, environmental quality, and a strong economy, and work with other jurisdictions and institutions to further these values throughout the region.
14. Provide a network of safe, well-maintained parks, open spaces, athletic facilities, and walking and biking trails connecting the city’s districts and neighborhoods to attract and retain a broad range of individuals, benefit the health of residents, and provide the level of public amenities required to encourage and support development of higher density urban living and transit use.

15. Improve Fresno's visual image, enhance its form, and function through urban design strategies and effective maintenance.
16. Protect and improve public health and safety.
17. Recognize, respect, and plan for Fresno's cultural, social, and ethnic diversity, and foster an informed and engaged citizenry.
18. Retain the existing sphere-of-influence.
19. Provide project development direction for future annexations within the existing sphere-of-influence.
20. Encourage development within urban infill areas.

3.11 - Intended Uses of This Document, Responsible Agencies, and Approvals Needed

The City of Fresno is the Lead Agency for the General Plan and Development Code Update. A list of the initial approvals associated with the Update is provided below. As subsequent projects are proposed, the individual projects may require plan and permit approvals. When subsequent approvals by the City and/or Responsible Agencies require discretionary actions, the Master EIR can be reviewed and used, as appropriate, for evaluations of environmental issues associated with subsequent projects. If the City or Responsible Agencies use the Master EIR, the agency approving the subsequent discretionary actions will be responsible to determine if the environmental evaluation in the Master EIR adequately addresses the potential effects associated with the subsequent projects.

The following are the initial discretionary approvals that are required by the City of Fresno, the Lead Agency:

3.11.1 - City of Fresno

- Approval of the General Plan Update
- Repeal of Chapter 12 of the City of Fresno Municipal Code
- Amendments and repeal of portions of the City of Fresno Municipal Code including Chapter 12
- Approval of the Development Code Update (Chapter 15 of the City of Fresno Municipal Code, including the Zone District Consistency Table)
- Approval of Amendments to the following Plans:
  - Bullard Community Plan (this will be renamed to the Pinedale Neighborhood Plan)
  - Sierra Sky Park Land Use Policy Plan
  - Fresno-Chandler Downtown Airport Master and Environs Specific Plan (formatting revisions for consistency with the ALUC's Plan)
  - Tower District Specific Plan
  - Butler-Willow Specific Plan
  - North Avenue Industrial Plan

  - Sun Garden Acres Specific Plan
  - Hoover Community Plan (this will be renamed the El Dorado Park Neighborhood Plan)

- Approval of the Repeal of the following Plans:
  - West Area Community Plan
  - Roosevelt Community Plan
  - Fulton/Lowell Specific Plan
  - Woodward Park Community Plan
  - Central Area Community Plan
  - McLane Community Plan
  - Fresno-High Roeding Plan
  - Yosemite School Area Specific Plan
  - Dakota-First Street Specific Plan
  - Edison Community Plan
  - Civic Center Master Plan
  - Highway City Specific Plan

- Approval of a Greenhouse Gas Reduction Plan

3.11.2 - Other Agencies

As subsequent projects that are specifically identified in the Master EIR as well as future development in accordance with the City of Fresno General Plan and Development Code Update are proposed for development, numerous agencies may be defined as Responsible and Trustee Agencies. Development of these future projects may require approval of discretionary actions by other agencies. These Responsible and Trustee Agencies can use the Master EIR that will be prepared for the City of Fresno General Plan and Development Code Update for their discretionary approval, if they determine that the environmental evaluation adequately addresses the effects associated with the discretionary action requested of them for approval.

Following is a general list of potential Responsible and Trustee Agencies.

- Caltrans including the Division of Aeronautics
- California Air Resources Board
- California Department of Fish and Wildlife
- California Department of Forestry and Fire Protection
- California Department of Housing and Community Development
- California Department of Parks and Recreation
- California Department of Toxic Substances Control
- California Public Utilities Commission
- California State Office of Historic Preservation
- California State Lands Commission
- California State University, Fresno
- California State Water Resources Control Board
- Central Valley Regional Water Quality Control Board

- County of Fresno
- County of Fresno Local Agency Formation Commission
- Fire Districts (Various)
- Fresno Airport Land Use Commission
- Fresno Council of Governments
- Fresno Metropolitan Flood Control District
- Fresno Irrigation District
- San Joaquin River Conservancy
- San Joaquin Valley Air Pollution Control District
- School Districts (Various)
- Sewer Districts (Various)
- Water Districts (Various)
- Any Other Responsible or Trustee Agency that may need to provide discretionary approval

SECTION 4: GENERAL DESCRIPTION OF ENVIRONMENTAL SETTING

4.1 - Project Environmental Setting

The City of Fresno's update to their General Plan includes a Planning Area that encompasses the same area that the existing 2025 General Plan encompassed. The Planning Area includes all areas within the City's current City limits, including the Fresno-Clovis Regional Wastewater Reclamation Facility, the areas within the current Sphere-of –Influence (SOI), and an area north of the City's most northeasterly portion of the City. The Planning Area encompasses approximately 106,027 acres that consists of approximately 68 percent within the City limits and approximately 32 percent outside of the City limits.

The Planning Area contains relatively flat terrain that slopes from northeast to southwest. The northern boundary of the Planning Area includes the San Joaquin River and steep bluffs that provide elevated views to the north. The Downtown area of the City is bounded by State Route 99 (SR-99) to the west and south, SR-41 to the east and south, and SR-180 to the north. Downtown is the urban core of the City with high-rise buildings that contain a variety of land uses. Many building within the Downtown area contain historic design elements. The suburbs of the City are located to the west, east, and north. These areas contain low-rise neighborhood building primarily dominated by single-family residential uses. Within the suburb areas, there are major thoroughfares including Herndon Avenue, Shaw Avenue, Ventura Avenue-Kings Canyon Road, Blackstone Avenue, and Clovis Avenue. South of the City is characterized by low-rise buildings with manufacturing, processing, and warehouse uses.

Current development within the Planning Area includes 186,840 dwelling units, 66.4 million square feet (msf) of commercial/office/public facility, 100,000 sf of mixed uses, and 72.8 msf of industrial uses. The Planning Area contains approximately 11,714 acres of agricultural land, 12,288 acres of open space, and 12,522 acres of vacant land. Existing agricultural land is primarily located in the southeastern and western portions of the Planning Area.

The Planning Area contains two major rail lines that generally traverse in a southeast to northwest direction. These railways include the Union Pacific Railroad line that is generally located along SR-99, and the BNSF Railway that diverges from the SR-99 in the southwest and travels through the downtown to the northwest.

There are three airports located within the City of Fresno including the Fresno-Yosemite International Airport located in the eastern portion of the Planning Area, the Fresno-Chandler Downtown Airport located west of downtown, and Sierra Sky Park Airport that is located on the northern portion of the Planning Area.

4.2 - Cumulative Environmental Setting

Section 15130 of the State CEQA Guidelines requires that an EIR discuss cumulative impacts of a project when the incremental effects of a project are cumulatively considerable. Cumulative impacts

are defined as an impact that is created as a result of the combination of the project evaluated in the Master EIR together with other projects causing related impacts. Cumulatively considerable means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. According to Section 15130(b) of the CEQA Guidelines, elements considered necessary to provide an adequate discussion of cumulative impacts of a project include either: (1) list of past, present, and probable future projects producing related or cumulative impacts; or (2) a summary of projection contained in an adopted General Plan or related planning document which is designed to evaluate regional or area-wide conditions.

The cumulative analysis discussed in this Master EIR is provided within each technical section in Section 5. A description of the cumulative impact study area is provided in the Environmental Setting for each technical section. The specific study area depends on the environmental issue that is analyzed.

Generally, a summary of projections contained in an adopted General Plan or related planning document was utilized to understand potential cumulative development. Due to recent approval of the High Speed Rail (HSR) project in the Fresno area, the HSR has been incorporated into the cumulative evaluations, as appropriate. Following is a general summary of projections contained in General Plans for agencies who jurisdictions are located adjacent to the Planning Area. These jurisdictions include the County of Fresno, City of Clovis, and the County of Madera.

The County of Fresno General Plan was last adopted in the year 2000. The General Plan identified the year 2020 projections outside the sphere-of-influences for cities within the East Valley area, which is located east of Interstate 5. The population projection in the unincorporated areas was projected to be 101,542 people and the employment projection was 57,737 (County of Fresno, 2000). Additional development projects are currently proposed northeast of the City of Fresno Planning Area including Friant Ranch that contains approximately 3,000 residential units along with supporting land uses.

The City of Clovis General Plan was last adopted in the year 1993; the General Plan identified a population projection for full buildout at 182,775 people (City of Clovis, 1993). The employment projection was 89,238 (City of Clovis, 1993). Currently, the City of Clovis is updating their General Plan and development projections. These projections include approximately 179,300 new people and 75,400 new employees (City of Clovis, 2014).

The County of Madera General Plan was last adopted in the year 1995. The General Plan identified population and employment growth projections through the year 2010. These estimates included 177,071 people and 61,866 employees. Since the adoption of the County's General Plan, substantial new development projects have been proposed in the southern portion of the County and some of the development is proposed within close proximity of the City of Fresno Planning Area. Currently proposed development projects include Gateway, Gunner Ranch, Liberty Groves, North Fork Village, Tesoro Viejo, and River Ranch Estates. These projects include a substantial amount of residential units, approximately 23,000 units, as well as supporting uses such as commercial, public facilities, parks, and open space.

SECTION 5: EVIRONMENTAL IMPACT ANALYSIS

Approach to Environmental Analysis

Section 5.1 through Section 5.16 of this Master EIR contain discussions of the environmental setting, regulatory setting, thresholds of significance, and potential environmental impacts related to construction and operation of the proposed project. These sections also include a discussion of mitigation measures and the level of significance after the implementation of mitigation measures.

Section 15125(a) of the CEQA Guidelines identifies that an EIR include a description of the physical environmental conditions as they exist at the time the Notice of Preparation (NOP) is published. Although the NOP was published in 2012, the population projection used as a baseline was from 2010. The 2010 population from the 2010 U.S. Census for the City of Fresno was 494,665 persons. The 2012 population estimate for the City of Fresno from the U.S. Census was 495,777 persons. The increase in population from 2010 to 2012 was approximately 1,000 persons which represented approximately 0.2 percent increase. The relatively small increase in population can likely be contributable to the economic recession and, consequently, very low economic development that occurred within the City of Fresno between 2010 and 2012. Since there was a small increase in population growth between 2010 and 2012, the use of the 2010 population estimate is considered appropriate since the establishment of a baseline for 2010 would result in an impact evaluation for the project that includes the potential effects that could have occurred between 2010 and 2012. Therefore, the use of the year 2010 population estimate as the baseline to address potential environmental effect is considered a worst-case impact evaluation.

The regulatory setting includes a discussion of the regulatory environment as it existed prior to the implementation of the General Plan and Development Code Update. There are federal, state, regional, county, and local regulations identified within each environmental issue discussion, where appropriate. It is acknowledge that although the existing City of Fresno and County of Fresno general plans and development codes currently guide development within the Planning Area, the proposed General Plan and Development Code Update would replace the existing goals, objectives, policies, standards, and regulations to provide new guidance for future development within the Planning Area.

The impact analysis contains a discussion of project-specific impacts as well as cumulative impacts. The project that is evaluated is comprised of two components: the General Plan Update and the Development Code Update. The General Plan Update includes a comprehensive update of the existing General Plan and includes ten elements, as described in Section 3.2.1 of this Master EIR and a consistency update of the Housing Element. As a component of the General Plan Update, the City includes amendments to various existing plans as described in Section 3.11.1 of this Master EIR. The update also includes a Greenhouse Gas Reduction Plan which is located in Appendix F-2 of this Master EIR. As a component of the Development Code Update, the City includes the repeal of Chapter 12 of the City of Fresno Municipal Code, amendments and repeal of portions of the City of Fresno Municipal Code including Chapter 12, and the inclusion of Chapter 15 of the City of Fresno

Municipal Code including the Zone District Consistency Table. The above project components are evaluated in Section 5.1 through Section 5.16. Specific components of the project are not separately evaluated; however, the project, as a whole, is evaluated. The project, as a whole, is referred to as the General Plan and Development Code Update, General Plan Update, or the proposed project throughout this Master EIR.

The impacts within the impact analysis are identified as no impact, less than significant impact, potentially significant impact, or significant impact. The project-specific impacts address the potential environmental impacts that could occur with buildout development of the Planning Area in accordance with the General Plan and Development Code Update. This Update is considered the proposed project which includes buildout of the Planning Area. As discussed in Section 3, Project Description, buildout of the Planning Area is projected to occur by the year 2056. To reduce potential environmental impacts, the proposed General Plan Update objectives and policies, as well as applicable proposed Development Code standards and regulations are identified. The resulting level of impact that would occur after the implementation of the objectives, policies, standards, and regulations is identified. If the resulting level of impact is a potentially significant or significant impact, mitigation measures are identified, if feasible. After the implementation of mitigation measures, the level of impact is identified. The level of impact could be no impact, less than significant impact, or significant impact. If the impact is determined to be significant after the implementation of mitigation measures, the impact would be significant and unavoidable which requires a statement of overriding considerations in accordance with Section 15093 of the CEQA Guidelines.

Environmental Topics

The potential environmental effects associated with the implementation of the proposed project are analyzed in the following topical environmental issue areas:

Aesthetics
Agricultural Resources
Air Quality
Biological Resources
Cultural Resources
Geology and Soils
Greenhouse Gases
Hazards and Hazardous Materials
Hydrology and Water Quality
Land Use and Planning
Noise
Population and Housing
Public Services
Transportation and Traffic
Utilities and Service Systems
Energy Conservation

Organization of Issue Areas

Each environmental issue in Section 5 contains the following components:

- **Introduction** includes a brief discussion of the information used for the analysis.
- **Environmental Setting** identifies and describes the existing physical environmental conditions of the Planning Area associated with each of the impact sections.

- **Regulatory Setting** provides an understanding of the regulatory environment that exists prior to the implementation of the project. This discussion includes the existing objectives and policies from the City of Fresno 2025 General Plan as well as other regulations that currently exist.
- **Thresholds of Significance** identifies thresholds from Appendix G of the CEQA Guidelines that assist in determining the significance of an impact. Some thresholds include a more detailed discussion to address the City of Fresno's or other local agency's specific significance criteria for the Planning Area.
- **Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation** describes environmental changes to the existing physical conditions that may occur if the proposed project is implemented, and evaluates these changes with respect to the thresholds of significance. This section includes a project-specific impact analysis and a cumulative impact analysis. Mitigation measures are identified for potential significant project and cumulative impacts, if determined feasible. The mitigation measures are those measures that could avoid, minimize, or reduce an environmental impact. This section also includes a discussion of the level of significance after mitigation that describes the level of impact significance remaining after mitigation measures are implemented.

Level of Significance

Determining the severity of project and cumulative impacts is fundamental to achieving the objectives of CEQA. CEQA Guidelines Section 15091 requires that decision makers mitigate, as completely as is feasible, the significant impacts identified in the Master EIR. If the Master EIR identifies any significant unmitigated impacts, CEQA Guidelines Section 15093 requires decision makers in approving a project to adopt a statement of overriding considerations that explains why the benefits of the project outweigh the adverse environmental consequences identified in the Master EIR.

The level of significance for each impact examined in this Master EIR is determined by considering the predicted magnitude of the impact against the applicable threshold. Thresholds are developed using criteria from the CEQA Guidelines and checklist; State, federal, and local regulatory schemes; local/regional plans and ordinances; accepted practice; consultation with recognized experts; and other professional opinions.

Format Used for Impact Analysis and Mitigation Measures

The format adopted in this Master EIR to present the evaluation of impacts is described and illustrated below.

Summary Heading of Impact

Impact AES-1:	**An impact summary heading appears immediately preceding the impact description (Summary Heading of Impact in this example). The impact abbreviation identifies the section of the report (AES for Aesthetics in this example) and the sequential order of the impact (1 in this example) within that section. To the right of the impact number is the impact statement, which identifies the potential impact.**

Project Impact Analysis

A narrative analysis follows the impact statement. The analysis includes a listing of objectives and policies of the General Plan Update and standards and regulations of the Development Code Update that would reduce the potential environmental impact of future development.

Cumulative Impact Analysis

A narrative analysis of cumulative impacts follows each impact statement. The cumulative impacts analysis includes a discussion of the level of impact that would occur if the proposed project in combination with cumulative development as described in Section 4, General Description of Environmental Setting, of this Master EIR, are implemented. If the combined level of impact is no impact, or less than significant impact, the project's incremental effect would be less than cumulatively considerable. If the combined level of impact is potentially significant or significant, the project's incremental effect is determined after the applicable objectives, policies, standards, and regulations of the proposed General Plan and Development Code Update are taken into account.

Mitigation Measures

Mitigation measures to reduce potential project-specific and cumulative impacts are set off with a summary heading and described using the format presented below:

MM AES-1 Project-specific or cumulative mitigation is identified that would reduce the impact to the lowest degree feasible. The mitigation number links the particular mitigation to the impact with which it is associated (Impact AES-1 in this example).

Level of Significance After Mitigation

This section identifies the resulting level of significance of the project-specific or cumulative impact following mitigation.

Abbreviations used in the mitigation measure numbering are shown in Table 5-1, below.

Table 5-1: Environmental Issue Abbreviations

Code	Environmental Issue
AES	Aesthetics
AG	Agricultural Resources
AIR	Air Quality
BIO	Biological Resources
CUL	Cultural Resources
GEO	Geology and Soils
GHG	Greenhouse Gases
HAZ	Hazards and Hazardous Materials
HYD	Hydrology and Water Quality
LUP	Land Use and Planning
NOI	Noise
PH	Population and Housing
PS	Public Services
TRANS	Transportation and Traffic
USS	Utilities and Service Systems
EN	Energy

5.1 - Aesthetics

5.1.1 - Introduction

The following evaluation addresses scenic vistas, scenic resources, visual character, and light and glare throughout the Planning Area. The potential for visual impacts to occur as a result of future development in accordance with the proposed project is evaluated.

5.1.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding aesthetics is the City of Fresno Planning Area because potential development under the City of Fresno 2035 General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative aesthetics impacts is the City of Fresno Planning Area and the portions of Fresno County located outside the Planning Area as well as portions of the City of Clovis and the County of Madera that can be viewed from, and have views of, the Planning Area. This analysis will be based on a summary of projections approach as provided in Section 15130(b)(1)(B) of the CEQA Guidelines. The applicable projections include growth projections from the Fresno County 2000 General Plan, Madera County General Plan (1995), and buildout projections within the City of Clovis 1993 General Plan.

Scenic Vistas

A scenic vista is a viewpoint that provides a distant view of highly valued natural or man-made landscape features for the benefit of the general public. Typical scenic vistas are locations where views of rivers, hillsides, and open space areas can be obtained as well as locations where valued urban landscape features can be viewed in the distance.

Based on a review of the City of Fresno 2025 General Plan, the City has not identified or designated scenic vistas. Although no scenic vista has been designated, scenic vistas within the Planning Area could provide distant views of natural landscape features such as the San Joaquin River along the northern boundary of the Planning Area and the foothills of the Sierra Nevada Mountain Range. The River bluffs provide distant views of the San Joaquin River as well as areas north of the River. However, the majority of these views are from private property. There are limited views of the San Joaquin River from Weber Avenue, Milburn Avenue, McCampbell Drive, Valentine Avenue, Palm Avenue, State Route 41, Friant Road, and Woodward Park. There are various locations throughout the eastern portion of the Planning Area that provide views of the Sierra Nevada foothills that are located northeast and east of the Planning Area. These distant views of the Sierra Nevada foothills are impeded many days during the year by the poor air quality in the Fresno region. Distant views of man-made landscape features include the Downtown Fresno buildings that provide a unique skyline.

Scenic Resources

Scenic resources include landscapes and features that are visually or aesthetically pleasing. They contribute positively to a distinct community or region. These resources produce a visual benefit upon communities. The scenic resources within the Planning Area include landscaped open spaces such as parks and golf courses. Additional scenic resources within the Planning Area include areas along the San Joaquin River due to the topographic variation in the relatively flat San Joaquin Valley. The River bluffs provide a unique geological feature in the San Joaquin Valley. Historic structures in Downtown Fresno buildings also represent scenic resources because they provide a unique skyline.

Existing Visual Character

Visual character is a description of the attributes within a specific area. The Planning Area contains various distinctive visual attributes or characteristics, and they are generally located in Downtown, within suburbs, along corridors of major thoroughfares, within industrial areas, rural residential areas, and agricultural areas.

The Downtown area is the urban core of the City with high-rise buildings that contain a variety of land uses. The most common building types within Downtown are mixed-use buildings, theaters, civic/institutional buildings, and industrial warehouses. The Downtown area contains many structures that provide historic design elements. The suburbs contain low-rise neighborhood buildings that are primarily dominated by single-family residential uses. Supporting uses within the suburbs include retail, office, church, schools, parks, and other public facilities. Corridors consist of primarily low-rise commercial, residential, and industrial uses that are located along major thoroughfares within the City such as Herndon Avenue, Shaw Avenue, Ventura Canyon Avenue/Kings Canyon Road, Blackstone Avenue, and Clovis Avenue. There are three primary areas of industrial uses including area south of Downtown, along State Route 99, and adjacent to the Fresno-Yosemite International Airport. These areas are characterized by large low-rise buildings with manufacturing, processing and warehouse uses as well as utility equipment and service yards.

Light and Glare

The majority of the Planning Area within the existing City limits is urbanized, with significant sources of light and glare, such as streetlights, parking lots, interior lights from Downtown buildings, lighted recreational facilities, and light emitted from residential and non-residential buildings throughout the Planning Area. Limited lighting currently exists in rural residential and agricultural areas that are located within the southeastern and western portions of the Planning Area. Buildings and structures made with glass, metal, and polished exterior or roofing materials exist throughout the Planning Area. These surfaces as well as the natural and manmade light sources could result in localized glare.

5.1.3 - Regulatory Setting

Existing Policies Applying to the Planning Area

Below are summaries of major state and local policies that are applicable to the study area regarding visual resources.

State Policies

State Scenic Highway Program

The State Scenic Highway Program was created by the Legislature in 1963 with the purpose of protecting and enhancing the natural scenic beauty of California highways and adjacent corridors through special conservation treatment. The state laws governing the Scenic Highway Program are in Section 260-263 of the Streets and Highways Code. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been officially designated. The status of a proposed state scenic highway changes from eligible to officially designated when the following happens: local governing body applies to Caltrans for scenic highway approval, adopts a Corridor Protection Program, and receives notification that the highway has been officially designated a Scenic Highway (California Department of Transportation, 2012).

According to the California Department of Transportation mapping of State Scenic Highways (http://www.caltrans.ca.gov/hq/LandArch/scenic_highways/fresno.htm), the County of Fresno does not have officially designated State Scenic Highways. Fresno County has three eligible State Scenic Highways, and the nearest eligible highways are east of the Planning Area along State Route 180 (approximately 7 miles east of the Planning Area) and along State Route 168 east of the City of Clovis (approximately 5 miles east of the Planning Area). The nearest designated State Scenic Highway within the County of Madera is located more than 30 miles northeast of the Planning Area. There are no eligible or officially designated State Scenic Highways within the Planning Area.

City of Fresno Policies

The principal tools used by the City of Fresno to regulate urban design are the General Plan and zoning ordinance. The General Plan governs the distribution and intensity of land uses, sets the principles for evaluating development and guides the development and growth of the City. The Zoning Ordinance establishes specific development criteria for each zoning district (i.e. parking requirements, walls, fencing, setbacks, building height, etc.).

City of Fresno Zoning Ordinance - Urban Growth Management

The City's Zoning Ordinance contains Article 4.5, Urban Growth Management Ordinance of the City of Fresno. This area is designated on the City's Zoning Map and is generally located in and around the city's fringe and is either relatively undeveloped or is predominantly agricultural in use and lacks most, if not all, municipal facilities, improvements, or services necessary to serve residential, commercial, industrial, or other type of development. The purpose of the Urban Growth Management Ordinance of the City of Fresno is to achieve the orderly use and development of land by providing a process under the Subdivision Ordinance Article 10, Chapter 12, or the Zoning Ordinance for the construction or modification of buildings and structures in such Area or the change of occupancy of such buildings or structures (City of Fresno Municipal Code. Section 12-4.501).

An integral part of Urban Growth Management is a process referred to as the Urban Growth Management Process. This process is intended to neither prevent any development or growth, or to permit free or disorganized development or growth in the Urban Growth Management Area. The process is instead intended to identify the demands on municipal facilities, improvements, or

services created by any proposed residential, commercial, industrial, or other type of development and to provide the means for satisfying such demands; to identify any deleterious effects of any such development and protect the city and its residents against such effects by minimizing the costs of municipal facilities, improvements, and services; and to maintain a high quality of such facilities, improvements, and services (City of Fresno Municipal Code, Section 12-4.501).

City of Fresno 2025 General Plan

Below are the objectives and policies that relate to aesthetics from the Urban Form Element of the currently adopted Fresno 2025 General Plan.

Image/Gateway and Streetscapes

C-18. OBJECTIVE: Enhance the visual image of all "gateway" routes entering the Fresno metropolitan area.

C-18-a. Policy: Through unified design requirements, encourage the development of gateways which welcome travelers to the city's activity centers.

C-18-b. Policy: Gateway designation shall apply to key access routes such as Freeways 99, 41, 168, and 180; passenger rail rights-of-way; Peach Avenue and Clinton Way where air travelers enter Fresno; Van Ness/Fulton, Divisadero, Tulare, Fresno, Blackstone/Abby, Shaw and Herndon Avenues should also receive a greater emphasis on streetscape improvements to identify them as special entryways.

C-18-c. Policy: Identify and designate any other entry routes which serve as gateways.

C-18-d. Policy: Prepare and adopt a master plan for Fresno area gateways, expanding the design concept of the Central Area Streetscape Master Plan.

C-18-e. Policy: Pursue funding to ensure systematic implementation of gateway enhancement plans and programs.

C-18-f. Policy: Work with Caltrans, the Council of Fresno County Governments, Tree Fresno, neighboring jurisdictions, and other organizations to obtain funding for highway beautification programs.

C-18-g. Policy: Support and pursue the recommendations of the Fresno County Council of Governments Highway 99 Beautification Master Plan.

C-18-h. Policy: Properties adjacent to both sides of a gateway should be designed to provide a sense of entry and transition, and serve as initial information points for visitors. They should be highlighted by more prominent landscaping, special lighting, orientation signs, and symbols or logos.

C-18-i. Policy: *Placement* of building footprints along gateway areas should be carefully evaluated.

C-18-j. Policy: Potentially unsightly land uses may be restricted, or may be subject to special design/buffering standards, to protect viewscapes along gateways.

C-19. OBJECTIVE: Develop and implement streetscape plans to establish cohesive and aesthetic major and local street design patterns by using distinctive features.

C-19-a. Policy. Use a well-balanced variety and spacing of trees with standards established by the city's Parks Division to establish visual continuity for each streetscape and to achieve coherent linkages between public and private spaces.

C-19-b. Policy. Properties fronting on major streets shall be improved with landscaped setbacks and sidewalks which reflect a continuity of design, depth, and planting materials. This should include unified design of street furniture and walls.

C-19-c. Policy. Pursue, through use of both public and private funding, full landscaping of all completed median islands.

C-19-d. Policy. Where appropriate, local streets should be developed as "urban parkways" with landscaping and pedestrian spaces.

C-19-e. Policy. Working with utility companies the city will continue to pursue the undergrounding of overhead utilities as feasible.

Image/Site and Building Design

C-20. OBJECTIVE: As part of the city's project review process, major emphasis will be given to site and building design in order to preserve functionality and community aesthetics.

C-20-a. Policy. Utilize plan implementation /advisory committees, as established through adopted community plans and/or specific plans and city council actions, to review and make recommendations on proposed developments.

C-20-b. Policy. Consider implementation of the recommendations of the Architectural Review Committee as contained in the Design Review Guidelines manual of January 2002 submitted to the Planning and Development Department.

C-20-e. Policy. Consider innovative lot designs and patterns to enhance community livability in residential projects and to most efficiently utilize land for all types of projects.

C-20-d. Policy. Development projects shall be designed with appropriate layouts that provide sufficient areas for all proposed activities, for support functions, and for efficient and safe vehicular and pedestrian access.

- Appropriate space shall be provided for activities proposed (e.g., indoor area for display of merchandise, as opposed to "sidewalk"/parking lot display).

- Sufficient space and access shall be provided for support functions, (e.g., storage, loading, parking, waste disposal/recycling).
- Particular attention shall be given to location of proposed customer parking areas so as to not discourage pedestrian, bicycle and other forms of transit to the project site and so as to encourage multi-modal transit activity centers.
- Safe vehicular, bicycle, and pedestrian access shall be provided and maintained. Access for the disabled shall be incorporated into project designs as required.
- Buildings in shopping centers should be linked by pedestrian walkways.
- Business and industrial parks should be created as integrated, "campus-like" settings, with uniformity of improvements and shared facilities for parking, loading, mass transit, and with internal and external bicycle and pedestrian access.
- Structural conversions and changes of occupancy shall demonstrate compliance with building and zoning codes.

C-20-e. Policy Development projects shall include aesthetic measures which support functionality and add to the appearance and livability of the community.

C-20-f. Policy The project developer shall provide a set of documents and drawings that will allow assessment of the final building product. Materials, texture, and colors shall be noted on the original special permit drawings and on construction plans.

- Development projects shall appropriately interface with adjacent properties.
- High-contrast or gaudy building facades, lighting and signage which create disharmony with adjacent properties, or which draw undue attention, should be avoided.
- Locate service truck access, loading zones, and waste storage/recycling areas at the maximum practical distance from residences and other living quarters.
- Shopping centers shall have internally unified building design, landscaping, and signage.
- Building facades shall include design features and decorative treatments. Visible sides of buildings shall not develop with featureless, "blank" walls.
- Adequately screen roof-mounted mechanical equipment, and ensure that such equipment adheres to noise standards as set forth in the General Plan Noise Element and City Noise Ordinance.
- Apply and enforce the city's Sign and Outdoor Advertising Ordinances. Pursue the amortization and removal of nonconforming and illegal signs and outdoor advertising structures.
- Landscaping and parking lot shading shall be employed for environmental and aesthetic improvement, while observing safe lines-of-sight along access routes.

- Exterior lighting shall not create glare for neighboring properties, but shall provide adequate on-site lighting for safety and security purposes.

C-20-g. Policy. Standards and guidelines shall ensure that metal buildings function as an acceptable and economical form of structures in specially defined areas, including areas adjacent to existing residential neighborhoods, along gateways, and areas adjacent to listed historic structures.

- New buildings with metal walls or metal roofs shall have appropriate finishes.
- Improve metal building appearance by use of steeper roof slopes and fascias, defined entryways, contrasting colors, concealed fasteners, parapet walls, and other treatments.
- Screen all unsightly mechanical equipment with parapet walls, mechanical wells, or other means. Roof vent color should match that of the roof. The distinctive pattern of ribs and joints in standing seam and other metal roofing materials should coordinate dimensionally with similar elements in exterior walls.
- The shape and slope of roof forms can enhance character and scale and should blend with surrounding buildings.
- Roof and wall colors, when appropriate, should also be coordinated with those on surrounding facades.

C-21. OBJECTIVE: Incorporate the following design considerations and practices for single-family clustered projects, multi-family, and residential/ institutional projects.

C-21-a. Policy. An architectural theme shall be established for each development, including visually enhanced architectural features and building materials (which shall be applied throughout the development, particularly where visible to street frontages and adjacent properties).

C-21-b. Policy. In order to promote attractive external appearances and appealing living environments, design measures should be utilized to avoid large scale massive and repetitive "institutional" visual appearances, and to provide a more varied, small scale appearance suggestive of single-family residential development.

C-21-c. Policy. The design measures should include variations of the building footprints with indentations, projections and offsets; variations in the exterior walls using a variety of materials and features such as balconies, bay windows, verandas and entryways and varied roof forms with slopes, ridges and valleys suggestive of single-family residential structures.

G-21-d. Policy. Utilize the cluster planned development criteria and standards where applicable (FMC Section 12-306-N-2 1).

C-21-e. Policy. Design pedestrian and vehicular entrances, walkways, parking areas, open spaces, common facilities, structures and fencing to inhibit uncontrolled access by nonresidents and facilitate surveillance by residents, property managers and law enforcement or security personnel. Vehicular access gates may be used when they can be safely installed.

C-21-f. Policy. Fences and walls along street frontages shall be designed to be architecturally compatible, aesthetically pleasing, and durable with easy pedestrian access to nearby commercial uses.

C-21-g. Policy. Ensure adequate covered parking and overall supply of parking to reflect the actual parking demand of these residential projects and permit an evaluation of a variety of measures such as fully-enclosed garages, multistory parking structures, underground parking and shared facilities. In the comprehensive update of the zoning ordinance, the standards for the parking requirements for residential projects shall be reevaluated.

Image/Community Maintenance and Beautification

C-22. OBJECTIVE: The city will focus efforts on maintaining and improving area health, safety, quality of life, image, and attractiveness through programs which prevent and abate blighting influences.

C-22-a. Policy. The city will implement its newly expanded and proactive Code Enforcement Division activity to remove more public nuisances in a timely manner, through the following:

- maintain efficiency in resolving complaints, and institute proactive code enforcement programs which can abate violations before they engender complaints.
- utilize the Exterior Building Maintenance Ordinance to implement required renovation or removal of unsafe, unsightly structural conditions.
- continue to expedite seasonal weed abatement.
- establish a coordination program among the Code Enforcement Division, City Business Licensing, and the Planning and Development Department to ensure that businesses obtain required entitlements and remain in conformance with established land use conditions and city ordinances (including signage regulations).
- seek grant funding to improve Fresno's tire abatement program.
- work with the Police Department to increase prosecution of illegal dumping.
- improve cost recovery practices so that violators reimburse the city for code enforcement activity.

C-22-b. Policy. Maintain and enhance, as feasible, Community Sanitation's efforts toward litter clean-up and abatement of trash stockpiles on public and private streets.

C-22-c. Policy. Pursue funding for, and support of, building facade improvement programs to refurbish older commercial districts.

C-22-d. Policy. Continue and expand the city's effective Graffiti Abatement Program.

- Maintain city restrictions on spray paint sales to minors, and continue to work with Fresno County in an effort to get a parallel county ordinance.

- Direct resources to support an appropriate number of graffiti abatement vehicles to allow this vandalism to be obliterated within 24 to 48 hours.

Below are the objective and policies that relate to aesthetics from the Public Facilities Element of the currently adopted Fresno 2025 General Plan.

Transportation/Streets and Highways

E-4. OBJECTIVE: Preserve and provide scenic corridors by application of appropriate policies and regulations.

E-4-a. Policy. Implement measures to preserve and develop scenic or aesthetic qualities along those streets and highways designated as scenic corridors or boulevards by the adopted 2025 Fresno General Plan Land Use and Circulation Map.

At a minimum the following streets or highways are to be designated as "scenic corridors or boulevards." While additional streets of neighborhood significance may be designated by community or specific plans:

- Van Ness Boulevard – Weldon to Shaw
- Van Ness Extension – Shaw to San Joaquin River Bluff
- Kearney Boulevard – Fresno Street to Polk
- Van Ness-Fulton couplet – Weldon to Divisadero
- Butler Avenue – Peach to Fowler
- Minnewawa Avenue – Belmont to Central Canal
- Huntington Boulevard – First to Cedar
- Shepard Avenue – Friant to Willow
- Audubon Drive – Blackstone to Herndon
- Friant Road – Audubon to Millerton Road
- Tulare Avenue – Sunnyside to Armstrong
- Ashlan Avenue – Palm to Maroa

E-4-c. Policy. Preservation of street trees lining designated scenic corridors or boulevards should take precedence when private or public access involve scenic corridors or boulevards.

E-4-d. Policy. Maintenance and replacement of specimen trees along scenic corridors or boulevards should be done with attention to the impact on the visual quality of the area.

E-4-e. Policy. Replacement shall be done with trees of the predominant type and in a comparable pattern to existing plantings if there will be no detriment to public safety.

5.1.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impacts on the environment. The criteria used to determine the significance of

an impact to aesthetics are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, aesthetics impacts resulting from the proposed project are considered significant if the project would:

a) Have a substantial adverse effect on a scenic vista? (See Scenic Vista, Impact AES-1)

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway? (See Scenic Resources within a State Scenic Highway, Impact AES-2)

c) Substantially degrade the existing visual character or quality of the site and its surroundings? (See Visual Character, Impact AES-3)

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? (See Light or Glare, Impact AES-4)

5.1.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Scenic Vista

Impact AES-1 **The project would not have a substantial adverse effect on a scenic vista.**

Project Specific Impact Analysis

The currently adopted 2025 General Plan for the City of Fresno does not designated any locations within the Planning Area as a scenic vista; however, the proposed General Plan Update identifies six locations along the San Joaquin River bluffs. Distant views of highly valued features such as the San Joaquin River, the foothills of the Sierra Nevada, and the Downtown Fresno buildings are provided in within the Planning Area. However, public views of the San Joaquin River from the Planning Area are limited due to the presence of private property located adjacent to the River. Public views of the foothills of the Sierra Nevada are provided within the eastern portion of the Planning Area. These public views are primarily provided along existing roadways. Although views of the foothills are provided from these roadways, the views are impeded due to the poor air quality within the Fresno area. The scenic views from the San Joaquin River bluffs are not expected to be substantially affected since the land uses under the General Plan Update are similar to current land uses. The implementation of future development associated with the General Plan and Development Code Update would result in a less than significant impact on existing public scenic vistas.

Public views of the Downtown Fresno buildings provide a unique skyline within the San Joaquin Valley. Due to the relatively flat topography, existing development and landscaping, views of the unique skyline are primarily limited to areas within the Downtown Fresno area. The interchanges at the freeways that border the Downtown Fresno area provide elevated views of the existing high rises while views of the existing low-rise buildings are impeded by existing vegetation. The implementation of the General Plan and Development Code will allow future development in the Downtown area. This future development could include additional high rises; however, given the

limited views from outside the Downtown Fresno area, existing scenic vistas would result in a less than significant impact.

Cumulative Impact Analysis

The implementation of cumulative development that is located outside of the Planning Area such as development that would occur within the City of Clovis, the County of Fresno, and the County of Madera, would not result in the potential to impact the limited scenic vistas to view the San Joaquin River or the Downtown Fresno skyline because the vista is located within the Planning Area. Cumulative development has the potential to reduce distant views of the Sierra Nevada foothills east of the Planning Area along existing roads; however, due to the relatively flat topography and poor air quality that reduce views of the foothills; future cumulative development would result in less than significant cumulative impacts on scenic vistas. Therefore, the implementation of the General Plan and Development Code Update would result in less than significant cumulative impacts.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Scenic Resources within a State Scenic Highway

Impact AES-2	**The project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway.**

Project Specific Impact Analysis

According to the California Department of Transportation mapping of State Scenic Highways (http://www.caltrans.ca.gov/hq/LandArch/scenic_highways/fresno.htm), the County of Fresno does not have any officially designated State Scenic Highways, but has three eligible State Scenic Highways. The nearest eligible highways are east of the Planning Area along State Route 180 (approximately 7 miles east of the Planning Area) and along State Route 168 east of the City of Clovis (approximately 5 miles east of the Planning Area). Since there are no eligible or officially designated State scenic highways within the Planning Area, future development in accordance with the General Plan and Development Code Update would not impact a designated state scenic highway. , The eligibility of the three State Scenic Highways near the Planning Area, scenic resources located within the highway segments or its viewshed would not be impacted by future development as well.

Therefore, future development within the Planning Area would not impact scenic resources within a state scenic highway located well outside of the Planning Area.

Cumulative Impact Analysis

Since there are no designated State Scenic Highways within Fresno County, cumulative development within the City of Clovis and County of Fresno would not impact State Scenic Highways. In addition, the nearest State Scenic Highway in the County of Madera is located more than 30 miles northeast of the Planning Area. Therefore, future development in accordance with the General Plan and Development Code Update would result in no cumulative impact on State Scenic Highways.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

No impact.

Cumulative

No impact.

Visual Character

Impact AES-3	**The project would substantially degrade the existing visual character or quality of the site and its surroundings.**

Project Specific Impact Analysis

The proposed General Plan and Development Code Update would result in a substantial alteration to the existing urban form and character of the existing Planning Area. The Update will provide for a substantial increase in residential units (approximately 85 percent increase compared to the existing units) and buildings occupied by non-residential uses (approximately 90 percent increase in square footage compared to the existing square footage). These non-residential uses include commercial, office, public facilities, mixed uses, and industrial. Based on the Update, roughly half of future residential units will be located within the existing City limits, primarily within Downtown Fresno, mixed-use centers, and along major transit corridors such as Blackstone Avenue and Ventura Avenue-Kings Canyon Road.

In addition to future development within the existing City limits, there is a substantial amount of development that is planned for areas outside the existing City limits and within the Planning Area. There are various development areas (i.e., West Development Area, Southwest Development Area, and Southeast Development Area) that will include a variety of land uses that will replace existing rural and agricultural uses as well as open space. This land use replacement will substantially alter

the visual character within the areas that are outside of the existing City limits through the increase of densities and intensification of land uses. Significant visual character impacts are expected to occur from views within the Planning Area as well as from views that are outside the Planning Area such as properties within the County of Fresno, the City of Clovis, and possibly the County of Madera.

To reduce potential visual character impacts within the Planning Area, the General Plan Update includes the following objectives and policies within the Urban Form, Land Use and Design Element and the Mobility and Transportation Element.

Urban Form, Land Use and Design Element

Policy UF-1-c: Legible City Structure. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people, and pedestrian-oriented activity in Downtown; along a small number of prominent east-west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lanes and streets.

Policy UF-1-e. Unique Neighborhoods. Promote and protect unique neighborhoods and mixed use areas throughout Fresno that respect and support various ethnic, cultural and historic enclaves; provide a range of housing options, including furthering affordable housing opportunities; and convey a unique character and lifestyle attractive to Fresnans. Support unique areas through more specific planning processes that directly engage community members in creative and innovative design efforts.

Objective UF-2. Enhance the unique sense of character and identity of the different subareas of the Downtown neighborhoods.

Objective UF-8. Develop each of Downtown's neighborhoods and districts, according to its unique character.

Policy UF-12-g. Impacts on Surrounding Uses. Establish design standards and buffering requirements for high-intensity Activity Centers to protect surrounding residential uses from increased impacts from traffic noise and vehicle emissions, visual intrusion, interruption of view and air movement, and encroachment upon solar access.

Policy UF-13-a. Future Planning to Require Design Principles. Require future planning, such as Specific Plans, neighborhood plans or Concept Plans, for Development Areas and BRT Corridors designated by the General Plan to include urban design principles and standards consistent with the Urban Form, Land Use, and Design Element.

Policy UF-1-f. Complete Neighborhoods, Densities, and Development Standards. Use Complete Neighborhood design concepts, development standards, and project reviews outside the Downtown Planning Area to achieve the development of Complete Neighborhoods and the residential density targets of the General Plan.

Objective UF-14. Create an urban form that facilitates multi-modal connectivity.

Policy UF-14-a. Design Guidelines for Walkability. Develop and use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.

Objective LU-1. Establish a comprehensive citywide land use planning strategy to meet economic development objectives, achieve efficient and equitable use of resources and infrastructure, and create an attractive living environment.

Policy LU-1-b. Land Use Definition and Compatibility. Include zoning districts and standards in the Development Code that provide for the General Plan land use designations and create appropriate transitions or buffers between new development with existing uses, taking into consideration the health and safety of the community.

Policy LU-1-a. Promote Development within the Existing City Limits as of December 31, 2012. Promote new development, infill, and rehabilitation of existing building stock in the Downtown Planning Area, along BRT corridors, in established neighborhoods generally south of Herndon Avenue, and on other infill sites and vacant land within the City.

Objective LU-2. Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residents.

Policy LU-2-c. Infill Design Toolkit. Develop and distribute an infill design toolkit, consistent with the City's Infill Development Act to support and encourage infill development.

Policy LU-2-e. Neighborhood Preservation. Incorporate standards in the Development Code to preserve the existing small-scale residential quality of older neighborhoods.

Policy LU-3-b. Mixed-Use Urban Corridors that Connect the Downtown Planning Area. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon Road corridors, as shown on Figure LU-1: General Plan Land Use Diagram.

Policy LU-4-a. Neighborhood Nuisance Abatement. Continue proactive and responsive code enforcement and nuisance abatement programs to improve the attractiveness of residential neighborhoods.

Policy LU-5-g. Scale and Character of New Development. Allow new development in or adjacent to established neighborhoods that is compatible in scale and character with the surrounding area by promoting a transition in scale and architectural character between new buildings and established neighborhoods, as well as integrating pedestrian circulation and vehicular routes.

Policy LU-6-a. Design of Commercial Development. Foster high quality design, diversity, and a mix of amenities in new development with uses through the consideration of guidelines, regulations and design review procedures.

Policy LU-6-b. Commercial Development Guidelines. Consider adopting commercial development guidelines to assure high quality design and site planning for large commercial developments, consistent with the Urban Form policies of this Plan.

Policy LU-6-d. Neighborhood and Community Commercial Center Design. Plan for neighborhood mixed use and community commercial uses to implement the Urban Form concepts of this Plan, promote the stability and identity of neighborhood and community shopping areas, and allow efficient access without compromising the operational effectiveness of the street system.

- Neighborhoods will be anchored by community commercial centers with a mix of uses that meet the area's needs and create a sense of place.
- Community commercial centers will be located within Activity Centers.

Policy LU-6-e. Regional Center Planning and Design. Promote economic growth with regional commercial centers.

- New regional commercial centers will be located with access to State Routes and/or other major transportation facilities to ensure access from throughout the region.
- Regional shopping centers will have internally-unified building design, landscaping, and signage standards.

Policy LU-6-f. Auto-Oriented Commercial Uses. Direct highway-oriented and auto-serving commercial uses to locations that are compatible with the Urban Form policies of the General Plan. Ensure adequate buffering measures for adjacent residential uses noise, glare, odors, and dust.

Policy LU-9-e. Downtown Sightline. Require new development to preserve existing sightlines to Downtown to the extent feasible.

Policy LU-9-f. View Corridors. Promote new view corridors that highlight the Downtown skyline.

Objective D-1. Provide and maintain an urban image that creates a "sense of place" throughout Fresno.

Policy D-1-d. Public Art. Continue to promote a citywide public art program that contributes to an awareness of the City's history and culture.

Policy D-1-e. Graphic Identity. Continue the preservation, promotion, procurement and strategic location of landmarks, monuments and artwork that provide orientation and represent Fresno's cultural heritage and artistic values.

Policy D-1-h. Screening of Parking. Continue requiring all new development with parking in Activity Centers and along corridors to be screened or concealed. Locate principal pedestrian entrances to new non-residential buildings on the sidewalk; any entrances from parking areas should be incidental or emergency use only.

Objective D-2. Enhance the visual image of all "gateway" routes entering the Fresno Planning Area.

Policy D-2-a. Design Requirements for Gateways. Consider unified design requirements for gateways to welcome travelers to the City's Activity Centers.

Policy D-2-c. Highway Beautification. Work with Caltrans, the Fresno Council of Governments, Tree Fresno, neighboring jurisdictions, and other organizations to obtain funding for highway beautification programs.

Objective D-3. Create unified plans for Green Streets, using distinctive features reflecting Fresno's landscape heritage.

Policy D-3-a. Green Street Tree Planting. Create a Green Street Tree Planting Program, with a well-balanced variety and spacing of trees to establish continuous shading and visual continuity for each streetscape. Strive to achieve coherent linkages between public and private spaces, prioritizing tree planting along tree-deficient Arterial and Collector Roadways in neighborhoods characterized by lower per capita rates of vehicle ownership.

Policy D-3-b. Funding for Green Street Tree Planting Program. Pursue funding for the Green Street Tree Planting Program, including landscaping of median islands.

Policy D-3-c. Local Streets as Urban Parkways. Develop local streets as "urban parkways,", where appropriate, with landscaping and pedestrian spaces.

Policy D-3-d. Undergrounding Utilities. Partner with utility companies to continue to pursue the undergrounding of overhead utilities as feasible.

Objective D-4. Preserve and strengthen Fresno's overall image through design review and create a safe, walkable and attractive urban environment for the current and future generations of residents.

Policy D-4-f. Design Compatibility with Residential Uses. Strive to ensure that all new non-residential land uses are developed and maintained in a manner complementary to and compatible with adjacent residential land uses, to minimize interface problems with the surrounding environment and to be compatible with public facilities and services.

Objective D-5. Maintain and improve community appearance through programs that prevent and abate blighting influences.

Policy D-5-a. Code Enforcement. Continue enforcement of the Fresno Municipal Code to remove or abate public nuisances in a timely manner:

Policy D-5-b. Clean Streets. Promote community partnerships and continued City efforts toward litter clean-up and abatement of trash stockpiles on public and private streets.

Policy D-5-c. Facade Improvements. Pursue funding for, and support of, building facade improvement programs.

Policy D-5-d. Graffiti Prevention and Abatement. Seek ways to end graffiti, continue and expand the City's effective Graffiti Abatement Program.

Policy D-6-b. Consider adopting and implementing incentives for, and support efforts by,, private development to incorporate culturally-specific architectural elements in areas with a predominant ethnic population.

Mobility and Transportation Element

Objective MT-3. Identify, promote and preserve scenic or aesthetically unique corridors by application of appropriate policies and regulations.

Policy MT-3-a. Scenic Corridors. Implement measures to preserve and enhance scenic qualities along scenic corridors or boulevards, including:

- Van Ness Boulevard – Weldon to Shaw Avenues
- Van Ness Extension – Shaw Avenue to the San Joaquin River Bluff
- Kearney Boulevard – Fresno Street to Polk Avenue
- Van Ness-Fulton couplet – Weldon Avenue to Divisadero
- Butler Avenue – Peach to Fowler Avenues
- Minnewawa Avenue – Belmont Avenue to Central Canal
- Huntington Boulevard – First Street to Cedar Avenue
- Shepherd Avenue – Friant Road to Willow Avenue
- Audubon Drive – Blackstone to Herndon Avenues
- Friant Road – Audubon to Millerton Roads
- Tulare Avenue – Sunnyside to Armstrong Avenues
- Ashlan Avenue – Palm to Maroa Avenues

Policy MT-3-b. Preserve street trees lining designated scenic corridors or boulevards. Replace trees of the predominant type and in a comparable pattern to existing plantings if there is no detriment to public safety.

Although the above objectives and policies will reduce the potential visual character impacts from locations within and outside the Planning Area, the replacement of rural and agricultural uses and open space with urban land uses will continue to result in a substantial alteration of the visual character of the Planning Area. This substantial alteration is considered a significant visual character impact.

Cumulative Impact Analysis

The implementation of cumulative development that is located outside of the Planning Area such as development that would occur within the City of Clovis, the County of Fresno, and the County of Madera, is anticipated to contribute to the conversion of rural and agricultural land to urban uses. This conversion outside of the Planning Area is expected to result in a substantial alteration of the existing visual character of the area. Therefore, cumulative development will result in a significant impact. Since the proposed project will also result in a significant visual character impact even after the implementation of the General Plan Update goals, objectives, and policies, the project's contribution to cumulative visual alteration impacts in the project vicinity would be cumulatively considerable. Therefore, the project would result in a significant cumulative impact related to the existing visual character.

Mitigation Measures

Project Specific

No feasible mitigation measures are available.

Cumulative

No feasible mitigation measures are available.

Level of Significance After Mitigation

Project Specific

Significant impact.

Cumulative

Significant impact.

Light or Glare

Impact AES-4	**The project would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.**

Project Specific Impact Analysis

Development in accordance with the General Plan and Development Code Update will result in land use changes by increasing densities and intensities of land uses within the Planning Area. These land use changes include the development of new residential and non-residential land uses.

New development within the City limits could increase the amount of light from street lights, exterior lighting systems on private and public property, exterior lighting from buildings, and vehicular headlights. New development could also increase light with new illuminated signs and lighting systems to illuminate active play areas. The increase in lighting within the City limits could result in light spillover onto adjacent properties. In addition, the increase in light will substantially illuminate the sky at night. This increase in light illumination is considered a significant impact.

Outside of the existing City limits and within the Planning Area as well as areas directly adjacent to the Planning Area, many areas are exposed to a nominal amount of light due to the rural and

agricultural setting. New urban development will substantially alter these existing rural and agricultural areas. Increases in lighting systems will occur within new development throughout this area and could result in an increase in lighting adjacent to the Planning Area. Development will include new roads that will have lighting systems along the rights-of-way. Residential development will include lighting systems on properties to provide safety and security. Non-residential development will include lighting system for parking areas, buildings, and signs. Public facilities including active use parks will increase lighting to illuminate play areas for evening activities. With the increase in development in this area, there will be increases in nighttime traffic that will increase lighting from car headlights. Together, new development outside the existing City limits and within the Planning Area will increase the amount of light that could cause light spillover onto adjacent properties within and adjacent to the Planning Area and increase the illumination of the sky at night. This increase in light is considered a significant impact.

Development in accordance with the General Plan and Development Code Update will increase the amount of structures that could create new sources of glare within the Planning Area and directly adjacent to the Planning Area. These new sources of glare could be from materials used on building facades, parking lots, signs, roadway surfaces, and motor vehicles. Within the City limits, there are currently many sources of glare, and future development will add to the existing sources. Within the rural and agricultural areas, there are limited sources of glare. The primary sources of glare that will be added within the Planning Area will occur from vertical structures such as building facades and signs. Parking lots, roadway surfaces and motor vehicles do not create substantial amount of glare. Therefore, due to the substantial amount of new building square footage planned for the Planning Area, new buildings will result in a substantial increase in glare. This increase could result in significant glare impacts.

Cumulative Impact Analysis

The implementation of cumulative development that is located outside of the Planning Area such as development that would occur within the City of Clovis, the County of Fresno, and the County of Madera, will contribute to the increase in lighting in the project vicinity. However, future development within the County adjacent to the Planning Area is anticipated to be rural in character and therefore, any development within the County is expected to result in nominal increases in lighting. Future development within the City of Clovis is anticipated to include urban uses adjacent to the northeastern boundary of the Planning Area. This increase in lighting will occur from increases in new roads that will have lighting systems along the rights-of-way. New residential development will include lighting systems on properties to provide safety and security. Non-residential development will include lighting system for parking areas, buildings, and signs. Public facilities including active use parks will increase lighting to illuminate play areas for evening activities. Increases in light from development within the City of Clovis are anticipated to be significant. Furthermore, future development within the County of Madera may occur on the north side of the San Joaquin River. This potential development may include lighting systems for similar land uses as within the Planning Area. Overall, cumulative development is anticipated to result in a significant increase in lighting. Since the proposed project is expected to result in significant lighting impacts, the project's contribution to potential cumulative lighting impacts is cumulatively considerable. Therefore, the implementation of the project would result in significant cumulative lighting impacts.

With future development outside of the Planning Area, there will be increases in the amount of structures that could create new sources of glare. These new sources of glare could be from materials used on building facades, parking lots, signs, roadway surfaces, and motor vehicles. Therefore, cumulative development could create significant glare impacts. Since the proposed project is expected to result in significant glare impacts, the project's contribution to potential cumulative glare impacts is cumulatively considerable. Therefore, the implementation of the project would result in significant cumulative glare impacts.

Mitigation Measures

Project Specific

MM AES-1 Lighting systems for street and parking areas shall include shields to direct light to the roadway surfaces and parking areas. Vertical shields on the light fixtures shall also be used to direct light away from adjacent light sensitive land uses such as residences.

MM AES-2 Lighting systems for public facilities such as active play areas shall provide adequate illumination for the activity; however, low intensity light fixtures and shields shall be used to minimize spillover light onto adjacent properties.

MM AES-3 Lighting systems for non-residential uses, not including public facilities, shall provide shields on the light fixtures and orient the lighting system away from adjacent properties. Low intensity light fixtures shall also be used if excessive spillover light onto adjacent properties will occur.

MM AES-4 Lighting systems for freestanding signs shall not exceed 100 foot Lamberts (FT-L) when adjacent to streets which have an average light intensity of less than 2.0 horizontal footcandles and shall not exceed 500 FT-L when adjacent to streets which have an average light intensity of 2.0 horizontal footcandles or greater.

MM AES-5 Materials used on building facades shall be non-reflective.

Cumulative

Implementation of Mitigation Measures AES-1 through AES-5 is required.

Level of Significance After Mitigation

Project Specific

Significant impact. The illumination of the sky at night will remain significant. Lighting on properties adjacent to lighting systems will be less than significant. Glare impacts will be less than significant.

Cumulative

Significant impact. The project's contribution of the illumination of the sky at night will remain cumulatively significant. Lighting impact on properties adjacent to lighting systems will be less than cumulatively significant. Glare impacts will also be less than cumulatively significant.

5.2 - Agricultural Resources

5.2.1 - Introduction

This section addresses potential environmental impacts to agricultural resources resulting from implementation of the proposed General Plan and Development Code Update. Information obtained from the City of Fresno has been used to determine the existing agricultural setting within the Planning Area. Information on types of crops grown and impact on crops as well as impacts on the value of the soils are economic effects and are not addressed because economic effects are not required to be treated as significant environmental effects (CEQA Guidelines Section 15131). In addition, the proposed General Plan and Development Code Update would result in the loss of farmland and the City acknowledges that there are no feasible measures to replace the loss of farmland.

5.2.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding agricultural resources is the Planning Area because potential development under the General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative agricultural resources impacts is the area surrounding the Planning Area including land under the jurisdiction of the County of Fresno, City of Clovis, and County of Madera.

Regional Setting

Central California is one of the world's premier growing regions. The Fresno region is characterized as a mature agricultural area, with a well-defined pattern of farming activities. Much of the land under agricultural operations is devoted to relatively stable crops such as orchards and vineyards. The primary crops within Fresno and Madera Counties include fruits and nuts, livestock and poultry, vegetable crops, and field crops.

Local Setting

Based on existing farmland data received from the Fresno County Assessor's Office Land Use Codes that were provided by City staff, there is a total of approximately 11,714 acres that have agricultural operations within the Planning Area. The primary agricultural uses are located outside the existing City limit. The southeast portion of the Planning Area, referenced in the General Plan as the Southeast Development Area, or SEDA, contains approximately 50 percent of the existing farming in the Planning Area.

5.2.3 - Regulatory Setting

Farmland Protection Policy Act (FPPA)

The FPPA was designed to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. This act assures that to the extent possible federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Federal agencies are required to develop and review their policies and procedures to implement the FPPA every two years. This act does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners. For the purposes of the act, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land (NRCS, 2012).

Farmland Mapping and Monitoring Program

The California Department of Conservation established the Farmland Mapping and Monitoring Program (FMMP) in 1982. The FMMP is a non-regulatory program and provides a consistent and impartial analysis of agricultural land use and land use changes throughout California. The FMMP produces maps and statistical data used for analyzing impacts on California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status. The best quality land is called Prime Farmland with additional categories, including Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. The maps are updated every two years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. The farmland mapping categories that are used for the County of Fresno are shown below in Table 5.2-1:

Table 5.2-1: Description of Farmland Classifications

Farmland Category	Description
Prime Farmland (P)	Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
Farmland of Statewide Importance (S)	Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
Unique Farmland (U)	Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
Farmland of Local Importance (L)	Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

Farmland Category	Description
	In Fresno County, this category is defined as all farmable lands within Fresno County that do not meet the definitions of Prime, Statewide, or Unique. This includes land that is or has been used for irrigated pasture, dry-land farming, confined livestock and dairy, poultry facilities, aquaculture and grazing land.1
Grazing (G)	Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.
Urban & Built- up Land (D)	Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
Other (X)	Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.
Water (W)	Perennial water bodies with an extent of at least 40 acres.
Optional Designation: Land Committed to Nonagricultural Use	This category was developed in cooperation with local government planning departments and county boards of supervisors during the public workshop phase of the FMMP's development in 1982. Land Committed to Nonagricultural Use is defined as existing farmland, grazing land, and vacant areas, which have a permanent commitment for development.
Source: http://www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx, Accessed April 16, 2012.	

Based on the farmland mapping categories identified above, Table 5.2-2 depicts the acreages of each category within the Planning Area and Exhibit 5.2-1 illustrates the location of each farmland category.

Table 5.2-2: Farmland Designations within the Planning Area per the Farmland Mapping and Monitoring Program

Designation	Acreage
Prime Farmland	9,550
Farmland of Statewide Importance	2,355
Unique Farmland	2,911
Farmland of Local Importance	9,070

Designation	Acreage
Urban/Developed	70,410
Rural Residential[1]	6,540
Natural Vegetation	1,915
Confined Animal Agriculture	150
Grazing	1
Vacant	2,530
Water	55
Semi-Agricultural/ Rural Commercial	540
Total[2]	106,027

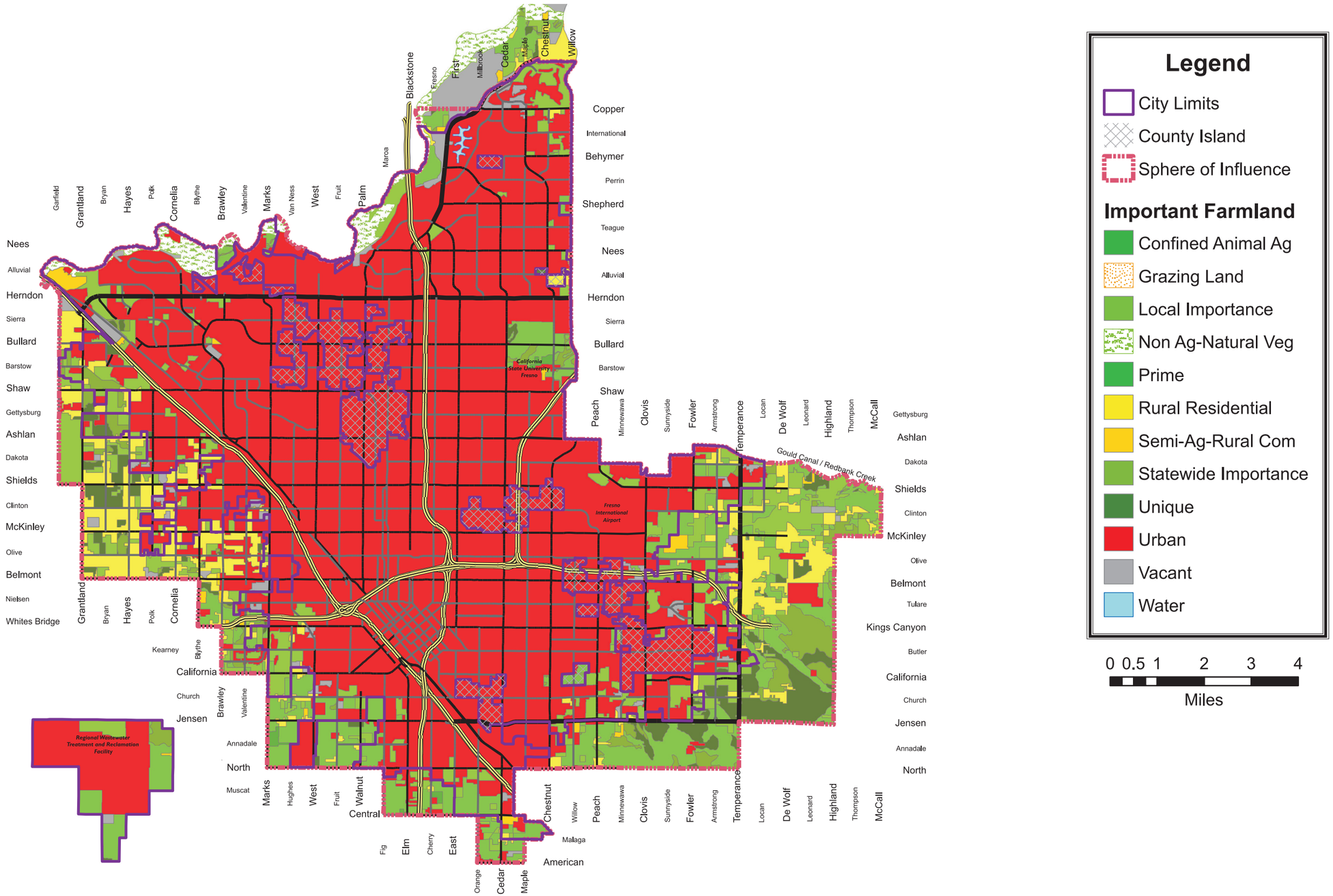
[1] Residential areas of 1 to 5 structures per 10 acres ("ranchettes") as defined by the FMMP
Source: California Department of Conservation, Important Farmland Mapping, 2010

As shown in Table 5.2-2, the Planning Area includes approximately 10,149 acres of Prime Farmland, approximately 2,559 acres of Farmland of Statewide Importance, and approximately 3,195 acres of Unique Farmland. The Planning Area includes approximately 15,903 acres of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. This represents approximately 16 percent of the Planning Area.

Land Conservation Act of 1965 (Williamson Act)

The California Land Conservation Act of 1965 (Williamson Act) enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses. In return, the landowners receive property tax assessments based on farming and open space uses, as opposed to full market value, thus resulting in a lower tax burden. These contracts are for 10 years and automatically renew the following year and roll into the next year unless the owner files a notice of non-renewal.

The purpose of the Williamson Act is to preserve agricultural and open space lands by discouraging premature and unnecessary conversion to urban uses. The minimum preserve size is 100 acres, and minimum standard contract size for Fresno County is 20 acres on Prime Farmland and 40 acres on non-prime within a preserve. The Williamson Act has a minimum contract size of 10 acres. The landowner can petition to cancel a contract, although the presiding jurisdiction must make a finding based on substantial evidence that supports the cancellation of the contract. Upon approval, the landowner must pay a fee equal to 12.5 percent of the unrestricted, current fair market valuation of the property.



Source: City of Fresno. CA Important Farmland Mapping, 2010

FirstCarbon® SOLUTIONS

Exhibit 5.2-1
Farmland Classifications

As shown in Table 5.2-3, the Planning Area contains approximately 748 acres of prime agricultural land that are under a Williamson Act Contract as well approximately 824 acres of non-prime agricultural land (i.e., Statewide Importance, Local Importance, or Unique). Exhibit 5.2-2 illustrates the locations of the Williamson Act Contract land. None of the land under Williamson Act Contract as of January 2014 has been issued a notice of non-renewal based on requests of the property owners. All non-renewal requests within the Planning Area have now resulted in termination of the contract.

Table 5.2-3: Farmland Under Williamson Act Contracts within the Planning Area

Farmland Designation of Williamson Act Contract	Acreage[1]
Prime Farmland	748
Farmland of Statewide Importance	362
Unique Farmland	411
Farmland of Local Importance	51
Other Lands	43
Total	1,615

[1] Acreage was obtained from the Fresno County Williamson Act Contracts.
Source: FirstCarbon Solutions 2014.

Local Policies

The City of Fresno has objective and policies related to agricultural resources within the City of Fresno 2025 General Plan. These include the following:

G-5 Objective: While recognizing that the County of Fresno retains the primary responsibility for agricultural land use policies and the protection and advancement of farming operations, the City of Fresno will support efforts to preserve agricultural land outside of the area planned for urbanization and outside of the city's public service delivery capacity by being responsible in its land use plans, public service delivery plans, and development policies.

G-5-a. Policy: Establish a cooperative research and planning program with the County of Fresno, City of Clovis, and other public agencies to conserve agricultural - land resources.

G-5-b. Policy: Plan for the location and intensity of urban development in a manner that efficiently utilizes land area located within the planned urban boundary, including the North and Southeast Growth Areas, while promoting compatibility with agricultural uses located outside of the planned urban area.

G-5-c. Policy: The City of Fresno shall encourage project development proposals that result in the infilling of the existing urban area.

G-5-d. Policy: New urban development should be compact within the constraints of service capability to conserve land resources and forestall conversion of agricultural land by preventing urban sprawl.

G-5-e. Policy: Amend the urban referral and "holding zone" provisions of the 1983 City of Fresno/City of Clovis/Fresno County Joint Resolution on Metropolitan Planning, and negotiate a memorandum of understanding with these adjoining jurisdictions to prevent further development of rural residential development as well as all forms of urban development not consistent with the 2025 General Plan strategies for compact contiguous development within the city general plan boundaries.

G-5-f. Policy: Oppose lot splits and development proposals in unincorporated areas within and outside the city general plan boundary when these proposals would do any of the following:

- -make it difficult or infeasible to implement the general plan.
- -contribute to the premature conversion of agricultural, open space, or grazing lands; or constitute a detriment to the management of resources and/or facilities important to the metropolitan area (such as, air quality, water quantity and quality, traffic circulation, and riparian habitat).

G-5-g. Policy: In the San Joaquin River bottom, accommodate agricultural uses that do not stimulate unplanned growth or conversion of designated open space land to urban uses.

5.2.4 - Thresholds of Significance

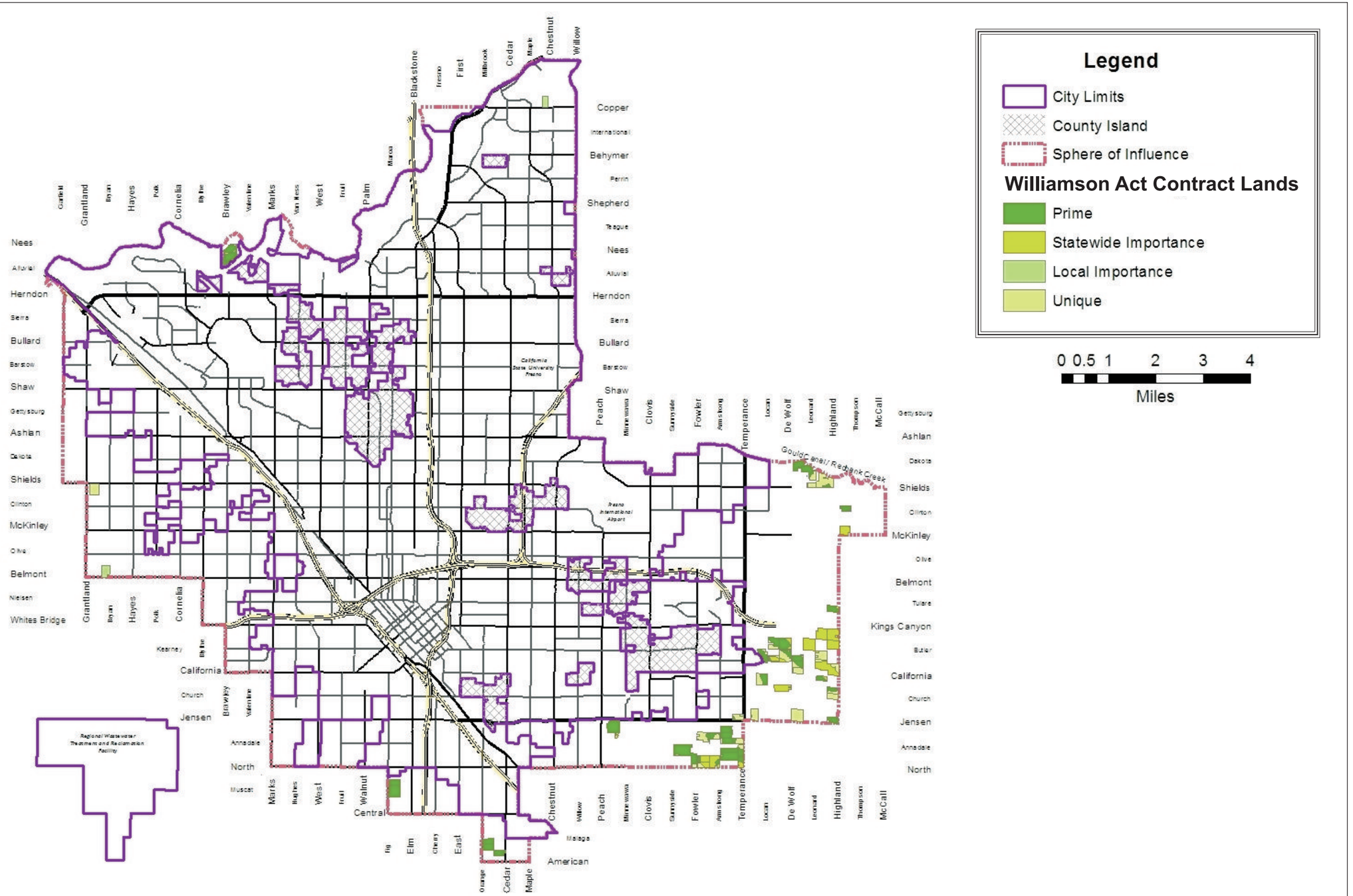
CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to agricultural resources are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, agricultural resources impacts resulting from the proposed project are considered significant if the project would:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? (See Convert Farmland to Non-Agricultural Use, Impact AG-1)

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? (See Conflict with Existing Zoning or Williamson Act Contract, Impact AG-2)

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? (See Section 7.2.1, Forestry Resources)



Source: City of Fresno. CA Important Farmland Mapping, 2010. Fresno County Williamson Act Contracts DBF 2013.

FirstCarbon SOLUTIONS

Exhibit 5.2-2
Williamson Act Contracts

d) Result in the loss of forest land or conversion of forest land to non-forest use? (See Section 7.2.1, Forestry Resources)

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use? (See Conversion to Non-Agricultural or Non-Forest Use, Impact AG-3)

5.2.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Convert Farmland to Non-Agricultural Use

Impact AG-1	**The project would convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.**

Project Specific Impact Analysis

The Planning Area includes locations that have been designated as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance through the Farmland Mapping and Monitoring Program of the California Department of Conservation. The proposed General Plan Update includes a variety of land uses; however, there are no land uses that only allow agricultural uses. One land use designation within the General Plan and Development Code Update allows agricultural uses; however, there are other uses that are allowed within the same designation. This designation is "Buffer" and is intended to separate urban uses from agricultural uses. This use is planned within an approximately one-quarter mile wide buffer designated along the eastern Planning Area boundary in the Southeast Development Area. This area encompasses approximately 736 acres. In addition to agricultural uses, there are other general categories of land uses allowed within the Buffer designation including environmental, habitat, water conveyance, retention and recharge, and preservation and preparation of gravel resources for beneficial uses related to permanent water resource facilities. Therefore, for the purpose of this analysis, as a worst-case assumption, the General Plan Update would not conserve agricultural resources within the Planning Area.

Based on the FMMP, there are approximately 9,550 acres of Prime Farmland, approximately 2,911 acres of Unique Farmland, and approximately 2,355 acres of Farmland of Statewide Importance for a total of approximately 14,816 acres within the Planning Area. Although there may be land this is designated as farmland in the FMMP, existing agricultural operations are not necessarily occurring on all of the designated land. In addition, there may be some agricultural operations that occur within the Planning Area that are not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Based on existing farmland data received from the Fresno County Assessor's Office Land Use Codes that was provided by City staff, there is a total of approximately 11,714 acres that have agricultural operations.

With the implementation of the General Plan and Development Code Update, the approximately 15,903 acres of FMMP-designated farmland and approximately 11,714 acres of existing farmland are

anticipated to be converted to uses other than agriculture. This conversion is a significant impact on agricultural resources.

Through the previous approval of the City of Fresno 2025 General Plan in 2002, a majority of the approximately 15,903 acres of farmland were approved to be converted to non-agricultural uses. The City of Fresno 2025 General Plan currently has approximately 82 acres of land that is designated as open space-agriculture. Although it appears that the City would need to approve the conversion of an additional 82 acres of City-designated agricultural land, the City will consider the approval of the conversion of approximately 15,903 acres of FMMP-designated farmland and approximately 11,714 acres of existing farmland to non-farmland uses. This conversion of agricultural uses is considered a significant impact.

To reduce potential project-specific impacts on agricultural uses, the general Plan Update includes the following policy.

Policy RC-9-b. Land Outside SOI. Express opposition to residential and commercial development proposals in unincorporated areas (excluding County Islands) within or adjacent to the Planning Area when these proposals would do any of the following:

- Make it difficult or infeasible to implement the General Plan;
- Contribute to the premature conversion of agricultural, open space, or grazing lands; or
- Constitute a detriment to the management of resources and/or facilities important to the Fresno Metropolitan Area (such as air quality, water quantity and quality, traffic circulation, and riparian habitat).

With the implementation of the above objective and policies, project impacts on agricultural resources will remain significant.

Cumulative Impact Analysis

Future development in areas outside of the Planning Area such as the County of Fresno, City of Clovis, and County of Madera are anticipated to convert agricultural uses to non-agricultural uses. This future conversion would result in a significant cumulative impact. The implementation of the General Plan and Development Code Update will contribute to the conversion of agricultural uses to non-agricultural uses. Therefore, the proposed project's contribution to impacts on agricultural resources is considered cumulatively significant. As a result, the project will result in a significant cumulative impact on agricultural resources.

To reduce potential cumulative impacts on agricultural uses, the General Plan Update includes the following objective and policies.

Objective RC-9. Preserve agricultural land outside of the area planned for urbanization under this General Plan.

Policy RC-9-a. Regional Cooperation. Work to establish a cooperative research and planning program with the Counties of Fresno and Madera, City of Clovis, and other public agencies to conserve agricultural land resources.

Policy RC-9-b. Land Outside SOI. Express opposition to residential and commercial development proposals in unincorporated areas (excluding County Islands) within or adjacent to the Planning Area when these proposals would do any of the following:

- Make it difficult or infeasible to implement the General Plan;
- Contribute to the premature conversion of agricultural, open space, or grazing lands; or
- Constitute a detriment to the management of resources and/or facilities important to the Fresno Metropolitan Area (such as air quality, water quantity and quality, traffic circulation, and riparian habitat).

Policy RC-8-c. Farmland Enrollment. Advocate for the enrollment of all prime farmland outside of the City's SOI in agricultural land conservation programs.

With the implementation of the above objective and policies, cumulative impacts on agricultural resources will remain significant.

Mitigation Measures

Project Specific

No feasible measures in addition to the above policy are available.

Cumulative

No feasible measures in addition to the above objective and policies are available.

Level of Significance After Mitigation

Project Specific

Significant impact.

Cumulative

Significant impact.

Conflict with Existing Zoning or Williamson Act Contract

Impact AG-2	**The project would conflict with existing zoning for agricultural use, or a Williamson Act contract.**

Project Specific Impact Analysis

The Planning Area includes lands that are under a Williamson Act Contract for prime agricultural land as well as non-prime agricultural land. Currently, the majority of the Williamson Act Contract land is designated for non-agricultural land uses. There are approximately 82 acres that are currently designated for open space-agricultural uses under the existing City of Fresno 2025 General Plan.

These 82 acres are proposed with non-agricultural land uses under the proposed General Plan and Development Code Update. In addition to the 82 acres, the remaining land that is under a Williamson Act contract and within the Planning Area will continue to be designated for non-agricultural uses. Therefore, the implementation of the proposed General Plan and Development Code Update could conflict with existing Williamson Act Contracts because non-agricultural uses are allowed on the existing Contract land. As a result, the proposed project could result in a significant impact on existing Williamson Act Contract land.

In addition, the approximately 82 acres of agricultural land are designated for Open Space Conservation under the existing zoning ordinance. Agricultural uses are a permitted use in the Open Space Conservation zone. The proposed Development Code Update modifies the Open Space Conservation designation to Open Space where agricultural uses are no longer a permitted use. The existing agricultural uses can continue to operate as legal non-conforming land uses. However, the proposed revision to the zoning ordinance related to agricultural uses would result in a significant impact on existing zoning for agricultural uses.

To reduce potential project-specific impacts on agricultural zoning and Williamson Act Contracts, the General Plan Update includes Policy RC-9-b that will reduce the premature conversion of agricultural land within the Planning Area and outside the sphere-of-influence. Although this policy will reduce some impacts on agricultural zoning and Williamson Act contracts, impacts will remain significant.

Cumulative Impact Analysis

Future development in areas outside of the Planning Area such as the County of Fresno, City of Clovis, and County of Madera may conflict with existing agricultural zoning and Williamson Act Contracts. There are existing areas currently zoned for agriculture and under Williamson Act Contracts adjacent to and outside of the Planning Area. Since the proposed project could conflict with agricultural zoning and Williamson Act Contracts within the Planning Area, the proposed project's contribution to impacts on agricultural zoning and Williamson Act Contracts is considered cumulatively significant. As a result, the project will result in a significant cumulative impact on land zoned for agriculture and under a Williamson Act Contract.

To reduce potential cumulative impacts on agricultural zoning and Williamson Act Contracts, the General Plan Update includes Objective RC-9 and Policies RC-9-a through RC-9-c that will reduce the premature conversion of agricultural land within the Planning Area and outside the sphere-of-influence and could reduce conflicts with agricultural zoning and Williamson Act Contracts. Although this objective and policies may reduce some impacts on agricultural zoning and Williamson Act contracts, the project's contribution to cumulative impacts will remain significant.

Mitigation Measures

Project Specific

No feasible measures in addition to the above policy are available.

Cumulative

No feasible measures in addition to the above objective and policies are available.

Level of Significance After Mitigation

Project Specific

Significant impact.

Cumulative

Significant impact.

Conversion to Non-Agricultural or Non-Forest Use

Impact AG-3	**The project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.**

Project Specific Impact Analysis

As discussed in Impact AG-1, future development in accordance with the General Plan Update would result in the conversion of farmland to a non-agricultural use. Except for direct conversion, the implementation of project development would not result in other changes in the existing environment that would impact agricultural land outside of the Planning Area. In addition, the development in accordance with the General Plan Update would not impact forest land as discussed in Section 7.2.1 of this Draft Master EIR. Therefore, the project would result in no impact on farmland or forest land involving other changes in the existing environment.

Cumulative Impact Analysis

Future development in areas outside of the Planning Area such as the County of Fresno, City of Clovis, and County of Madera may involve other changes in the existing environment that could result in the conversion of farmland or forest land. However, since the proposed project would not result in impacts on farmland due to other changes in the existing environment, the proposed project would not contribute to potential cumulative impacts. Therefore, the proposed project would result in no cumulative impacts involving other changes in the existing environment that could result in the conversion of farmland or forest land.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

No impact.

Cumulative

No impact.

5.3 - Air Quality

5.3.1 - Introduction

This section contains the following components:

- Environmental Setting: Describes the San Joaquin Valley Air Basin, the concentration of air pollutants in the City and surrounding area, the County of Fresno air emissions, and the attainment status of the Air Basin.
- Regulatory Setting: Describes the federal, state, district, and local regulatory setting for air pollutants.
- Project Impacts and Mitigation Measures: Assesses the significance of air pollutants that may be emitted as part of the project and applies mitigation measures if necessary. Project emissions are estimated by FirstCarbon Solutions; spreadsheets are contained in Appendix B-1.

5.3.2 - Environmental Setting

The City of Fresno is located in the County of Fresno in the San Joaquin Valley Air Basin (Air Basin). The Air Basin consists of Kings, Madera, San Joaquin, Merced, Stanislaus, and Fresno counties, as well as a portion of Kern County. The local agency with jurisdiction over air quality in the Basin is the San Joaquin Valley Air Pollution Control District (the District). Regional and local air quality is impacted by topography, dominant airflows, atmospheric inversions, location, and season.

Study Area for Project Impacts

The study area for project impacts regarding air quality is the City of Fresno Planning Area and proximate sensitive receptors potentially impacted by a project within the Planning Area because potential development under the City of Fresno General Plan and Development Code Update is limited to areas within the Planning Area. However, the buildout of the General Plan is the cumulative result of hundreds of separate projects requiring separate approvals that add to emissions generated from existing development. Air quality impacts are inherently cumulative in nature. For example, the largest source of emissions, motor vehicles, occur as individuals travel throughout the Planning Area and beyond to a multitude of destinations each day.

The SJVAB is classified nonattainment for ozone, particulate matter less than ten micrometers in diameter (PM_{10}) and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$). Therefore, a significant air quality impact currently exists without the project. When the existing condition is a significant impact, it is necessary to identify an amount of project emissions that would be considered a significant cumulative contribution to an existing exceedance. The SJVAPCD had adopted project level thresholds based on a cumulative contribution of ozone precursors reactive organic gases (ROG) and oxides of nitrogen (NOx) of 10 tons per year. Although not adopted in its guidance document, the SJVAPCD recommends thresholds for PM_{10} and $PM_{2.5}$ of 15 tons per year based on their stationary source offset threshold. A conservative interpretation of this threshold

would apply the annual emission thresholds to annual emission generated during General Plan buildout. The combined annual emissions of projects during construction and operation would be compared to the annual threshold.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative regional air quality impacts such as ROG, NOx, PM_{10}, and $PM_{2.5}$ is the San Joaquin Valley Air Basin which includes the Counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and a portion of Kern. Under the federal Clean Air Act, any monitoring location that exceeds ambient air quality ozone and particulate standards within the air basin results in the entire air basin to be designated nonattainment. Therefore, an exceedance in Fresno or another city would affect the attainment status of the rest of the San Joaquin Valley even if no other location exceeded one of the standards. This means that air quality plans must provide reductions that demonstrate attainment at the location with the highest concentration in the basin and that cleaner locations would attain the standards earlier.

Air pollutants can remain in the atmosphere for long periods and can build to unhealthful levels when stagnant conditions that are common in the San Joaquin Valley occur. Pollutants are transported downwind from urban areas with many emission sources, but also are recirculated to the urban areas by wind eddies and upslope/downslope mountain and valley winds. Therefore, emissions from large urban areas like Fresno have the potential to create regional air quality impacts for ozone and PM in addition to localized impacts for CO, NO_2, and PM.

The analysis of regional emissions is based on a summary of projections approach as provided in Section 15130(b)(1)(B) of the CEQA Guidelines. The applicable projections include those provided within the air quality attainment plans for the San Joaquin Valley Air Basin prepared by the District. The study area for the analysis of cumulative localized impacts is limited to areas with sensitive receptors that are in the immediate vicinity of specific sources.

San Joaquin Valley

The information in this section is primarily from the District's Guide for Assessing and Mitigating Air Quality Impacts and the accompanying Technical Document (San Joaquin Valley Air Pollution Control District 2002).

The Air Basin has an "inland Mediterranean" climate and is characterized by long, hot, dry summers and short, foggy winters. Sunlight can be a catalyst in the formation of some air pollutants (such as ozone); the Air Basin averages over 260 sunny days per year.

Topography

The Air Basin is generally shaped like a bowl. It is open in the north and is surrounded by mountain ranges on all other sides. The Sierra Nevada mountains are along the eastern boundary (8,000 to 14,000 feet in elevation), the Coast Ranges are along the western boundary (3,000 feet in elevation), and the Tehachapi Mountains are along the southern boundary (6,000 to 8,000 feet in elevation). Comparing the San Joaquin Valley to Los Angeles' air basin, the Los Angeles basin can handle 10

times more pollution due to its different location, topography and air flow patterns (proximity to the ocean and ocean winds).

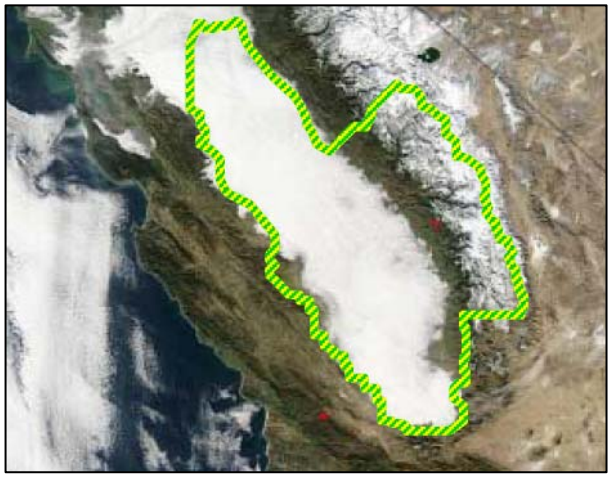
Dominant Airflow

Dominant airflows provide the driving mechanism for transport and dispersion of air pollution. The mountains surrounding the Air Basin form natural horizontal barriers to the dispersion of air contaminants. The wind generally flows south-southeast through the valley, through the Tehachapi Pass and into the Southeast Desert Air Basin portion of Kern County. As the wind moves through the Air Basin, it mixes with the air pollution generated locally, generally transporting air pollutants from the north to the south in the summer and in a reverse flow in the winter.

Inversions

Generally, the temperature of air decreases with height, creating a gradient from warmer air near the ground to cooler air at elevation. This gradient of cooler air over warm air is known as the environmental lapse rate. Inversions occur when warm air sits over cooler air, trapping the cooler air near the ground. These inversions trap pollutants from dispersing vertically, and the mountains surrounding the San Joaquin Valley trap the pollutants from dispersing horizontally. Strong temperature inversions occur throughout the Air Basin in the summer, fall, and winter. Daytime temperature inversions occur at elevations of 2,000 to 2,500 feet above the San Joaquin Valley floor during the summer and at 500 to 1,000 feet during the winter.

Exhibit 5.3-1: San Joaquin Valley Inversion



The result is a relatively high concentration of air pollution in the valley during inversion episodes. Exhibit 5.3-1 to the right displays how pollution is trapped in the Valley in the winter months (source: San Joaquin Valley Air Pollution Control District 2007, 2007 Ozone Plan). These inversions cause haziness, which in addition to moisture may include suspended dust, a variety of chemical aerosols emitted from vehicles, particulates from wood stoves, and other pollutants. In the winter, these conditions can lead to carbon monoxide (CO) "hotspots" along heavily traveled roads and at busy intersections. During summer's longer daylight hours, stagnant air, high temperatures, and plentiful sunshine provide the conditions and energy for the photochemical reaction between reactive organic gases (ROG) and oxides of nitrogen ($NO_{x)}$, which results in the formation of ozone.

Location and Season

Because of the prevailing daytime winds and time-delayed nature of ozone, concentrations are highest in the southern portion of the Air Basin, such as around Bakersfield. Summers are often periods of hazy visibility and occasionally unhealthful air, while winter air quality impacts tend to be

localized and can consist of (but are not exclusive to) odors from agricultural operations; soot or smoke around residential, agricultural, and hazard-reduction wood burning; or dust near mineral resource recovery operations.

Comparing the San Joaquin Valley to the South Coast Air Basin (SCAB) which includes Los Angeles, the SCAB can handle approximately 10 times more pollution due to its coastal location, and air flow patterns (proximity to the ocean and ocean winds. As an example, total NOx emissions for the SCAB were 754 tons per day (tpd) in 2008. During that year, the SCAB recorded 80 days above the 1997 national 8-hour ozone standard. For the same year, the total NOx emissions for the San Joaquin Valley Air Basin SJVAB) were 409 tpd (over a larger area), yet the Valley recorded 82 days above the standard. NOx dispersal is primarily dependent on summertime weather patterns. The SCAB experiences regular coastal winds through much of the summer that not only disperse pollutants from the air basin, but also moderates temperatures. Conversely, the Valley, surrounded by mountain ranges, routinely experiences stagnant weather patterns (less wind) and extended periods of high temperatures, both of which build and concentrate ozone to levels above the standard (SJVAPCD 2012).

Local Air Quality

The local air quality can be evaluated by reviewing relevant air pollution concentrations near the General Plan area. Table 5.3-1 summarizes 2009 through 2012 published monitoring data, which is the most recent 4-year period available. The data is from three monitoring stations in Fresno and one in Clovis. The data shows that during the past few years, the region in and around the City of Fresno has exceeded the standards for some key components of air pollution: ozone, particulate matter (PM) less than 10 micrometers in diameter (PM_{10}), and PM less than 2.5 micrometers in diameter ($PM_{2.5}$) See the pollutant descriptions in Table 5.3-4 for more information regarding the characteristics and health effects of these pollutants.

Table 5.3-1: Air Quality Monitoring Summary

Air Pollutant	Units	Item	Station	2009	2010	2011	2012
Ozone	ppm	Maximum 1 Hour	Clovis	0.119	0.133	0.133	0.124
			Drummond	0.118	0.108	0.129	0.127
			First Street	0.121	0.127	0.119	0.135*
			Skypark	0.119	0.138	0.115	0.130
	days	Days > 1 Hour State Standard (0.09 ppm)	Clovis	33	22	32	37
			Drummond	25	5	27	19
			First Street	36	16	14	23
			Skypark	20	14	20	7
	ppm	Maximum 8 Hour	Clovis	0.105	0.105	0.103	0.109
			Drummond	0.100	0.091	0.104	0.108

Air Pollutant	Units	Item	Station	2009	2010	2011	2012
			First Street	0.104	0.107	0.096	0.116*
			Skypark	0.104	0.114	0.099	0.109
	days	Days > 8 Hour State Standard (0.07 ppm)	Clovis	64	58	72	93
			Drummond	55	24	73	75
			First Street	73	51	54	73*
			Skypark	48	56	70	34
	days	Days > 8 Hour National Standard (0.075 ppm)	Clovis	48	39	49	57
			Drummond	39	13	52	46
			First Street	51	26	33	0
			Skypark	34	35	45	19
Carbon monoxide (CO)	ppm	Maximum 8 Hour	Clovis	1.66	1.43	1.42	ID
			Drummond	1.95	1.45	1.73	ID
			First Street*	2.07	2.03	2.29	2.06
			Skypark	1.40	0.90	1.58	ID
	days	Days > 8 Hour Standard (9.0 ppm)	Clovis	0	0	0	ID
			Drummond	0	0	0	ID
			First Street*	0	0	0	0
			Skypark	0	0	0	ID
Nitrogen dioxide (NO_2)	ppm	Annual Average	Clovis	0.011	0.010	ID	0.010
			Drummond	0.014	ID	ID	0.013
			First Street	0.014	0.013	0.012	ID
			Skypark	0.007	ID	ID	ID
	ppm	Maximum 1 Hour	Clovis	0.061	0.055	0.050	0.055
			Drummond	0.076	0.062	0.069	0.070
			First Street	0.068	0.077	0.062	0.059
			Skypark	0.044	0.034	0.039	0.043
	days	Days > 1 Hour State Standard (0.18 ppm)	Clovis	0	0	0	0
			Drummond	0	0	0	0
			First Street	0	0	0	0
			Skypark	0	0	0	0
Sulfur dioxide (SO_2)	ppm	Annual Average	First Street	0.001	0.000	ID	ID
	ppm	Maximum 24 Hour	First Street	0.005	0.004	ID	ID
Inhalable	$\mu g/m^3$	Annual Average	Clovis	28.5	28.2	30.4	29.2

Air Pollutant	Units	Item	Station	2009	2010	2011	2012
coarse particles (PM_{10})			Drummond	35.3	26.9	32.3	42.9
			First Street*	30.9	25.9	29.6	17.1
	$\mu g/m^3$	24 Hour	Clovis	65.2	62.8	77.0	78.3
			Drummond	84.0	68.1	91.3	114.3
			First Street*	75.3	88.6	99.5	71.0
	days	Estimated Days > 24 Hour State Standard (50 $\mu g/m^3$)	Clovis	32.8	47.9	53.0	55.8
			Drummond	71.8	ID	72.0	ID
			First Street*	50.2	30.6	53.9	ID
	days	Days > 24 Hour National Standard (150 $\mu g/m^3$)	Clovis	0	0	0	0
			Drummond	0	ID	0	0
			First Street*	0	0	0	ID
Fine particulate matter ($PM_{2.5}$)	$\mu g/m^3$	Annual Average	Clovis	18.2	14.6	17.9	15.3
			First Street*	15.1	13.0	15.4	14.4
	$\mu g/m^3$	24 Hour	Clovis	71.0	75.2	76.4	80.8
			First Street*	82.3	62.0	78.5	88.8
	days	Estimated Days > 24 Hour National Standard (35 $\mu g/m^3$)	Clovis	36.0	19.8	38.3	24.1
			First Street*	35.8	21.7	39.0	29.4

Notes and Abbreviations:
> = exceed ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter
ID = insufficient data State Standard = California Ambient Air Quality Standard
National Standard = National Ambient Air Quality Standard
Stations: Clovis = 908 N. Villa Avenue, Clovis
Drummond = 4706 E. Drummond Street, Fresno
First Street = 3425 N. First Street, Fresno
* The First Street monitoring station was closed in 2012 and replaced by the Garland Avenue station; data for pollutants marked with "*" in 2012 for First Street reflects the Garland Avenue station.
Skypark = 4508 Chennault Avenue, Fresno
Source: California Air Resources Board 2012b.

The data in Table 5.3-1 reflects the *concentration* of the pollutants in the air, measured using air monitoring equipment. This differs from *emissions*, which are calculations of a pollutant being emitted over a period of time. Emissions for Fresno County using the most recent data available are shown in Table 5.3-2. Emissions within the City of Fresno are included in these emissions, though it also includes other emissions in the County. As shown in Table 5.3-2, the main source of NOx and CO is from on-road mobile vehicles (cars and trucks on the road). The main source of ROG is from solvent evaporation. The main source of PM_{10} is from road dust. The main source of $PM_{2.5}$ is from managed burning and disposal. See the pollutant descriptions in Table 5.3-4 for more information regarding the characteristics and health effects of these pollutants

Table 5.3-2: Fresno County Emissions

Source	Emissions (tons/day)					
	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
On-road mobile vehicles	11.5	39.1	109.7	0.1	2.4	1.5
Other mobile sources	13.4	25.5	77.3	0.2	1.6	1.5
Stationary fuel combustion	0.8	11.6	8.6	4.5	1.3	1.2
Waste disposal	1.5	<0.1	0.1	<0.1	<0.1	<0.1
Cleaning and surface coatings	6.2	<0.1	<0.1	<0.1	<0.1	<0.1
Petroleum production and marketing	3.0	<0.1	<0.1	<0.1	<0.1	<0.1
Industrial processes	5.2	5.0	0.3	3.4	2.9	1.7
Solvent evaporation	15.1	0.0	0.0	0.0	0.0	0.0
Residential fuel combustion	1.4	1.7	21.1	0.1	2.6	2.5
Farming operations	12.2	-	-	-	15.7	3.6
Construction and demolition	-	-	-	-	3.0	0.3
Road dust	-	-	-	-	24.0	2.9
Fugitive windblown dust	-	-	-	-	15.6	2.7
Fires, managed burning and disposal, cooking	7.7	5.2	89.2	0.5	11.0	9.7
Total	**78.0**	**88.1**	**306.3**	**8.8**	**80.1**	**27.6**

Note: ROG and NOx are precursors to ozone formation that are controlled to reduce ozone concentrations.
Source of mobile emissions: EMFAC2011, Fresno County, 2011, Annual Average, all model years, all speeds
Source of all other emissions: California Air Resources Board 2009. Almanac Emission Projection Data for 2008.

Sensitive Receptors

Those individuals who are sensitive to air pollution include children, the elderly, and persons with pre-existing respiratory or cardiovascular illness. The District considers a sensitive receptor to be a location that houses or attracts children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Examples of sensitive receptors include hospitals, residences, convalescent facilities, and schools. There are many sensitive receptors throughout the City of Fresno.

Attainment Status

The United States Environmental Protection Agency (EPA) and the California Air Resources Board (ARB) designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified."

National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or "form" of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring value exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the 3-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard. The current attainment designations for the basin are shown in Table 5.3-3.

Table 5.3-3: San Joaquin Valley Air Basin Attainment Status

Pollutant	Designation	
	Federal	State
Ozone –1-hour	No Federal Standard	Nonattainment/Severe
Ozone – 8-hour	Nonattainment	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon monoxide	Fresno County is in Maintenance	Merced, Madera, and Kings County are unclassified; others in Attainment
Nitrogen dioxide	Attainment/Unclassified	Attainment
Sulfur dioxide	Attainment/Unclassified	Attainment
Lead	Attainment	Attainment
Hydrogen sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-reducing particles	No Federal Standard	Unclassified
Vinyl chloride	No Federal Standard	Attainment
Source of state status: California Air Resources Board 2012. Source of national status: U.S. Environmental Protection Agency 2013.		

5.3.3 - Regulatory Setting

Air pollutants are regulated at the national, state, and air basin level; each agency has a different level of regulatory responsibility. The United States Environmental Protection Agency (EPA) regulates at the national level. The California Air Resources Board (ARB) regulates at the state level. The District regulates at the air basin or local level.

National and State Air Quality Standards

The EPA is responsible for national and interstate air pollution issues and policies. The EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans, provides research and guidance for air pollution programs, and sets National

Ambient Air Quality Standards, also known as federal standards. There are federal standards for six common air pollutants, called criteria air pollutants, which were identified from provisions of the Clean Air Act of 1970. The criteria pollutants are:

- Ozone (O_3)
- Nitrogen dioxide (NO_2)
- Lead (Pb)
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)

The federal standards were set to protect public health, including that of sensitive individuals; thus, the standards continue to change as more medical research is available regarding the health effects of the criteria pollutants. Primary federal standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health (California Air Resources Board 2012a).

A State Implementation Plan is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain federal standards. The State Implementation Plan for the State of California is administered by the ARB, which has overall responsibility for statewide air quality maintenance and air pollution prevention. California's State Implementation Plan incorporates individual federal attainment plans for regional air districts—air district prepares their federal attainment plan, which sent to ARB to be approved and incorporated into the California State Implementation Plan. Federal attainment plans include the technical foundation for understanding air quality (e.g., emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms.

The ARB also administers California Ambient Air Quality Standards (state standards) for the 10 air pollutants designated in the California Clean Air Act. The 10 state air pollutants are the six federal standards listed above as well as visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride.

The federal and state ambient air quality standards, relevant effects, properties, and sources of the pollutants are summarized in Table 5.3-4.

Table 5.3-4: Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Ozone (O_3)	1 Hour	0.09 ppm	—	Irritate respiratory system; reduce lung function; breathing pattern changes; reduction of breathing capacity; inflame and damage cells that line the lungs; make lungs more susceptible to infection; aggravate asthma; aggravate other chronic lung diseases; cause permanent lung damage; some immunological changes; increased mortality risk; vegetation and property damage.	Ozone is a photochemical pollutant as it is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between volatile organic compounds (VOC), NO_x, and sunlight. Ozone is a regional pollutant that is generated over a large area and is transported and spread by the wind.	Ozone is a secondary pollutant; thus, it is not emitted directly into the lower level of the atmosphere. The primary sources of ozone precursors (VOC and NO_x) are mobile sources (on-road and off-road vehicle exhaust).
	8 Hour	0.070 ppm	0.075 ppm			
Carbon monoxide (CO)	1 Hour	20 ppm	35 ppm	Ranges depending on exposure: slight headaches; nausea; aggravation of angina pectoris (chest pain) and other aspects of coronary heart disease; decreased exercise tolerance in persons with peripheral vascular disease and lung disease; impairment of central nervous system functions; possible increased risk to fetuses; death.	CO is a colorless, odorless, toxic gas. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, replaces oxygen as an attachment to hemoglobin, and reduces available oxygen in the blood.	CO is produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources.
	8 Hour	9.0 ppm	9 ppm			
Nitrogen dioxide[b] (NO_2)	1 Hour	0.18 ppm	0.100 ppm	Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; contribution to atmospheric discoloration; increased visits to	Nitrogen dioxide (NO_2) is one of a group of highly reactive gasses known as "oxides of nitrogen," or "nitrogen oxides (NOx)." Other nitrogen oxides include nitrous acid and nitric acid. EPA's National Ambient Air Quality Standard uses NO_2 as the indicator for the larger group of nitrogen oxides in addition	NO_2 forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. NO_x is produced in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. Nitrogen dioxide (NO_2) forms quickly from NO_x emissions. NO_2 concentrations
	Annual	0.030 ppm	0.053 ppm			

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
				hospital for respiratory illnesses.	to contributing to the formation of ground-level ozone, and fine particle pollution.	near major roads can be 30 to 100 percent higher than those at monitoring stations.
Sulfur dioxide[c] (SO_2)	1 Hour	0.25 ppm	0.075 ppm	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles (PM_{10} and smaller) show a similar association with ambient sulfur dioxide levels. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.	Sulfur dioxide is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor, similar to rotten eggs. Sulfur oxides (SO_x) include sulfur dioxide and sulfur trioxide. Sulfuric acid is formed from sulfur dioxide, which can lead to acid deposition and can harm natural resources and materials. Although sulfur dioxide concentrations have been reduced to levels well below state and federal standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM_{10}.	Human caused sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethyl sulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. The sulfur dioxide levels in the State are well below the maximum standards.
	3 Hour	—	0.5 ppm			
	24 Hour	0.04 ppm	0.14 (for certain areas)			
	Annual	—	0.030 ppm (for certain areas)			
Particulate matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3	• Short-term exposure (hours/days): irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; those with heart disease can suffer heart attacks and arrhythmias. • Long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; death.	Suspended particulate matter is a mixture of small particles that consist of dry solid fragments, droplets of water, or solid cores with liquid coatings. The particles vary in shape, size, and composition. PM_{10} refers to particulate matter that is between 2.5 and 10 microns in diameter, (1 micron is one-millionth of a meter). $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter, about one-thirtieth the size of the average human hair.	Stationary sources include fuel or wood combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal, and recycling. Mobile or transportation related sources are from vehicle exhaust and road dust. Secondary particles form from reactions in the atmosphere.
	Mean	20 µg/m^3	—			
Particulate matter ($PM_{2.5}$)	24 Hour	—	35 µg/m^3			
	Annual	12 µg/m^3	12.0 µg/m^3			
Visibility-reducing particles	8 Hour	See note below[d]				

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Sulfates	24 Hour	25 µg/m^3	—	(a) Decrease in ventilatory function; (b) aggravation of asthmatic symptoms; (c) aggravation of cardio-pulmonary disease; (d) vegetation damage; (e) degradation of visibility; (f) property damage.	The sulfate ion is a polyatomic anion with the empirical formula SO_4^{2-}. Sulfates occur in combination with metal and/or hydrogen ions. Many sulfates are soluble in water.	Sulfates are particulates formed through the photochemical oxidation of sulfur dioxide. In California, the main source of sulfur compounds is combustion of gasoline and diesel fuel.
Lead[e]	30-day	1.5 µg/m^3	—	Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. It can cause impairment of blood formation and nerve conduction, behavior disorders, mental retardation, neurological impairment, learning deficiencies, and low IQs.	Lead is a solid heavy metal that can exist in air pollution as an aerosol particle component. Leaded gasoline was used in motor vehicles until around 1970. Lead concentrations have not exceeded state or federal standards at any monitoring station since 1982.	Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering.
	Quarter	—	1.5 µg/m^3			
	Rolling 3-month average	—	0.15 µg/m^3			
Vinyl chloride[e]	24 Hour	0.01 ppm	—	Short-term exposure to high levels of vinyl chloride in the air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.	Vinyl chloride, or chloromethane, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. In 1990, ARB identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.	Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. It can be formed when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites.

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Hydrogen sulfide	1 Hour	0.03 ppm	—	High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause headache, nausea, vomiting, and cough. Long exposure can cause pulmonary edema.	Hydrogen sulfide (H_2S) is a flammable, colorless, poisonous gas that smells like rotten eggs.	Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal).
Volatile organic compounds (VOC)		There are no State or federal standards for VOCs because they are not classified as criteria pollutants.		Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, concentrations of VOCs are suspected to cause eye, nose, and throat irritation; headaches; loss of coordination; nausea; and damage to the liver, the kidneys, and the central nervous system. Many VOCs have been classified as toxic air contaminants.	Reactive organic gases (ROGs), or VOCs, are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably.	Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.
Benzene		There are no ambient air quality standards for benzene.		Short-term (acute) exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, loss of consciousness can occur. Long-term (chronic) occupational exposure of high doses has caused blood disorders, leukemia, and lymphatic cancer.	Benzene is a VOC. It is a clear or colorless light-yellow, volatile, highly flammable liquid with a gasoline-like odor. The EPA has classified benzene as a "Group A" carcinogen.	Benzene is emitted into the air from fuel evaporation, motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Benzene is used as a solvent for paints, inks, oils, waxes, plastic, and rubber. Benzene occurs naturally in gasoline at 1 to 2 percent by volume. The primary route of human exposure is through inhalation.

Air Pollutant	Averaging Time	California Standard	Federal Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Diesel particulate matter (diesel PM)		There are no ambient air quality standards for diesel PM.		Some short-term (acute) effects of diesel PM exposure include eye, nose, throat, and lung irritation, coughs, headaches, light-headedness, and nausea. Studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Human studies on the carcinogenicity of diesel PM demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure.	Diesel PM is a source of $PM_{2.5}$—diesel particles are typically 2.5 microns and smaller. Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Organic compounds account for 80 percent of the total particulate matter mass, which consists of compounds such as hydrocarbons and their derivatives, and polycyclic aromatic hydrocarbons and their derivatives. Fifteen polycyclic aromatic hydrocarbons are confirmed carcinogens, a number of which are found in diesel exhaust.	Diesel exhaust is a major source of ambient particulate matter pollution in urban environments. Typically, the main source of diesel PM is from combustion of diesel fuel in diesel-powered engines. Such engines are in on-road vehicles such as diesel trucks, off-road construction vehicles, diesel electrical generators, and various pieces of stationary construction equipment.

Notes:
ppm = parts per million (concentration) $\mu g/m^3$ = micrograms per cubic meter Annual = Annual Arithmetic Mean 30-day = 30-day average Quarter = Calendar quarter

[a] Federal standard refers to the primary national ambient air quality standard, or the levels of air quality necessary, with an adequate margin of safety to protect the public health. All standards listed are primary standards except for 3 Hour SO_2, which is a secondary standard. A secondary standard is the level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[b] To attain the 1-hour NO_2 national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (0.100 ppm).

[c] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[d] Visibility-reducing particles: In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

[e] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source of effects, properties, and sources: South Coast Air Quality Management District 2007; California Environmental Protection Agency 2002; California Air Resources Board 2009; U.S. Environmental Protection Agency 2003, 2009a, 2009b, 2010, 2011a, and 2012a; National Toxicology Program 2011a and 2011b.
Source of standards: California Air Resources Board 2012a.

Asbestos

Asbestos is the name given to a number of naturally occurring fibrous silicate minerals that have been mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The three most common types of asbestos are chrysotile, amosite, and crocidolite. Chrysotile, also known as white asbestos, is the most common type of asbestos found in buildings. Chrysotile makes up approximately 90 to 95 percent of all asbestos contained in buildings in the United States.

Construction sometimes requires the demolition of existing buildings that may include materials containing asbestos. No demolition is associated with this project, however, asbestos is also found in a natural state known as naturally occurring asbestos. Exposure and disturbance of rock and soil that naturally contain asbestos can result in the release of fibers into the air and consequent exposure to the public. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Sources of asbestos emissions include unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present.

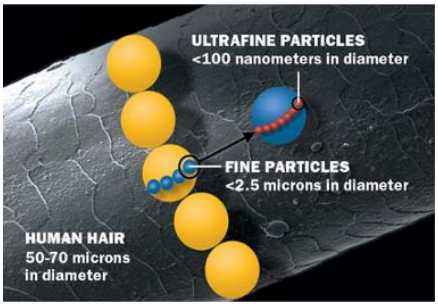
Exposure to asbestos is a health threat; exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest, and abdominal cavity), and asbestosis (a non-cancerous lung disease that causes scarring of the lungs).

The ARB has an Air Toxics Control Measure for construction, grading, quarrying, and surface mining operations requiring the implementation of mitigation measures to minimize emissions of asbestos-laden dust. The measure applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where naturally occurring asbestos is likely to be found. Areas are subject to the regulation if they are identified on maps published by the Department of Conservation as ultramafic rock units or if the Air Pollution Control Officer or owner/operator has knowledge of the presence of ultramafic rock, serpentine, or naturally occurring asbestos on the site. The measure also applies if ultramafic rock, serpentine, or asbestos is discovered during any operation or activity.

Ultrafine Particles (UFP)

Ultrafine particles are particulate matter (PM) that exists in the ambient air and are less than 0.1 micrometer (µm or microns) in diameter. Ultrafine particles (UFP or PM0.1) are included in the group called $PM_{2.5}$, particulate matter less than 2.5 micrometers in diameter. Exhibit 5.3-2 (source: Levin 2012) displays the relative size of the particles compared with a human hair, with PM_{10} (particulate matter less than 10 micrometers in diameter) indicated as yellow circles, $PM_{2.5}$ shown as blue circles, and ultrafine particles are shown as red circles.

Exhibit 5.3-2: Ultrafine Particles



In its recent revisions to the national ambient air quality standards for particulate matter, the United States Environmental Protection Agency (EPA) states that, "In considering both the currently available health effects evidence and the air quality data, the Policy Assessment concluded that this information was still too limited to provide support for consideration of a distinct PM standard for ultrafine particles" (EPA 2013). Considering the above information, this assessment does not specifically distinguish between ultrafine particles and $PM_{2.5}$ or quantify in particular ultrafine particles. However, $PM_{2.5}$ emissions are estimated and a significance finding is provided for them.

Toxic Air Contaminants(TAC)

A toxic air contaminant (TAC) is defined as an air pollutant that may cause or contribute to an increase in mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. The California Almanac of Emissions and Air Quality presents the relevant concentration and cancer risk data for the ten TACs that pose the most substantial health risk in California based on available data. The ten TACs are acetaldehyde, benzene, 1.3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter (diesel PM).

Some studies indicate that diesel PM poses the greatest health risk among the TACs listed above. A 10-year research program (California Air Resources Board 1998) demonstrated that diesel PM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to diesel PM poses a chronic health risk. In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Diesel exhaust is a major source of fine particulate pollution as well, and studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

Diesel PM differs from other TACs in that it is not a single substance but a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies, depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, however, no ambient monitoring data are available for diesel PM because no routine

measurement method currently exists. The ARB has made preliminary concentration estimates based on a diesel PM exposure method which uses PM10 as a surrogate for estimating the toxic fraction consisting of diesel PM. The diesel PM exposure method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM.

Federal Regulations

The federal Clean Air Act provides the EPA with authority to adopt emission standards for non-road engines and vehicles such s marine vessels, construction equipment and farm equipment. The regulation of most of these sources has been delegated to the State of California, but the federal government retains authority to regulate a number of sources. The most important federal sources in California are locomotives, aircraft, and marine vessels.

California Regulations

Legal authority for California to regulate sources of air pollution is found in federal and state law. The ARB is charged with coordinating regional and local efforts to attain and maintain state and nation air quality standards. The ARB has been given authority to regulate many sources that would normally be pre-empted by federal regulations through the issuance of waivers.

Pursuant to these authorities, ARB has adopted the world's most stringent standards for passenger cars, light-duty trucks, and medium-duty vehicles. ARB has also adopted regulations establishing standards for heavy-duty vehicles, offroad vehicles and engines, offroad recreational vehicles, off road diesel engines and equipment, offroad gasoline and LPG engines and equipment, and marine pleasure craft. Descriptions of these regulations are provided below.

Low-Emission Vehicle Program

The ARB first adopted Low-Emission Vehicle (LEV) program standards in 1990. These first LEV standards ran from 1994 through 2003. LEV II regulations, running from 2004 through 2010, represent continuing progress in emission reductions. As the State's passenger vehicle fleet continues to grow and more sport utility vehicles and pickup trucks are used as passenger cars rather than work vehicles, the more stringent LEV II standards were adopted to provide reductions necessary for California to meet federally mandated clean air goals outlined in the 1994 State Implementation Plan (SIP). In 2012, ARB adopted the LEV III amendments to California's Low-Emission Vehicle (LEV) regulations. These amendments include more stringent emission standards for both criteria pollutants and greenhouse gases for new passenger vehicles (ARB 2012a).

On-Road Heavy-Duty Vehicle Program

The ARB has adopted standards for emissions from various types of new on-road heavy-duty vehicles. Section 1956.8, Title 13, California Code of Regulations contains California's emission standards for on-road heavy-duty engines and vehicles, and test procedures. ARB has also adopted programs to reduce emissions from in-use heavy-duty vehicles including the Heavy-Duty Diesel Vehicle Idling Reduction Program, the Heavy-Duty Diesel In-Use Compliance Program, the Public Bus Fleet Rule and Engine Standards, and the School Bus Program and others (ARB 2013c).

ARB Regulation for In-Use Off-Road Diesel Vehicles

On July 26, 2007, the ARB adopted a regulation to reduce diesel particulate matter and NOx emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. The ARB is enforcing that part of the rule with fines up to $10,000 per day for each vehicle in violation. Performance requirements of the rule are based on a fleet's average NOx emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirements making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

ARB Airborne Toxic Control Measure for Asbestos

In July 2001, the ARB approved an Air Toxic Control Measure for construction, grading, quarrying and surface mining operations to minimize emissions of naturally occurring asbestos. The regulation requires application of best management practices to control fugitive dust in areas known to have naturally occurring asbestos and requires notification to the local air district prior to commencement of ground-disturbing activities. The measure establishes specific testing, notification and engineering controls prior to grading, quarrying or surface mining in construction zones where naturally occurring asbestos is located on projects of any size. There are additional notification and engineering controls at work sites larger than one acre in size. These projects require the submittal of a "Dust Mitigation Plan" and approval by the air district prior to the start of a project.

Construction sometimes requires the demolition of existing buildings where construction occurs. Buildings often include materials containing asbestos, but no demolition is associated with this project. However, asbestos is also found in a natural state, known as naturally occurring asbestos. Exposure and disturbance of rock and soil that naturally contain asbestos can result in the release of fibers into the air and consequent exposure to the public. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Sources of asbestos emissions include unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present.

The ARB has an Air Toxics Control Measure for construction, grading, quarrying, and surface mining operations requiring the implementation of mitigation measures to minimize emissions of asbestos-laden dust. The measure applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where naturally occurring asbestos is likely to be found. Areas are subject to the regulation if they are identified on maps published by the Department of Conservation as ultramafic rock units or if the Air Pollution Control Officer or owner/operator has knowledge of the presence of ultramafic rock, serpentine, or naturally occurring asbestos on the site. The measure also applies if ultramafic rock, serpentine, or

asbestos is discovered during any operation or activity. The Department of Conservation Maps show the presence of asbestos mines in San Bernardino County.

Diesel Risk Reduction Plan

The ARB's Diesel Risk Reduction Plan has led to the adoption of new state regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce DPM emissions by about 90 percent overall from year 2000 levels as stated on page 1 of the plan. The projected emission benefits associated with the full implementation of this plan, including federal measures, are reductions in DPM emissions and associated cancer risks of 75 percent by 2010 and 85 percent by 2020 (ARB 2000).

ARB Air Quality Land Use Handbook

The Air Quality Land Use Handbook is not regulatory, it merely provides non-binding guidance for local jurisdictions regarding sources of toxic emissions. The following recommendations address the issue of siting "sensitive land uses" near specific sources of air pollution; namely:

- High traffic freeways and roads
- Distribution centers
- Rail yards
- Ports
- Refineries
- Chrome plating facilities
- Dry cleaners
- Large gas dispensing facilities

Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities are provided in Table 5.3-5.

Table 5.3-5: Recommendations on Siting New Sensitive Land Uses Near Toxic Air Contaminant Sources

Source Category	Advisory Recommendation
Freeways and High-Traffic Roads	Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day
Distribution Centers	Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week).
	Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	Avoid siting new sensitive land uses within 1,000 feet of a major

Source Category	Advisory Recommendation
	service and maintenance rail yard. Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Refineries	Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloroethylene	Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district.
	Do not site new sensitive land uses in the same building with Perchloroethylene dry cleaning operations.
Gasoline Dispensing Facilities	Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities.
Notes: These recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues. Source: ARB 2006	

San Joaquin Valley Air Pollution Control District

The District is responsible for controlling emissions primarily from stationary sources. The District maintains air quality monitoring stations throughout the basin. The District, in coordination with the eight county transportation agencies, is also responsible for developing, updating, and implementing air quality attainment plans for the Air Basin. The District also has roles under CEQA.

Current Air Quality Plans

Ozone Plans

As an extreme nonattainment area for the 1-hour ozone national standard, the District adopted the Extreme Ozone Attainment Demonstration Plan (1-Hour Ozone Plan) in 2004. On March 8, 2010, the EPA approved the 1-Hour Ozone Plan. Although the EPA revoked the 1-hour standard effective June 15, 2005, the control requirements remain in effect to ensure progress toward meeting the new, more stringent, 8-hour ozone standard that replaced the 1-hour standard. Both Ozone Plans contain commitments to reduce a precursor of ozone, NO_x, including NO_x reductions from indirect sources.

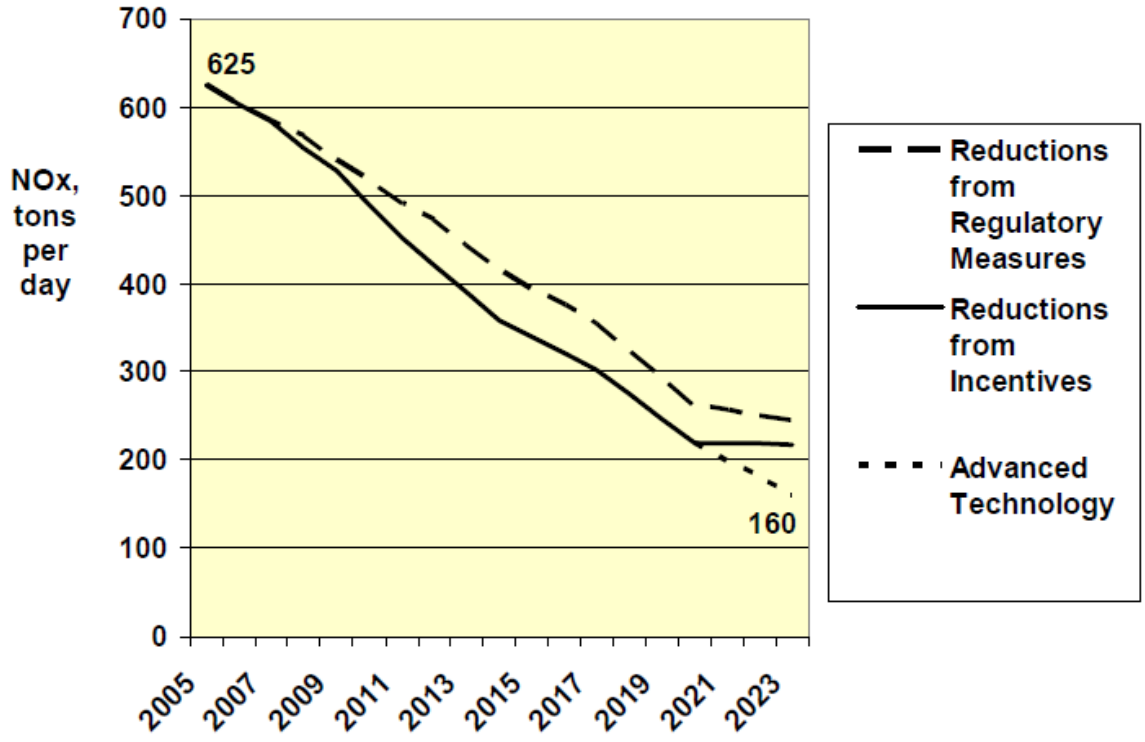
EPA originally classified the San Joaquin Valley Air Basin (SJVAB) as serious nonattainment for the 1997 federal 8-hour ozone standard with an attainment date of 2013. On April 30, 2007, the District's Governing Board adopted the 2007 Ozone Plan, which contained analysis showing a 2013 attainment target to be infeasible. The 2007 Ozone Plan details the plan for achieving attainment on schedule with an "extreme nonattainment" deadline of 2024. At its adoption of the 2007 Ozone

Plan, the District also requested a reclassification to extreme nonattainment. ARB approved the plan in June 2007, and EPA approved the request for reclassification to extreme nonattainment on April 15, 2010.

The 2007 Ozone Plan contains measures to reduce ozone and particulate matter precursor emissions to bring the Basin into attainment with the federal 8-hour ozone standard. The 2007 Ozone Plan calls for a 75-percent reduction of NO_x and a 25-percent reduction of ROG. Exhibit 5.3-3 displays the anticipated NO_x reductions attributed in the 2007 Ozone Plan (Source: 2007 Ozone Plan). The plan, with innovative measures and a "dual path" strategy, assures expeditious attainment of the federal 8-hour ozone standard for all Basin residents. The District Governing Board adopted the 2007 Ozone Plan on April 30, 2007. The ARB approved the plan on June 14, 2007. The 2007 Ozone Plan requires yet to be determined "Advanced Technology" to achieve additional reductions after 2021 to attain the standard at all monitoring stations in the Basin by 2024 as allowed for areas designated extreme nonattainment by the federal Clean Air Act (CAA).

The San Joaquin Valley Air Basin (SJVAB) is designated as an extreme ozone nonattainment area for the U.S. Environmental Protection Agency's (EPA) 2008 8-hour ozone standard of 75 parts per billion (ppb). The plan to address this standard is expected to be due to EPA in 2015/2016.

Exhibit 5.3-3: San Joaquin Valley NO_x Emissions Forecast



Particulate Matter Plans

The District adopted the *2007 PM_{10} Maintenance Plan in* September 2007 to assure the San Joaquin Valley's continued attainment of the EPA's PM_{10} standard. The EPA designated the valley as an attainment/maintenance area for PM_{10}.

The *2008 $PM_{2.5}$ Plan* builds upon the comprehensive strategy adopted in the 2007 Ozone Plan to bring the Basin into attainment of the 1997 national standards for $PM_{2.5}$. The EPA has identified NO_x and sulfur dioxide as precursors that must be addressed in air quality plans for the 1997 $PM_{2.5}$ standards. The 2008 $PM_{2.5}$ Plan is a continuation of the District's strategy to improve the air quality in the Basin.

The District prepared the *2012 $PM_{2.5}$ Plan* to bring the San Joaquin Valley into attainment of the EPA's most recent 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$. The California Air Resources Board (ARB) approved the District's 2012 $PM_{2.5}$ Plan at a public hearing on January 24, 2013. The plan, approved by the District Governing Board on December 20, 2012, will bring the Valley into attainment of EPA's 2006 $PM_{2.5}$ standard by the 2019 deadline, with most areas seeing attainment well before then.

SJVAPCD Rules and Regulation

The SJVAPCD rules and regulations that may apply to projects that will occur during buildout of the Plan Area include but are not limited to the following:

- Rule 2201 – New and Modified Stationary Source Review (applies to any stationary/industrial equipment that emits regulated pollutants in amounts specified by the rule. Rule 2201 requires stationary source projects that exceed certain thresholds to install best available control technology (BACT) and to obtain emission offsets to ensure that growth in stationary sources on a cumulative basis will not result in an increase in emissions.
- Rule 4002 – National Emissions Standards for Hazardous Air Pollutants. The purpose of the rule is to incorporate the National Emission Standards for Hazardous Air Pollutants from Part 61, Chapter I, Subchapter C, Title 40, Code of Federal Regulations and the National Emission Standards for Hazardous Air Pollutants for Source Categories from Part 63, Chapter I, Subchapter C, Title 40, Code of Federal Regulations to protect the health and safety of the public from hazardous air pollutants, such as asbestos.
- Rule 4102 – Nuisance. The purpose of this rule is to protect the health and safety of the public, and applies to any source operation that emits or may emit air contaminants or other materials.
- Rule 4601 – Architectural Coatings. The purpose of this rule is to limit Volatile Organic Compounds (VOC) emissions from architectural coatings. Emissions are reduced by limits on VOC content and providing requirements on coatings storage, cleanup, and labeling.
- Rule 4641 – Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations. The purpose of this rule is to limit VOC emissions from asphalt paving and maintenance operations. The paving operations for new development and existing paved surfaces will be subject to Rule 4641.

- Rule 4692 – Commercial Charbroiling. The purpose of this rule is to limit VOC and PM-10 emissions from commercial charbroiling. New and existing businesses with charbroiling equipment are subject to this rule.
- Rule 4901 – Wood Burning Fireplaces and Wood Burning Heaters. The purposes of this rule are to limit emissions of carbon monoxide and particulate matter from wood burning fireplaces, wood burning heaters, and outdoor wood burning devices, and to establish a public education program to reduce wood burning emissions. All development that includes wood burning devices are subject to this rule.
- Regulation VIII – Fugitive PM10 Prohibitions. Rules 8011-8081 are designed to reduce PM10 emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, etc. All development projects that involve soil disturbance are subject to at least one provision of the Regulation VIII series of rules.
- Rule 9410 – Employer Based Trip Reduction. The purpose of this rule is reduce vehicle miles traveled (VMT) from private vehicles used by employees to commute to and from their worksites to reduce emissions of NOx, VOC and PM. The rule would require larger employers (those with 100 or more eligible employees) to establish employee trip reduction programs to reduce VMT, reducing emissions associated with work commutes. The rule uses a menu-based Employer Trip Reduction Implementation Plan and periodic reporting requirements to evaluate performance on a phased-in compliance schedule.
- Rule 9510 – Indirect Source Review. This rule reduces the impact of NOx and PM10 emissions from growth. The rule places application and emission reduction requirements on development projects meeting applicability criteria in order to reduce emissions through onsite mitigation, offsite SJVAPCD-administered projects, or a combination of the two. Compliance with SJVAPCD Rule 9510 reduces the emissions impacts through incorporation of onsite measures as well as payment of an offsite fee that funds emission reduction projects in the Air Basin. The emissions analysis for Rule 9510 is detailed and is dependent on the exact project design that is expected to be constructed or installed. Compliance with Rule 9510 is separate from the CEQA process, though the control measures used to comply with Rule 9510 may be used to mitigate significant air quality impacts.

Fresno Council of Governments

Fresno Council of Governments (FCOG) is responsible for regional transportation planning in Fresno County and participates in developing mobile source emission inventories used in air quality attainment plans.

RTP/SCS

Regional Transportation Plans (RTP) address the mobility needed to keep our region moving and our communities connected. Fresno Council of Governments' (FCOG) 2014 RTP charts the long-range vision of regional transportation in Fresno County through the year 2040. The RTP identifies existing

and future transportation related needs, while considering all modes of travel, analyzing alternative solutions, and identifying what can be completed with anticipated available funding for the 1,100 projects and multiple programs included within it. Senate Bill 375 (SB 375), which went into effect in 2009, added statutes to the California Government Code to encourage planning practices that create sustainable communities. It calls for each metropolitan planning organization to prepare a Sustainable Communities Strategy (SCS) as an integrated element of the RTP that is to be updated every four years. The SCS is intended to show how integrated land use and transportation planning can lead to lower greenhouse gas (GHG) emissions from autos and light trucks. Fresno COG has included the SCS for the first time in its 2014 RTP.

Transportation Conformity

FCOG must ensure that transportation plans and projects comply with Federal Transportation Conformity. Transportation conformity is a way to ensure that Federal funding and approval are given to those transportation activities that are consistent with air quality goals. It ensures that these transportation activities do not worsen air quality or interfere with the "purpose" of the State Implementation Plan, which is to meet the National Ambient Air Quality Standards (NAAQS). Meeting the NAAQS often requires emissions reductions from mobile sources.

According to the Clean Air Act, transportation plans, programs, and projects cannot:

- Create new NAAQS violations;
- Increase the frequency or severity of existing NAAQS violations; or
- Delay attainment of the NAAQS.

In practice, air quality plans include criteria pollutant emission budgets required for attainment of air quality standards by mandated deadlines. The budgets must not be exceeded considering projected growth in mobile source activity. Emissions from projected growth must not exceed the budgets in any year.

CEQA

The District has three roles under CEQA:

1. Lead Agency: responsible for preparing environmental analyses for its own projects (adoption of rules, regulations, or plans) or permit projects filed with the District where the District has primary approval authority over the project.
2. Responsible Agency: The discretionary authority of a Responsible Agency is more limited than a Lead Agency; having responsibility for mitigating or avoiding only the environmental effects of those parts of the project which it decides to approve, carry out, or finance. The District defers to the Lead Agency for preparation of environmental documents for land use projects that also have discretionary air quality permits unless no document is prepared by the Lead Agency and potentially significant impacts related to the permit are possible. The District comments on documents prepared by Lead Agencies to ensure that District concerns are addressed.

3. Commenting Agency: the District reviews and comments on air quality analyses prepared by other public agencies (such as the proposed project).

The District also provides guidance and thresholds for CEQA air quality and greenhouse gas analyses. The result of this guidance as well as state regulations to control air pollution is an overall improvement in the Basin. In particular, the District's draft 2012 Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) states the following:

> The District's Air Quality Attainment Plans include measures to promote air quality elements in county and city general plans as one of the primary indirect source programs. The general plan is the primary long range planning document used by cities and counties to direct development. Since air districts have no authority over land use decisions, it is up to cities and counties to ensure that their general plans help achieve air quality goals. Section 65302.1 of the California Government Code requires cities and counties in the San Joaquin Valley to amend appropriate elements of their general plans to include data, analysis, comprehensive goals, policies, and feasible implementation strategies to improve air quality in their next housing element revisions. This was completed for the City of Fresno with the adoption of the Air Quality Update of the 2025 Fresno General Plan Resources Conservation Element last revised May 7, 2009.
>
> The Air Quality Guidelines for General Plans (AQGGP), adopted by the District in 1994 and amended in 2005, is a guidance document containing goals and policy examples that cities and counties may want to incorporate into their General Plans to satisfy Section 65302.1. When adopted in a general plan and implemented, the suggestions in the AQGGP can reduce vehicle trips and miles traveled and improve air quality. The specific suggestions in the AQGGP are voluntary. The District strongly encourages cities and counties to use their land use and transportation planning authority to help achieve air quality goals by adopting the suggested policies and programs. The 2025 General Plan and the General Plan Update integrate many of the recommended goals and policies of the AQGGP.

City of Fresno

Proposed General Plan Update

The proposed General Plan Update sets forth the following guiding and implementing policies that are relevant to air quality.

Policy UF-1-c: Legible City Structure. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people, and pedestrian-oriented activity in Downtown; along a small number of prominent east west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lanes and streets.

Objective UF-12: Locate roughly one-half of future residential development in infill areas - defined as being within the City on December 21, 2012- including the Downtown core area and surrounding

neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas and vacant land.

Policy UF-12-a: BRT Corridors. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.

Policy UF-12-b: Activity Centers. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.

Policy UF-12-d: Appropriate Mixed-Use. Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one site or adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.

Policy UF-12-e: Access to Activity Centers. Promote adoptions and implementation of standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.

Policy UF-12-f: Mixed-Use in Activity Centers. Update the Development Code to include use regulations and standards to allow for mixed-uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.

Objective UF-14: Create an urban form to facilitate multi-modal connectivity.

Policy UF-14-a: Design Guidelines for Walkability. Develop and use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.

Policy UF-14-b: Local Street Connectivity. Design local roadways to connect throughout neighborhoods and large private developments with adjacent major streets and pathways of existing adjacent development. Create access for pedestrians and bicycles where a local street must dead end or be designed as a cul-de-sac to adjoining uses that provide services, shopping, and connecting pathways for access to the greater community area.

Policy UF-14-c: Block Length. Create development standards that provide desired and maximum block lengths in residential, retail, and mixed-use districts order to enhanced walkability.

Objective LU-2: Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residences.

Policy LU-2-a: Infill Development and Redevelopment. Promote development of vacant, underdeveloped, and redevelopable land uses within the City Limits where urban services are available considering the establishment and implementation of supportive regulations and programs.

Policy LU-2-b: Infill Development for Affordable Housing. Consider a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City as a strategy to help to meet the affordable housing needs of the community.

Policy LU-3-b: Mixed-Use Urban Corridors that Connect the Downtown Planning Area. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon road corridors, as shown on Figure LU-1: General Plan Land Use Diagram.

Policy LU-3-c: Zoning for High Density on Major BRT Corridors. Consider the adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish the long-term growth and development potential for Downtown.

Policy LU-5-f: High Density Residential Uses. Promote high-density residential uses to support Activity Centers and BRT Corridors, affordable housing and walkable access to transit stops.

Policy LU-6-b: Commercial Development Guidelines. Consider adopting commercial development guidelines to assure high quality design and site planning for large commercial developments, consistent with the Urban Form policies of this Plan.

Policy LU-6-f: Auto-Oriented Commercial Uses. Direct highway-oriented and auto-serving commercial uses to locations that are compatible with planned Urban Form policies of the General Plan. Ensure adequate buffering measures for adjacent residential uses noise, glare, odors, and dust.

Policy LU-6-g: Lodging Facilities Location. Site lodging facilities and related accommodations near major transportation facilities.

Policy LU-8-b: Access to Public Facilities. Ensure that major public facilities and institutions have adequate mulit-modal access and can be easily reached by public transit.

Objective RC-4: In cooperation with other jurisdictions and agencies in the San Joaquin Valley Air Basin, take necessary actions to achieve and maintain compliance with State and federal air quality standards for criteria pollutants.

Policy RC-4-a: Support Regional Efforts. Support and lead, where appropriate, regional, State and federal programs and actions for the improvement of air quality, especially the SJVAPCD's efforts to monitor and control air pollutants from both stationary and mobile sources and implement Reasonably Available Control Measures in the Ozone Attainment Plan.

Policy RC-4-b: Conditions of Approval. Develop and incorporate air quality maintenance requirements, compatible with Air Quality Attainment and Maintenance Plans, as conditions of approval for General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals.

Policy RC-4-c: Evaluate Impacts with Models. Continue to require the use of computer models used by SJVAPCD to evaluate the air quality impacts of plans and projects that require such environmental review by the City.

Policy RC-4-d: Forward Information. Forward information regarding proposed General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals that require air quality evaluation, and amendments to development regulations to the SJVAPCD for their review of potential air quality and health impacts.

Policy RC-4-e: Support Employer-Based Efforts. Support and promote employer implementation of staggered work hours and employee incentives to use carpools, public transit and other measures to reduce vehicular use and traffic congestion.

Policy RC-4-f: Municipal Operations and Fleet Actions. Continue to control and reduce air pollution emissions from vehicles owned by the City operations and municipal operations and facilities by undertaking the following:

- Expand the use of alternative fuel, electric, and hybrid vehicles in City fleets.
- Create preventive maintenance schedules that will ensure efficient engine operation.
- Include air conditioning recycling and charging stations in the City vehicle maintenance facilities, to reduce freon gases being released into the atmosphere and electrostatic filtering systems in City maintenance shops, when feasible or when required by health regulations.
- Use satellite corporation yards for decentralized storage and vehicle maintenance.
- Convert City-owned emergency backup generators to natural gas fuels whenever possible, and create an advanced energy storage system.

Policy RC-4-g: FAX Actions. Continue efforts to improve Fresno Area Express (FAX) bus transit system technical performance, reduce emission levels, streamline system operations, and implement BRT where supportive land uses are proposed by Figure LU-1: Land Use Diagram.

Policy RC-4-h: Airport Actions. Support Airport efforts to develop and maintain programs and policies to support City, State and Federal efforts to achieve and maintain air quality standards.

Policy RC-4-j: All Departments. Continue to develop and implement in all City departments, operational policies to reduce air pollution.

Policy RC-7-d: Update Standards for New Development. Continue to refine water saving and conservation standards for new development.

Objective RC-8: Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

Policy RC-8-a: Existing Standards and Programs. Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.

Policy RC-8-c: Energy Conservation in New Development. Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.

Policy RC-8-d: Incentives. Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Policy RC-8-e: Energy Use Disclosure. Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

Policy RC-8-f: City Heating and Cooling. Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.

Policy RC-8-g: Revolving Energy Fund. Create a City Energy Fund, which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Policy RC-8-h: Solar Assistance. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Policy RC-8-i: Renewable Target. Adopt and implement a program to increase the use of renewable energy to meet a given percentage of the city's peak electrical load within a given time frame.

Policy RC-8-j: Alternative Fuel Network. Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

Policy HC-3-f: New Drive-Through Facilities. Include in the Development Code design review to reduce vehicle emissions resulting from queued idling vehicles at drive-through facilities in proximity to residential neighborhoods.

Policy HC-3-d: Green Standards for Affordable Housing. Provide appropriate incentives for affordable housing providers, agencies, non-profit and market rate developers to use LEED and CalGreen Tier 1 or Tier 2 standards or third party equivalents.

5.3.4 - Thresholds of Significance:

The following air quality significance thresholds are contained in Appendix G of the CEQA Guidelines. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. A significant impact would occur if the project would:

a) Conflict with or obstruct implementation of the applicable air quality plan? (See Air Quality Plan, Impact AIR-1)

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? (See Air Quality Standards/Violations, Impact AIR-2)

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? (See Criteria Pollutants, Impact AIR-3)

d) Expose sensitive receptors to substantial pollutant concentrations? (See Sensitive Receptors, Impact AIR-4)

e) Create objectionable odors affecting a substantial number of people? (See Odors, Impact AIR-5)

The SJVAPCD is the applicable air pollution control district for the SJVAB, which includes the City of Fresno. The SJVAPCD has adopted thresholds of significance in its GAMAQI that are used where appropriate in the following analysis. While the final determination of whether a project is significant is within the purview of the Lead Agency pursuant to Section 15064(b) of the CEQA Guidelines, SJVAPCD recommends that its quantitative air pollution thresholds be used to determine the significance of project emissions. If the City as Lead Agency finds that the project has the potential to exceed these air pollution thresholds, the project will be considered to have significant air quality impacts.

Odor Threshold Discussion

Odor impacts on residential areas and other sensitive receptors, such as hospitals, day-care centers, schools, etc., warrant the closest scrutiny, but consideration could also be given to other land uses where people may congregate, such as recreational facilities, worksites, and commercial areas. While offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the SJVAPCD.

Two situations create a potential for odor impact. The first occurs when a new odor source is located near an existing sensitive receptor. The second occurs when a new sensitive receptor locates near an existing source of odor. The District has determined the common land use types that are known to produce odors in the Basin. These types are shown in Table 5.3-6.

Table 5.3-6: Screening Levels for Potential Odor Sources

Odor Generator	Distance
Wastewater Treatment Facilities	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g., auto body shop)	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rendering Plant	1 mile
Source: San Joaquin Valley Air Pollution Control District, 2002.	

According to the District's 2002 Guide, analysis of potential odor impacts should be conducted for the following two situations:

- **Generators** - projects that would potentially generate odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate, and
- **Receivers** - residential or other sensitive receptor projects or other projects built for the intent of attracting people locating near existing odor sources.

Projects proposing to locate facilities listed in Table 5.3-5 would require an odor assessment to determine if the project would impact sensitive receptors. The first step is to determine if the project would result in existing or planned land uses with sensitive receptors being located within the distances listed in Table 5.3-6. If yes, a more detailed analysis including a review of District odor complaint records is warranted. The detailed analysis would involve contacting the District's Compliance Division for information regarding odor complaints for similar facilities and review of the facilities operation statement to identify processes and emissions sources that have the potential to generate odors. Facilities with the potential to generate significant odors would be required to

prepare an odor management plan for approval by the City and by CalRecycle for facilities involved in handling solid waste.

For a project locating near an existing source of odors, the project should be identified as having a potentially significant odor impact if it is proposed for a site that is as close or closer to an existing odor source where there have been:

- More than one *confirmed* complaint per year averaged over a three-year period, or
- Three *unconfirmed* complaints per year averaged over a three-year period.

Projects meeting these criteria should provide an odor assessment to determine if the odor issues from the facilities have been resolved or if mitigation measures are available to reduce odor impacts to future residents. In all cases, this information will be included as part of the project file for public disclosure.

5.3.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Air Quality Plan

Impact AIR-1	**The project would not conflict with or obstruct implementation of the applicable air quality plan.**

Project Specific Impact Analysis

The project was assessed to determine if the impacts from implementing the General Plan would conflict with or obstruct the implementation of the applicable attainment plan. As defined above, the project is the buildout of the Project Area. Buildout is predicted to occur at growth rates consistent with those used by the SJVAPCD to develop plans for all nonattainment pollutants in the SJVAB. The growth rate used for this analysis results in buildout by the year 2056.

The assessment used two tests to determine if the project conflicts or obstructs the applicable air quality plans. First, if development proposed by the General Plan exceeds the growth projections used in the applicable attainment plan, it would produce a potentially significant impact. Second, if the project includes goals, policies, and development standards that are in conflict with the development related control measures in the attainment plans, the project would be potentially significant. Under these tests, the project would not have a significant impact.

The growth projections used for the General Plan assume that growth in population, vehicle use and other source categories will occur at historically robust rates that are consistent with the rates used to develop the SJVAPCD's attainment plans. In other words, the amount of growth predicted for the General Plan Update is accommodated by the SJVAPCD's attainment plan and would allow the air basin to attain the 8-hour ozone standard by the 2023 attainment date. In addition, as shown in the operational emissions analysis in Impact AIR-3, reductions anticipated from existing regulations and adopted control measures will result in emissions continuing to decline even though development and population will increase. Furthermore, the General Plan Update increases the City's

sustainability efforts that reduce motor vehicle use and energy consumption. This is accomplished with more compact development achieved by increasing development density and by providing a land use pattern and transportation infrastructure more supportive of public transportation, walking, and bicycling. Therefore, the General Plan supports the implementation of SJVAPCD's attainment plans and successfully meets this test.

Review of the proposed goals and policies of the General Plan Update found them to be consistent with the applicable control measures of the SJVAPCD attainment plan. The General Plan Update includes numerous policies that would reduce operational air pollutant emissions and increase energy efficiency. The applicable goals and policies are listed in the previous section. The City also participates in regional planning efforts such as the San Joaquin Valley Blueprint Project and works closely with Fresno COG in developing Regional Transportation Plans and capital improvement plans and capital improvement plans (see Policy MT-1-a). These efforts contribute to the attainment strategy for the San Joaquin Valley Air Basin.

The SJVAPCD has adopted rules and regulations specifically designed to reduce the impacts of growth on the applicable air quality plans. For example, Rule 9510-Indirect Source Review was adopted to provide emission reductions needed by the SJVAPCD to demonstrate attainment of the federal PM_{10} standard and contributed reductions that assist in attaining federal ozone standards. Rule 9510 also contributes toward attainment of state standards for these pollutants. The District's Regulation VIII – Fugitive PM_{10} Prohibitions requires controls for sources of particulate matter necessary for attaining the federal PM_{10} standards and achieving progress toward attaining the state PM_{10} standards. Rule 2201 – New and Modified Stationary Source Review requires new and modified stationary/industrial sources provide emission controls and offsets that ensure that stationary sources decline over time and do not impact the applicable air quality plans. Development implementing the General Plan Update will comply with these rules and regulations providing additional support for the conclusion that it will not interfere or obstruct with the application of the attainment plans.

Therefore, the project would be consistent with the air quality attainment plans and would result in a less than significant impact for this criterion.

Cumulative Impact Analysis

Attainment plans must demonstrate that the nonattainment area will achieve air quality standards by deadlines mandated by the Federal Clean Air Act and maintain the standards accounting for the cumulative growth in all source emissions predicted for the air basin. The General Plan identifies the cumulative growth that would occur in the Planning Area and its buildout is based on growth projections that are consistent with the applicable attainment plans. Therefore, under this criterion, the buildout of the General Plan Update would not have a significant cumulative impact on the applicable attainment plans.

Because the SJVAB is designated as an Extreme Nonattainment Area for the 8-hour ozone standard, the Clean Air Act allows the SJVAPCD 2007 Ozone Plan to rely upon future measures to be identified later after adopting all feasible control measures to demonstrate attainment. The 2007 Ozone Plan

strategy is to achieve the remaining reductions with new incentive funding and technological advancements. The future reductions must be in place by 2020 to achieve the ozone standards by the 2023 attainment year. Attainment requires an additional 14 percent NOx reduction beyond the adopted regulatory measures to achieve attainment at all monitoring stations in the air basin. The Clean Air Act (CAA) includes sanctions and penalties for air basins that fail to fulfill plan commitments, providing a strong incentive for the air district to identify and implement the required actions. The CAA requires the SJVAPCD to prepare Rate of Progress Plans every three years to identify any shortfalls early and to identify new control measures if needed. The General Plan Update would not conflict with or obstruct attainment if the Air District fails to identify and implement the required reductions since the General Plan Update efforts to reduce vehicle miles traveled and energy consumption would continue to assist the SJVAPCD in achieving the standards to the extent possible.

The SJVAB has attained federal PM_{10} standards and state standards have no attainment deadlines. Attainment deadlines for $PM_{2.5}$ are earlier than for ozone and require fewer NOx reductions to achieve the federal standards. In addition, the $PM_{2.5}$ Plan identifies sufficient reductions from adopted regulations to achieve the standard on schedule. Therefore, ozone precursor reductions are the controlling pollutants for attainment in the SJVAB.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Air Quality Standards / Violations

Impact AIR-2	**The project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation.**

Project Specific Impact Analysis

Violations of air quality standards occur when official air monitoring stations within the air basin exceed air quality standards as defined by EPA criteria and statistical sampling methods. Monitoring stations are located in areas that are representative of air quality in the air basin and are not located in areas impacted by local sources. Although monitoring stations in Fresno currently experience violations of ozone and $PM_{2.5}$ air quality standards, the impacts of the project for these pollutants are better assessed on a cumulative basis because a single project alone would not result in a

violation of the ozone standard (See Impact AIR-3). Ozone is generated by photochemical reactions of the cumulative emissions of ROG and NOx in the air basin. $PM_{2.5}$ is generated by direct emissions and by secondary reactions in the atmosphere, but is primarily considered a cumulative impact. Two other pollutants, carbon monoxide (CO) and sulfur dioxide (SO_2) are directly emitted and could cause a violation or contribute to a violation of the standards for these pollutants if emitted in substantial quantities. The analysis for CO and SO_2) is provided below.

Carbon Monoxide (CO) and Sulfur Dioxide (SO_2)

Fresno County is currently classified as a maintenance area for CO, which means that it achieved the standard. After attainment is reached, the area must demonstrate that pollutant levels will continue to be maintained for a period of 10 years after which the area will meet requirements in the Clean Air Act for redesignation to attainment. The Air Basin is classified attainment for sulfur dioxide. The highest level recorded in the San Joaquin Valley is a factor of 10 below the standard (see Table 5.3-1). The change in emissions of CO and SO_2 with the buildout of the General Plan Update is shown in Table 5.3-7 and Exhibit 5.3-4.

As shown in Table 5.3-7, CO emissions decrease after the year 2010, even with increases in population and vehicle miles traveled. This is because newer vehicles and equipment would have fewer emissions due to technological advances required by state regulations. Therefore, implementation of the General Plan Update would result in less than significant CO emissions impacts.

SO_2 would, however, increase over time primarily because the future year emission forecasts are assumed to increase proportionally with population growth. The largest source of SO_2 is electricity production; however, very little of the power consumed in Fresno is produced locally. PG&E produces and purchases power from numerous sources, many of which are outside the San Joaquin Valley Air Basin and may or may not affect pollution concentrations in the City of Fresno. However, as a conservative worst case assumption, the emissions from electricity consumption are assumed to directly affect air quality in Fresno. Another conservative assumption is that the increase in electricity would be supplied by the same mix of electricity providers in future years as in the year 2010, which does not account for the expected increase in solar and other renewable electricity sources.

The San Joaquin Valley is currently designated attainment for sulfur dioxide, and the monitored concentrations are far below the ambient air quality standards. Any increases in SO2 due to new power plants or from expansions at existing power plants are subject to permitting and emission control requirements of the SJVAPCD that would minimize the emission increases and keep levels well below the ambient air quality standards. A conservative estimate of future SO2 concentrations can be accomplished by assuming that ambient concentration will increase proportionally with emissions from sources in tons per year. SO_2 emissions are estimated to increase from 289 tons per year in 2010 to 441 tons per year at project buildout in 2056 or a 54 percent increase. A 54 percent increase in SO_2 concentration would result in a change from the current level of 0.004 PPM to 0.006 PPM compared to the standard of 0.04 PPM, a factor of 6 below the standard. Therefore, SO_2 emissions impacts are considered less than significant.

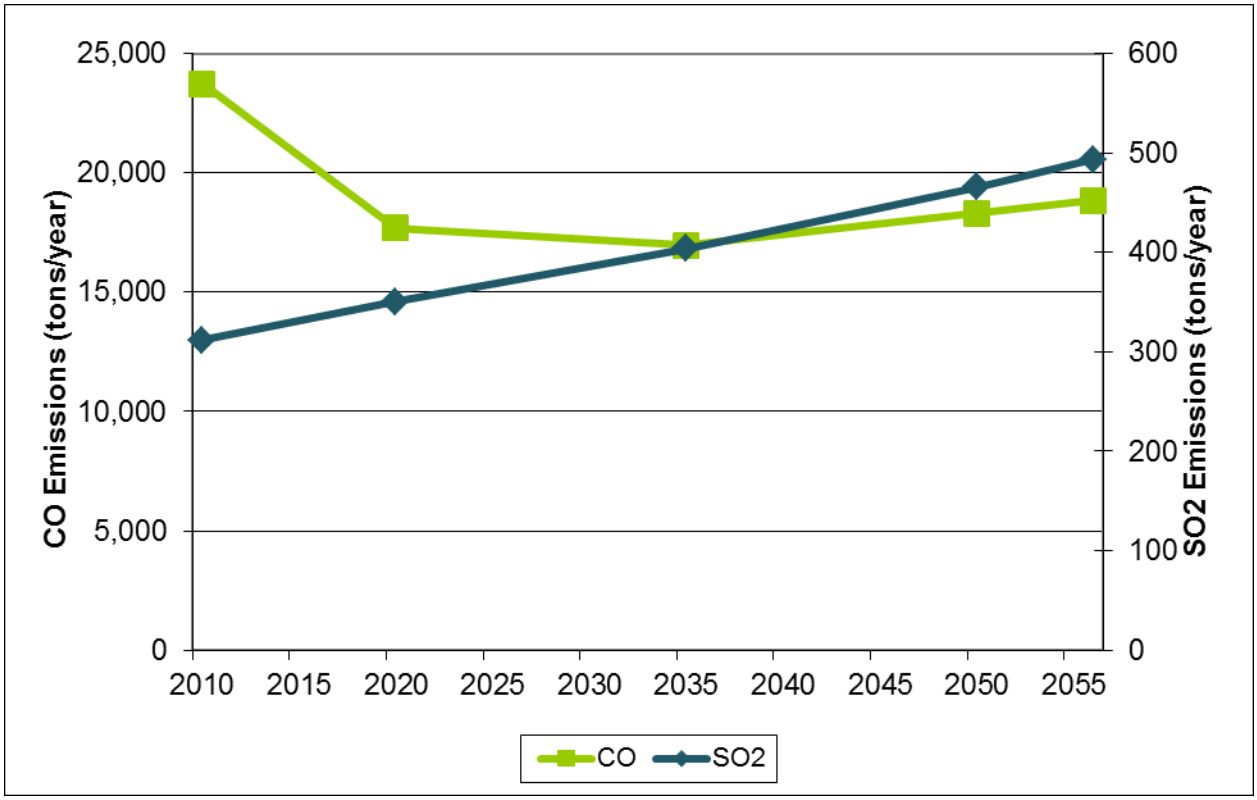
Table 5.3-7: City of Fresno Planning Area Annual Carbon Monoxide and Sulfur Dioxide Emissions

Year	Source	Emissions (tons/year)	
		CO	SOx
2010	On-road motor vehicles	13,091	ND
	Electricity	ND	2118
	Natural gas	495	5
	Stationary/area	203	89
	Off-road vehicles	9,943	7
	Total	**23,731**	**312**
2020	On-road motor vehicles	5,948	ND
	Electricity	ND	246
	Natural gas	574	5
	Stationary/area	203	89
	Off-road vehicles	10,972	10
	Total	**17,697**	**350**
2035	On-road motor vehicles	5,100	ND
	Electricity	ND	299
	Natural gas	681	6
	Stationary/area	203	89
	Off-road vehicles	10,972	10
	Total	**16,955**	**404**
2056	On-road motor vehicles	6,675	ND
	Electricity	ND	386
	Natural gas	915	9
	Stationary/area	203	89
	Off-road vehicles	10,972	10
	Total	**18,855**	**493**
Net change between 2010 and 2020		**-7,826**	85
Net change between 2010 and 2035		**-6,560**	132
Net change between 2010 and 2056		**-6,050**	152

Notes:
ND = no data was available; CO = carbon monoxide; SOx = sulfur oxides. Generation of electricity at power plants is an insignificant source of CO. SOx is not reported by ARB the EMFAC2011 model.
Source of motor vehicle emissions: The emissions include all on-road vehicles, including

Year	Source	Emissions (tons/year)	
		CO	SOx
light duty automobiles, light duty trucks, light heavy-duty trucks, motorcycles, motor homes, buses, and heavy-duty trucks. Emissions were estimated by FirstCarbon Solutions using emission factors from the EMFAC2011 model and vehicle miles traveled data from Fehr and Peers. Source of electricity and natural gas emissions: 2010 emissions are from PG&E; future years emissions are projected using population (for residential electricity) and employment (for commercial electricity). Note that industrial emissions are not available. Source of stationary and area: ARB CEIDARS inventory for the year 2010; since the data is from real facilities, it would be impossible to predict if the emissions would increase or decrease in the future. Therefore, the emissions are assumed to remain the same over time. Source of off-road vehicles: ARB's OFFROAD2007 model; 2056 emissions use 2035 emissions because OFFROAD only goes to the year 2040. There may be some overlap in the stationary/area source emissions and the off-road vehicle emissions. Source of net change between 2010 and 2056: 2056 emissions minus 2010 emissions. Refer to Appendix B-1 for calculation details. Year 2050 emissions are also included in the appendix; however, the emissions are similar to 2056; therefore, they are not shown in the table.			

Exhibit 5.3-4: Carbon Monoxide and Sulfur Dioxide Emissions in Fresno Planning Area



Cumulative Impact Analysis

The project analysis is based on the cumulative development envisioned for the General Plan Update. The effects of existing development are accounted for in the ambient concentrations measured at Fresno air monitoring stations, which shows that levels are well below ambient air quality standards. The analysis of CO including development at buildout results in a net decrease in CO emissions and would result in continued declines in CO concentrations. CO impacts are localized and are not impacted by regional sources. The analysis of SO_2 impacts shows a small increase in emissions at buildout; however, as described in the project level analysis, the increase in ambient SO_2 concentrations would not be substantial nor be a violation of air quality standards. Therefore, impacts are less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Criteria Pollutants

Impact AIR-3	**The project would result in a considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).**

Project Specific Impact Analysis

The SJVAPCD has adopted project level quantitative thresholds for ozone precursors reactive organic gases ROG and oxides of nitrogen (NO_x) of 10 tons per year, and recommends quantitative thresholds for PM_{10} and $PM_{2.5}$ of 15 tons per year pending an update to the GAMAQI that is currently in draft form. Although these thresholds are intended for use on individual development projects, no other quantitative plan level threshold has been adopted. The General Plan Update provides for the development of numerous individual development projects that will be subject to the project level thresholds at the time they are proposed. Large individual projects are likely to exceed the thresholds during project construction and operation.

The General Plan Update reflects the cumulative projects anticipated for the City from the present until buildout, which is predicted for 2056. A more appropriate metric for cumulative contribution at the plan level is whether the cumulative impact of development predicted by the General Plan

Update would conflict with plans adopted to achieve the applicable standards. A conflict would result when emission levels exceed the amounts required for attainment by the years mandated by state and federal regulations. After the attainment year, the emissions inventory must stay below the attainment inventory even with continued growth in order to maintain the standard. Once standards are achieved, no significant impact to health would occur as long as standards are maintained.

The project area is designated nonattainment for ozone, PM_{10}, and $PM_{2.5}$. Ozone is not directly emitted but is formed in the atmosphere by ozone precursors (ROG and NO_2). In addition, PM_{10} and $PM_{2.5}$ are emitted directly and also form in the atmosphere as a secondary pollutant from emissions of NO_2 and ammonia. Ammonia is not a criteria pollutant and the SJVAPCD PM control strategy is based primarily on NO_2 controls and reductions of directly emitted PM_{10} and $PM_{2.5}$. Therefore, this section addresses the cumulative emissions of the pollutants ROG, NOx, PM_{10}, and $PM_{2.5}$.

Development of the General Plan Update would result in air pollutant emissions from short-term construction activities and long-term project operation described below.

Construction

Construction activity from implementing the General Plan Update would cause temporary, short-term emissions of various air pollutants within the Planning Area. ROG and NOx (ozone precursors), PM_{10}, and $PM_{2.5}$ would be emitted by construction equipment during various activities, which may include but are not limited to grading, excavation, building construction, or demolition. Soil disturbance during construction activities emit fugitive dust a fraction of which is comprised of PM_{10} and $PM_{2.5}$.

SJVAPCD and state regulations reduce potential construction emissions. The ARB has adopted regulations for New Off-Road Diesel Engines and Equipment that result in cleaner equipment being placed in service as older, higher emitting equipment is retired. The ARB also adopted the In-Use Off-Road Diesel Vehicle Regulation requiring NOx and PM_{10} emission reductions from equipment and vehicles currently in operation. SJVAPCD Regulation VIII includes requirements to control fugitive dust emissions during construction activities and requires commercial projects over 5 acres and residential projects over 10 acres to file a Dust Control Plan. The SJVAPCD 2002 GAMAQI states that compliance with Regulation VIII will normally reduce impacts from fugitive dust to less than significant. Rule 9510 – Indirect Source Review requires projects to reduce exhaust related construction emissions by 20 percent for NOx and by 50 percent for PM_{10}; however, significance for these emissions is based on whether projects exceed the SJVAPCD annual quantitative thresholds.

The District indicates that the control measures in Regulation VIII are required by regulation for all construction sites to reduce fugitive dust emissions. The District's 2002 GAMAQI lists additional measures that may be required because of sheer project size or proximity of the project to sensitive receptors. The additional measures are referred to as "enhanced control measures" in the GAMAQI. These enhanced control measures have been added as amendments to Regulation VIII, so they are no longer considered mitigation measures that could be imposed on very large or sensitive projects, but standard control measures required for rule compliance. As stated above, each commercial

project over 5 acres in size and residential project over 10 acres in size is required to submit a Dust Control Plan to the SJVAPCD for approval and requires control measures adequate to prevent significant fugitive dust impacts. If measures included in the Dust Control Plan prove inadequate to control fugitive dust, construction contractors must implement additional controls or cease dust generating construction activities. In addition, projects smaller than the Dust Control Plan size thresholds must still comply with most other Regulation VIII requirements. Therefore, fugitive dust impacts from construction activities are considered less than significant.

The buildout of the General Plan Update will result in hundreds of individual development projects. Information regarding specific development projects, soil conditions, and the location of sensitive receptors in relation to the various projects would be needed in order to determine localized impacts associated with construction activity. However, overall estimates based on annual rates of construction activity required to reach buildout provides a reasonable method for determining an annual contribution rate for construction emissions. The emission inventory for the City of Fresno's share of the San Joaquin Valley construction activity source categories is provided in Table 5.3-8 below. The annual emissions would substantially exceed the SJVAPCD project level thresholds for all pollutants. The inventory represents a worst case emission estimate for construction activity. Emissions from construction activities are expected to decline over time as new cleaner equipment replaces older higher emitting equipment. However, on a cumulative basis, construction emissions would continue to exceed SJVAPCD annual thresholds even with the regulatory reductions.

Table 5.3-8: City of Fresno Planning Area Construction Emissions

Year	Source	Emissions (tons/year)			
		ROG	NO_x	PM_{10}	$PM_{2.5}$
2008	Architectural Coatings	532.2	0	0	0
	Asphalt Paving and Roofing	96.4	0	0	0
	Construction and Demolition	0	0	650.4	65.7
	Off-road Equipment	184.0	1,419.1	74.5	67.9
	Total	**812.6**	**1,419.1**	**724.5**	**133.6**
SJVAPCD Annual Thresholds		**10**	**10**	**15**	**15**

Source: ARB Almanac 2009 Fresno County Emissions. City of Fresno Planning Area share based on 60 percent share of County population.

Emissions related to projected construction activities are included in emission forecasts used to demonstrate attainment of the applicable air quality standards and would therefore, not interfere or obstruct with SJVAPCD attainment plans. However, the combined impact of all construction projects to reach buildout is a cumulative impact that makes it more difficult to attain the air quality standards compared to a scenario where no growth takes place. Although individual projects may exceed SJVAPCD project level thresholds, using a project threshold to address the impact of

hundreds of projects that would be constructed to reach General Plan buildout is a highly conservative measure of project level significance for an impact that is cumulative in nature.

Rule 9510 – Indirect Source Review requires reductions of construction emissions in order to mitigate the impacts of growth. The rule requires NOx reductions of 20 percent and PM_{10} reductions of 45 percent compared to the statewide average by using clean construction equipment at the project site or paying mitigation fees to the SJVAPCD to obtain off-site reductions. Rule 9510 serves to mitigate both project level and cumulative effects of construction on ozone and particulate matter emissions. Individual projects that exceed project level significance thresholds after accounting for Rule 9510 reductions would be required to implement additional mitigation measures to reduce significant emissions or the City would be required to prepare an EIR and adopt a statement of overriding considerations.

ARB off-road equipment regulations would result in reductions in NOx and PM emissions as new equipment meeting current and future standards replaces older higher emitting equipment. The regulations provide substantial reductions near term and midterm. ARB also requires retrofits of existing equipment to reduce particulate emissions that will help reduce emissions from older equipment. Regulations are normally implemented over a 5 to 10 year period at which time a new round of regulations are proposed if still needed to attain the air quality standards. The ARB has a long history of tightening regulations as technology advances increase the feasibility of additional controls. Large individual projects that exceed the SJVAPCD project thresholds will be required to include feasible mitigation measures that reduce the significant impact. The measures could include additional onsite controls or off-site mitigation fees that reduce emissions to less than significant levels.

Based on the continued emission reductions anticipated from adopted ARB and SJVAPCD regulations, attainment of ozone and particulate standards, accounting for projected growth, are on track. In the event that the SJVAB fails to reach Rate of Progress requirements, or to reach attainment of the air quality standards on schedule, or falls out of attainment in the future, the SJVAPCD will be required to implement contingency measures to address the shortfall or be subject to Clean Air Act sanctions. The SJVAPCD could obtain additional reductions from any source within its regulatory authority, which includes the construction emissions regulated under Rule 9510. No action by the SJVAPCD or the City of Fresno is required until such time the planned reductions prove insufficient.

When project construction emissions are viewed in relation to the applicable air quality plans adopted by the SJVAPCD, the emissions would not result in a significant cumulative contribution since the emissions would not interfere with attainment of air quality standards. However, estimated annual project construction emissions exceed project level thresholds by a substantial margin for all pollutants. Therefore, construction emissions are considered potentially significant.

Operation

The main sources of operational criteria air pollutants in the City of Fresno are on-road motor vehicles, off-road motor vehicles, natural gas combustion, and stationary/area sources.

City of Fresno air pollutant emissions for the years 2010 (existing), 2020, 2035, and 2056 (buildout) are shown in Table 5.3-9 and displayed graphically in Exhibit 5.3-5 and Exhibit 5.3-6. As shown in the Table 5.3-9, the greatest sources of emissions are from on-road and off-road vehicles. Off-road vehicle emissions are generated by sources such as recreational equipment, lawn and garden equipment, and construction/mining equipment. The City of Fresno has no large electrical power generation facilities within the Planning Area. PG&E's largest plants exceed 1,000 MW. The Kings River Conservation District (KRCD) operates a 98 MW peaker plant in Malaga, but that plant only operates during periods of peak demand. The California Energy Commission has licensing authority for all thermal power plants with a capacity of 50 megawatts (MW) or more that are proposed for construction within the state, providing a logical cutoff point for consideration as a large facility. The emissions reported in Table 5.3-9 for electricity are based on electricity consumption in the Planning Area at PG&E emission rates for its energy production portfolio. PG&E's portfolio includes electricity produced at power plants powered by many different fuels and from renewable sources like hydroelectric, wind, and solar. Only a fraction of fossil-fueled power plants where PG&E obtains power are located within the San Joaquin Valley Air Basin and even fewer are located within Fresno County. Although the City of Fresno's electricity consumption is responsible for the emissions generated by the power plants, the emissions may or may not have an effect on ozone and particulate concentrations in its Air Basin.

As shown in the Table 5.3-9, total emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ exceed the District's project level significance thresholds; however, as discussed earlier, the project threshold are a highly conservative measure of significance for a long-range plan. Analysis of emission projections accounting for the effects of adopted regulations shows that there would be a net decrease in emissions with buildout of the General Plan Update even though the vehicle miles traveled and population would increase substantially. This is because the emission rates for the most important sources of these pollutants substantially decrease from 2010 levels due to SJVAPCD and state regulations. The reductions predicted are adequate to demonstrate attainment of air quality standards for all criteria pollutants with the exception of the 8-hour ozone standard. Achieving the 8-hour ozone standard depends on future measures that would utilize advanced technology and increased incentive funding. However, as discussed in Impact AIR-1, the CAA includes provisions that address emission shortfalls and failures to meet plan commitments.

Table 5.3-9: City of Fresno Planning Area Annual Air Pollutant Emissions

Year	Source	Emissions (tons/year)			
		ROG	NO_x	PM_{10}	$PM_{2.5}$
2010	On-road motor vehicles	721	5,541	157	144
	Electricity	0	300	0	0
	Natural gas	86	760	59	59
	Stationary/area	554	507	238	*
	Off-road vehicles	1,743	3,881	278	278
	Total	**3,105**	**10,989**	**732**	**482**

Year	Source	Emissions (tons/year)			
		ROG	NO_x	PM_{10}	$PM_{2.5}$
2020	On-road motor vehicles	311	2,407	46	42
	Electricity	0	350	0	0
	Natural gas	100	887	69	69
	Stationary/area	554	507	238	*
	Off-road vehicles	1488	2,268	182	182
	Total	**2,453**	**6,418**	**536**	**294**
2035	On-road motor vehicles	306	1,719	54	49
	Electricity	0	425	0	0
	Natural gas	117	1,032	81	81
	Stationary/area	554	507	238	*
	Off-road vehicles	1,488	2,268	182	182
	Total	**2,465**	**5,952**	**555**	**312**
2056	On-road motor vehicles	406	2281	71	66
	Electricity	0	549	0	0
	Natural gas	158	1,394	109	109
	Stationary/area	554	507	238	*
	Off-road vehicles	1,488	2,268	182	182
	Total	**2,606**	**6,998**	**600**	**357**
Net change between 2010 and 2020		**-640**	**-5,037**	**-178**	**-169**
Net change between 2010 and 2035		**-538**	**-4,287**	**-144**	**-137**
Net change between 2010 and 2056		**-499**	**-3,991**	**-132**	**-125**
SJVAPCD project significance thresholds		**10**	**10**	**15**	**15**

Source of motor vehicle emissions: The emissions include all on-road vehicles, including light duty automobiles, light duty trucks, light heavy-duty trucks, motorcycles, motor homes, buses, and heavy-duty trucks. Emissions were estimated by FirstCarbon Solutions using emission factors from the EMFAC2011 model and vehicle miles traveled data from Fehr and Peers.
Source of electricity and natural gas emissions: 2010 emissions are from PG&E; future years emissions are projected using population (for residential electricity) and employment (for commercial electricity). Note that industrial emissions are not available.
Source of stationary and area: ARB CEIDARS inventory for the year 2010; since the data is from real facilities, it would be impossible to predict if the emissions would increase or decrease in the future. Therefore, the emissions are assumed to remain the same over time.
* $PM_{2.5}$ emissions for stationary/area are not available.
Source of off-road vehicles: ARB's OFFROAD2007 model; 2056 emissions use 2035 emissions because OFFROAD only provides emission data to the year 2040. There may be some overlap in the stationary/area source emissions and the off-road vehicle emissions.
Source of net change between 2010 and 2056: 2056 emissions minus 2010 emissions.
Refer to Appendix B-1 for calculation details.

The decline in emissions shown in Table 5.3-9 is the result of adopted regulations the benefits of which are incorporated in the air quality models used to estimate emissions. The rate of decline is rapid through 2020 reflecting the benefits of currently adopted regulations. Mobile source regulations are dependent on technological advancements in pollution controls and fuels. The state cannot require manufacturers to produce new equipment and vehicles that are not technologically or economically feasible. ARB updates regulations as technologies come to fruition or provides adequate lead times for compliance with technology forcing regulations. The latest on-road standards adopted by the ARB in 2013 are not yet reflected in the emission model (EMFAC 2011) used to estimate emissions. Those standards would provide reductions well beyond 2020 that are not reflected in Table 5.3-9.

The State of California and the SJVAPCD are very likely to adopt additional regulations on most sources of emissions to be implemented during the General Plan buildout period and result in much greater reductions than is predicted with the adopted regulations included in the air quality models as of 2014 or with off-model quantification methods available pending the next model update. Expanded use of renewable fuels, zero emission vehicles, and replacing combustion sources with electrically powered alternatives for greenhouse gas reductions will also result in reductions in criteria pollutant emissions. In addition, the General Plan includes policies and development patterns that will result in lower vehicle miles traveled and energy use compared to development projects constructed in the recent past that provide the basis for future emission projections.

The development within the Planning Area will result in increases in annual emissions that exceed SJVAPCD significance thresholds for all nonattainment pollutants. Although the growth in emissions is accounted for in SJVAPCD attainment plans and total emissions will decline even accounting for growth, this analysis identifies the impact as significant under the ton per year quantitative threshold criterion as listed in Table 5.3-9.

Exhibit 5.3-5: City of Fresno Planning Area Particulate Matter Emissions

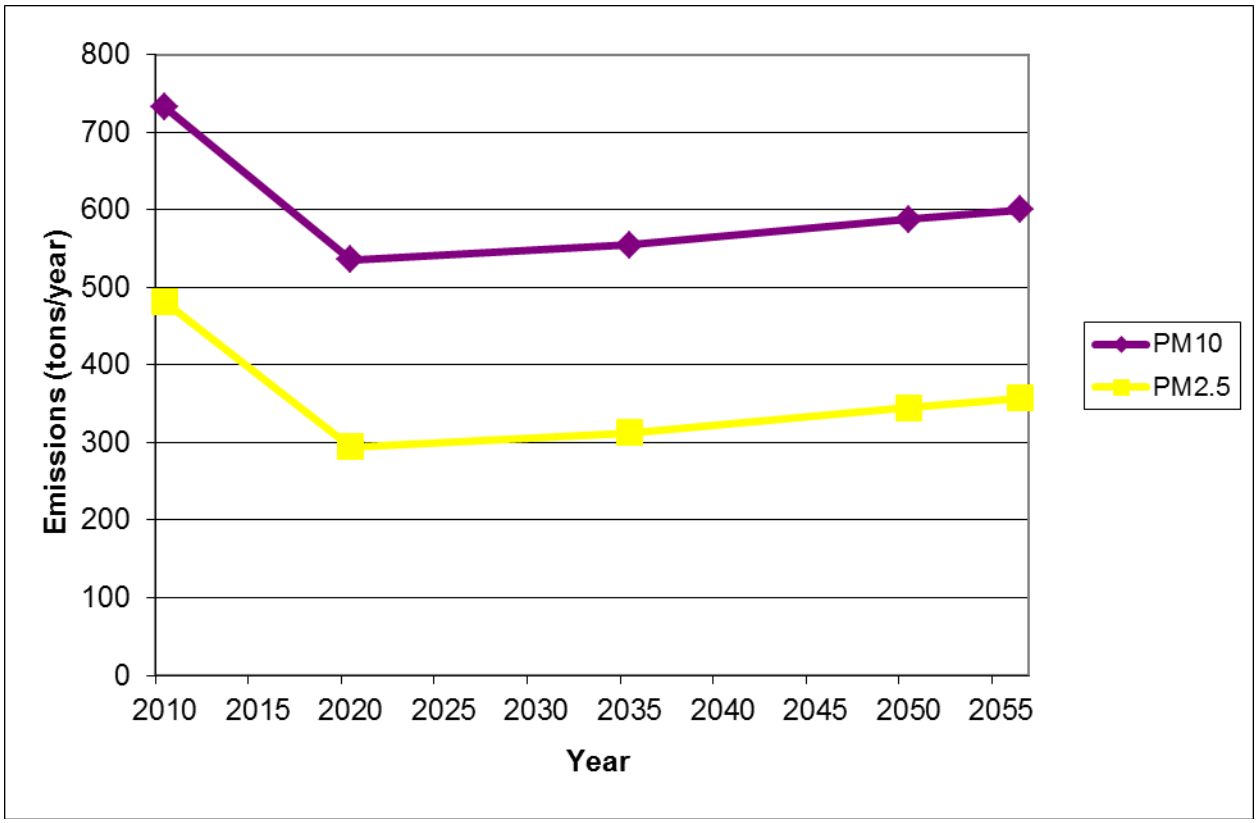
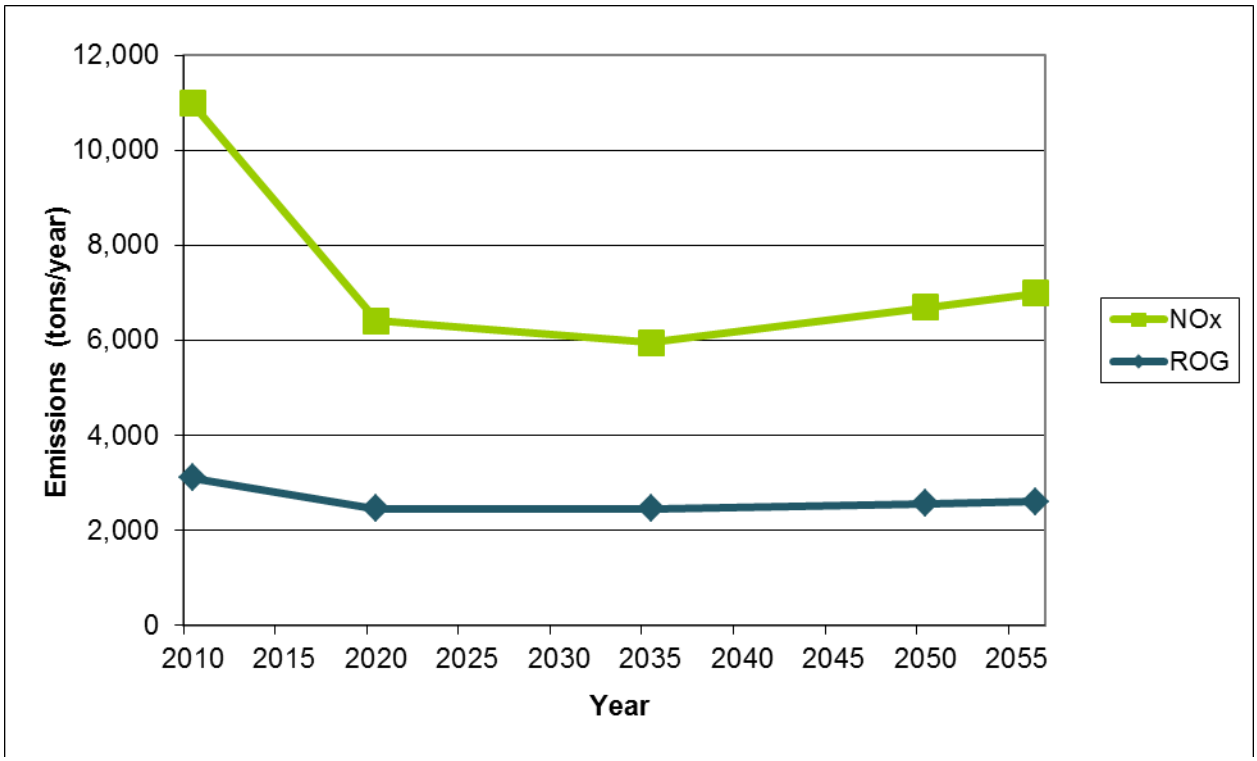


Exhibit 5.3-6: City of Fresno Planning Area Ozone Precursor Emissions



Stationary Sources

A variety of industrial and commercial processes (e.g., food processing plants, glass manufacturers, gas stations, dry cleaning, etc.) allowed under the project would also be expected to emit criteria pollutant emissions. These are referred to as stationary and stationary/area sources in this assessment.

Emissions from stationary sources are regulated at the local and regional level through SJVAPCD permitting and prohibitory rules. Under Rule 2201– New and Modified Stationary Source Review, sources emitting more than two pounds per day of any regulated pollutant are required to obtain an Authority to Construct (ATC) and Permit to Operate (PTO) from the SJVAPCD, and to implement best available control technology (BACT). Emission offsets are required for stationary sources that exceed offset thresholds contained in Rule 2201. The SJVAPCD has also adopted prohibitory rules that set emission limits and/or identify control technologies that apply to new and existing sources and further reduce emissions. The net effect of this regulatory system is continued reductions in stationary source emissions including proposed buildout of the General Plan. Therefore, stationary source emissions from the project are considered less than significant.

The ARB's database of stationary sources for Fresno was reviewed to identify the location of the largest sources. The top three stationary/area source emitters for ROG, NOx, and PM_{10} in the Planning Area in 2010 are shown in Table 5.3-10. The percent of the total emissions for each

pollutant are also shown in the Table 5.3-10. As an example, the top emitter of ROG in the Planning Area is E&J Gallo Winery, which contributed 25 percent of the ROG emissions in the year 2010.

Table 5.3-10: Top Three Stationary/Area Source Emitters in City of Fresno Planning Area (2010)

Pollutant	Facility (Type of Facility)	Percent of Emissions (%)
ROG	E&J Gallo Winery	25
	Golden State Vintners (wine)	11
	SFPP, L.P. (petroleum transportation)	11
NOx	PPG Industries (glass manufacturing)	57
	Rio Bravo Fresno (biomass energy)	18
	Fresno/Clovis Regional Wastewater Treatment Plant	5
PM_{10}	Rio Bravo Fresno (biomass energy)	19
	PPG Industries (glass manufacturing)	17
	MB Technology (roofing systems)	7
Source of emissions data: California Air Resources Board, CEIDARS 2.5, data is from the year 2010. Percentages calculated by FirstCarbon Solutions.		

Policies, Ordinances, and Regulations that Mitigate Project Impacts

The City of Fresno has previously adopted comprehensive policies and strategies aimed at improving the environment for the people of Fresno. The General Plan Update expands on the previous efforts to create a more sustainable Fresno. Previous initiatives include the following:

Fresno Green: The City of Fresno's Strategy for Achieving Sustainability. The City adopted the Handbook for Fresno Green Residential and Non-Residential Checklist in October 2009. The program provides incentives for projects that achieve a minimum of 20 points spread over five major sustainability categories including those with air quality benefits. The incentives include:

- 25 percent reduction on Planning entitlement fees
- 20 percent minor deviation from development standards (i.e., parking, setbacks, etc.)
- Expedited processing
- Recognition

Air Quality Update to the 2025 General Plan. The City approved amendments to the 2025 General Plan to add the Air Quality Update of the 2025 Fresno General Plan Resource Conservation Element that met the requirements of Assembly Bill 170 on May 7, 2009. The update includes many policies designed to assist the SJVAPCD attain air quality standards. Those policies are proposed within the General Plan Update where applicable.

Fresno Bus Rapid Transit Master Plan. The City of Fresno prepared the Bus Rapid Transit (BRT) Master Plan in 2008. The overall vision of the BRT Master Plan is to demonstrate how improved efficiency, speed, and service can attract new transit ridership, improve customer satisfaction, and benefit the broader community by providing a quality of service similar to light rail systems through the use of bus technology. The City has received a grant from the federal government to implement BRT in Fresno.

General Plan Update Policies. The General Plan includes policies designed specifically to address a variety of air quality impacts through measures that reduce vehicle and other operational-related air quality emissions. A partial list of policies that would reduce air pollutant emissions is provided below. For a full list of policies with air quality benefits see section 5.3.3 Regulatory Setting.

- Policies to reduce motor vehicle emissions by encouraging compact communities, smart growth, mixed use, infill development, pedestrian and bicycle accessibility, transit use, alternative fuel, and jobs/housing balance:
  - UF-1-c, UF-12-a, UF-12-b, UF-12-d, UF-12-e, UF-12-f, UF-14-a, UF-14-b, UF-14-c, LU-2-a, LU-2-b, LU-3-b, LU-3-c, LU-5-f, LU-5-e, LU-6-b, LU-6-f, LU-6-g, LU-8-b, RC-4-d, RC-4-e, RC-4-f, RC-4-g,RC-8-b, HC-3-b, and policies under the objectives MT-1, MT-4, MT-5, MT-6, MT-8, and MT-9.
- Policies to reduce the City government operational emissions:
  - RC-4-j, RC-8-f, RC-8-g.
- Policies encouraging the environmental review of projects to reduce air pollutant emissions:
  - RC-4c, RC-4d, RC-8c.

SJVAPCD Land Use Related Regulations. Individual projects to be developed under the proposed project would be subject to District Rules and Regulations, including Rule 9510 (Indirect Source Review) and Regulation VIII (Fugitive Dust Prohibitions), Existing businesses and new projects that are large employers (over 100 employees) will be subject to Rule 9410 (Employer Based Trip Reduction). Rule 9510 was adopted with the purpose of mitigating the impacts of growth on air quality throughout the San Joaquin Valley. Rule 9510 is by far the most stringent development related air regulation in California and the nation. Reductions from Rule 9510 are surplus meaning they are not required to demonstrate attainment of air quality standards. Rule 9410's purpose is to reduce emissions related to employee commute trips. These two rules provide substantial emission reductions from the General Plan buildout and provide assurance that the project would not result in significant air quality impacts.

SJVAPCD Voluntary Emission Reduction Agreements (VERA). The SJVAPCD offers VERAs as a method for development projects that exceed SJVAPCD thresholds after accounting for Rule 9510 reductions to mitigate significant criteria pollutant impacts. VERAs require emission reductions in addition to those required by Rule 9510. The developers of individual projects enter into contracts with the SJVAPCD to purchase emission reductions obtained through projects funded under SJVAPCD grant and incentive programs. The SJVAPCD will also verify emission reductions from projects identified by the developer and manage the implementation and long term monitoring of the

projects. The use of a VERA may not be feasible for all projects but should be considered for large projects with significant impacts.

Summary

Although the existing policies, ordinances, and regulations and the objectives and policies proposed in the General Plan Update will reduce criteria pollutant emissions, the project exceeds the SJVAPCD project level thresholds of significance for ROG, NOx, PM_{10}, and $PM_{2.5}$. Therefore, the project impact is potentially significant.

Cumulative Impact Analysis

The study area for the analysis of cumulative regional air quality impacts such as ROG, NOx, PM_{10}, and $PM_{2.5}$ is the San Joaquin Valley Air Basin which includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and a portion of Kern. This analysis will be based on a summary of projections approach as provided in Section 15130(b)(1)(B) of the CEQA Guidelines. Section 15130(b) of the CEQA Guidelines states:

> The following elements are necessary to an adequate discussion of significant cumulative impacts: 1) Either: (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.

The District's 2012 Draft GAMAQI states the following regarding cumulative criteria air pollutants:

> As discussed in section 8.4 (Thresholds of Significance – Criteria Pollutant Emissions) the District's thresholds of significance for criteria pollutants are based on District Rule 2201 (New Source Review) offset requirements. Furthermore, New Source Review (NSR) is a major component of the District's attainment strategy. The District's attainment plans demonstrate that project specific emissions below New Source Review (NSR) offset requirements will not prevent the District from achieving attainment. Consequently, if project specific criteria pollutant emissions are below their respective thresholds of significance, the project would be consistent with the overall District attainment plan and would be determined to have a less than cumulatively significant impact on air quality.

Under the amended CEQA Guidelines, cumulative impacts may be analyzed using other plans that evaluate relevant cumulative effects. The air quality attainment plans describe and evaluate the future projected emissions sources in the Basin and set forth a strategy to meet both state and federal Clean Air Act planning requirements and federal ambient air quality standards. The applicable plans are listed in Section 5.3.6. Therefore, the attainment plans are relevant plans for a CEQA cumulative impacts analysis. As discussed in Impact AIR-1, the project is consistent with the air quality attainment plans. Therefore, this is a less than significant impact under this criterion.

However, since the project exceeds the SJVAPCD quantitative thresholds for ROG, NOx, PM_{10}, $PM_{2.5}$, cumulative air emissions impacts are considered potentially significant.

Mitigation Measures

Project Specific

No mitigation measures beyond General Plan policies, ordinances, and regulations are available to further reduce this impact.

Cumulative

No mitigation measures beyond General Plan policies, ordinances, and regulations are available to further reduce this impact.

Level of Significance After Mitigation

Project Specific

Significant impact.

Cumulative

Significant impact.

Sensitive Receptors

Impact AIR-4	**The project could expose sensitive receptors to substantial pollutant concentrations.**

Project Specific Impact Analysis

Criteria Air Pollutants

Certain criteria pollutants can produce localized impacts often referred to as hotspots due to their potential to expose sensitive receptors to substantial pollutant concentrations. These include NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. Elevated concentrations of these pollutants can occur where a large number of sources are located in a concentrated area or when particularly large sources are located near sensitive receptors. In this case, substantial concentrations are defined as causing a localized exceedance of an air quality standard or contributing substantially to an existing exceedance of the standard at a specific receptor location.

Determination of localized pollutant concentrations requires project specific information that is not available at the General Plan level. Therefore, criteria are needed to allow the City to identify future projects with the potential for producing substantial pollutant concentrations. The criteria vary by pollutant and will also vary with time as emissions from sources of these pollutants continue to decline through implementation of regulations. Screening criteria for each pollutant of concern are provided below.

Carbon Monoxide (CO). Localized exceedances of the CO standards have become increasingly unlikely. The SJVAB is in attainment of the State and Federal CO standards and background levels of CO as measured at SJVAB monitoring stations continues to decline. The maximum one-hour concentration in Fresno was 2.29 ppm compared to the State standard of 9.0 ppm. The intersection

with the maximum traffic volume in Fresno at General Plan buildout (Palm and Herndon) is expected to accommodate approximately 12,000 trips during the peak hour. A sensitivity analysis using the CALINE4 CO Hotspot model was run to determine the volume of trips that would be required to exceed the most stringent standard. At triple the predicted peak for General Plan buildout of 36,000 peak hour trips, the hourly concentration was 7.5 ppm and an 8-hour concentration of 6.0 ppm. Based on this analysis is it extremely unlikely that a CO hotspot will occur in the Plan Area. CO emissions are predicted to continue to decline as old vehicles are retired and cleaner new motor vehicles take their place. Therefore, no CO hotspot modeling should be required for new projects during General Plan Buildout unless intersection volumes exceed 36,000 peak hour trips.

Nitrogen Dioxide (**$NO_{2)}$**). Localized nitrogen dioxide impacts can occur at sites with large numbers of diesel engines such as warehouse distribution centers and large retail centers with multiple daily truck deliveries. Proximity to the nearest sensitive receptor is the second criteria. Only projects with nearby sensitive sources have the potential to exceed the one-hour NO_2 standard. The distance considered nearby will vary with the magnitude of the source. Generally, projects with large numbers of heavy-duty truck trips and receptors within 100 meters of the project should conduct screening analysis or dispersion modeling to assess localized NO_2 impacts. NO_2 emissions are decreasing rapidly as cleaner vehicles replace higher emitting old vehicles. The decrease in vehicle emissions is expected to reduce the potential impact for NO_2 hotspots as the General Plan is built out. Generally, projects with five or more heavy-duty truck deliveries per day and sensitive receptors with 100 meters of loading areas should conducted a screening analysis. NOx emissions will decrease from trucks with time due to the implementation of State motor vehicle regulations so the screening criteria should be revisited during the course of General Plan buildout.

Particulate Matter (PM). Localized particulate matter emissions (PM_{10} and $PM_{2.5}$) impacts result from combustion sources in close proximity to receptors. Wood burning in residences was a substantial source of particulate matter emissions in the past; however, prohibitions on installing wood burning devices and wood burning restrictions on no burn days required by SJVAPCD Rule 4901 – Wood Burning Fireplaces and Wood Burning Heaters has successfully reduced this impact. Substantial concentrations of particulate matter (PM) can also occur where large numbers of diesel-powered vehicles congregate such as large construction sites, distribution centers, and rail yards. Freeways and major roadways can be sources of particulate matter that impact projects containing sensitive receptors. Projects locating sensitive receptors near freeways and major roadways with average daily trips exceeding 100,000 should perform screening analysis or dispersion modeling to determine if significant impacts would occur and mitigation measures to reduce exposure should be required.

Criteria Pollutant Assessments. Projects that expose sensitive receptors to concentrations exceeding ambient air quality standards or that make a cumulatively considerable contribution to pollutant that already exceed air quality standards would be considered significant. Dispersion modeling to determine criteria pollutant concentrations is recommended for projects with large numbers of diesel powered engines or vehicles near to sensitive receptors. Screening tools may be developed by the SJVAPCD or others that use conservative assumptions to allow assessments without dispersion modeling. Generally, projects with 10 or more diesel trucks accessing a project

site per day and with sensitive receptors located within 100 meters should undergo screening for NO_2 and PM impacts. Stationary sources that emit NO_2 and PM are subject to the SJVAPCD permitting process that includes an assessment of localized criteria pollutant impacts. NO_2 and PM localized impacts will decrease over time as the ARB regulations on diesel vehicles and equipment are fully implemented and fleet turnover takes place. Thresholds for requiring analysis should be reviewed periodically during General Plan buildout to take declining emissions into account.

Toxic Air Contaminants

Besides the criteria air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. Impacts from these contaminants tend to be highest near the sources of emissions and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. HAPs and TACs are regulated at the air district, state, and federal level. HAPs are the air contaminants identified by the EPA as known or suspected to increase the risk of cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use.

EPA identifies 188 different compounds as HAPs. There are 21 compounds identified as Mobile Source Toxics (MSATs) that are a subset of the 188 HAPs. Of the 21 MSATs, EPA identifies six priority HAPs that include diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1, 3-butadiene. The ARB, based on available data, identified the ten TACs that pose the greatest known ambient risk in California: acetaldehyde, benzene, 1, 3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter (diesel PM) (ARB 2009).

Project Level TAC Analysis. The regulatory agencies responsible for TAC emissions, the SJVAPCD and ARB, emphasize the localized nature of TAC emission sources in assessing project level impacts and impacts of existing sources on projects containing sensitive receptors. Project locations with large TAC sources in close proximity to sensitive receptors can exceed the SJVAPCD TAC threshold of a 10 in a million increase in cancer risk to the maximally impacted receptor.

The ARB Air Quality and Land Use Handbook (ARB 2005) identified the following sources that warrant special consideration:

- Freeways and High Traffic Roadways
- Distribution Centers (100 trucks per day/40 trucks with TRUs per day)
- Rail Yards
- Refineries
- Chrome Plating Facilities
- Dry Cleaners
- Large Gasoline Dispensing Facilities (3.6 million gallon/year throughput)

Other sources that warrant consideration when receptors are located near the project include projects with diesel engines.

- Large Commercial Projects with Loading Docks (3 or more deliveries per day)
- Recycling Centers using Diesel Equipment for Loading and Crushing Operations
- Hospitals with multiple Emergency Diesel Engines
- Other Facilities with Multiple Idling Trucks

In accordance with General Plan Policy RC-4-c, the City requires screening analyses or health risk assessments for these projects and as recommended by the SJVAPCD during CEQA consultation.

All stationary source projects subject to air permitting are assessed for TAC impacts by the SJVAPCD as part of the permitting process. Air permits for projects exceeding the 10 in a million threshold are not approved per SJVAPCD policy.

Stationary Source TAC Emission Sources

The SJVAPCD provided a list of the 25 highest emitting toxic air contaminant stationary sources in the City of Fresno Planning Area, which are summarized in Table 5.3-11. The SJVAPCD reviewed sources of TACs to comply with AB 2588, which requires prioritization of sources. In September 1987, the California Legislature established the AB 2588 air toxics "Hot Spots" program. It requires facilities to report their air toxics emissions, ascertain health risks, and to notify nearby residents of significant risks. None of these sources result in impacts that exceed the SJVAPCD threshold of 10 in a million increase in cancer risk that would require notification (SJVAPCD 2012).

Table 5.3-11: City of Fresno Planning Area
Highest Emitting Toxic Air Contaminant Stationary Sources

No.	Facility Name	Address in Fresno, CA	Facility Type, Pollutant Sources
1	SFPP, L.P.	4149 S. Maple Ave.	Petroleum Transportation; Sources include diesel emergency generators, fuel storage tanks, fuel loading stations and racks
2	California Army National Guard	5168 E. Dakota Ave. (Fresno Yosemite International Airport)	Base, munitions storage area, 144th Fighter Wing
3	PPG Industries	3333 S. Peach Ave.	Glass manufacturing; sources include train shed and silo unloading, float glass furnace, glass packing and cullet system
4	Armature Service Company	4321 S. Chestnut Ave.	Unknown
5	TG Schmeiser Co. Inc	3160 E. California Ave.	Farm equipment manufacturing
6	The Papé Group	2896 E. Jensen Ave.	Machinery and equipment
7	Valley Iron Inc.	3158 S. Cherry Ave.	Shearing and saw cutting, plate processing
8	California Crematory	1553 N. Backer St.	Crematory

No.	Facility Name	Address in Fresno, CA	Facility Type, Pollutant Sources
9	West Coast Cooperage/Barrels	4333 S. Fowler	Wood container and pallet manufacturing
10	Praxair Distribution Inc.	2771 Maple Ave.	Industrial gas manufacturing
11	Excelsior Metals, Inc.	2597 N. Fordham Ave.	Laser cutting and metal fabrication services including assembly, engineering, fabrication, rolling and welding
12	Betts Spring Company	2843 S. Maple Ave.	Coil springs, leaf springs, and wire form manufacturing
13	VA Medical Center	2615 E. Clinton Ave.	Diesel exhaust*
14	Foods Co. #339	3055 E. Shields Ave.	Grocery store
15	Club Cleaners	9525 N. Sommerville	Dry cleaner; perchloroethylene
16	Fresno Unified School District	2540 E. Hedges	Diesel exhaust*
17	Harris Manufacturing, Inc.	4775 E. Vine Ave.	Unknown
18	Chapel of the Light	1620 W. Belmont	Crematory
19	Kroeker, Inc.	4627 S. Chestnut	Diesel exhaust*
20	Gleim-Crown Pump, Inc.	3087 S. Elm Ave.	Diesel exhaust*
21	City of Fresno – Water Division	9503 N. Fine Ave.	Diesel exhaust*
22	Fresno Community Hospital	2823 Fresno St.	Natural gas boilers, emergency diesel generator
23	Community Living Center	3003 N. Mariposa	Diesel exhaust*
24	Allied Electric Motor Service	2635 S. Sierra Vista	Service center
25	Golden State Crematory Inc.	1103 E. St.	Crematory

Sources:
- Facility name and address: San Joaquin Valley Air Pollution Control District, 2013, public information request
- Pollutant sources:
Facility 1: San Joaquin Valley Air Pollution Control District 2011, Title V Permit Renewal, Facility C-1077, http://www.valleyair.org/notices/Docs/2011/12-29-11%20(C-1074143)/Public%20Notice%20Package.pdf
Facility 3: San Joaquin Valley Air Pollution Control District 2011, Title V Permit Renewal, Facility C-948, http://www.valleyair.org/notices/Docs/2011/05-27-11%20(C-1062650)/Public%20Notice%20Package.pdf
* Diesel exhaust was the only pollutant listed for these facilities

New sensitive receptors located near existing toxic air contaminant sources may be exposed to substantial pollutant concentrations. This potential impact is considered in CEQA documents for individual projects. General Plan Policy RC-4-c states, "Require use of computer models recommended by the SJVAPCD to evaluate the air quality impacts of projects that require

environmental review by the City." The District's significance threshold for new projects is conservative and requires that carcinogen related impacts are less than 10 in a million and non-carcinogen impacts with a hazard index less than 1.0 for sensitive receptors. New projects that include toxic air contaminant sources would need to undergo review to determine if they have the potential to create a significant impact from TAC emissions. It should be noted that projects with stationary sources regulated by the SJVAPCD will not be approved if the emissions result in an increased risk exceeding the threshold. Projects located near facilities with large numbers of diesel trucks such as distribution centers or loading docks in close to proximity to receptors should undergo additional analysis using screening tools or dispersion modeling to determine if significant impacts may occur. Projects with potentially significant impacts after screening, should prepare a health risk assessment (HRA) to more accurately characterize the potential impact and the benefits of mitigation measures available to reduce project impacts.

Motor Vehicle Emissions Impacts to Sensitive Receptors

Impacts from motor vehicles are generally greatest within close proximity to locations with large numbers of diesel-powered vehicles. Therefore, sensitive receptors placed near high volume freeways or roads could be exposed to substantial pollutant concentrations. The ARB's Land Use Handbook (2005) recommends avoiding new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day. General Plan Policy HC-3a states, "Restrict new residential development, schools, and parks within 500 feet of a limited access freeway, in order to reduce exposure to concentrations of toxic air pollutants and noise, unless impacts can be mitigated as if these uses were 500 feet or further away." The project traffic analysis determined that the highest traffic volumes on any urban road will be 93,000 vehicles per day on a 6-lane arterial analyzed under the cumulative plus project scenario. No rural roads are planned for the Planning Area. Therefore, only freeways have the potential to exceed the ARB screening criteria with the buildout of the General Plan Update.

Cumulative Impact Analysis

Cumulative development allowed with the proposed General Plan Update would result in significant cumulative impact. The Proposed Project's contribution to the significant cumulative impact is considerable because the project analysis identifies an existing significant impact. To reduce the project contribution to less than significant, mitigation measure MM-AQ-1 is required.

Areas of the community with multiple sources of TAC emissions can expose nearby sensitive receptors to elevated risk. Sources such as freeways and high volume roadways can have large concentrations of diesel vehicles that represent the cumulative emissions from truck travel generated by projects throughout the region. Industrial areas with large stationary sources or distribution centers may also result in elevated existing TAC emissions and risk. Projects constructed near large existing sources should undergo analysis to determine if there is an existing cumulative TAC impact without the project.

The SJVAPCD has not adopted a TAC threshold that defines conditions that would result in an existing significant TAC impact without the project. As described earlier, the SJVAPCD considers projects that exceed the 10 in a million increase in cancer risk threshold to provide a significant cumulative

contribution. Under this concept, the existing TAC impacts throughout the air basin are considered significant regardless of differences in local concentrations.

The District's Draft 2012 GAMAQI states the following regarding cumulative toxic air contaminants:

> Impacts from hazardous air pollutants are largely localized impacts. As presented above in section 8.3 (Thresholds of Significance - Toxic Air Contaminant Emissions), the District has established thresholds of significance for toxic air contaminants (TAC) that are extremely conservative; protective of health impacts on sensitive receptors. Consequently, the District's application of thresholds of significance for TACs is relevant to the determination of whether individual project emissions of TAC would have a cumulatively significant health impact. Because the established TAC significance thresholds are highly conservative, if project specific TAC emissions would have a less than significant health impact, the project would not be expected to result in a cumulatively considerable net increase in TAC. Thus, the project would be determined to have a less than cumulatively significant impact on air quality.

Another air district has used a different approach to cumulative assessment that accounts for elevated risk from nearby sources. The Bay Area Air Quality Management District (BAAQMD) has adopted a cumulative threshold based on the aggregate total risk of all past, present, and foreseeable future sources within a 1,000-foot radius from the fence line of a source, or from the location of a receptor, plus the contribution from the project. Projects with an excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0 are considered cumulatively significant. This approach allows the identification of areas with TAC emissions that are likely to have higher cancer risk than the regional average risk in a community due to location of multiple sources of TAC emissions in close proximity to a project.

Although TAC impacts are most important in a localized context, the emissions can remain in the atmosphere long enough to mix throughout a wider area to create a background risk. The amount of background risk at locations away from individual sources is not well documented. Non-diesel PM TAC emissions were monitored at only three locations in the San Joaquin Valley. There is no method available to directly monitor diesel PM which ARB concludes is responsible for over 70 percent of air borne cancer risk in the San Joaquin Valley. Concentrations at actual locations vary widely due to importance of localized sources and dispersion. The ARB provides average risk data for the SJVAB and other air basins; however, the ARB states that "the regional cancer risks published by the ARB should be viewed as a gauge of relative risk, rather than as an absolute risk determination. These regional risks are useful for determining the geographic locations where current science indicates that the greatest amount of risk from toxic air contaminants exists. However, the absolute risk numbers should NOT [emphasis added by the ARB] be used as the basis for determining personal risk".

ARB's 2009 Air Quality Almanac provides the most recent available TAC risk estimates for California. The Almanac provides estimates of the annual average concentrations and health risks for each air basin, including the San Joaquin Valley Air Basin. The estimate of the average regional risk for TAC

emissions from pollutants other than diesel PM also referred to as non-diesel PM TAC for 2007 (the most recent year of data available) is 90 in a million. However, the record for 2007 is missing data for two TACs, carbon tetrachloride, and para-dichlorobenzene. Using 2003 data for carbon tetrachloride as a substitute for the missing data and assuming no decrease since 2003 would add a risk of 26 in a million. Using 2006 data for para-dichlorobenzene would add 10 in a million. Adding these to a risk of 90 in a million for the other non-diesel TACs results in an average risk of 126 in a million.

The last analysis year that included an estimate of diesel PM risk was 2000, with an estimated risk of 390 in a million from diesel alone and 196 in a million from the other sources analyzed, for a total risk of 586 in a million. The report stated that more current estimates for diesel impacts were under review. Note that the Almanac reports average cancer risk in the entire San Joaquin Valley and does not identify locations with higher or lower than average exposure to TACs. Combining the 2000 diesel PM risk of 390 in a million with the non-diesel PM risk of 126 in a million results in an estimated average cancer risk of 516 in a million.

Local data for Fresno TAC risk is limited. Non-diesel PM TAC data for Fresno was only collected at the ARB monitoring station located on North First Street in Fresno until 2011 when the site was closed. Additional TAC data will be available at a monitoring station located nearby on East Garland Avenue. The Fresno monitoring site is situated in the center of the city, near a variety of commercial, residential, and high-volume roadways and a freeway (State Route 41 [SR-41] is 0.6 mile west of the site). Air emissions samples were collected every 12 days to measure TAC levels. ARB averaged the data it collected over a year to provide annual average emissions. Daily and annual TAC monitoring data are available from the ARB for the years 1980 through 2009 (ARB 2012a). The ARB site did not monitor diesel PM (particulate matter), since there is no direct method available for monitoring diesel PM. However, other methods are available to provide estimates of diesel PM using PM_{10} monitoring data as a surrogate and estimating the fraction that is composed of diesel PM. The ARB used receptor-modeling techniques to generate risk estimates provided in the ARB 2009 Air Quality Almanac (ARB 2009) that include risks associated with diesel PM for the year 2000. Other more recent methods using NO_2 concentrations as a surrogate for diesel PM have also been used to estimate risk from this source.

ARB conducted a special study in Fresno to determine the adequacy of the air quality-monitoring network to identify impacts to children from TAC emissions. ARB analyzed monitoring data from the long-term Fresno First Street monitoring site and a temporary site located at a school as part of a 2006 special study, Community Air Quality Monitoring: Fresno, Fremont Elementary School (ARB 2006). The ARB conducted the study as part of a larger statewide evaluation of the adequacy of the State's air quality monitoring network as required by the Children's Environmental Health Protection Act (Escutia, Senate Bill 25, 1999 [SB 25]). Air monitoring at Fremont Elementary School was completed during a 15-month period, from June 2002 to August 2003. The study monitored 50 different air pollutants. As part of the study, data from Fremont Elementary School was compared with data from the nearest long-term monitoring site, Fresno–First Street, for the same time period.

Analysis of the monitoring results indicate that the potential cancer risk at Fremont Elementary School is mostly attributable to seven of the toxic air pollutants measured during the study: benzene,

1,3-butadiene, formaldehyde, acetaldehyde, perchloroethylene, carbon tetrachloride, and methylene chloride. Including the other toxic air pollutants measured at these sites does not significantly change the overall risk at each site, nor does it change the overall relationship of cancer risk between sites.

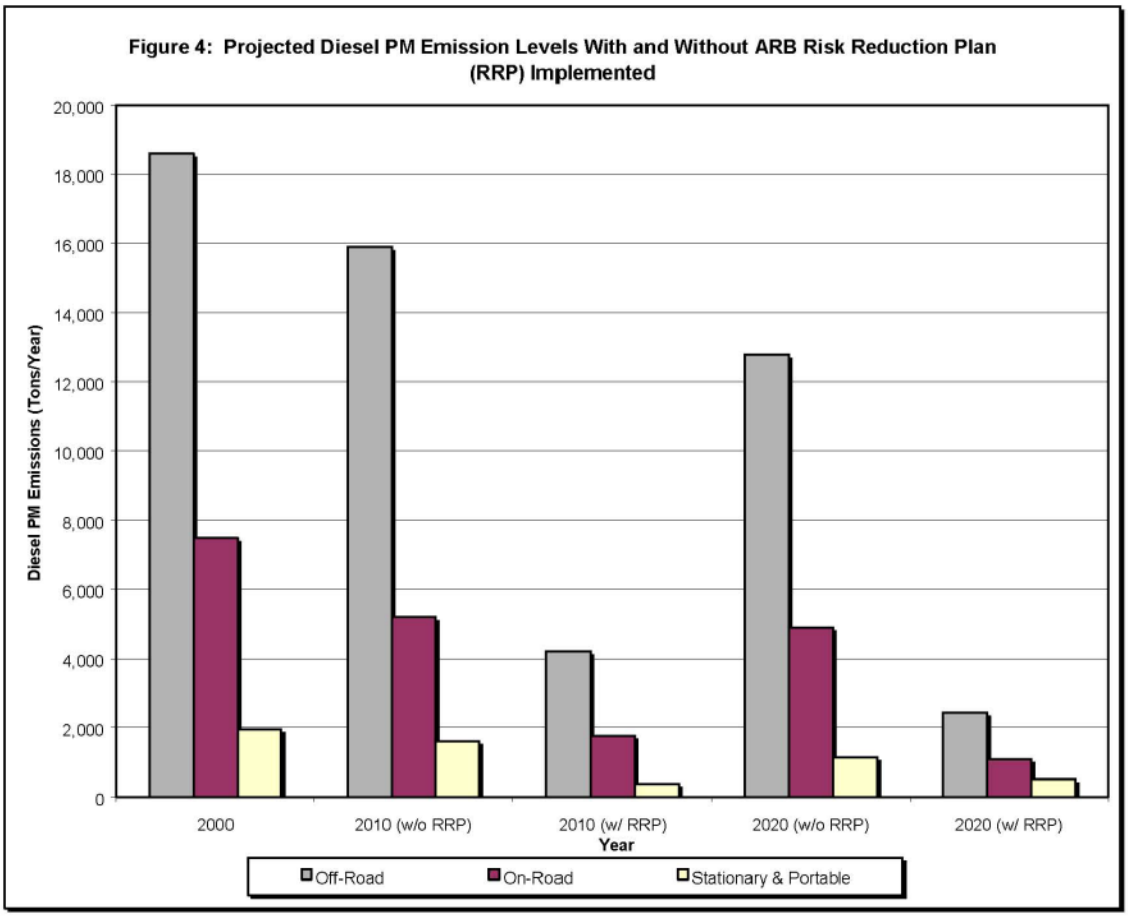
The cancer risk attributable to the ambient concentrations of the seven TACs was estimated at 156 in a million at the Fremont School site and 139 in a million at the Fresno First Street monitoring station during the period from July 2002 through June 2003. The Special Study on page 5 indicates that higher emissions and risk at the Fremont School compared with the Fresno First monitoring station were attributed to the school's location 0.5 mile east of State Route 99 and the proximity to a parcel distribution facility and other industrial and warehousing uses along State Route 99 (ARB 2006).

Rules and Regulations that Reduce TAC Impacts

Risk from TAC emissions is declining rapidly due to regulations adopted at the federal, state, and air district levels. The ARB's Diesel Risk Reduction Plan has led to the adoption of new state regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce diesel PM emissions by about 90 percent overall from year 2000 levels. The projected emission benefits associated with the full implementation of this plan, including federal measures, are reductions in diesel PM emissions and associated cancer risks of 75 percent by 2010 and 85 percent by 2020 (ARB 2000). The reductions in diesel PM emissions attributable to the Diesel Risk Reduction Plan are displayed in Exhibit 5.3-7. Regulations on stationary sources such as ARB's Air Toxic Control Measures (ATCM) and Toxic Best Available Control Technology (T-BACT) implemented by the SJVAPCD provide similar reductions for other TACs. The Diesel Risk Reduction Plan has not been updated, so the data includes projections for 2010 that has already passed. The ARB has aggressively implemented the Diesel Risk Reduction Plan and success in achieving the projected reductions appears likely based on reductions identified for individual regulations listed in Section 5.3.5.

There is no level of toxic emissions that is considered to have no health impacts. In that situation, decision makers must determine a level of risk that is acceptable considering the benefits of the activities provided by the emission sources. For example, using diesel trucks to transport goods and using gasoline to fuel motor vehicles are the two largest sources of TAC emissions, but are integral to the mobility of people in the San Joaquin Valley and to the economy. In light of the existing average TAC risk levels in the San Joaquin Valley of about 516 in a million, it seems appropriate to consider existing risk a significant impact. The implementation of future development under the General Plan Update will add TAC emissions to the air that would exceed the 10 in a million risk threshold. Therefore, the Proposed Project's contribution to cumulative TAC emissions would be considerable and would result in a significant cumulative impact.

Exhibit 5.3-7: ARB Diesel Risk Reduction Plan Reductions



To summarize, residents of the City of Fresno experience average risks of approximately 516 in a million from TAC emissions. Risk to individuals at specific locations has not been determined and may be higher or lower than the average because of the importance of localized sources. Development of new TAC sources in areas of the Planning Area with large concentrations of existing sources such as a freeway or a distribution center should undergo an assessment to determine if sensitive receptors would be exposed to elevated levels of TAC emissions (100 in a million cancer risk) from sources within an approximate 1,000 foot radius with and without the project. Projects at locations that exceed the cumulative threshold should be assessed to determine if they would make a significant cumulative contribution to an existing significant impact as defined by a 10 in a million increase in cancer risk threshold proposed by the SJVAPCD. Projects that result in a significant cumulative contribution should implement all feasible measures to mitigate their significant cumulative impact. Emissions and risk are declining to due regulations on TAC sources, so as the Planning Area is built out in accordance with the General Plan and Development Code Update, the chances of projects exceeding the project and cumulative thresholds will be less.

Mitigation Measures

Project Specific

No specific development projects are identified in the General Plan that would allow an assessment of project specific criteria pollutant localized impacts and TAC impacts. However, the possibility exists that one or more projects would exceed the thresholds for these pollutants during project buildout. Therefore, measures are identified below that shall be implemented on a project-by-project basis when a potentially significant impact would occur.

MM AQ-1 Projects that include five or more heavy-duty truck deliveries per day with sensitive receptors located within 300 feet of the truck loading area shall provide a screening analysis to determine if the project has the potential to exceed criteria pollutant concentration based standards and thresholds for NO_2 and PM2.5. If projects exceed screening criteria, refined dispersion modeling and health risk assessment shall be accomplished and if needed, mitigation measures to reduce impacts shall be included in the project to reduce the impacts to the extent feasible. Mitigation measures include but are not limited to:

- Locate loading docks and truck access routes as far from sensitive receptors as reasonably possible considering site design limitations to comply with other City design standards.
- Post signs requiring drivers to limit idling to 5 minutes or less.

MM AQ-2 Projects that result in an increased cancer risk of 10 in a million or exceed criteria pollutant ambient air quality standards shall implement site-specific measures that reduce TAC exposure to reduce excess cancer risk to less than 10 in a million. Possible control measures include but are not limited to:

- Locate loading docks and truck access routes as far from sensitive receptors as reasonably possible considering site design limitations to comply with other City design standards.
- Post signs requiring drivers to limit idling to 5 minutes or less
- Construct block walls to reduce the flow of emissions toward sensitive receptors
- Install a vegetative barrier downwind from the TAC source that can absorb a portion of the diesel PM emissions
- For projects proposing to locate a new building containing sensitive receptors near existing sources of TAC emissions, install HEPA filters in HVAC systems to reduce TAC emission levels exceeding risk thresholds.
- Install heating and cooling services at truck stops to eliminate the need for idling during overnight stops to run onboard systems.

- For large distribution centers where the owner controls the vehicle fleet, provide facilities to support alternative fueled trucks powered by fuels such as natural gas or bio-diesel.
- Utilize electric powered material handling equipment where feasible for the weight and volume of material to be moved.

Cumulative

Implementation of mitigation measures MM AQ-1 and MM AQ-2 is required. Projects located in areas with multiple existing or planned TAC sources nearby may result in elevated cancer risks to sensitive receptors also impacted by the project. Under this condition, it is appropriate to assess the additional cumulative impact from localized sources within the screening distances identified by ARB as warranting special consideration. MM AQ-2 would require the additional analysis per the specified criteria. Projects proposing development containing sensitive receptors may be located near to large or multiple existing TAC sources. Under this circumstance, analysis of the impact of the existing sources within the ARB screening distances is appropriate to identify the potential impact to the sensitive receptors within the proposed project. Mitigation measure AQ-4 addresses the situation where projects containing sensitive receptors are proposed near to existing TAC sources. The following mitigation measures are proposed to ensure that projects with the potential to expose sensitive receptors to significant TAC concentrations are identified during later environmental reviews.

MM AQ-3 Require developers proposing projects on ARB's list of projects in its Air Quality and Land Use Handbook (Handbook) warranting special consideration to prepare a cumulative health risk assessment when sensitive receptors are located within the distance screening criteria of the facility as listed in the ARB Handbook.

MM AQ-4 Require developers of projects containing sensitive receptors to provide a cumulative health risk assessment at project locations exceeding ARB Land Use Handbook distance screening criteria or newer criteria that may be developed by the SJVAPCD

Level of Significance After Mitigation

Project Specific

Significant impact. Mitigation measures MM AQ-1 and MM AQ-2 provides a list of measures that will serve to reduce the impacts of individual projects on sensitive receptors. However, identification of applicable project specific mitigation measures is not feasible without site-specific information. Project specific mitigation measures will depend on the types and amounts of pollutants that are present, the design characteristic of the site, and the location of the receptors in relation to the site. Projects may be proposed as part of the buildout of the General Plan and Development Code Update where there are no feasible measures to reduce impacts to less than significant. Those projects would require the preparation of an Environmental Impact Report and a Statement of Overriding Considerations if the project were approved. Implementation of the Proposed Project would continue to add emissions that contribute to cumulative TAC impact. Although, individual projects

can reduce impacts with implementation of mitigation measures MM AQ-1 and MM AQ -2, any contribution would still result in a significant impact. Therefore, the project level impacts of the General Plan and Development Code Update would remain significant.

Cumulative

Significant impact. Mitigation measures MM AQ-1 through MM AQ-4 will serve to ensure that the cumulative impacts of projects implemented in accordance with the General Plan and Development Code Update are assessed to determine if they will expose sensitive receptors to potentially significant cumulative impacts from TAC emissions. However, the project's cumulative assessment may identify significant impacts or cumulative contributions for which feasible mitigation measures are not available. Therefore, cumulative TAC impacts would remain significant.

Odors

Impact AIR-5	**The project would not create objectionable odors affecting a substantial number of people.**

Project Specific Impact Analysis

Potential Odor Sources in the City of Fresno Planning Area

The City of Fresno has many sources with the potential to generate odors including wastewater treatment facilities, landfills, transfer stations, recycling centers, manufacturing plants, food processors, painting operations, and rendering plants. Based on review of odor complaint history, very few of these facilities experience substantial odor complaints over the last three years. The implementation of the Proposed General Plan Update could result in the odor sources identified in Section 5.3.4 being located within the screening threshold distances and could result in significant impacts on sensitive receptors.

The proposed General Plan Update could also result in sensitive receptors being constructed within the screening level distances from existing odor sources. Under this situation, these potential odor impacts on new sensitive receptors could be significant. When potential odor impacts on these new sensitive receptors occur, the SJVAPD has authority under Rule 4102 to require the owner of the odor-generating source to take actions that would reduce impacts to less than significant.

Odor Complaints in City of Fresno Planning Area

The District provided a record of all odor complaints within the City of Fresno Planning Area from 2009 through 2011, which are summarized in Table 5.3-12. Two of the facilities shown in Table 5.3-12, the E&J Gallo Winery and Darling International facility experienced substantial numbers of complaints.

Table 5.3-12: Odor Complaints in City of Fresno Planning Area 2009-2011

Location	Date	Complaint Number	Findings
Concept Coatings Powder, 2540 S. Sarah Ave.	09/23/2009	C-0909-060	There were odors during cooking/cleaning the coating oven. The company now vacuums out the oven; odors resolved.
E&J Gallo Winery	10/01/2009	C-0910-004	Odors possibly from pomace generated from crushing.
	01/21/2010	C-1001-046	At inspection, odors at green waste receiving location.
	03/17/2010	C-1003-018	At inspection, odors were of fresh green waste in stockpiles and windrows.
	10/17/2011	C-1110-060	At inspection, fermenting grape odor.
Darling International, 795 W. Belgravia	07/07/2011	C-1107-011	The District was not able to confirm the odor was affecting residents near Darling International.
	07/28/2011	C-1107-056	The District was not able to confirm odors.
	11/28/2011	C-1107-058	The District was not able to confirm odors.
Protein Inc. 3902 E. Calwa	08/26/2011	C-1108-068	The truck that picks up the grease trap can be odorous.
Daytona Auto Sales	09/19/2011	C-1109-055	Complaint reported odors from spray painting. The District reported no violation, as the shop appears to be compliant.
	09/26/2011	C-1109-083	
Richard's Collision Center, 4934 E. Lansing Way	10/10/2011	C-1110-034	Facility had odors from automotive coating operations.
	11/08/2011	C-1111-025	The District was unable to confirm painting odor.
	11/14/2011	C-1111-043	The District was unable to confirm painting odor.
Lanna Café	11/23/2011	C-1111-083	The District was unable to confirm potential coffee roasting odor
Source: San Joaquin Valley Air Pollution Control District, request for information, 2012.			

Potential impacts from odor sources would be mitigated through compliance with General Plan Policy PU-9-d and by enforcement actions by agencies with regulatory authority over odors. General Plan Policy PU-9-d would ensure that waste and recycling facilities are properly located. Potential odor impacts from waste and recycling facilities is one of the primary factors considered in the location decision and are regulated by the State of California through CalRecycle and the Local Enforcement Agency delegated by the State. The SJVAPCD addresses odor issues through Rule 4102 – Nuisance. Facilities creating nuisance odors generating public complaints can result in SJVAPCD enforcement action. Individual development projects are required to determine if odors would be a potentially significant impact as part of CEQA review. The General Plan does not identify specific projects that are likely to result in an increase in odors. However, projects meeting the screening criteria are likely to be proposed in the Plan Area. In addition, projects containing sensitive receptors are likely to be proposed near existing odor sources. Projects proposing new receptors within

screening level distances will reduce the impact to less than significant through procedures provided by Rule 4102. Proposal of a new source within the screening distance would require the applicant to demonstrate that the proposed facility includes odor controls within its design and through implementation of odor management practices to reduce odors to less than significant. Therefore, impacts from the project are potentially significant.

Cumulative Impact Analysis

The geographic scope of the cumulative odor analysis is the local area. Impacts relative to objectionable odors are generally limited to the area in close vicinity to the source and are not cumulative in nature. As the emissions that cause odors disperse, the odor becomes less and less detectable. Odor impacts can occur when a project is an odor generator with the potential to impact sensitive receptors and when a project containing sensitive receptors is proposed within the odor screening distances from an existing odor generator. There are no specific land uses or policies proposed in the General Plan that would result in a concentration of odor sources at any particular location. With the buildout of the Proposed General Plan Update, impact from projects could result in a cumulative impact. Therefore, cumulative odors impacts are potentially significant.

Mitigation Measures

Project Specific

General Plan Policy PU-9-d addresses only one potential odor source type (waste and recycling facilities). Other odor source types listed in Table 5.3-6 may result in a potentially significant impact that would require mitigation to ensure the impact is reduced to less than significant.

MM AQ-4 Require developers of projects with the potential to generate significant odor impacts as determined through review of SJVAPCD odor complaint history for similar facilities and consultation with the SJVAPCD to prepare an odor impact assessment and to implement odor control measures recommended by the SJVAPCD or the City to the extent needed to reduce the impact to less than significant.

Cumulative

Implementation of Mitigation Measure AQ-4 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.4 - Biological Resources

5.4.1 - Introduction

This section describes how implementation of the City of Fresno General Plan and Development Code Update may affect biological resources that are known to occur within the Planning Area, including vegetation communities, special-status plant and wildlife species and their associated habitats, and special-status natural communities, including riparian communities and wetlands. This section also addresses local, state, and federal regulations as they pertain to project impacts on biological resources. Mitigation measures are provided to reduce potential project impacts.

For the purposes of this evaluation, "special-status species" are those species that meet one or more of the following criteria:

Listed Species

"Listed species" includes those species that are:

1. Listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (ESA) or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12); and/or
2. Listed or candidates for listing by the State of California as threatened or endangered under the California Endangered Species Act (CESA) (Fish and Game Code §2050 et seq.).

"Other" Special-status Species

"Other special-status species" include those species that are:

1. Listed as rare under the California Native Plant Protection Act (California Fish and Game Code §1900 et seq.).
2. Meet the definition of rare or endangered under the California Environmental Quality Act [CEQA] §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:
    - Species considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (California Rare Plant Ranks (CRPR) 1A, 1B, 2A, and 2B);
    - Species that may warrant consideration on the basis of local significance or recent biological information;
    - Some species included on the California Natural Diversity Database's (CNDDB) Special Plants, Bryophytes, and Lichens List (CDFW 2014).
3. Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (California Environmental Quality Act [CEQA] §15125 (c)) or is so designated in local or

regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

4. Listed as "Species of Special Concern" or as California Fully Protected Species by the CDFW;
5. Listed as "Species of Concern" by the U.S. Fish and Wildlife Service (USFWS).

"Special-status Natural Communities"

In general, "special-status natural communities" include those communities that are of limited distribution statewide or within a county or region; communities that are of special concern to resource agencies; and communities that, because they are vulnerable to the environmental effects of projects, are assessed or protected under CEQA Section 1600 of the California Department of Fish and Game Code, and/or Section 404 of the Clean Water Act, among others. The most current version of the California Department of Fish and Wildlife's (CDFW's) List of Vegetation Alliances and Associations (or "Natural Communities List") (2010) indicates which natural communities are considered "special-status" in the state of California.

5.4.2 - Environmental Setting

The following information is provided in accordance with Section 15125 of the California Environmental Quality Act (CEQA). The environmental setting discussion provides a baseline discussion of the existing conditions within the City of Fresno Planning Area and surrounding area.

Study Area for Project Impacts

The study area for project impacts to biological resources includes the Planning Area and areas within an approximately 5-mile-radius because implementation of the General Plan and Development Code Update could have either direct or indirect effects on biological resources occurring within these areas.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative biological resources impacts is the areas located within the San Joaquin Valley, which generally extends from the San Joaquin Delta in the north, the Sierra Nevada mountain range on the east, the Diablo and Temblor mountain ranges to the west and the Tehachapi Mountains to the south. The specific cumulative study area depends on the biological resource. This analysis includes the eight counties that are located within the San Joaquin Valley; all of Kings County, most of Fresno, Kern, Merced, and Stanislaus counties, and portions of Madera, San Luis Obispo, and Tulare counties.

Existing Conditions

Vegetation Communities

The following discussion of vegetation communities known to occur in the Planning Area is based on previously identified and mapped vegetation communities included in the City of Fresno General Plan Map Atlas prepared in 2011 as well as a review of information in the California Natural Diversity

Database (CNDDB). A total of 11 vegetation communities occur within the Planning Area (see Table 5.4-1), two of which are considered "special-status natural communities" by the CDFW.

Table 5.4-1: Vegetation Communities within the City of Fresno Planning Area

Vegetation Community Type	Total Acres within Planning Area
Annual Grassland	1,006
Barren	110
Deciduous Orchard	14,500
Irrigated Row and Field Crops	19,500
Lacustrine	3,030
Pasture	60
Riverine	270
Urban	67,050
Valley Foothill Riparian	380
Valley Oak Woodland[2]	120
Northern Claypan Vernal Pool[2]	1
Total	106,027

[1] City of Fresno, Map Atlas Existing Conditions Report, August 2011 and City of Fresno Development and Resources Management Department, 2013.
[2] Special-status natural community.
Source: FirstCarbon Solutions, 2013

Exhibit 5.4-1 illustrates the location of the plant communities within the Planning Area. Appendix C-1 includes an index map of the plant communities within the Planning Area. The mapping of vegetation communities in Exhibit 5.4-1 as well as the exhibits in Appendix C-1, do not include the northern claypan vernal pool community due to its small size (i.e., less than one acre). The northern claypan vernal pool community is located in an area that is surrounded by a lacustrine vegetation community in the northern portion of the Planning Area.

The majority (approximately 63 percent) of the City of Fresno's approximately 106,027-acre Planning Area consists of previously disturbed urban/developed areas containing industrial, commercial, and residential development and associated roads and infrastructure. Approximately 32 percent of the Planning Area contains previously disturbed agricultural lands, orchards, pasture, and row and field crops located predominately along the outer boundaries of the Planning Area. Undeveloped and undisturbed areas with native vegetation occur within the remaining 5 percent of the Planning Area.

For the purposes of this evaluation, vegetation communities are classified according to the CDFW's Natural Communities List and cross-referenced to descriptions provided in Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California (1986) and Oberbauer's update to

those descriptions (1996). The CDFW does not maintain narrative description of these vegetation communities, so the descriptions provided below have been adapted from Holland and Oberbauer.

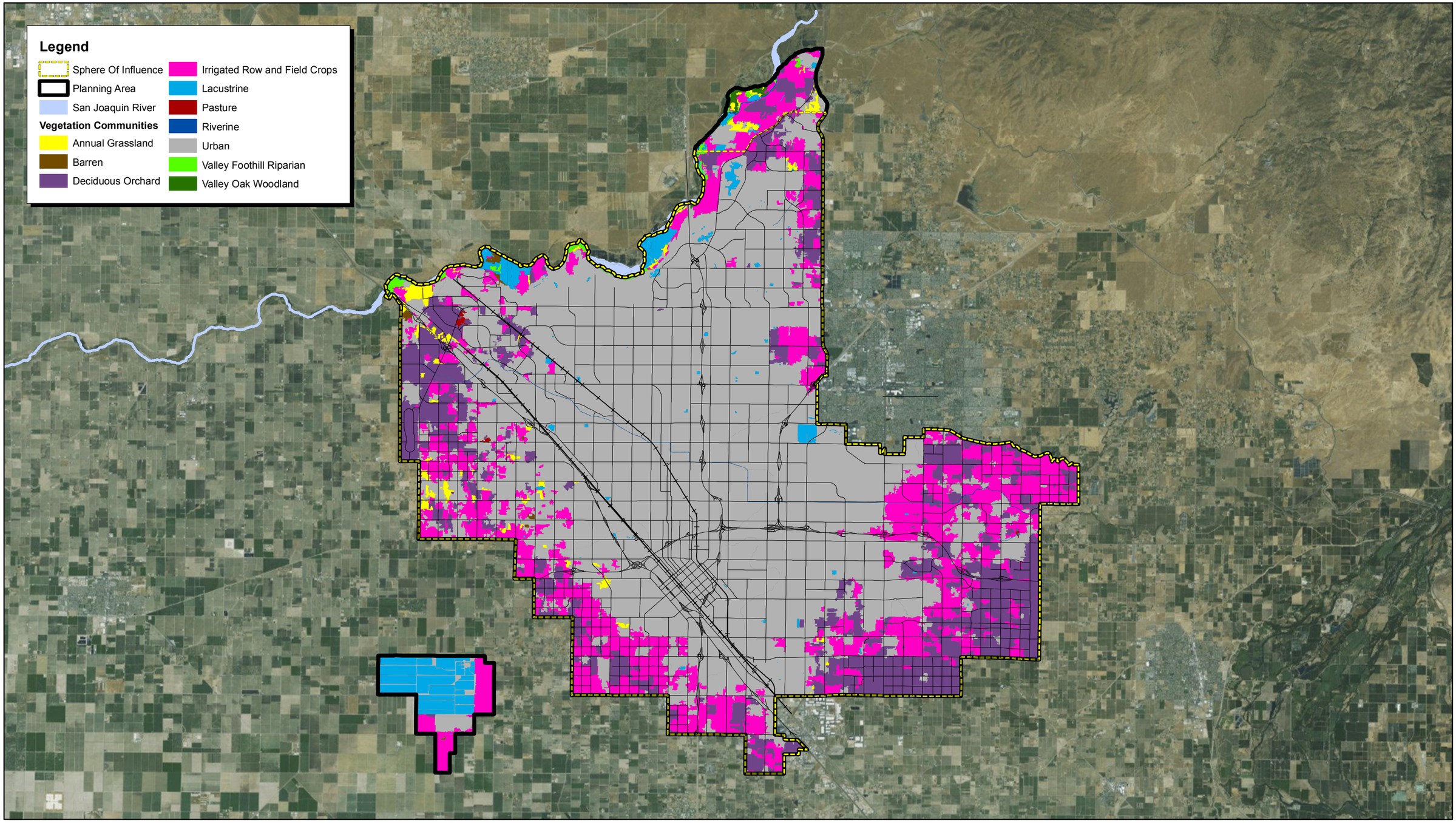
The vegetation maps produced for this evaluation do not imply regulatory jurisdictional determinations under Section 404 of the Federal Clean Water Act, Section 10 of the Rivers and Harbors Act, or Section 1600 of the California Fish and Game Code (Lake and Streambed Alteration Program), or the lack thereof. Such determinations usually require a site visit to assess the current conditions on the ground and to map boundaries at a finer scale than the City of Fresno General Plan Map Atlas employs. Similarly, terms such as "riparian" and "wetland" in the vegetation keys and type descriptions may inform, but do not imply or assert, regulatory jurisdiction or the lack thereof.

Annual Grassland

The Planning Area contains approximately 1,006 acres of annual grassland, located primarily along the northern and western borders of the Planning Area boundary. Annual grassland in the Planning Area includes a mix of native and non-native, annual grasses, which often occur in association with ruderal herbs and occasional native annual forbs. The dominant plant species within the annual grassland vegetation community typically include black needlegrass (*Nasella* sp.), fescue (*Vulpia* sp.), brome (*Bromus* sp.), and wild oats (*Avena* spp), with mustard (*Brassica nigra*), dove weed (*Eremocarpus setigerus*), and poppy (*Eschscholzia* sp.). These grasses germinate with the fall rains, grow during the winter and spring, and wither in the early summer.

Special-status species with a potential to occur in the Planning Area and associated with annual grassland habitats include:

- American badger
- burrowing owl
- California horned lark
- California linderiella
- California tiger salamander
- Fresno kangaroo rat
- pallid bat
- San Joaquin kit fox
- San Joaquin pocket mouse
- Swainson's hawk
- western mastiff bat
- western spadefoot
- Hartweg's golden sunburst
- caper-fruited tropidocarpum
- California jewel-flower
- dwarf downingia
- spiny-sepaled button-celery
- succulent owl's clover
- Greene's tuctoria



Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon SOLUTIONS

2.2 1.1 0 2.2 Miles

Exhibit 5.4-1
Vegetation Communities Map

Barren

The Planning Area includes approximately 110 acres of barren land. Barren lands include areas in which the vegetative cover comprises less than 10 percent of the surface area (disregarding natural rock outcrops) and where there is evidence of soil surface disturbance and compaction from previous legal human activity, and/or areas in which the vegetative cover is greater than 10 percent, soils surface compaction is evident, and building foundations and debris are present (e.g., irrigation piping, fencing, old wells, abandoned farming or mining equipment) from legal activities (as opposed to illegal dumping). Barren land occurs in the northwest corner of the Planning Area, adjacent to the San Joaquin River corridor. Vegetation within barren land has a high predominance of non-native or weedy species that are indicators of soil disturbance, including Russian thistle (*Salsola tragus*), telegraph weed (*Heterotheca grandiflora*), horehound (*Marrubium vulgare*), and sow thistle (*Sonchus oleraceus*), and a sub-dominance of non-native grasses.

Barren land only provides moderately suitable habitat for one special-status species, California horned lark.

Deciduous Orchard

Deciduous orchard communities comprise the third most abundant vegetation community in the Planning Area, accounting for approximately 14,500 acres along the western, southern and eastern margins of the Planning Area, where there are flat alluvial soils on valley floors, rolling foothills and relatively steep slopes. Orchard communities are typically comprised of artificially irrigated habitat dominated by one, sometimes several, tree or shrub species planted for cultivation. Trees are typically low and bushy, and the understory is open, with little ground cover. In the Planning Area, deciduous orchards include a variety of fruit trees (e.g., apples, apricots, cherries, citrus, kiwi, peaches, nectarines, pears, persimmons, plums, pluots, pomegranates, etc.) and/or nut trees and shrubs (e.g., almonds, olives, pistachios, walnuts, etc.) (County of Fresno 2012). Understory species generally consist of short native and non-native grasses and other herbaceous species.

Deciduous orchard is a relatively disturbed vegetation community and contains very little groundcover and planted trees that provide moderately suitable habitat for only one special-status species, California horned lark.

Irrigated Row and Field Crops

The second most abundant vegetation community in the Planning Area is irrigated row and field crops, accounting for 19,500 acres along the four borders of the Planning Area. This vegetation community frequently occurs in floodplains or upland areas with high soil quality. Irrigated row and field crows include annual and perennial crops, grown in rows, with open space between the rows. Row and field crops are artificially irrigated and feature a moderate disturbance rate by vehicle and pedestrian encroachment typically associated with farming activities. Species composition changes frequently, both by season and by year.

Since irrigated row and field crops contain active agriculture, and are therefore significantly disturbed with altered substrates, this vegetation community does not provide suitable habitat for

any special-status plant species and limited habitat for special-status wildlife species. Special-status wildlife species with a potential to occur within this vegetation community include:

- burrowing owl
- California horned lark
- Swainson's hawk

Lacustrine

Lacustrine communities consist of standing/open waters in topographic depressions (i.e., lakes) or dammed river channels. Lacustrine communities lack persistent emergent vegetation, but may have submerged or floating-leaved aquatic vegetation. Generally, lacustrine systems are surrounded by hydrophytic plants, grasses, and trees. Lacustrine systems account for approximately 3,030 acres in the northern portion of the Planning Area, near the San Joaquin River; within the isolated southwestern most portion of the Planning Area; and within the isolated basins and ponds that are interspersed throughout the City of Fresno.

Special-status species with a potential to occur within a lacustrine community include:

- western spadefoot
- tricolored blackbird
- hoary bat
- spotted bat
- western pond turtle
- dwarf downingia
- Sanford's arrowhead

Pasture

Approximately 60 acres of pasture lands occur along the northwest corner of the Planning Area, near deciduous orchards and other irrigated row and field crops. Pasture lands form a dense habitat with nearly 100 percent cover; usually monoculture crops are planted in these areas, which are irrigated, artificially seeded, and frequently maintained. Characteristic species include non-native grasses such as oat (*Avena* sp.), bermuda grass (*Cynodon* sp.), barley (*Hordeum* sp.), *Sorghum* grass, as well as clover (*Medicago* sp.). Often times, this land contains significant areas of bare ground due to livestock grazing and movement across acres of this vegetation community.

Special-status species with a potential to occur within this vegetation community include:

- burrowing owl
- California horned lark
- San Joaquin kit fox
- Swainson's hawk

Riverine

Riverine systems consist of linear aquatic communities of flowing, non-tidal waters with a distinct channel and little to no persistent emergent vegetation. Riverine systems may also include areas with abundant submerged or floating-leaved aquatic vegetation. Vegetation communities abutting riverine systems tend to be dominated by trees, shrubs, persistent emergent vegetation, and/or emergent mosses and lichens. This vegetation community occurs near or depends upon a nearby freshwater source or areas with fresh water flow during all or part of the year. Riverine communities in the Planning Area account for approximately 270 acres, predominately along the northern boundary, within the San Joaquin River system.

Special-status species that are known to occur in riverine habitat include:

- western yellow-billed cuckoo
- tricolored blackbird
- hardhead
- hoary bat
- spotted bat
- western pond turtle
- California satintail

Urban

Urban (or developed) lands have been constructed upon or otherwise covered with a permanent, unnatural surface (e.g., concrete, asphalt, buildings, homes, etc.) or large amount of debris or other materials. The Planning Area consists predominately of urban areas, which are concentrated in the central portion of the Planning Area, within the Fresno city limits. Urban land is less common within the rural and agricultural portions of the Planning Area. Approximately 67,050 acres of the Planning Area consist of urban land,

Urban land provides poor quality habitat for any special-status species. No special-status species is expected to occur within this vegetation community.

Valley Foothill Riparian

The Planning Area includes approximately 380 acres of the valley foothill riparian community, which occurs primarily within mature riparian forests along the San Joaquin River corridor. Valley foothill riparian communities typically have a 20 to 80 percent canopy cover with trees that are winter decidous. Wild grape (Vitis californica) often provides 30 to 50 percent ground cover. There is very little herbaceous understory with the exception of disturbed openings in the canopy cover. The understory typically consists of leaf-litter, fallen limbs, and is often impenetrable for smaller herbaceous plants. Tree canopy species within this community typically includes cottonwood (Populus fremontii), California sycamore (Platanus racemosa), and valley oak (Quercus lobata). Subcanopy species often includes white alder (Alnus rhombifolia), boxelder (Acer negundo), and Oregon ash (Fraxinus latifolia). Typical understory shrub layer plants include wild grape, California blackberry (Rubus ursinus), blue elderberry (Sambucus caerulea), poison oak (Toxicodendron diversilobum), and willows (Salix sp.)

Special-status species with a potential to occur within valley foothill riparian habitat includes:

- western spadefoot
- western yellow-billed cuckoo
- California horned lark
- hoary bat
- spotted bat
- pallid bat
- western mastiff bat
- valley elderberry longhorn beetle
- California satintail

Valley Oak Woodland

The Valley Oak Woodland is a special-status natural community. The Planning Area includes approximately 120 acres of valley oak woodland located primarily within the San Joaquin River corridor. Valley oak woodland communities vary from open-canopy savanna-like woodlands to partially closed canopy woodlands but mostly consist of winter-deciduous, broad-leaved species. Valley oak (Quercus lobata), a winter-deciduous species and California's largest broad-leaved tree, is usually the only tree species present, although blue oak (Q. douglasii) may also be present. Mature valley oaks can reach heights of 50 to 100 feet (about 15 to 35 meters). Valley oak woodlands typically occur on deep, well-drained alluvial soils in valley bottoms that have a higher summer moisture content. This community intergrades with valley oak riparian near rivers and with blue oak woodlands on drier slopes. Characteristic understory species include creeping wild rye (Elymus triticoides), wild oats (Avena sp.), brome (Bromus sp.), barley (Hordeum zp.), needlegrass (Nassella sp.) and poison oak (Toxicodendron diversilobum).

Special-status species known to occur within valley oak woodland habitat includes:

- western spadefoot
- spotted bat
- pallid bat
- western mastiff bat
- San Joaquin pocket mouse
- Hartweg's golden sunburst
- Madera leptosiphon

Northern Claypan Vernal Pool

The northern claypan vernal pool is a special-status natural community. The Planning Area includes approximately one acre of northern claypan vernal pool along the northwest boundary of the Planning Area. Typically, these pools are located within the lower elevations of the main San Joaquin Valley. These areas are typically associated with a series of small mima mounds with interspersed pools. Typically, these pools have highly alkaline and may display whitish salt deposits in non-vegetated centers of dry pools. These vernal pools are dominated by a high percentage of non-native species.

Special-status species known to occur within northern claypan vernal pool includes:

- California tiger salamander
- vernal pool fairy shrimp
- California linderiella
- molestan blister beetle
- midvalley fairy shrimp
- succulent owl's clover
- Green's tuctoria

Special-status Natural Communities

As described above, the Planning Area contains two special-status natural communities: valley oak woodland and northern claypan vernal pool. Based on a review of the CNDDB, there are three additional special-status natural communities located in the vicinity of the Planning Area. These three special-status natural communities include the northern hardpan vernal pool, great valley mixed riparian forest, and sycamore alluvial woodland. Each of these three special-status natural communities are associated with stream courses, waterways, drainages, wetlands, and seasonal pools; however, these have not been recorded to occur within the Planning Area and are, therefore, not likely to occur.

Special-Status Species

The Planning Area contains potentially suitable habitat for a total of 29 special-status species (including 12 plant species and 17 wildlife species). Each of the special-status species with potential to occur (or that are known to occur) within the Planning Area is described in more detail below. A listing of plant species was obtained from the California Native Plant Society Inventory of Rare and Endangered Plants (See Appendix C-2). A listing of the wildlife species was obtained from the CNDDB (See Appendix C-3).

Listed Plant Species

Six listed plant species have the potential to occur within the Planning Area. Impacts to these species should be avoided to the greatest extent possible. Consultation with state and/or federal agencies would be required in the event that a proposed project had the potential to affect a listed plant species.

California Jewel-Flower

California jewel-flower (*Caulanthus californicus*) is a state and federally listed endangered species and a CNPS list 1B.1 species. California jewel-flower occurs within chenopod scrub in valley and foothill grasslands and pinyon-juniper woodlands. It is historically known from various valley habitats in both the Central Valley and Carrizo Plain from 65 to 900 meters. There is one historical known location within the Planning Area, but it is located within an area that appears to have already been converted to urban use.

San Joaquin Valley Orcutt Grass

San Joaquin Valley orcutt grass (*Orcuttia inaequalis*) is a state endangered species, a federally threatened species, and a CNPS list 1B.1 species. This species is restricted to vernal pools at elevations from 30 to 755 meters above sea level. There is one historic known location within the Planning Area, near the central/western portion, just west of Highway 99.

Hairy Orcutt Grass

Hairy orcutt grass (*Orcuttia pilosa*) is state and federally endangered species and a CNPS list 1B.1 species. This species is restricted to vernal pools surrounded by annual grasslands. It is specifically known to occur within the northern hardpan vernal pool community, on San Joaquin fine sandy loam. There are no historic / known locations of this species within the Planning Area.

Hartweg's Golden Sunburst

Hartweg's golden sunburst (*Pseudobahia bahiifolia*) is state and federally endangered species and a CNPS list 1B.1 species that is known to occur within valley and foothill grasslands and cismontane woodlands. Hartweg's golden sunburst is associated with clay soils, predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools. There are no historic / known locations of this species within the Planning Area.

Succulent Owl's Clover

Succulent owl's clover (*Castilleja campestris* ssp. *succulenta*) is a state endangered species, a federally threatened species, and a CNPS list 1B.2 species. Succulent owl's clover is isolated to vernal pools in valley and foothill grasslands. Microhabitat requirements include moist places with acidic soils, from 25 to 750 meters. There is one historic/known location in the Planning Area, located within the County of Fresno (and outside of the City of Fresno sphere of influence), just south of the San Joaquin River corridor.

Greene's Tuctoria

Greene's tuctoria (*Tuctoria greenei*) is a federally endangered species, a California Rare species, and a CNPS list 1B.1 species. This species is known to occur within vernal pools surrounded by valley and foothill grasslands. Specifically this species is located on dry bottoms of vernal pools from an elevation range of 30 to 1,065 meters. There are no historic / known locations of this species within the Planning Area.

Other Special-Status Plant Species

In addition to the six listed plant species, there are six "other" special-status plant species have the potential to occur in the Planning Area: California satintail (*Imperata brevifolia*), Madera leptosiphon (*Leptosiphon serrulatus*), hairy Orcutt grass (*Orcuttia pilosa*), Sanford's arrowhead (*Sagittaria sanfordii*), caper-fruited tropidocarpum (*Tropidocarpum capparideum*), spiny-sepaled button-celery (*Eryngium spinosepalum*), dwarf downingia (*Downingia pusilla*). Direct take of these species should be avoided wherever possible.

Listed Wildlife Species

A total of eight listed wildlife species have the potential to occur or are known to occur within the Planning Area. Project impacts to these species should be avoided to the greatest extent possible.

California Red-Legged Frog

California Red-Legged Frog (*Rana draytoni*) is a federally threatened species and a California Species of Special Concern. The red-legged frog is the largest native frog in California; the underside of the hind legs and inner-half of the feet are pink to red, which gives this frog its common name. It ranges from Humboldt, Trinity, and Shasta counties, down the western slope of the Sierra Nevada (below 4,500 feet) to Mariposa County, and south to Mexico.

The red-legged frog frequently uses deep, in-channel pools in intermittent or perennial streams for breeding and to avoid predators such as raccoons and red-shouldered hawks. Preferred habitats consist of deep permanent pools in stream courses characterized by a thick over-story of willows, sycamores, and oaks; under-cut banks; and submerged root balls. Occupied streams are free of exotic aquatic vertebrates such as bullfrogs, crayfish, or fish. The presence of *Typha*, *Scirpus*, and *Salix* may be important indicators of potential habitat. Watercress (*Rorippa nasturtium-aquaticum*) and duckweed (*Lemma* sp.) tend to be the dominant understory species. Other breeding habitats include coastal lagoons, marshes, springs, and permanent and semi-permanent natural ponds, backwater portions of slow streams, and large stock ponds.

California Tiger Salamander

The California tiger salamander is federally threatened within the Central Valley in California. The Central Valley species is known to occur within grasslands and oak savannas and along the edges of mixed woodland and lower elevation coniferous forests. This species is endemic to California, but most of the historic range is not well known because it has been fragmented. Currently most populations in the Central Valley have been eliminated, and the remainder are found in the surrounding foothills from Tulare County north to Yolo County, and from Santa Barbara County to the Sacramento Valley.

The California tiger salamander is nocturnal and fossorial, spending most of its time underground in animal burrows, especially those of California ground squirrels and valley pocket gophers. Breeding occurs within vernal pools or other seasonal waters. The California tiger salamander emerges at night with the fall rains, sometimes in early November. This species needs both suitable upland terrestrial habitat and temporary breeding ponds in order to survive.

Fresno Kangaroo Rat

Fresno kangaroo rat (*Dipodomys nitratoides exilis*) is state and federally listed as endangered. This species excavates burrows in gently undulating to level terrain with sandy loam soils that are mildly to moderately alkaline and characterized by herbaceous vegetation with scattered shrubs. Herbaceous vegetation with scattered shrubs is common aboveground cover. Culbertson (1946) described burrow systems as covering a surface area from about 7-feet by 7-feet to 12-feet by 12-feet. Some burrow systems included short dead-end tunnels, apparently used to escape predators.

San Joaquin Kit Fox

San Joaquin kit fox (*Vulpes macrotis mutica*) is a state threatened species and a federally endangered species that is in population decline, particularly in California, largely due to widespread habitat loss from agriculture and urbanization. The species occurs from the San Joaquin Valley north to Contra Costa and Alameda counties. This species generally prefers open, level areas with loose-textured soils supporting scattered, shrubby vegetation with little human disturbance.

The San Joaquin kit fox is a small grayish fox about two and one half feet in length and weighing up to five and one half pounds. The kit fox is distinguished from other foxes by its large ears. The fox preys on rodents, rabbits, and lizards, and in turn is preyed upon by larger carnivores, particularly coyote.

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is a state threatened species that breeds regularly from southwestern Canada to northern Mexico. Typical habitat includes open desert, grassland, or croplands near scattered, large trees or small groves. This species nests in open riparian habitat or in scattered trees or small groves in sparsely vegetated flatlands. While it typically roosts in large trees, it will also roost on the ground in areas of suitable habitat, if no large trees are available. The nesting / breeding period for this species is from late March to mid-August, with peak activity in late May to late July. Swainson's hawks build their nests on a platform of sticks, bark, and fresh leaves in a tree, bush, or utility pole from 1.3 to 30 meters (4-100 feet) above ground. The Swainson's hawk forages in shrub-steppe habitats and agricultural lands. Swainson's hawk populations have declined markedly since the 1920s, with steep declines in the 1950s. In some areas there have been losses of 90 to 95 percent of past populations.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a federally threatened species. The beetle's current distribution is patchy throughout the remaining riparian forests of the Central Valley, between Redding and Bakersfield. The beetle is locally common (i.e., found in population clusters that are not evenly distributed across the Central Valley). The species is nearly always found on or close to its host plant, elderberry (*Sambucus* sp.). Females lay their eggs on the bark and larvae hatch and burrow into the stems. The larval stage may last 2 years, after which the larvae enter the pupal stage and transform into adults. Adults are active from March to June, feeding and mating. It appears that in order to serve as habitat, the shrubs must have stems that are 1.0 inch or greater in diameter at ground level. Use of the plants by the animal is rarely apparent.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp (*Branchinecta lynchi*) is a federally threatened species. Populations of this species are known to live in ephemeral freshwater habitats, such as vernal pools and swales. None are known to occur in running or marine waters or other permanent bodies of water. This species has a sporadic distribution within vernal pool complexes, wherein the majority of pools in a given complex typically are not inhabited by the species.

Although the vernal pool fairy shrimp has a relatively wide range, the majority of known populations inhabit vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands, but one population occurs in sandstone rock outcrops and another population in alkaline vernal pools (Collie and Lathrop 1976). They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that include specific salinity, conductivity, dissolved solids, and pH levels. Water chemistry is one of the most important factors in determining the distribution of fairy shrimp. The vernal pool fairy shrimp occurs at temperatures between 6-20 degrees C, in soft and poorly buffered waters.

Yellow-Billed Cuckoo

Yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a candidate for federal listing and a state endangered species. The yellow-billed cuckoo breeds in large blocks of riparian habitat (willow and cottonwood stands in river floodplains). This bird feeds primarily on large insects, including caterpillars and cicadas, and occasionally on small frogs and lizards. Breeding coincides with the emergence of cicadas and tent caterpillar. Historically, yellow-billed cuckoos nested primarily in coastal counties from San Diego County, near the Mexican border, to Sonoma County, to the Central Valley from Kern through Shasta Counties, and along the lower Colorado River. Primary threats to its habitat include conversion of riparian habitat to agriculture, urban development, and flood control, as well as disease, predation and lack of regulatory mechanisms.

Other Special-status Wildlife Species

In addition to the eight listed wildlife species, there are nine "other" special-status wildlife species that have the potential to occur or are known to occur within the Planning Area. Direct take of these species should be avoided and significant reductions in suitable habitat and project impacts that result in significant population decline should be avoided to the maximum extent feasible.

American Badger

American badger (*Taxidea taxus*) is a California Species of Special Concern that is known to occur within a variety of open, arid habitats, most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub. Principle habitat requirements include sufficient prey base, friable soils, and relatively open, uncultivated ground. They typically occur at elevation ranges from below sea level to over 12,000 feet above mean sea level. American badger habitat is threatened by habitat conversion to urban and agricultural uses, farming operations, shooting and trapping, poisoning, and reduction of prey base because of rodent control activities. This species occurs as far north as Canada, and as far south as central Mexico. In the United States, it currently extends east from the Pacific coast to Texas, Oklahoma, Missouri, Illinois, Indiana, and Ohio. In California, American badger is an uncommon, permanent resident throughout most of the state, with the exception of the North Coast area.

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is designated as a California Species of Special Concern. Burrowing owls require large open expanses of sparsely vegetated areas on gently rolling or level terrain with an abundance of active small mammal burrows. Typical habitat associated with the

species includes short-grass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), prairies, coastal dunes, desert floors, and some artificial, open areas as a year-round resident. Burrowing owls may also use golf courses, cemeteries, road easements and rights-of-way within cities, airports, vacant lots in residential areas, and irrigation ditches.

Burrowing owls often use existing rodent burrows (or other burrows) for roosting and nesting. They may also use pipes and culverts where burrows are scarce. If left undisturbed, a burrowing owl pair will use the same burrow year after year for nesting

Hardhead

Hardhead (*Mylopharodon conocephalus*), a fish, is a California Species of Special Concern that occurs in low to mid-elevation streams in the Sacramento-San Joaquin drainage and the Russian River. Microhabitat requirements include clear, deep pools with a mix of sand, gravel and boulder bottoms with slow water velocity. This species is not found where exotic centrarchids (commonly known as sunfish) predominate. Populations of this species are well established in mid-elevation reservoirs used exclusively for hydroelectric power generation, such as the Redinger and Kerkhoff Reservoirs on the San Joaquin River in Fresno County. Hardhead is a bottom feeder that forages for benthic invertebrates and aquatic plant material in quiet water. They will also occasionally feed on plankton and surface insects. This species is in decline due to predation by smallmouth bass, and damming of large to medium-sized warm water streams with natural flow regimes.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is a California Species of Special Concern and a High Priority species as designated by the Western Bat Working Group. This species ranges throughout California and occurs within a wide range of habitat types, typically below 6,000 feet above mean sea level. Pallid bats are non-migratory and hibernate during the winter, during which they experience very little activity. Pallid bats occur in a variety of habitats throughout the State and are most abundant in xeric ecosystems. Pallid bats roost alone and in both large and small groups. Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees, and human structures such as bridges, barns, porches, bat boxes, and buildings. This species also has been found roosting on or near the ground under stone piles, rags, and baseboards. Pallid bat is a gregarious species and often roost in colonies of 20 to several hundred individuals. The tendency to roost gregariously, combined with a relative sensitivity to disturbance, makes it vulnerable to mass displacement. Pallid bats are generalists that surface glean for arthropods and capture insects on the wing. Breeding occurs from October to February. Pups are born from late April to July and are Volant at 4 to 6 weeks of age. Breeding colonies disperse between August and October.

Spotted Bat

The spotted bat (*Euderma maculatum*) is a California Species of Special Concern and a High Priority species as designated by the Western Bat Working Group. The spotted bat is easily identifiable by its unique coloration of dorsal black fur with three white spots, white ventral surface and long, pink ears. In addition to being found in California, the species is known to occur in all of the states west of (and including) Montana, Wyoming, Colorado, New Mexico and Texas. The species generally occurs in arid, low desert habitats to high elevation conifer forests. Prominent rock features appear

to be a necessary feature for roosting. The winter range and hibernacula are unknown for most of its range, though the species has been captured year-round in the southern part of its range. This species likely breeds in late summer with females giving birth to a single pup in early summer (May or June). They appear to be solitary animals but occasionally roost or hibernate in small groups. Roost sites are cracks, crevices, and caves usually high in fractured rock cliffs. In general, the long-term persistence of this bat, as well as most bats, is threatened by the loss of clean, open water; modification or destruction of roosting and foraging habitat, and disturbance or destruction of hibernacula.

Tricolored Blackbird

The tricolored blackbird (*Agelaius tricolor*) is a California Species of Special Concern (CSC) that commonly occurs throughout central and coastal California. The species is often found near fresh water, as it prefers emergent wetlands with tall, dense cattails or tules, but it can also be found in thickets of willow, blackberry, wild rose, and other tall herbs. Tricolored blackbird is known to forage on the ground in croplands, grassy fields, flooded land, and along the edges of ponds. The tricolored blackbird diet generally consists of insects and spiders as a juvenile, and seeds and cultivated grains, such as rice and oats, as an adult. The breeding season for this colonial breeding species generally ranges from mid-April to late July.

Western Mastiff Bat

The western mastiff bat (*Eumops perotis*) is a California Species of Special Concern and a High Priority species as designated by the Western Bat Working Group. The western mastiff bat occurs throughout California in a wide range of habitat types, typically below 9,000 feet in elevation. Distribution is correlated with suitable rock features required for roosting. Western mastiff bats are non-migratory; however, they may move short distances within their home ranges. This bat species does not hibernate and is active periodically throughout the winter. Western mastiff bat is generally a cliff-dwelling species, but also uses building crevices for day roosts. This species forages most frequently in broad open areas such as flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, montane meadows, and agricultural areas, and requires large lakes or ponds at least 100 feet long for drinking. Western mastiff bat generally roosts high above the ground, allowing a clear vertical drop of at least 7 feet for flight. Maternity colonies range from 30 to several hundred individuals and generally include adult males. This species has an audible echolocation call and is easily detected while foraging. This bat forages primarily on moths, but also takes crickets and katydids. Breeding occurs from October to March, from which pups are born primarily in July and are Volant at 4 to 6 weeks of age.

Western Pond Turtle

The western pond turtle (*Emys marmorata*) is a California Species of Special Concern that inhabits ponds, lakes, rivers, streams, creeks, marshes and irrigation ditches containing abundant vegetation and either rocky or muddy bottoms in woodlands, forests and grasslands. It can be found basking on logs, rocks, cattail mats, and exposed banks within brackish water and seawater. This turtle feeds primarily on aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish. It mates in April and May, eggs are laid sometime between April and August, and hatchlings emerge in early fall or overwinter in the nest.

Western Spadefoot

Western spadefoot (*Spea hammondii*), a California Species of Special Concern, can be found primarily in grassland habitats and valley-foothill hardwood woodlands. It prefers open areas with sandy or gravelly soils in sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal pools and rain pools that do not contain bullfrogs, fish or crayfish are necessary for breeding. The species can be found from sea level up to 4,500 feet. Western spadefoot eats a variety of invertebrates, including adult beetles, larval and adult moths, crickets, flies, ants, and earthworms. This species is nocturnal and almost completely terrestrial, entering water only to breed. It can burrow underground to escape hot, arid environments, and will spend most of its life underground. The species is typically active between October and May.

Other Wildlife Species for Consideration

Species that are not state or federally listed, and are not afforded additional state or federal protection include: California horned lark (*Eremophila alpestris actia*), hoary bat (*Lasiurus cinereus*), San Joaquin pocket mouse (*Perognathus inornatus inornatus*), California linderiella (*Linderiella occidentalis*), Antioch efferian robberfly (*Efferia antiochi*), molestan blister beetle (*Lytta molesta*), Hurd's metapogon robberfly (*Metapogon hurdi*), and midvalley fairy shrimp (*Branchinecta mesovallensis*).

5.4.3 - Regulatory Setting

This section describes the relevant federal, state, and local (County and City) laws, regulations and policies pertaining to environmental impacts within the Planning Area.

Federal Regulations

Federal Endangered Species Act

The United States Fish and Wildlife Service (USFWS) administers the Federal Endangered Species Act (ESA). The ESA provides a process for listing species as either threatened or endangered and methods of protecting listed species. The ESA defines as "endangered" any plant or animal species that is in danger of extinction throughout all or a significant portion of its known geographic range. A "threatened" species is a species that is likely to become endangered. A "proposed" species is one that has been officially proposed by the USFWS for addition to the federal threatened and endangered species list.

Per Section 9 of the ESA, "take" of threatened or endangered species is prohibited. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct (codified at 16 U.S.C.A. § 1532(19). "Take" can include disturbance to habitats used by a threatened or endangered species during any portion of its life history. The presence of any federally threatened or endangered species in a project area generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. Under the regulations of the ESA, the USFWS may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

Federal Clean Water Act - Section 404

The US Army Corps of Engineers (USACE) administers Section 404 of the federal Clean Water Act (CWA). This section regulates the discharge of dredge and fill material into waters of the United States. "Discharge of fill material" is defined as the addition of fill material into waters of the United States, including, but not limited to, the following: placement of fill that is necessary for the construction of any structure or impoundment requiring rock, sand, dirt, or other material for the structure's construction; site development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; and fill for intake and outfall pipes and sub-aqueous utility lines (33 C.F.R. §328.2[f]).

The USACE has established a series of nationwide permits that authorize certain activities in waters of the United States, if a proposed activity can demonstrate compliance with standard conditions. Normally, USACE requires an individual permit for an activity that will affect an area equal to or in excess of 0.5 acre of waters of the United States. Projects that result in impacts to less than 0.5 acre can normally be conducted pursuant to one of the nationwide permits, if consistent with the standard permit conditions. USACE also has discretionary authority to require an Environmental Impact Statement for projects that result in impacts to an area between 0.1 and 0.5 acre. Use of any nationwide permit is contingent on the activities having no impacts to endangered species.

Federal Clean Water Act - Section 401

Per Section 401 of the CWA, "any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate, that any such discharge will comply with the applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of this title" (33 U.S.C.A. § 1341(a)(1)). Therefore, before the USACE will issue a Section 404 permit, applicants must apply for and receive a Section 401 water quality certification from the RWQCB.

Waters of the United States

Waters of the United States, as defined in 33 Code of Federal Regulations (CFR) Section 328.3, include all waters or tributaries to waters such as lakes, rivers, intermittent and perennial streams, mudflats, sand-flats, natural ponds, wetlands, wet meadows, and other aquatic habitats. Wetlands are also included and defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 C.F.R. §328.3[b]). Frequently, waters of the United States with at least intermittently flowing water or tidal influences are demarcated by an ordinary high water mark (OHWM). The OHWM is defined in 33 CFR Section 328.3(e) as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate

means that consider the characteristics of the surrounding areas. In this region, the OHWM is typically indicated by the presence of an incised streambed with defined bank shelving.

In June 2001, the USACE South Pacific Division issued Guidelines for Jurisdictional Delineations for Waters of the United States in the Arid Southwest. The purpose of this document was to provide background information concerning physical characteristics of dryland drainage systems. These guidelines were reviewed and used to identify jurisdictional drainage features within the Planning Area.

Wetlands

According to the USACE Wetlands Delineation Manual, Technical Report, three criteria must be satisfied to classify an area as a jurisdictional wetland:

- A predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation)
- Soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils)
- Permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology)

Wetland vegetation is characterized by vegetation in which more than 50 percent of the composition of dominant plant species are obligate wetland, facultative wetland, and/or facultative species that occur in wetlands. As a result of the 2001 Solid Waste Agency of North Cook County (SWANCC) case, a wetland must show connectivity to a stream course in order for such a feature to be considered jurisdictional. Although wetland criteria was used to identify if areas were considered wetlands, the exact limits of jurisdiction were not measured based on the standard wetland delineation protocol as described in the 1987 USACE manual.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) protects all common wild birds found in the United States (U.S.) except the house sparrow, starling, feral pigeon, and resident game birds such as pheasant, grouse, quail, and wild turkey. Resident game birds are managed separately by each state. Under the MBTA, "it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof …" (16 U.S.C.A. § 703(a)).

California Regulations

California Endangered Species Act

The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act (CESA). CESA applies to "endangered" or "threatened" birds, mammals, fish, amphibians, reptiles, and plants, but does not apply to insects (see 81 Cal. Op. Att'y Gen. 222 (1998)). The State of California considers an "endangered" species one whose prospects of survival and reproduction are in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease. Any species determined by the commission as "endangered" on or before January 1, 1985, is an "endangered species." A "threatened" species is one present in such small numbers throughout its range that it is likely to become an endangered species in the foreseeable future in the absence of special protection or management. The California Endangered Species Act of 1970 created the categories of "Endangered" and "Rare." The California Endangered Species Act of 1984 created the categories of "Endangered" and "Threatened." On January 1, 1985, all animal species designated as "Rare" were reclassified as "Threatened" (see Fish and Game Code § 2067).

Section 2080 of the Fish and Game Code prohibits "take" of any species that the commission determines to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project caused losses of listed species populations and their essential habitats.

"Candidate species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list (Fish and Game Code § 2068).

The CDFW exercises authority over mitigation projects involving State-listed species, including those resulting from CEQA mitigation requirements. Lead agencies are directed by the CESA to consult with the CDFW on projects or actions that could affect listed species. A "taking" may be authorized by the CDFW if an approved habitat management plan or management agreement that avoids or compensates for possible jeopardy is implemented. In addition, the CDFW requires preparation of mitigation plans in accordance with published guidelines.

California Department of Fish and Wildlife "Species of Special Concern"

A Species of Special Concern (SSC) is a species, subspecies, or distinct population of an animal (i.e., fish, amphibian, reptile, bird and mammal) native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:

- is extirpated from the State or, in the case of birds, in its primary seasonal or breeding role;

- is listed as Federally-, but not State-, threatened or endangered;
- meets the State definition of threatened or endangered but has not formally been listed;
- is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status;
- has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

SSCs tend to have a number of factors in common, including that they:

- occur in small, isolated populations or in fragmented habitat, and are threatened by further isolation and population reduction;
- show marked population declines;
- depend on a habitat that has shown substantial historical or recent declines in size and/or quality or integrity;
- have few California records, or which historically occurred in the State but for which there are no recent records; and
- occur largely in areas where current management practices are inconsistent with the animal's persistence.

"Species of Special Concern" is an administrative designation that carries no formal legal status per se, but signifies that the species is recognized as sensitive by the CDFW. Section 15380 of the CEQA Guidelines clearly indicates that species of special concern should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein.

California Native Plant Protection Act

In 1977, the Legislature formally recognized the status of rare or endangered plants with the passage of the Native Plant Protection Act (NPPA) (Fish and Game Code, Section 1900 et seq.). The NPPA directed the CDFW to preserve, protect, and enhance rare and endangered plants in California. The NPPA also authorized the Fish and Game Commission to designate native plants as “rare” or “endangered” and to require permits for collecting, transporting, or selling such plants. The Commission listed 24 plants in 1978.

Under Section 1901 of the Fish and Game Code, “native plant” means a plant growing in a wild uncultivated state, which is normally found native to the plant life of this state. A species, subspecies, or variety is considered "endangered" when its prospects of survival and reproduction are in immediate jeopardy from one or more causes. A species, subspecies, or variety is considered "rare" when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens.

Under Section 1913(c) of the NPPA, the owner of land where a rare or endangered native plant is growing is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of plant.

Fish and Wildlife Protection -California Fish and Game Code, Sections 1600 to 1603

The California Fish and Game Code mandates that "it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds, without first notifying the department of such activity." CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses, including dry washes, characterized by the presence of hydrophytic vegetation, the location of definable bed and banks, and the presence of existing fish or wildlife resources.

Furthermore, CDFW jurisdiction is often extended to habitats adjacent to watercourses, such as oak woodlands in canyon bottoms or willow woodlands that function as part of the riparian system. Historic court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear, but re-emerge elsewhere. Under the CDFW definition, a watercourse need not exhibit evidence of an OHWM to be claimed as jurisdiction. However, CDFW does not regulate isolated wetlands; that is, those that are not associated with a river, stream, or lake.

Porter-Cologne Water Quality Act

The RWQCB regulates actions that would involve "discharging waste, or proposing to discharge waste, within any region that could affect the water of the state" (Water Code Section 13260(a)), pursuant to provisions of the Porter-Cologne Water Quality Act. "Waters of the State" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code Section 13050 (e)).

Regional Water Quality Control Board Regulated Activities

Under Section 401 of the CWA, the RWQCB regulates all activities that are regulated by the USACE. Additionally, under the Porter-Cologne Water Quality Act, the RWQCB regulates all activities, including dredging, filling, or discharge of materials into waters of the state that are not regulated by the USACE due to a lack of connectivity with a navigable water body and/or lack of an OHWM.

California Fish and Game Code - Section 3503 and Section 3511

The CDFW administers the California Fish and Game Code. There are particular sections of the Fish and Game Code that are applicable to natural resource management. For example, Section 3503 of the Fish and Game Code states it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird that is protected under the MBTA. Fish and Game Code Section 3503.5 further protects all birds in the orders Falconiformes and Strigiformes, birds of prey such as hawks and owls, and their eggs and nests, from any form of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is also considered a "taking" by the CDFW. Fish and Game Code Section 3511 lists fully protected bird species where the CDFW is unable to authorize the issuance of permits or licenses to take these species.

Natural Community Conservation Planning Act -Fish and Game Code Sections 2800 et seq.

The State of California has adopted the Natural Community Conservation Planning and Habitat Conservation Planning (NCCP/HCP) program to focus on creating a multiple-species, multiple-habitat subregional Reserve System and implementing a long-term "adaptive management" program. To accomplish this, the NCCP/HCP creates a subregional habitat Reserve System and implements a coordinated program to manage biological resources within the habitat reserve. The creating of a defined Reserve System provides certainty to the public and to affected landowners with respect to the location of future development and open space within the subregion. The NCCP/HCP was developed with coordination through the CDFW and the USFWS, in order to account for the CESA and the federal ESA.

The Planning Area does not occur within any NCCP/HCP designated area.

California Native Plant Society

The California Native Plant Society (CNPS) maintains a list of plant species native to California that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Plants of California. Potential impacts to populations of CNPS-listed plants require consideration under CEQA. The following identifies the definitions of the California Rare Plant Ranks (formerly known as the CNPS lists):

- California Rare Plant Rank 1A: Plants believed extirpated in California and either rare or extinct elsewhere.
- California Rare Plant Rank 1B: Plants rare, threatened, or endangered in California and elsewhere.
- California Rare Plant Rank 2A: Plants presumed extirpated in California, but more common elsewhere.
- California Rare Plant Rank 2B: Plants rare, threatened or endangered in California, but more common elsewhere.
- California Rare Plant Rank 3: Plants about which more information is needed - a review list.
- California Rare Plant Rank 4: Plants of limited distribution – a watch list.

The CNPS Threat Rank is an extension added onto the California Rare Plant Rank, which designates the level of threats by a 1 to 3 ranking, with 1 being the most threatened and 3 being the least threatened. Each threat rank is defined as follows:

- 0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat).
- 0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat).

- 0.3-Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

County of Fresno Regulations

The County of Fresno Open Space and Conservation Element of the General Plan is concerned with protecting and preserving natural resources, preserving open space areas, managing the production of commodity resources, protecting and enhancing cultural resources, and providing recreational opportunities.

The Open Space and Conservation Element sets out goals, policies, and implementation measures under three main headings: Productive Resources, Natural Resources, and Recreation and Cultural Resources. Productive Resources encompasses three sections: Water Resources, Forest Resources, and Mineral Resources. Natural Resources encompass four sections: Wetland and Riparian Areas, Fish and Wildlife Habitat, Vegetation and Air Quality. The Recreation and Cultural Resources sections encompass: Parks and Recreation, Recreational Trails, Cultural, Geologic Resources, Scenic Resources, and Scenic Roadways.

City of Fresno Regulations

The guidelines outlined in the City of Fresno General Plan and Municipal Codes, in conjunction with the County of Fresno General Plan, ensure project level compliance with all applicable state and federal regulations.

General Plan

The City of Fresno General Plan is intended to serve as a guide to enable government at all levels, private enterprise, community groups, and individual citizens to make decisions and use community resources in a manner that will realize progress toward a common vision of a measurably physical, economic, and social environment. The goal of the 2025 Fresno General Plan is to provide a mechanism to identify potential issues upfront and provide mitigation to expedite project approval within the Planning Area. The General Plan contains specific objectives and policies to protect biological resources within the Planning Area. These objectives and policies regarding native plants and wildlife are outlined in Chapter 4, Resource Conservation Element, of the General Plan, as follows:

G-12. Objective: To provide for long-term preservation, enhancement, and enjoyment of plant, wildlife, and aquatic habitat resources in the Fresno area by protecting, improving, and restoring these resources.

G-12-a. Policy: Support state, federal, and local programs to acquire significant habitat areas in and near Fresno for permanent protection and/or conjunctive educational and recreational use.

G-12-b. Policy: The City of Fresno will participate in cooperative, multi-jurisdictional approaches (involving the Counties of Fresno and Madera, the City of Clovis, the San Joaquin River Conservancy, the Metropolitan Flood Control District, and other agencies and organizations) for area-wide habitat

conservation plans to preserve and protect rare, threatened, and endangered species that could be adversely affected by continued population growth and development.

G-12-c. Policy: In development projects, consider the incorporation of natural features (such as ponds to be designed and managed for habitat values, or hedgerows and wooded strips) such that these features can serve as a buffer for adjacent natural areas and/or an enhancement to the ecological values of Fresno.

G-12-d. Policy: Projects that could adversely affect rare, threatened, or endangered wildlife and vegetative species (or may have impacts on wildlife, fish, and vegetation restoration programs) may be approved only when findings are made by the California Department of Fish and Game and the U.S. Fish and Wildlife Service, as appropriate) that adequate mitigation measures are incorporated in the project's design.

G-12-e. Policy: Open Space land use designations, appropriate zoning, setbacks, and conservation easements will be used to preserve areas identified as sensitive or critical habitat for rare, threatened, or endangered vegetation and wildlife species, with particular attention paid to the North and Southeast Growth Areas and to the preparation of the required community and/or specific plans for these expansion areas of the proposed 2025 Fresno General Plan.

G-12-f. Policy: If the California Department of Fish and Game or federal conservation agencies require habitat replacement as a condition of, or mitigation for, any development project in Fresno's planning area, such replacement or mitigation habitat should be located, if possible, within or near the Fresno-Clovis Metropolitan Area.

G-12-g. Policy: Mitigation programs involving restoration of natural habitats shall include measures needed to create functional, sustainable wildlife habitat. Specific components of these programs will include:

- an evaluation of the site's pre-project environmental setting and the proposed design and operating parameters of the mitigation measures, to be evaluated in the project's CEQA/NEPA environmental review processes.
- a graphic depiction of land to be acquired or set aside for mitigation activities.
- permitting required by local, state, and federal agencies for the project.
- mitigation site preparation plans.
- specification of the types and sources of plant material used for any revegetation.
- water supply and distribution for plants and wildlife.
- post-planting maintenance and other operation measures to ensure successful mitigation.
- monitoring at an appropriate frequency by qualified personnel and reporting of data collected during monitoring to permitting agencies.

G-12-h. Policy: Establish, in consultation with appropriate public agencies with special expertise, development and operational standards that may be needed to supplement existing law and regulations to avoid or reduce any adverse impacts of development adjacent to important habitat areas. Standards could include such measures as controls on noise and glare, or restrictions on disturbance of vegetated areas.

G-12-i. Policy: For drainage and flood detention basins in agricultural or industrial areas, and for those basins where design or other factors preclude developed recreational uses, Fresno Metropolitan Flood Control District and the City of Fresno will consider development of public or private fisheries and habitat areas for native plants and wildlife, in consultation with the state Department of Fish and Game.

G-12-j. Policy: Where appropriate in flood zones along water courses and flood detention basins, pursue development of conjunctive habitat and recreational trail uses in flood control and drainage projects.

G-12-k. Policy: Encourage property owners to reestablish, maintain, and protect continuous wildlife corridors along riparian areas, by use of building setbacks and the planting of suitable native vegetation along the riverbanks and bluffs, streambanks, drainage or irrigation ditches, and, where appropriate, fence lines.

G-12-l. Policy: Coordinate habitat restoration programs with federal, state, and local flood control and natural resource agencies, to achieve useful restoration and take advantage of the opportunity for a coordinated regional mitigation program, while avoiding flood control problems and the undesirable introduction of non-native plant and animal species.

G-13. Objective: Maintain and restore, where feasible, the ecological values of the San Joaquin River corridor, because (1) this area is Fresno's main scenic feature and natural area; (2) it is important for maintenance of good-quality water resources in the region; and (3) it constitutes unique, irreplaceable habitat for valley native species.

G-13-a. Policy: Adopted plans, codes/ordinances, regulations, and policies of the city will continue to indicate strong concern for, and protection of, the San Joaquin River bluffs and the river bottom, to promote Fresno's scenic amenities and protect the river's water quality, fisheries, and associated riparian environment.

G-13-b. Policy: Support Fresno County General Plan policies which promote the preservation and enhancement of natural resources in Fresno County's river influence areas.

G-13-c. Policy: Apply, and continue to honor, the open space land use designation in the entire San Joaquin river bottom and bluffs when considering land use decisions in the vicinity of the river. Ensure that development projects in the vicinity of the river corridor protect and complement its habitats and natural settings, including development within the proposed North Growth Area of the 2025 Fresno General Plan.

G-13-d. Policy: Implement the multi-use open space land use designation through the following actions:

- apply "O"/Open Conservation District or "AE-20"/Exclusive Twenty-Acre Agricultural District zoning when land use plans, rezonings and annexations are proposed for land on the San Joaquin River bluffs and river bottom.
- continue to prohibit new residential land use entitlements (zoning, special permits, and subdivisions) in the river bottom, pursuant to the multi-use open space land use designation and zoning districts adopted for the area.
- require a finding of plan consistency for all land use entitlements (including land divisions and all types of special permits) and all infrastructure projects in the river corridor.
- prohibit the location of any solid waste facilities of any type (including transfer and waste material recovery stations) in the river bottom.
- adjacent to the river corridor, incorporate natural topography with respect to the design and siting of all physical improvements, in order to minimize grading and disturbances of the viewshed.
- complete studies addressing the limitations of the area's biotic community and hydrologic status prior to the approval of any project which involves land in, or immediately abutting, the San Joaquin river bottom.
- carefully plan and regulate outdoor lighting visible in, and from, the river corridor. In instances where such lighting is necessary, it shall be of the lowest feasible intensity and directed away from, or shielded from, the reserve or corridor. Adverse impacts of lighting will be further mitigated by planting tall vegetation for screening between light sources and wildlife corridors/reserves.

G-13-e. Policy: Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Discharge of runoff from industrial and commercial land uses to the San Joaquin River or other riparian corridors shall be avoided.
- Development entitlements for sites, which have drainage (directly or indirectly), to the San Joaquin River or other riparian areas shall be conditioned upon adequate measures for preventing pollution of natural bodies of water from their runoff.
- Water quality and sediments shall be frequently monitored near drainage outfalls to riparian areas.
- If unacceptable levels of contaminant(s) occur, remedial measures shall be promptly instituted.

G-14. Objective: Support the San Joaquin River Conservancy in its efforts to develop a river parkway that strikes an appropriate balance between facilitating recreational pursuits; protecting water

resources; meeting economic and development needs through sand and gravel production; and long-term preservation, enhancement, and public enjoyment of the river's unique and irreplaceable plant, wildlife, and aquatic resources.

G-14-a. Policy: Encourage natural reserve areas and a wildlife corridor in the river bottom to protect, enhance, and restore riparian and aquatic habitats, adjacent wetlands, and upland areas integral to the life cycle of river wildlife.

G-14-b. Policy: Natural reserves and wildlife corridors need to be acquired and expanded through purchase, easements, mitigation for proposed activities, or other mutually satisfactory transactions.

G-14-c. Policy: Natural reserves should be sited where highest-quality habitat exists adjoining the river's wildlife corridor and in such other location where endangered, threatened, or rare species are established or are being reestablished.

G-14-d. Policy: The San Joaquin River's wildlife corridor is to provide continuous land and water areas parallel to the river.

- A minimum width of 200 feet of riparian vegetation should be preserved on both sides of the river. The corridor should be wider when possible and/or necessary to protect additional areas of native plants and critical habitat (such as wildlife breeding areas). In areas where 200 feet of riparian vegetation no longer exists along the river bank, a 200-foot or wider band of native plants is recommended to be reestablished, to the maximum extent feasible from topologic and hydrologic standpoints. Consider exceptions where the minimum-width corridor is infeasible due to topography, hydrology, or other constraints. In those instances, an offsetting expansion is recommended on the opposite side of the river. Where steep bluffs drop directly into or close to the river, incorporate the bluff face into the wildlife corridor.

G-14-e. Policy: Routine monitoring shall be done to determine the status of conditions and mitigation measures required for projects within, and in the vicinity of, the river corridor.

- A memorandum of understanding or other agreement should be implemented so that the San Joaquin River Conservancy can perform, or participate in, this monitoring program in order to furnish additional expertise, provide for cost efficiency, and to ensure consistency throughout the river corridor.
- Based on information obtained from monitoring, modifications in special permits, reclamation plans, and other documents, operating parameters for uses may be necessary to insure human health and safety and the well-being of riparian plants and wildlife.

G-14-f. Policy: As specified in the San Joaquin River Parkway Master Plan and EIR (1997), natural reserve areas and the wildlife corridor areas would be protected whenever more intensive human uses exist or are proposed on adjacent lands. Buffer zones would allow multiple uses on parts of the parkway while still protecting wildlife and native plants.

- Any studies done to determine appropriate buffer widths, along with the conclusions and recommendations drawn from the studies, shall be performed by, or be reviewed and approved by, state and federal wildlife agencies before variances from standard buffer zone widths can be granted.
- The vegetation and permitted uses of the buffer zones need to be tailored to the adjacent habitat it is designed to protect. Natural riparian buffer zones should be maintained, rehabilitated, or reestablished with appropriate native plants (seed material and cuttings locally derived).
- Open space uses such as pasture, low-intensity agricultural activities, and the "rough" or marginal areas of golf courses, may be incorporated into buffer zones when they constitute an improvement in habitat over a previous use or degraded area. However, the potential impacts of construction, cultural, and operational practices (such as grading, number of livestock per acre, lighting, and use of pesticides, herbicides, and fertilizers) need to be thoroughly evaluated and addressed before these uses can be used for buffering.

Open Space and Biological Resources

Municipal Code (Section 13-305-Tree Preservation)

The City of Fresno Municipal Code Section13-305 protects all public trees in the City, including but not limited to trees that are affecting surface improvements or underground facilities or which are diseased, or located where construction is being considered or will occur. No person, except authorized City personnel, shall remove, destroy, deface or injure any tree on public property by any means including but not limited to: pouring material on or immediately adjacent to any tree, attaching any sign or notice to a tree without supervision of the Director, causing or encouraging fire around any tree, or covering the ground within a 4-foot radius around any tree with concrete or other unnatural surface. Any removal of trees shall be conducted only after an evaluation and inspection by the Director, and written authorization.

5.4.4 - Thresholds of Significance

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in a significant adverse impact on the environment. The criteria used to determine the significance of an impact to biological resources are based on the initial study checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, biological resource impacts resulting from the proposed project are considered significant if the project would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? (See Effect on Species, Impact BIO-1)

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California

Department of Fish and Wildlife or US Fish and Wildlife Service? (See Riparian Habitat, Impact BIO-2)

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? (BIO-3)

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? (See Wildlife Corridors and Nursery Sites, Impact BIO-4)

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? (See Local Policies or Ordinances Protecting Biological Resources, Impact BIO-5)

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? (See Conservation Plans, Impact BIO-6)

5.4.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Effect on Species

Impact BIO-1	**The project could have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.**

Project Level Impact Analysis

Development within the Planning Area could result in the loss of natural vegetation communities that provide suitable habitat for 30 special-status plant and wildlife species that have the potential to occur or are known to occur within the Planning Area. The vegetation communities within the Planning Area boundary that provide suitable habitat for listed and other special-status species are described above, under Section 5.4.2 of this Master EIR. Development within the Planning Area could result in the loss or degradation of natural habitats such as annual grassland, oak woodland, lacustrine, riverine, and pasture, which may support special-status plant and wildlife species. Project-related impacts to any of these habitat types may result in a substantial adverse effect, if it is determined that a special-status species will be impacted, either directly or through habitat modifications.

Direct project impacts to species listed as a candidate, sensitive, or special-status species by local, state, and federal agencies should be avoided to the greatest extent feasible; however, it is acknowledged that future projects may not be able to avoid these species. Project-related impacts that result in the direct take of a special-status species may be considered a significant impact. The presence/absence of a special-status species on a project site and the potential to impact a special-status species must be determined prior to project construction. If development within the Planning

Area results in the direct take or loss of suitable habitat for any of the 30 special-status species that have the potential to occur in the Planning Area, project-level mitigation will be required. Project impacts to special-status species listed as threatened or endangered by CDFW and/or USFWS may also require agency consultation and/or take permits.

Proposed projects within the Planning Area will incorporate project design features outlined in the objectives and policies of the Fresno General Plan Update. The General Plan Update includes specific implementing policies pertaining to biological resources that must be adhered to for development within the Planning Area, specifically within the Open Space and Biological Resources Section of Chapter 5, the Parks, Open Space, and Schools Element. Project-level implementation of the General Plan Policies POSS-5-a through POSS-5-f will reduce potential project impacts to special-status species and their associated habitats.

To reduce potential project-specific impacts on biological resources, the General Plan Update includes the following policies.

Policy POSS-5-a: Habitat Area Acquisition. Support state, federal, and local programs to acquire significant habitat areas for permanent protection and/or conjunctive educational and recreational use.

Policy POSS-5-b: Habitat Conservation Plans. Participate in cooperative, multi-jurisdictional approaches for area-wide habitat conservation plans to preserve and protect rare, threatened, and endangered species.

Policy POSS-5-c: Buffers for Natural Areas. Require development projects, where appropriate and warranted, to incorporate natural features (such as ponds hedgerows and wooded strips) to serve as buffers for adjacent natural areas with high ecological value.

Policy POSS-5-d: Guidelines for Habitat Conservation. Establish guidelines for habitat conservation and mitigation programs. These programs will include:

- An evaluation of the site's environmental setting and proposed design and operating parameters of proposed mitigation measures.
- A graphic depiction of land to be acquired or set aside for mitigation activities.
- Mitigation site preparation plans.
- Specification of the types and sources of plant material used for any revegetation.
- Water irrigation plans.
- Post-planting maintenance and other operational measures to ensure successful mitigation.
- Monitoring at an appropriate frequency by qualified personnel and reporting of data collected to permitting agencies.

Policy POSS-5-e: Pursue development of conjunctive habitat and recreational trail uses in flood control and drainage projects.

Policy POSS-5-f: Regional Mitigation and Habitat Restoration. Coordinate habitat restoration programs with responsible agencies to take advantage of opportunities for a coordinated regional mitigation program.

Cumulative Impact Analysis

Development within the San Joaquin Valley study area during buildout of the Planning Area primarily focuses on the conversion of agricultural land to development, which will reduce the availability of suitable habitat for special-status species, including suitable foraging habitat for raptor species. Additionally, agricultural land and open space conversion has the potential to reduce the size, extent, and/or quality of existing wildlife movement corridors, due to habitat fragmentation of undeveloped open space areas within the San Joaquin Valley study area.

The loss of potentially suitable habitat for special-status species as a result of cumulative development would primarily result from the total conversion of agricultural and undeveloped land to urban and rural development. This potential conversion by cumulative development is considered a potential significant impact on special-status species. Since the proposed project would also result in potential significant impacts on special-status species, the project's contribution is considered cumulatively considerable, and therefore, would result in a significant cumulative impact.

Mitigation Measures

Project Level

The following measures are required to be implemented to reduce the project's impact on special-status species to less than significant. In addition, the implementation of the measures below would reduce the project's contribution to a potential significant cumulative loss of a population(s) of a special-status species to less than significant.

MM BIO-1 Construction of a proposed project should avoid, where possible, vegetation communities that provide suitable habitat for a special-status species known to occur within the Planning Area. If construction within potentially suitable habitat must occur, the presence/absence of any special-status plant or wildlife species must be determined prior to construction, to determine if the habitat supports any special-status species. If a special-status species are determined to occupy any portion of a project site, avoidance and minimization measures shall be incorporated into the construction phase of a project to avoid direct or incidental take of a listed species to the greatest extent feasible.

MM BIO-2 Direct or incidental take of any state or federally listed species should be avoided to the greatest extent feasible. If construction of a proposed project will result in the direct or incidental take of a listed species, consultation with the resources agencies and/or additional permitting may be required. Agency consultation through the CDFW 2081 and USFWS Section 7 or Section 10 permitting processes must take place prior to any action that may result in the direct or incidental take of a listed species. Specific mitigation measures for direct or incidental impacts to a listed species will be determined on a case-by-case basis through agency consultation.

MM BIO-3 Development within the Planning Area should avoid, where possible, special-status natural communities and vegetation communities that provide suitable habitat for special-status species. If a proposed project will result in the loss of a special-status natural community or suitable habitat for special-status species, compensatory habitat-based mitigation is required under CEQA and CESA. Mitigation will consist of preserving on-site habitat, restoring similar habitat or purchasing off-site credits from an approved mitigation bank. Compensatory mitigation will be determined through consultation with the City and/or resource agencies. An appropriate mitigation strategy and ratio will be agreed upon by the developer and lead agency to reduce project impacts to special-status natural communities to a less than significant level. Agreed-upon mitigation ratios will depend on the quality of the habitat and presence/absence of a special-status species. The specific mitigation for project level impacts will be determined on a case-by-case basis.

MM BIO-4 Proposed projects within the Planning Area should avoid, if possible, construction within the general nesting season of February through August for avian species protected under Fish and Game Code 3500 and the Migratory Bird Treaty Act (MBTA), if it is determined that suitable nesting habitat occurs on a project site. If construction cannot avoid the nesting season, a pre-construction clearance survey must be conducted to determine if any nesting birds or nesting activity is observed on or within 500-feet of a project site. If an active nest is observed during the survey, a biological monitor must be on site to ensure that no proposed project activities would impact the active nest. A suitable buffer will be established around the active nest until the nestlings have fledged and the nest is no longer active. Project activities may continue in the vicinity of the nest only at the discretion of the biological monitor.

Cumulative

Implementation of Mitigation Measures BIO-1 through BIO-4 is required.

Level of Significance After Mitigation

Project Level

Less than significant impact.

Cumulative

Less than significant impact.

Riparian Habitat

Impact BIO-2	**The project may have a substantial adverse effect on any riparian habitat or other special-status natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.**

Project Level Impact Analysis

The Planning Area contains riparian habitat areas and special-status natural communities, primarily along the Planning Area boundaries. The riparian habitat within the Planning Area provides suitable habitat for a number of special-status plant and wildlife species known to occur in the region. There are two (2) special-status natural communities with a potential to occur within the Planning Area: northern claypan vernal pool and valley oak woodland. Planned development within the Planning Area is primarily limited to existing disturbed, developed and agricultural areas located around the geographic center of the Planning Area. However, as development continues within the Planning Area, it likely will continue towards existing water features. Future development that occurs in the vicinity of the San Joaquin River, its tributaries, any lakes or streams, and/or open grasslands with seasonal wetlands, may result in a significant impact to riparian habitat or a special-status natural community. The presence of riparian habitat and/or a special-status natural community on a project site must be evaluated prior to project approval. Any project-related impacts to riparian habitat and/or a special-status natural community are considered a significant impact and require mitigation.

Project level implementation of the General Plan Implementing Policies POSS-6-a through POSS-7-d will reduce potential project impacts to riparian habitat, and areas such as the San Joaquin River corridor.

Objective POSS-6: Maintain and restore, where feasible, the ecological values of the San Joaquin River corridor.

Policy POSS-6-a: San Joaquin River Parkway Master Plan. Update the San Joaquin River Parkway Master Plan, working with the other jurisdictions and the River Conservancy, to create a comprehensive and feasible plan for preservation, conservation, and development.

Policy POSS-6-b: Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Discharge of runoff from industrial and commercial land uses to the San Joaquin River or other riparian corridors shall be avoided.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. If unacceptable levels of contaminant(s) occur, remedial measures shall be promptly instituted.

Object POSS-7: Support the San Joaquin River Conservancy in its efforts to develop a river parkway.

Policy POSS-7-a: Preserve Wildlife Corridors. Acquire and expand natural reserves and wildlife corridors through purchase, easements, mitigation for proposed activities, or other mutually satisfactory transactions.

Policy POSS-7-b: Wildlife Corridor along San Joaquin River. Create a wildlife corridor to provide continuous land and water areas parallel to the San Joaquin River.

A minimum width of 200 feet of riparian vegetation should be preserved on both sides of the river. The corridor should be wider when possible and/or necessary to protect additional areas of native plants and critical habitat (such as wildlife breeding areas). In areas where 200 feet of riparian vegetation no longer exists along the river bank, a 200-foot or wider band of native plants is recommended to be reestablished, to the maximum extent feasible from topologic and hydrologic standpoints. Consider exceptions where the minimum-width corridor is infeasible due to topography, hydrology, or other constraints. In those instances, an offsetting expansion is recommended on the opposite side of the river. Where steep bluffs drop directly into or close to the river, incorporate the bluff face into the wildlife corridor.

Policy POSS-7-c: Monitoring River Corridor Conditions. Undertake periodic monitoring to determine the status of conditions and mitigation measures required for projects within, and in the vicinity of, the river corridor.

- A memorandum of understanding or other agreement should be executed so that the San Joaquin River Conservancy can perform, or participate in, this monitoring program in order to furnish additional expertise, provide for cost efficiency, and to ensure consistency throughout the river corridor.
- Based on information obtained from monitoring, modifications in special permits, reclamation plans, and other documents, operating parameters for uses may be necessary to insure human health and safety and the well-being of riparian plants and wildlife.

Policy POSS-7-d: Buffer Zones near Intensive Uses. Protect natural reserve areas and the wildlife corridor areas in the River Corridor whenever more intensive human uses exist or are proposed on adjacent lands. Buffer zones will allow multiple uses on parts of the parkway while still protecting wildlife and native plants.

- Require studies of appropriate buffer widths to be approved by state and federal wildlife agencies before variances from standard buffer zone widths are granted.
- Maintain natural riparian buffer zones with appropriate native plants (seed material and cuttings locally derived).

Incorporate open space uses such as pasture, low-intensity agricultural activities, and the “rough” or marginal areas of golf courses, into buffer zones when they constitute an improvement in habitat over a previous use or degraded area. However, the potential impacts of construction, cultural, and operational practices (such as grading, number of livestock per acre, lighting, and use of pesticides, herbicides, and fertilizers) will need to be thoroughly evaluated and addressed before these uses can be approved for buffer zones.

With the implementation of the above objectives and policies, potential impacts to riparian habitat areas would be reduced; however, the impact would remain significant.

Cumulative Impact Analysis

Implementation of cumulative development within the San Joaquin Valley could result in potential impacts to riparian habitat. Cumulative development could encroach into areas adjacent to existing rivers and streams that could contain riparian habitat. In addition, cumulative development near the San Joaquin River corridor could result in potential impacts on riparian habitat. Since development in accordance with the General Plan Update could result in potential impacts on riparian habitat, the project's contribution to cumulative impacts would be considerable and would represent a significant cumulative impact.

Mitigation Measures

Project Level

MM BIO-5 If a proposed project will result in the removal or impact to any riparian habitat and/or a special-status natural community with potential to occur in the Planning Area, compensatory habitat-based mitigation shall be required to reduce project impacts. Compensatory mitigation must involve the preservation or restoration or the purchase of off-site mitigation credits for impacts to riparian habitat and/or a special-status natural community. Mitigation must be conducted in-kind or within an approved mitigation bank in the region. The specific mitigation ratio for habitat-based mitigation will be determined through consultation with the appropriate agency (i.e., CDFW or USFWS) on a case-by-case basis.

MM BIO-6 Project impacts that occur to riparian habitat may also result in significant impacts to streambeds or waterways protected under Section 1600 of Fish and Wildlife Code and Section 404 of the CWA. CDFW and/or USACE consultation, determination of mitigation strategy, and regulatory permitting to reduce impacts, as required for projects that remove riparian habitat and/or alter a streambed or waterway, shall be implemented.

MM BIO-7 Project-related impacts to riparian habitat or a special-status natural community may result in direct or incidental impacts to special-status species associated with riparian or wetland habitats. Project impacts to special-status species associated with riparian habitat shall be mitigated through agency consultation, development of a mitigation strategy, and/or issuing incidental take permits for the specific special-status species, as determined by the CDFW and/or USFWS.

Cumulative

Implementation of Mitigation Measures BIO-5 through BIO-7 is required.

Level of Significance After Mitigation

Project Level

Less than significant impact.

Cumulative

Less than significant impact.

Federally Protected Wetlands

Impact BIO-3	**The project could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.**

Project Level Impact Analysis

Development within the Planning Area, particularly in undeveloped areas, could result in the loss of jurisdictional wetland habitat, which includes vernal pools, seasonal wetlands, waters of the U.S. or intermittent/permanent water bodies. Proposed projects that encroach into grassland, agricultural, lake or riverine areas may result in the significant disturbance and/or fill of potentially jurisdictional wetlands. Any project-related impacts that result in the significant alteration or fill of a federally protected wetland is considered a significant impact. Additionally, special-status species associated with wetlands and vernal pool habitats, such as vernal pool fairy shrimp, may be impacted as a result of project impacts to protected wetlands. Project-specific agency (i.e., CDFW, RWQCB, and/or USACE coordination and/or regulatory permitting would be required to reduce project impacts to wetland habitat.

The implementation of Policies POSS-6-a through POSS-7-d, as listed in Impact BIO-2, would reduce potential project impacts to wetlands and wetland habitat, and areas such as the San Joaquin River corridor.

Cumulative Impact Analysis

The conversion of grassland and undeveloped areas to cumulative development, within the San Joaquin Valley, may increase effects on protected wetland habitats. Cumulative development that encroaches into wetland habitat areas or indirectly impacts wetland habitat through the increase of upstream urban runoff could result in significant impact. Since the development in accordance with the General Plan Update could increase impacts on wetland habitats, the project's contribution to potential impacts on wetland habitat is cumulatively considerable. Thus, the proposed project would result in a significant cumulative impact.

Mitigation Measures

Project Level

MM BIO-8 If a proposed project will result in the significant alteration or fill of a federally protected wetland, a formal wetland delineation conducted according to USACE accepted methodology is required for each project to determine the extent of wetlands on a project site. The delineation shall be used to determine if federal permitting and mitigation strategy are required to reduce project impacts. Acquisition of permits from USACE for the fill of wetlands and USACE approval of a wetland mitigation plan would ensure a "no net loss" of wetland habitat within the

Planning Area. Appropriate wetland mitigation/creation shall be implemented in a ratio according to the size of the impacted wetland.

MM BIO-9 In addition to regulatory agency permitting, Best Management Practices identified from a list provided by the USACE shall be incorporated into the design and construction phase of the project to ensure that no pollutants or siltation drain into a federally protected wetland. Project design features such as fencing, appropriate drainage and incorporating detention basins shall assist in ensuring project-related impacts to wetland habitat are minimized to the greatest extent feasible.

Cumulative

Implementation of Mitigation Measures BIO-8 and BIO-9 are required.

Level of Significance After Mitigation

Project Level

Less than significant impact.

Cumulative

Less than significant impact.

Wildlife Corridors and Nursery Sites

Impact BIO-4	**The project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites.**

Project Level Impact Analysis

Project development within the Planning Area is primarily focused on existing disturbed and developed areas situated near the geographic center of the Planning Area. These areas are mainly surrounded by existing development and disturbed habitat areas. The majority of habitat within the Planning Area consists of urban areas characterized by disturbed land and development. Planned land use within the Planning Area includes residential, commercial, industrial, and associated infrastructure.

Open space areas, undeveloped land, and agricultural land are mainly located along the boundaries of the Planning Area, particularly near the northern boundary along the San Joaquin River corridor. The San Joaquin River corridor functions as a wildlife movement corridor for a number of terrestrial and aquatic mammals and birds. The San Joaquin River corridor facilitates movement of wildlife species from the Planning Area to the Sierra Nevada Mountains to the east and open agricultural land to the west. The proposed project could include development within and adjacent to the San Joaquin River corridor. This development could result in potential impacts to the wildlife movement corridor. The General Plan Update includes policies POSS-6-a through POSS-7-d that would reduce impacts to species that use the San Joaquin River corridor as a wildlife movement corridor by providing buffer zones, control stormwater runoff, and providing periodic monitoring of the

biological resource conditions. These policies would reduce potential impacts to wildlife movement corridors along the San Joaquin River to less than significant.

In the remaining portions of the Planning Area, there are open space parks and recreational use areas, but these areas are scattered throughout the Planning Area. Due to the isolation of these areas, there are no substantive linkages to consider them as part of a wildlife movement corridor. Therefore, implementation of future development within the Planning Area in accordance with the General Plan Update would result in less than significant impacts on wildlife movement corridors.

Cumulative Impact Analysis

The San Joaquin Valley study area contains vast areas of agricultural land, open space areas, several rivers and mountains that serve to facilitate wildlife movement across the San Joaquin Valley study area and most of the Central Valley. Development within the Planning Area and cities within the San Joaquin Valley study area are characterized by existing disturbed and developed land. As development has occurred over the years, it has been within or immediately adjacent to the existing cities and communities within the San Joaquin Valley study area. Open areas for wildlife movement typically occur outside cities and communities within the study area, particularly along river corridors, connected open space, and the foothills along the east and west sides of the valley. Development within the San Joaquin Valley study area could have a significant impact on wildlife movement corridors. However, the project's potential contribution to cumulative impacts on wildlife movement corridors is less than cumulatively considerable. Thus, the project's cumulative impacts to potential wildlife movement corridors or wildlife nursery sites within the San Joaquin Valley study area, through development of the Planning Area, are considered less than significant.

Mitigation Measures

Project Level

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Level

Less than significant impact.

Cumulative

Less than significant impact.

Local Policies or Ordinances Protecting Biological Resources

Impact BIO-5	**The project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.**

Project Level Impact Analysis

Project development within the Planning Area may result in the removal or alteration of existing street and public trees within the boundaries of the Planning Area. Existing preserved trees and landscaped trees within public property, including parkways, must be preserved in order to beautify the City, purify its air, and provide shade for its inhabitants. Project development within the Planning Area could have the potential to impact trees on public property; however, the future development would be required to comply with Article 3 of Section 13 of the City of Fresno Municipal Code. Therefore, potential impact to the City's public tree ordinance would be less than significant.

Cumulative Impact Analysis

Implementation of cumulative development throughout the San Joaquin Valley would primarily not impact trees within public property of the Planning Area. However, there could be other cumulative projects within the Planning Area, such as the High Speed Rail project, that could impacts trees within public property. Since cumulative development within the Planning Area as well as development in accordance with the General Plan Update would be required to comply with Article 3 of Section 13 of the City of Fresno Municipal Code, potential impacts on trees within public property would be less than significant. Therefore, the project's contribution to potential cumulative impacts on the City's public tree ordinance would be less than cumulatively considerable and thus a less than significant cumulative impact.

Mitigation Measures

Project Level

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Level

Less than significant impact.

Cumulative

Less than significant impact.

Conservation Plans

Impact BIO-6	**A project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.**

Project Level Impact Analysis

The City of Fresno Planning Area is not located within the boundaries of any approved or draft Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other adopted

local, regional or state HCP. Therefore, development within the Planning Area will not result in any impacts to an adopted HCP or NCCP.

Cumulative Impact Analysis

Within the San Joaquin Valley, there is currently only one habitat conservation plan, the Metropolitan Bakersfield Habitat Conservation Plan (MBHCP). Cumulative development within the MBHCP could result in impacts to the plan. Since the City of Fresno Planning Area is not located within the MBHCP or any other HCP, development in accordance with the General Plan Update would not contribute to any potential cumulative impacts on a HCP. Therefore, the proposed project would result in no cumulative impacts.

Mitigation Measures

Project Level

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

No impact.

Cumulative

No impact.

5.5 - Cultural Resources

5.5.1 - Introduction

This section describes the existing cultural resources setting in the Planning Area. Current CEQA Guidelines divide the cultural resources category into three different branches of study: historical resources, archaeological resources, and paleontological/geological resources. The descriptions in this section are based in part on information obtained from a records search conducted at the Southern San Joaquin Valley Information Center (SSJVIC), background literature research, and a review of environmental compliance documents in and near the Planning Area.

For the purposes of this analysis, an archaeological resource is considered any cultural resource that was deposited before Europeans established a Franciscan Mission in California (1769), although it has long been recognized that Europeans plied the coast as early as the mid 16th Century and landed on the Coast on several occasions. Buried resources deposited after 1769 are technically considered historical resources. Such resources would also include Native American resources deposited after that date.

The following information is provided in accordance with Section 15125 of the California Environmental Quality Act (CEQA). The environmental setting discussion provides a baseline discussion of the existing conditions within the Planning Area and surrounding area.

5.5.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding cultural resources is the City of Fresno Planning Area because potential development under the City of Fresno 2035 General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative cultural resources includes the counties of Fresno and Madera, and the analysis is based on the summary of projections approach discussed in Section 15130(b)(1)(B) of the CEQA Guidelines.

Historic Context and Cultural Setting

Cultural resources include prehistoric-era archaeological sites, historic-era archaeological sites, Native American traditional cultural properties, sites of religious and cultural significance, and historical buildings, structures, objects, and sites. The importance of any single cultural resource is defined by the context in which it was first created, current public opinion and modern yet evolving analysis. From the analytical perspective, temporal and geographic considerations help to define the historical context of the Planning Area. The importance or significance of a cultural resource is in part described by the context in which it originated or developed. National Park Service Bulletin 16a (1997: http://www.nps.gov/nr/publications/bulletins/nrb16a.pdf), describes a historic context as "information about historic trends and properties grouped by an important theme in prehistory or

history of a community, state, or the nation during a particular period of time." A context links an existing property to important historic trends and this allows a framework for determining the significance of a property. Given this, a major goal of the historian is to determine accurate themes of analysis, a task that can only be undertaken by a thorough review of previous researchers' thoughts and ideas, as well as reviewing the literature of the resources.

In California, historians have divided the past into broad categories based on climate models, archaeological dating and written histories. Paleontologists divide time into much larger segments, with defined and named periods of time shortening in timespan as the modern era is reached. For the purposes of this analysis, these periods in history have been summarized below.

Prehistoric Era

To better understand the past, archaeologists develop models of prehistoric resource chronologies and description of lifestyles based on data collected at the archaeological sites they investigate. Essentially a template of understanding that is subject to change and reinterpretation, models of prehistoric lifeways are tested against what is derived from archaeological research and ethnographic information. As more archaeological data is brought forth, the models are refined and reinterpreted.

Unfortunately, prehistoric archaeological investigations are very limited in the Fresno area. Indeed, the San Joaquin River section of the middle and lower San Joaquin Valley is identified by many researchers to be one of the least understood areas of the State (Rosenthal et al. 2007). For this reason, the prehistoric background review in this section is derived from several regional reports of recent publication. General information associated with Fresno County and San Joaquin Valley regional archaeology has been derived from Moratto (1984), Fagan (2003) and Arnold et al. (2004). Prehistoric background information derived from near-City cultural resource projects has been derived from Rosenthal et al. (2007), SJRRP (2011) and the California High Speed Rail Project (2012). Bennyhoff and Fredrickson's Central California Taxonomic System (CCTS: see Hughes 1994) has in the past been used to form descriptions of the temporal background for certain projects in Fresno County. A more generalized systemic description is provided here because many of the archaeological elements supporting the CCTS have not been uncovered in the Planning Area. Part of the challenge associated with archaeological research in this area is that the eastern side of the San Joaquin Valley has been farmed for generations and farming tends to destroy the surface signatures of most prehistoric sites.

Terminal Pleistocene (13,500 to 11,000 ybp [years before present])

About 14,000 years ago, California was a much wetter and cooler place, but with the retreat of continental Pleistocene glaciers, the whole of California except the northwest coast saw a warming and drying trend. Large shallow lakes filled with glacial meltwater were located in the Central Valley and used by populations of large game animals, most of which are now extinct. The water in these pluvial lakes rose and fell with the season, but are unlikely to have dried completely. A few prehistoric sites have been discovered near the southwestern shore of Tulare Lake, but none in or near the Planning Area and none in the middle San Joaquin Valley. Native American populations were probably widely dispersed hunter-gatherers, and their archaeological assemblages would have

consisted of large projectile points with distinctive "fluted" styles and deeply buried features with animal fragments. Such sites would likely be discovered on Late Pleistocene-dated ground surfaces. Within the City, these surfaces are not exposed at the ground surface and would quite probably be deeply buried.

Early and Middle Holocene (11,000 to 7,000 ybp --- 7,000 to 3,800 ybp)

Moratto (1984) argued that land located between the floodplain of the middle and lower San Joaquin Valley and the lower foothills is covered with a recent and thick blanket (30 feet or more) of alluvium derived from a post-Pleistocene erosion of the western Sierras. Thus, while a few sites from the early Holocene periods are found in upland environments, there are no such dated sites in or very near the Planning Area.

Sites in the nearby foothills exhibit groundstone assemblages suggesting that acorns and pine nuts were harvested when ripe by bands of mobile groups. Comparative ethnographic data suggests that mobile peoples with a seasonal round may have created a home base (village) in winter during these periods, then travelled to exploit pockets of certain resources in temporary encampments. This type of lifeway was likely common for most California peoples except those on the North Coast, and probably continued in a like fashion throughout the Early and Middle Holocene. Differences in lowland and upland sites emerged about 4,500 ybp giving the regional populations distinct patterns. Lowland groups may have predominated in the Fresno area during the late Middle Holocene and archaeological sites dated to this time would likely exhibit foodstuff and processing tools more focused on lakeshore resources than grinding implements seen in upland sites. Soil strata found in the northwestern portion of the City has been defined as a Late Pleistocene non-marine alluvial fan covered with a veneer of late Holocene soil. In general, early and Middle Holocene alluvial deposits with cultural resources in them would typically be exposed only after several feet of soil has been removed. Soils near active stream channels are younger and are less likely to exhibit sites from this period except on intact dunes and at some depth. Thus, sites from this period are likely located in the Planning Area, but are more likely to be found at depth after a disturbed topsoil horizon has been removed.

Late Holocene (3,800 to 1,500 ybp)

This period saw an increase in the number of sites and evidence for an increased sophistication in the toolkit of the local prehistoric groups. Archaeologists often interpret increases in the number of sites dated to a certain period as reflecting an increase in population: the Arnold et al. (2004) report reflects this concept. Populations existing on flatter areas between braided stream channels near the City and those along the major riverine systems in the middle San Joaquin Valley probably concentrated their lifeways on marsh-based resources. Evidence for trading networks between nearby groups is robust.

The quantity of sites near the south bank of the San Joaquin River (in and near the City limits) is large and several were investigated by Rosenthal et al. (2007). Archaeologists seldom excavate buried sites exhibiting data that might allow a determination of whether or not a prehistoric site "belongs" to one ethnographic group or another, but at the end of this period cultural groups possessing Great Basin-style toolkits began to arrive in California and appear to have begun

influencing and/or merging with the existing populations. Local sites saw changes in the toolkit with an overall reduction of projectile point size suggestive of bow and arrow technologies. Rosenthal et al. (2007) suggests that at about 2,300 years ago large villages were clustered along the banks of the San Joaquin River and other watersheds (winter villages). Structured social hierarchies are inferred in the archaeological data. Evidence for Late Holocene deposits in and very near the City limits is likely. These would lie upon buried alluvial fans and riverine deposits at shallow depths, and possibly near the exposed surface of vacant properties.

Late Prehistoric (1,500 ybp to Contact with the Spanish)

With the introduction of Great Basin populations into the Eastern Sierras of California at the beginning of the Late Prehistoric, many of the ancestral California tribes were influenced by their toolkits and lifestyles. Part of this interpretation is derived from linguistic studies. The Yokuts were Penutian speakers, which appear to have arrived earlier, and many of the tribes to the east and southeast were newly arrived Takic or Uto-Aztecan (Kroeber 1925) speakers. The Takic speakers exhibited toolkits and lifeways adapted to desert climates. Bow and arrow technologies and the use of pottery are found in sites dating to this period. This period was the zenith of prehistoric California life, with an increase in sophisticated lifestyles, extensive trade networks, and a burgeoning population. The end of the period saw the introduction of Europeans and their diseases of which the local tribes had little defense or resistance. For more information on the Yokuts, see the ethnographic section below.

Ethnographic Overview

At the time of European contact, most of the San Joaquin Valley and the foothills of the western slope of the Sierra Nevada were occupied by 40 or so groups classified together as the Yokuts (Silverstein 1978) with a Foothills division and a Valley division of language dialects. The Yokuts were recognized as having three major subgroups: the Northern Valley, the Foothill, and the Southern Valley. Each of these ethnolinguistic groups was composed of autonomous, culturally and linguistically related tribes or tribelets. Ethnographic evidence suggests the City of Fresno is located in part of the Southern Valley Yokuts territory.

Alfred Kroeber divided a Yokuts classification system into Valley Divisions and Foothill Divisions based on ethnographic lines, geographic habitat, and dialect (1963). Here, the Foothill Division's world-view and economy were influenced more by their Shoshonean neighbors than the Valley Division Yokuts. Later, William Wallace divided the Yokuts into three subgroups, Southern Valley, Northern Valley, and Foothill, and shifted the known tribelets among these divisions (see Wallace 1978). The following is a review of ethnographic information associated with the Southern Valley Yokuts.

The Southern Valley Yokuts occupied a rich environment with abundant water resources from the nearby sloughs, lake basins, and river systems. Swamps and tule marshes surrounded the waterways and teemed with wildlife, including aquatic mammals, fish, and waterfowl. Adjacent grasslands provided food for herds of elk, antelope, and (in the winter) deer. The regional flora was equally, if not more, diverse and was used as a main staple of the Yokuts diet. The Southern Valley Yokuts dietary base relied on a mixed strategy of fishing, waterfowl hunting, shellfish, and plant collecting, with less emphasis on large-game hunting. Important vegetal resources included cattail roots,

grasses, nuts, seeds, tule, and bulbs. The resource-rich environment allowed for permanent village sites, which typically were occupied throughout the year.

Resources not found in the local environment were obtained through an extensive trade network, which had begun to develop during the Late Holocene. Quality stone and wood were lacking in the Valley environment and were often acquired through trade with nearby tribes. Imported items included acorns, salt, obsidian, and seashells, which were exchanged for locally available asphaltum, steatite, and animal skins.

The material culture of the Southern Valley Yokuts included structures, watercraft, basketry, weapons, and tools fashioned primarily from local resources. The ubiquitous tule was the primary component used for house construction and other fiber crafts such as basketry, mats, and cradles. Rafts were central to the economy base because of the abundance of waterways, which made watercraft the preferred mode of transportation. Wood, stone, and bone were commonly used to manufacture a variety of tools and weapons. Sweathouses were common to every settlement and, in the case of the Southern Valley Yokuts, were used exclusively by men on a daily basis.

The Southern Valley Yokuts were divided into true tribes, with individual tribelets having their own name, dialect, and territory. Typically, a tribelet was ruled by a central chief who inherited the position, was assisted by one or more aides, and lived in the largest village. The chief's duties included decisions that affected the well-being of the entire tribelet, sanctioning trade, entertaining guests, and arbitration of intra-tribal disputes. Marriage was typically informal, and patrilocality was the accepted practice following marriage. Thus, if a family had numerous sons, a circle of extended family members would inhabit the area immediately adjacent to the patriarch's home. Polygamy was not objected to, but it was practiced solely by men. There is scant evidence that the Southern Valley Yokuts participated in a large number of organized religious ceremonies.

Historic Era

Gabriel Moraga was one of the first Europeans to see and explore the Central Valley of California. In 1805, he was ordered by the Spanish Governor to send his cavalry into the Modesto area and Calaveras Rivers, naming both (Bancroft 1884-1890). In 1806, he travelled past the Kings, Merced and Stanislaus watersheds, naming each river. In 1808, he was ordered into the Central Valley once again in search of potential new Mission sites and runaway neophytes. He named a tributary of the San Joaquin during this trip (San Joaquin Creek). It was later discovered that the creek fed into a larger river, which was named San Joaquin River. As Spanish California passed to Mexican control, American trappers increasing began to exploit the regions resources and once gold was discovered, the population rush into California began, with mineral exploration in the mountains and foothills east of the Planning Area. During the latter half of the 19th century, the size of all Yokuts populations dwindled dramatically, due to the spread of European settlements and the diseases the Europeans brought with them.

Mexican Period

With the declaration of Mexican independence in 1821, Spanish control of Alta California ended, although little change actually occurred. Political change did not take place until mission

secularization in 1834, when Native Americans were released from missionary control and the mission lands were granted to private individuals. Researchers hypothesize that mission secularization removed the social protection and support on which Native Americans had come to rely. It exposed them to further exploitation by outside interests, often forcing them into a marginal existence as laborers for large ranchos. Following mission secularization, the Mexican population grew as the native population continued to decline. Anglo-American settlers began to arrive in Alta California during this period and often married into Mexican families, becoming Mexican citizens, which made them eligible to receive land grants. In 1846, on the eve of the U.S.-Mexican War (1846 to 1848), the estimated population of Alta California was 8,000 non-natives and 10,000 natives. However, these estimates have been debated (Cook 1976). It is estimated that the Native American population was 100,000 in 1850; the U.S. Census of 1880 reports the Native American population as 20,385.

American Expansion

In 1848, California became a United States territory as a result of the Treaty of Guadalupe Hidalgo. Also in 1848, John Marshall found gold at Sutter's Mill, which marked the start of the Gold Rush. The influx of miners and entrepreneurs increased the non-native population of California from 14,000 to 224,000 in just four years. In 1854, gold was discovered in the upper reaches of the Kern River, which brought a tremendous influx of miners into eastern Kern County. This, in turn, stimulated commercial growth in the central and lower San Joaquin Valley as eager entrepreneurs set up business to support the miners and mining operations. Gold and silver were mined along the San Joaquin but the deposits were not large. When the Gold Rush was over, many of the miners settled in the Central Valley communities and established farms, ranches, and lumber mills.

Local History

Mining opportunities allowed the development of very small communities along rivers and streams in the foothills and mountains east and northeast of the City. In 1856, Fresno County was created and the first county seat was located in the foothill community of Millerton. In 1867, the San Joaquin River flooded Millerton and several other small towns along its banks, causing locals to look for a safer place to build a trade center that could serve the whole of the foothills. Named for the Spanish word for "ash tree," Fresno has its roots in the form of a large farm established in 1867 by A.Y. Easterby in an area of what is now central downtown. Moses Church, his partner, began building a water delivery system for this farm and others and began diverting water from the Kings River into the region via a series of ditches. By 1871, Easterby's 5,000-acre ranch featured plots of wheat irrigated by these river-fed "Church ditches." When Central Pacific Railroad officials, including Leland Stanford, saw the Easterby farm in 1871, legend has it that Stanford declared the area the site of a stop for the new Central California Railroad (Southern Pacific) line.

Because the railroad followed a northwest-southeast track, the first town site of Fresno Station (1872) was built on the Easterby farm paralleling the tracks, with the upslope portions (east) preferred for development. After locals realized Fresno Station would become the trading center for the area, development spread beyond the original Easterby plat, and began to be oriented toward roadways put in along Section lines in cardinal directions.

The need for water to irrigate the arid San Joaquin Valley became a priority for the economic development of Central Valley towns such as Fresno. Agriculture's dominance over ranching was exhibited in 1873 when the California State Legislature passed the "No Fence Law." Under this law, farmers were no longer obligated to put up fences to keep roaming livestock out of their crops; furthermore, any crop destruction became the responsibility of the rancher who owned the offending livestock. Irrigation companies, colonies, and districts were formed in the vicinity of various small towns including Fresno to promote agriculture.

In 1875 the Central California Colony was established south of Fresno, which set the model for a system of development that was used throughout the San Joaquin Valley. Tracts of land were subdivided into 20-40 acre parcels, irrigated from a system of canals and often landscaped with boulevards of palms, eucalyptus or other drought-resistant trees. By 1903, there were 48 separate colonies or tracts in Fresno County which drew farmers and their families from Scandinavia and from across the United States.

Church's Fresno Canal and Irrigation Company, a predecessor of the Fresno Irrigation District, began expanding in 1876 in response to locals moving into the area near the railroad stop; this became the first extensive irrigation system in the Central Valley. Agricultural colonies were developed and water rights for those colonies established. The expanding irrigation system led to a shift in both the types of crops grown and the size of a typical farm. Pioneers initially grew wheat and other grain crops or raised cattle. As irrigation water became more readily available, individual farmers realized that premium crops like grapes, citrus, and tree fruit could be profitably grown on lots as small as 20 acres (The Planning Center 2010).

Fresno incorporated in 1885, with a population of over 3,000. Development was restricted to a six-block area beginning at and northeast from the Central Pacific Depot; development was concentrated at Mariposa and H Street. Development of the infrastructure needed to support increases in agricultural and commercial industry soon followed and once diversity of industry began, immigrant populations also began to increase. Chinese, Armenian and Volga Germans began to arrive and settle. By 1900, Fresno held 12,000 people.

Fresno County's first lumber mill was constructed in 1852, with 23 new mills following soon after. Wood flumes, some measuring more than 50 miles in length, were built by large lumber companies to transfer logs from the mills in the mountains to Fresno for rail transport. In 1921, the Sugar Pine Lumber Company (Sugar Pine) was incorporated: the goal was to harvest the vast sugar pine strands of the Sierra Nevada east of Fresno. Sugar Pine located its mill on a 574-acre tract overlooking the San Joaquin River north of Fresno. Fresno County historian Charles Clough called Pinedale "the largest [lumber mill] in the world at that time" with the capacity to cut 600,000-board feet and send out forty boxcars of lumber per day (Clough 1963, 1986).

As Fresno grew from its founding as a regional agricultural center, municipal infrastructure and amenities also increased. One of the first projects to build Fresno's infrastructure was the electric intra-urban railway. By 1905, Fresno Traction Company had laid 15.5 miles of track on Fresno streets before being purchased in 1910 by Southern Pacific Railroad. In addition, the Fresno Traction

Company built an amusement park on eight acres of San Joaquin River bottomland eleven miles from downtown Fresno named Fresno Beach. They extended the tracks to the beach in 1913. The Fresno Beach route was terminated at Herndon Avenue in 1930 due to increasing automobile use. Fresno Traction Company continued to cut back all of its routes and in 1939 streetcar service in Fresno ended.

The founding and expansion of Fresno in the late 19th Century plus the extensive developments before World War I has left its mark on the setting of the City, its cultural and physical enclaves, the names of streets, and how the suburban areas of the City expanded and changed. Numerous project-level historical studies have taken place in the City during the last ten years (Bungalow Courts 2004; Chinatown Survey 2006; Germantown Historical Context 2006; Arts and Culture District 2006-7; Pinedale 2007; Mid-Century Modern Historic Context 2008; North Park 2008; South Stadium 2008; Wilson Island 2009), and each have focused on the background history of specific areas in the City. Future historical research is likely to occur at neighborhood analytical levels because of the City's status as a NPS-SHPO Certified Local Government.

The first three decades of the 20th Century were a period of steady growth and increasing prosperity for Fresno during which the city established itself as the primary city of the San Joaquin Valley. The City's first electric streetcar was in use in 1902. By 1909, the first double- track streetcar line was installed along J Street. By the early 1920s, streetcar lines would radiate out from the central business district to the north, east, south, and west where farmland was being subdivided for suburban development. The expanding transit infrastructure, along with exponentially increasing private automobile ownership, made living further from the city center possible. Land within the central city increasingly became used for commercial and civic purposes.

By the end of the 1920s, Fresno had transformed into a thriving city at the center of the United States most productive agricultural region. The downtown was fully established as the San Joaquin Valley's primary marketplace offering office, retail, lodging, dining, and entertainment facilities. Adjacent industrial activity enabled agricultural goods to be processed and shipped to distant consumers. The central city's residential areas had largely been developed. Residential properties were increasingly redeveloped for commercial uses as the City's wide-ranging streetcar system and increased private automobile ownership allowed more of Fresno's citizens to live outside of the city center. Fresno, along with the nation, appeared increasingly prosperous. Then on November 24, 1929, the New York Stock Exchange crashed and millions of dollars in stock value vanished. The stock market crash exposed structural weaknesses in the banking and finance systems, key industries, and the economy as a whole, ushering in the Great Depression.

The Great Depression had a profound effect on the San Joaquin Valley. Farmers were forced to cut costs in the face of reduced demand for their products; many were forced into foreclosure. Along with the rest of the country, unemployment skyrocketed. The Valley's problems were exacerbated by the influx of migrant refugees or "Dust Bowl" migrants. It is believed that 2.5 million people migrated from the Midwestern Plains states between 1930 and 1940, with over 300,000 relocating to California just between 1930 and 1934. Thousands more would continue to arrive throughout the 1930s and many ended up in the Central Valley as migrant farm workers earning very low wages.

On December 7, 1941, the Japanese attacked Pearl Harbor and the United States officially entered World War II. The United States entrance into the War effectively ended the Depression in California as all aspects of the national economy mobilized to serve the war effort. California received almost 12% of the government war contracts and produced 17% of all war supplies. California also acquired more military installations than any other state by a wide margin, and military bases were opened throughout the state. Aircraft, shipbuilding, and numerous other industries were booming due to the war effort, and unemployment was virtually eliminated.

Approximately 60,000 service members were stationed in and around Fresno during the War. Military activity was concentrated at two locations. One, the Hammer Field bomber base, was constructed in 1941 just beyond what was then the eastern boundary of the City. Today it is the site of Fresno Yosemite International Airport. The second, Camp Pinedale, was located six miles east of Downtown Fresno in the (then) unincorporated community of Pinedale on the site of the defunct Sugar Pine Lumber Company. The Army had acquired the site in March of 1942 for use as an Army Signal Training School.

Following World War II, the passage of the G.I. Bill enabled returning veterans to purchase homes and establish businesses, prompting another period of rapid expansion. The Mayfair subdivision, completed in 1947 northeast of the Project Area, included Fresno's first suburban shopping mall and ushered in an era of development at the suburban fringe. Between 1940 and 1950, the City's population grew by 30,000, with much of the growth accommodated in new auto-oriented suburbs. The Interstate Highway Act of 1956 served to spur development of suburbs, and ultimately led to the economic decline of many inner cities.

By the mid-1950s, however, the results of rapid suburbanization were becoming evident in Downtown Fresno as major retailers such as Sears & Roebuck relocated to newly developed suburban shopping centers such as Manchester Center (1955) and Fig Garden Village (1956). The downtown core was continually being bypassed as a place to locate new businesses. With Downtown unable to compete with burgeoning suburban development, construction of new buildings in Downtown Fresno came to a virtual halt.

Historic-era Architectural Styles in Fresno

Fresno is home to a diversity of architectural styles that include Victorian, Revival (Colonial, Italian, Renaissance, Mission, Mediterranean, Spanish, and Tudor), Neoclassical, Craftsman Bungalow, Streamline Moderne, Beaux-Arts, Art Deco, International, Mid-Century Modern, and Ranch among others. While styles focus upon a collection of specific decorative features; types are based on form. Considered a distinctly American type, the Prairie Box—also known as the American Foursquare—was popular in Fresno in the early 20th Century.

Beginning in the early 20th century the city's downtown was completely transformed: the elegant "Victorian" style blocks and hotels were demolished or in the case of smaller buildings were eventually refaced with a "modern" storefront. What emerged was a more "rational" Classic Revival city, one influenced by the latest trends in architectural design emanating from American cites such as New York, Chicago, and San Francisco, as well as Paris, France. The first "high-rise" neoclassical

office building was the Griffith-McKenzie Building, also known as the Helm Building, a 10-story steel frame structure constructed in 1914 and designed by the San Francisco architect George Kelham. Numerous office buildings followed suit, many of them designed and constructed by the R.F. Felchlin Company. The building boom in downtown was halted in mid-1930 as the Depression began to sink in. Many of the downtown buildings that survived relatively intact are listed on Fresno's Local Register of Historic Resources (www.fresno.gov: City of Fresno 2012). There are also 26 National Register-listed structures in the downtown core.

Although farming and ranching remain at the economic forefront, its place in central California means that Fresno is an excellent location for industrial complexes and distribution centers. In addition, its central location and less expensive housing prices offer opportunities for expansion.

Paleontologic/Geologic Context

The general structure of the central San Joaquin Basin had begun to take shape in the Late Cretaceous (65 to 75 million years ago [MYA]) as the effects of subductive North American and Pacific Plates collision lifted once extremely deep ocean sediments above sea level. During the Paleocene (65 to 53 MYA) and Eocene (53 to 35 MYA) Epochs, regional changes in the structure of the Earths crust caused the Basin to rise and fall below sea level numerous times. During periods when the area was above sea level, large deltas brought sediment out of the Sierras to the east with smaller amounts out of the Diablos to the west. During periods when the Basin was below sea level, sedimentation within a shallow sea environment at maximum several hundred feet deep would occur. The deeper rocks and strata in the Basin, as encountered by petroleum geologists, reflect the fresh and saltwater layer-cake nature of geological time, and many of the deeper petroleum and natural gas deposits trapped by oceanic sedimentation are under extremely high pressure.

By the Miocene Epoch, the relationship between the North American and Pacific Plates had changed from subduction to transpression, and the Pacific Plate began sliding northwest. Tremendous volumes of sediment ran into the Basin, filling it by the end of the Pliocene Epoch (5 to 2 MYA) as the seaways were cut off, and raising the land level above the sea. The surrounding mountains were uplifted by tectonic pressure at the same time erosion filled the valleys below. The San Joaquin quickly became a major trap for freshwater and as the water table rose, and the massive Lake Corcoran formed filling the southern and middle San Joaquin Valley with a deltaic outlet to the sea west of Sacramento. Finally, during the Pleistocene Epoch, the deeper areas became individual freshwater lakes that filled and shrank as each season progressed. The low nature of the Valley produced large swamps and meandering stream and river channels. Pleistocene-era and earlier rock strata will exhibit freshwater and marine fossils within slow-moving lithological environments, only to be hidden by the non-fossiliferous Holocene strata that has formed within the last 10,000 years.

Krazan (Nelson 2012) performed a geological analysis of the Project area in support of this MEIR. Based on a review of geological information, the geological subgrade of the Planning Area is entirely alluvial consisting of gravels, sands and clays.

SSJVIC Literature Review

Background information associated with cultural resources was derived from an extensive record search conducted at the Southern San Joaquin Valley Information Center (SSJVIC) in Bakersfield by FirstCarbon Solutions Senior Project Archaeologist, Carrie D. Wills. The record search was conducted over a four-day period from May 7, 2012 to May 10, 2012. The record search review included examinations of existing reports, historic maps, and Department of Parks and Recreation (DPR) forms for the area within the City of Fresno boundaries. As of May 2012, there were more than 50 cultural resource studies filed with the SSJVIC. Of these, there are 16 survey reports associated with block acreage. The total amount of area surveyed inside the Planning Area is approximately 358 acres or less than 0.3 percent of the total area within the Planning Area. As part of the literature review, the following files were reviewed at the SSJVIC:

- California Inventory of Historic Resources;
- California Historical Landmarks;
- California Points of Historical Interest;
- National Register of Historic Places;
- A Guide to Historic Architecture in Fresno (online site: www.HistoricFresno.org);
- California Register of Historical Resources;
- The Historic Property Data File for Fresno County as maintained by the Office of Historic Preservation, Sacramento (HRI)

One of the primary goals of the record search review was to identify previously recorded archaeological sites and archaeological analyses to determine, if possible, which parts of the Planning Area are sensitive for cultural resources. In addition, every effort was made to determine what areas within the Planning Area have environmental components (e.g., adjacent to water or vegetal resources), which would have the potential for unidentified archaeological deposits. Since the vast majority of the Planning Area is within an urbanized built environment, it is expected that the vast majority of listed cultural resources would be historic-era buildings. Table 5.5-1 provides a quantification of the known cultural resources within the Planning Area.

Table 5.5-1: Known Cultural Resources within the Planning Area, SSJVIC Records Search[1]

Prehistoric Archaeological Site Count	Historic Archaeological Site Count	Historic-era Buildings and Structures	Linear Historic Resources	Isolated Artifacts	HRI Address Count
0	4	602	5	0	1916

[1]This table identifies known cultural resources in the Planning Area based on an SSJVIC records search. Additional resources, including historic-era buildings, may qualify as cultural resources.

In addition, all on-line documents found on the City of Fresno website related to historical resources located inside the Planning Area, of which many of the documents are not included in the SSJVIC database, were reviewed.

Several historic building surveys and landscape surveys are known to have been prepared within the Planning Area but have not been filed with the SSJVIC (i.e., Bungalow Court, Hattersley-Drayton 2004; Germantown, ARG 2006; Pinedale, PRA 2007; Mid-century Modern, PRA 2008), and these sources name many buildings not currently on information center lists. Two new studies have been recently prepared since the records search was undertaken and do not yet appear within the SSJVIC database. These analyses are discussed in some detail below. Historic maps were also examined. These maps illustrated the substantial increase in development density since the 1960s.

Data from Greenwood and Associates' published archaeological report (Slawson and Kay 2012), which was focused within the Downtown area, uses an unconventional but not unprecedented technical analysis to show is was possible that the potential for buried cultural resources in any area of the Planning Area could be demonstrated through scientific means. Surveys of certain selected vacant parcels confirmed that there was moderate to high potential for impacts to buried historic archaeological deposits during future construction in those parcels, and that enough historic residues could be observed during the survey to warrant the preparation of DPR523 form sets for inclusion into the SSJVIC. For the first time within the Planning Area, Slawson and Kay demonstrated that a Moderate potential and High potential for buried archaeological resources exists within the Planning Area.

Over 300 individual properties were evaluated for their historical significance in the Downtown Area using a reconnaissance survey and intensive survey format. The historical importance of any one structure used the concepts of integrity and significance following the Historic Preservation Ordinance of the City of Fresno, National Register and California Register criteria. Based on the historical evaluation of the properties, there were 63 properties that potentially meet the criteria for designation as individual Historic resources eligible for listing on the City of Fresno Local Register of Historic Resources. Seven of the 63 properties had previously been designated to the Local Register of Historic Resources by the City. Of the 56 properties that have not been designated by the City to the Local Register of Historic Resources, 14 appear to be eligible for listing in the National Register. In addition, 50 of the 56 properties appear to be eligible for listing in the California Register. The HRG evaluation in 2011 also identified a potential Local Historic District, referenced as the “Civic

Center Historic District," with 14 contributing buildings and one non-contributing building. The "Civic Center Historic District" has not been designated by the City as a Local Historic District. However, seven of the 14 contributing buildings have been previously designated individually to the Local Register of Historic Resources by the City.

Known Prehistoric Resources

Review of documents at the SSJVIC and from on-line sources show that no previous prehistoric site or artifact has been recorded within the Planning Area, which covers approximately 106,027 acres. Although this may be a consequence of developmental disturbance, the research data shows that less than 0.3 percent of this acreage has been surveyed by a qualified archaeologist. Since prehistoric deposits are typically detected by surveying archaeologists during the planning stages of a project, the lack of recorded deposits is not surprising. Additional reviews of various historic newspaper archive websites shows that no references to a Native American discovery within the City limits has been noted in an archived newspaper, such as the Fresno Bee. This is somewhat unusual for a California city, but not unique. Review of studies prepared for development projects located within the City show that little information is provided regarding the possibility that prehistoric resources might be uncovered during construction-related earthmoving.

As shown above in the historical and geological setting of the City, except near the San Joaquin River, most parts of the City are clearly not conducive to deposition or preservation of surface prehistoric resources at the modern ground surface. Slawson and Kay (2012:34) identified that the City is located in areas that might have had good potential for archaeological deposits, and that such deposits may have been damaged by development and farming practices.

Citywide, an accurate assessment of resource sensitivity for prehistoric resources cannot be established at the present time. Based on existing data, the sensitivity for prehistoric cultural resources to be uncovered within the Planning Area is not certain because there have been a minor amount of land (approximately 0.3 percent of the Planning Area that has been surveys. Upstream and downstream of the Planning Area, the banks of the San Joaquin River are known to contain prehistoric archaeological sites (see Byrd et al. 2009). This is because the river channel has carved a 50-70 foot deep cut into the surrounding alluvium since the end of the Pleistocene, and the banks of permanent rivers in the Central Valley of California have a much greater chance to contain buried or otherwise undiscovered prehistoric resources compared to areas subject to regular flooding.

The portion of the Planning Area that extends from the south bank of the San Joaquin River to approximately one-mile south of the River is identified as having a high sensitivity for buried prehistoric resources. Because most lands in the remainder of the Planning Area have been built upon or disturbed by farming, it is difficult to predict when prehistoric resources will be uncovered as a result of new development. Researchers have shown that when reliable water is available, prehistoric people may have lived nearby and exploit local resources. They could have built permanent villages. Based on the geological study provided in Appendix E-1, it may be possible to detect certain types of Pleistocene and Holocene ground surfaces once the disturbed horizons have been removed by earthmoving equipment during development activities. Finally, the Native

American Heritage Commission characterized the City of Fresno as being "very sensitive" for potential impacts to Native American sacred sites and prehistoric deposits.

Known Historical Resources

The City of Fresno has experienced extensive growth since the 1800s when the railroad arrived and the broad plain between the Kings and San Joaquin Rivers was hand-cleared of brush and native grasses. As agricultural commerce strengthened, most of the downtown area was transformed from little farms and railroad-supply businesses, to a burgeoning agricultural center, then to the development of Victorian style blocks with grand hotels, to more modern styles evidenced in many Classic Revival buildings.

The City of Fresno retains many of its historically significant buildings and structures through listings on various registers; local and national. Within the Planning Area there are 29 historical resources listed on the National Register of Historic Places, and 240 existing structures that are designated by the City on the Local Register of Historic Resources. Additionally, there are 13 Heritage Properties, which are not Historic Resources for the purposes of the City's Historic Preservation Ordinance but could potentially be treated as historical resources for the purposes of CEQA at the City's discretion. (http://www.historicfresno.org/). According to Map Atlas – Existing Conditions Report prepared for the City of Fresno, there are three designated Local Historic Districts: the Porter Tract, the Wilson Island, and the Chandler Airfield/Fresno Municipal Airport. Since 1995, numerous historic building surveys have been undertaken by the City's Historic Preservation Division and technically qualified consultants, resulting in a potential of an additional 11 historic districts identified but not formally designated by the City on the local register as Local Historic Districts.

Unlike the analysis of prehistoric resources, a process for establishing the significance of individual buildings and historic districts was mandated by the City in 1979 in the form of a Historic Preservation Ordinance, which was updated in 1999. The Ordinance has resulted in the identification of over 2,000 older structures within the City limits, and as the City ages more historic-era properties are added to the databases each year. Many formal studies have been undertaken, especially in the last 10 years, primarily because the City recognizes the advantages of preservation.

Paleontologic/Geologic Research Results

Kenneth L. Finger, Ph.D., a micropaleontologist and Manager of Microfossil Collections at U.C.-Berkeley undertook a search of the University of California Museum of paleontology vertebrate paleontology database (Appendix D-1). Current geological maps indicate that the Planning Area consists of Quaternary alluvium with two primary surficial deposits: 1) Pleistocene non-marine and, 2) Quaternary non-marine fan deposits. The Pleistocene non-marine deposits have been more recently referred to as the Riverbank Formation, and are considered to have high potential sensitivity. The Quaternary non-marine terrace deposits consist of undifferentiated Pleistoscene-Holocene alluvial sediments and is also considered to have high potential sensitivity.

Based on a database records search at the University of California Museum of Paleontology (UCMP), three Pleistocene Riverbank Formation localities (#V4401, #V65100, and #V81121) were found in surrounding Fresno County, all of which yielded elements of the Rancholabrean (late Pleistocene)

vertebrate fauna. Locality #V81121 is referred to the Riverbank Formation, whereas the other two units are unnamed. Locality #V4401 (Tranquility) accounts for 149 of the 151 specimens listed. Numerous specimens have been have been published, several of which are types for their species. The recovered faunal assemblage includes pond turtle (*Clemmys marmorata*), rattlesnake (*Crotalus*), loon (*Gavia*), broad-footed mole (*Scapanus latimanus*), jackrabbit (*Lepus*), vole (*Microtus*), wood rat (*Neotoma*), pocket gopher (*Thomomys*), badger (*Taxidea*), grey fox (*Urocyon*), true fox (*Vulpes*), coyote (*Canis latrans*), horse (*Equus*), bison (*Bison*), elk (*Cervus*), and mule deer (*Odocoileus*). Among these are type specimens of Clemmys marmorata, *Scapanus latimanus*, and *Canis latrans* that have been documented in scientific publication. The UCMP database also records 12 plant localities in Fresno County, in the Pleistocene alluvial deposits of the Modesto, Riverbank, and Turlock Lake formations.

Native American Consultation

The City of Fresno consulted with the Native American Heritage Commission (NAHC) in October 2010. A letter to the NAHC was sent by City staff requesting a sacred lands search. The NAHC identified that there were no known sacred lands that were located within the Planning Area; however, the NAHC provided a list of 11 Native American tribes to consult. The City sent letters to each of the tribes in February 2011. They followed-up with a phone call to the representative of the tribes. Appendix D-2 includes the Native American consultation information. No Native American resources were identified during the City's consultation with the tribes.

5.5.3 - Regulatory Setting

State and local laws, regulations, plans, or guidelines that are potentially applicable to the Planning Area are summarized below. The Federal Section 106 compliance process is commonly discussed within EIRs but the process holds no regulatory requirement within the City unless cultural resources listed on the National Register are adversely affected by a City-approved project. Therefore, a review of the Federal process is necessary here only to provide background. Cultural resource law and regulations associated with the CEQA process are based upon, but are statutorily distinct from, the Section 106 process.

Federal

National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA) is the most concise and effective federal law dealing with historic preservation. Federal preservation law does not apply to the purpose of this analysis but a short review of the legislation is needed because the State and Local requirements have been derived from this legislation. The NHPA established guidelines to "preserve important historic, cultural, and natural aspects of our cultural heritage, and to maintain, wherever possible, an environment that supports diversity and a variety of individual choice." The NHPA includes regulations specifically for federal land-holding agencies, but also includes regulations (known as Section 106) which pertain to all projects that are funded, permitted, or approved by any federal agency and which have the potential to affect cultural resources. In addition, the NHPA authorizes the Secretary of the Interior to establish a National Register of Historic Places (The National

Register). The Register is an inventory of districts, sites, buildings, structures and objects significant at a national, State, or local level in American history, architecture, archaeology, engineering, and culture. The National Register is wholly maintained by the National Park Service, the Advisory Council on Historic Preservation, and the State Office of Historic Preservation (SHPO) and grants-in-aid programs.

According to the National Park Service (NPS) and the State Historic Preservation Office (SHPO), the City is a Certified Local Government (CLG). The CLG program is a preservation partnership between local, state and national governments focused on promoting historic preservation at the grass roots level. The program is jointly administered by NPS and SHPO, with each local community working through a certification process to become recognized as a CLG. CLG's become an active partner in the Federal Historic Preservation Program and the opportunities (and funding) it provides.

State

California Register of Historical Resources

The California Register of Historical Resources (California Register or CRHR) is an inventory of significant architectural, archaeological, and historical resources in the State of California. Important cultural resources can be listed in the California Register through a number of methods, and listing requires approval from the State Historic Resources Commission. Properties can be nominated to the California Register by local governments, private organizations, or citizens. State Historical Landmarks and National Register-listed properties gain automatic listing in the California Register. The evaluative criteria used by the California Register for determining eligibility are closely based on those developed by the National Park Service for the National Register of Historic Places. In order for a cultural resource to be *significant*, or in other words eligible, for listing in the California Register, it must reflect one or more of the following criteria (PRC 5024.1c):

- Criterion 1 (Events): Resources that are associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.
- Criterion 2 (Persons): Resources that are associated with the lives of persons important to local, California, or national history.
- Criterion 3 (Architecture): Resources that embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of a master, or possess high artistic values.
- Criterion 4 (Information Potential): Resources or sites that have yielded or have the potential to yield information important to the prehistory or history of the local area, California, or the nation.

California Environmental Quality Act

CEQA requires that public agencies assess the effects on historical resources of public or private projects that the agencies finance or approve. Historical resources are defined as buildings, sites,

structures, objects, areas, places, records, or manuscripts that the lead agency determines to have historical significance, including architectural, archaeological, cultural, or scientific significance.

CEQA requires that if a project results in an effect that may cause a substantial adverse change in the significance of a historical resource, alternative plans or mitigation measures must be considered. However, only significant historical resources need to be addressed. Therefore, before the assessment of effects or development of mitigation measures, the significance of cultural resources must be determined. The steps that are normally taken in a cultural resources investigation for CEQA compliance are as follows:

1. Identify potential historical resources.
2. Evaluate the eligibility of historical resources.
3. Evaluate the effects of the project on all eligible historical resources.

In addition, properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR and thus are significant historical resources for the purposes of CEQA (PRC Section 5024.1[d][1]).

According to CEQA, a project with an effect that may cause a substantial adverse change in the significance of a historical resource may have a significant impact on the environment (State CEQA Guidelines 15064.5[b]). CEQA also states that a substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of an historical resource or its immediate surroundings such that the significance of the resource would be materially impaired. Actions that would materially impair the significance of a historical resource are any actions that would demolish or materially and adversely alter the physical characteristics of a historical resource that convey its historical significance and qualify or justify its eligibility for inclusion in the CRHR or in a local register or survey that meet the requirements of PRC Sections 5020.1(k) and 5024.1(g).

Significant Historical Resources under CEQA Guidelines

In completing an analysis of a project under CEQA, it must first be determined if the project site possesses a historical resource. A site may qualify as a historical resource if it falls within at least one of four categories listed in CEQA Guidelines Section 15064.5(a). The four categories are:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Pub. Res. Code Section 5024.1, Title 14 CCR, Section 4850 et seq.).
2. A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3. Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852).

These conditions are related to the eligibility criteria for inclusion in the CRHR (PRC Sections 5020.1[k], 5024.1, 5024.1[g]). A cultural resource may be eligible for inclusion in the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Pub. Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Pub. Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Pub. Resources Code sections 5020.1(j) or 5024.1.

A lead agency must consider a resource that has been listed in, or determined to be eligible for listing in the California Register (Category 1) as an historical resource for CEQA purposes. In general, a resource that meets any of the other three criteria listed in CEQA Guidelines Section 15064.5(a) is also considered to be a historical resource unless "the preponderance of evidence demonstrates" that the resource is not historically or culturally significant."

State Health and Safety Code

The discovery of human remains is regulated according to California Health and Safety Code Section 7050.5, which states, "If human remains are encountered, no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified to the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify Most Likely Descendant (MLD). With the permission of the landowner or his or her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 24 hours of notification by the NAHC. The MLD may

recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials."

California Government Code 65352.3-5: Local Government-Tribal Consultation

California Government Code Sections 65092, 65351, 65352, 65352.3, and 65352.4, formally known as Senate Bill (SB) 18, regulate the consultation with California Native American tribes having traditional lands located within the jurisdiction of applicable cities and counties. The intent of the underlying legislation was to provide all California Native American tribes that are on the contact list maintained by the Native American Heritage Commission, an opportunity to consult with specific local governments for the purpose of preserving and protecting their sacred places. Such consultations apply to the preparation, adoption and amendment of general plans.

City of Fresno

Historic Preservation Ordinance

The City of Fresno has established a Historic Preservation Commission and a Local Register of Historic Resources (Fresno Municipal Code, Chapter 12, Article 16). First established in 1979, the Ordinance was last updated in 1999. The Ordinance is used to provide local levels of control over the historical aesthetics of cultural resources within the City, and to ensure that the potential impact to locally significant historical resources that may be the subject of redevelopment are given reasonable consideration. The purpose of the Ordinance is to:

> …continue to preserve, promote and improve the historic resources and districts of the City of Fresno for educational, cultural, economic and general welfare of the public; to continue to protect and review changes to these resources and districts which have a distinctive character or a special historic, architectural, aesthetic or cultural value to this city, state and nation; to continue to safeguard the heritage of this city by preserving and regulating its historic buildings, structures, objects, sites and districts which reflect elements of the city's historic, cultural, social, economic, political and architectural history; to continue to preserve and enhance the environmental quality and safety of these landmarks and districts; to continue to establish, stabilize and improve property values and to foster economic development. (Article 16 Section 12-1602(a).)

The Ordinance provides legislative mechanisms to protect certain historical resources. Local registers of identified historical resources are known, including:

1. **Heritage Properties.** These are defined as a resource which is worthy of preservation because of its historical, architectural or aesthetic merit but which is not proposed for and is not designated as an Historic Resource under the ordinance.
2. **Historic Resources.** These are defined as any building, structure, object or site that has been in existence more than fifty years and possesses integrity of location, design, setting, materials, workmanship, feeling and association, and is associated with events that have made a significant contribution to the broad patterns of City history, or is associated with the lives of persons significant in our past, or embodies the distinctive characteristics of a type,

period or method of construction, or represents the work of a master or possesses high artistic values; or has yielded, or may be likely to yield, important information in prehistory or history; and has been designated as such by the Council pursuant to the provisions of the Ordinance.

3. **Local Historic Districts.** These are defined as any finite group of resources related to one another in a clearly distinguishable way or any geographically definable area which possesses a significant concentration, linkage or continuity of sites, buildings, structures or objects united historically or aesthetically by plan or physical development. The Local Historic District must be significant as well as identifiable and it must meet Local Register Criteria for listing on that Register. Contributors to Historic Districts are defined as any Historic Resource that contributes to the significance of the specific Local Historic District or a proposed National Register Historic District under the criteria set forth in the Ordinance.
4. **National Register Historic Districts**, which shall mean any finite group of resources related to one another in a clearly distinguishable way or any geographically definable area which possesses a significant concentration, linkage or continuity of sites, buildings, structures or objects united historically or aesthetically by plan or physical development. A National Register Historic District must be significant as well as identifiable and it must meet National Register Criteria for listing on that Register. Contributors to a National Register Historic District are defined as any individual Historic Resource which contributes to the significance of a National Register Historic District under the criteria set forth in the Ordinance.

Certified Local Government

The Certified Local Government (CLG) Program is administered by the State Historic Preservation Office (OHP). When a Lead Agency becomes a CLG it agrees to carry out the intent of and serve as a local steward of the National Historic Preservation Act and the Secretary of the Interior's Standards. In meeting those standards, OHP serves as an advisor. The use of the National Register/California Register criteria and the Secretary of the Interior Standards integrates local, state, and federal levels of review. It brings clarity to the question of what resources are significant when it comes to CEQA and Section 106 of the National Historic Preservation Act. Adopting the Secretary of the Interior's Standards will allow the use of categorical exemptions under CEQA, and likely result of findings of no adverse effect under Section 106. The use of these criteria and standards make environmental review faster, more efficient, and reduces costs and delays. The City has been certified as a CLG since September 1996.

Local Policies

Following are the objectives and policies related to cultural resources from the existing City of Fresno 2025 General Plan.

G-10. Objective: Foster community pride, attract visitors and tourists to distinctive areas, provide recreational opportunities, enhance educational opportunities, and augment the body of scientific and historic knowledge through identification, appropriate recognition, and promotion of historic and cultural resources.

G-10-b. Policy: Historic structures, districts, sites, and landscape features shall be considered as those which:

- Represent past eras, events, and persons important in history.
- Provide significant examples of architectural styles of the past or are landmarks in the history of architecture.
- Are unique and irreplaceable assets to the city and its neighborhoods or provide examples of the physical surroundings in which past generations lived, for this and future generations.
- Designated historic districts shall be "living" examples of maintaining quality and continuity of historic resource material and the overall character of the neighborhood.

G-10-c. Policy: Unique prehistoric resource sites shall be considered as those archaeological and paleontological/geological sites which:

- Contain information needed to answer important scientific research questions.
- Have special quality or unique features, such as being the oldest, largest, or most complete example of a particular type of site or are directly associated with a scientifically recognized prehistoric or historic event or person.

G-11. Objective: Safeguard Fresno's heritage by preserving resources which reflect important cultural, social, economic, and architectural features so that community residents will have a foundation upon which to measure and direct physical change.

G-11-d. Policy: Prehistoric resources (those containing archaeological and paleontological/geological material) shall be protected.

G-11-e Policy: If the site of a proposed development or public works project is found to contain unique prehistoric (archaeological or paleontological/geological) resources, and it can be demonstrated that the project will cause damage to these resources, reasonable efforts shall be made to permit any or all of the resource to be scientifically removed, or it shall be preserved in situ (left in an undisturbed state).

5.5.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to cultural resources are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, cultural resources impacts resulting from the proposed project are considered significant if the project would:

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5? (See Historical Resource, Impact CUL-1.)

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5? (See Archaeological Resource, Impact CUL-2.)

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? (See Paleontological Resource or Geologic Feature, Impact CUL-3.)

d) Disturb any human remains, including those interred outside of formal cemeteries? (See Human Remains, Impact CUL-4.)

CEQA Guidelines Section 15064.5 defines "substantial adverse change" as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. CEQA Section 15064.5(b)(2) defines "materially impaired" for purposes of the definition of substantial adverse change as follows:

The significance of an historical resource is materially impaired when a project:

a) demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that conveys its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or

b) demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to PRC Section 5020.1(k) or its identification in an historical resource survey meeting the requirements of PRC Section 5024.1(g), unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

c) demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources by a lead agency for the purposes of CEQA.

5.5.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Historical Resources

Impact CUL-1	**The project could cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?**

Project Specific Impact Analysis

Known historical resources are located primarily in Downtown Fresno because this is the area where development of the city began in the mid-1800s. These known resources meet the definition of historical resource under CEQA Section 15064.5(a). As discussed previously, there are 29 historical resources listed on the National Register of Historic Places, 31 historical resources listed on the California Register of Historic Resources, four State Historic Landmarks, and 240 existing structures

that are on the Local Register of Historic Places. There are also 13 Heritage Properties, which are not Historic Resources for the purposes of the City's Historic Preservation Ordinance but could potentially be treated as historical resources for the purposes of CEQA at the City's discretion. In addition to the individual resources, there are three designated Local Historic Districts within the Planning Area. As additional surveys for potential historical resources are prepared, such as the surveys that were prepared for the Fulton Corridor Specific Plan in Downtown Fresno, additional resources may be added to the various lists. Many areas of Downtown, as well as other locations within the Planning Area, have not been surveyed. As a result, only a portion of the resources in the Planning Area are known.

As land uses are built out in accordance with the General Plan and Development Code Update, the growth that would occur within the Planning Area would include infill development and buildout of rural, agricultural, and undeveloped areas. As the density and intensity increases in the existing urban areas, there is a possibility that the new development could result in demolition or substantial alterations of historical or potentially historical buildings and structures. In addition to land use development, infrastructure and other public works improvements could result in demolition or substantial alterations of historical resources.

To reduce the potential impacts on historical resources, there are federal, state, and local regulations. These regulations are discussed in Section 5.5.5 in this Draft MEIR. The City of Fresno Historic Preservation Ordinance provides a process to preserve, promote, and improve the Historic Resources and Historic Districts within its jurisdiction. In addition to the Historic Preservation Ordinance, the General Plan Update includes the following objectives and policies to preserve historic resources.

Objective HCR-1: Maintain a comprehensive, citywide preservation program to identify, protect and assist in the preservation of Fresno's historic and cultural resources.

Policy HCR-1-c: Historic Preservation Ordinance. Maintain the provisions of the City's Historic Preservation Ordinance, as may be amended, and enforce the provisions as appropriate.

Objective HCR-2: Identify and preserve Fresno's historic and cultural resources which reflect important cultural, social, economic and architectural features so that community residents will have a foundation upon which to measure and direct physical change.

Policy HCR-2-a: Identification and Designation of Historic Properties. City staff and the Historic Preservation Commission shall work in tandem to identify potential historic resources and districts and to prepare nomination forms for Fresno's Local Register of Historic Resources. Historic resources may include not only buildings but also structures, objects and sites, as well as cultural and historic landscapes and traditional cultural properties (as defined by the National Park Service) – examples include farm complexes, canal systems, signage, gardens, infrastructure such as lighting and street furniture, and landscaped boulevards. As appropriate, resources may be forwarded to the State Historical Resources Commission for consideration for the California Register of Historical Resources and/or the National Register of Historic Places.

Policy HCR-2-b: Historic Surveys. Prepare historic surveys according to California Office of Historic Preservation protocols, as funding is available. Prioritize the survey of resources located on parcels within the Bus Rapid Transit corridors slated for development and intensification.

Policy HCR-2-c: Project Development. Prior to project approval, a subject parcel and its Area of Potential Effects (APE), without benefit of a prior historic survey, will be evaluated and reviewed for the potential for historical and/or cultural resources by a professional who meets the Secretary of Interior's Qualifications. Survey costs shall be the responsibility of the project developer.

Policy HCR-2-f: Demolition Review. Require that preservation staff review all demolition permits to ascertain whether or not a resource scheduled for demolition is potentially eligible for listing on the Local Register of Historic Resources. Potential resources that appear to meet the threshold for individual eligibility will be reviewed by the City's Historic Preservation Commission and referred as appropriate to the City Council for consideration and a final determination before demolition may be approved.

Policy HCR-2-g: City-owned Resources. Maintain all City-owned historic and cultural resources in a manner that is consistent with the U.S. Secretary of the Interior's Standards for the Treatment of Historic Properties, as appropriate.

Objective HCR-3: Promote a "New City Beautiful" ethos by linking historic preservation, public art, and planning principles for complete neighborhoods with green building and technology.

Policy HCR-3-c: Context Sensitive Design. Work with the development and planning communities to ensure that infill development is context sensitive in its design, massing, set-backs, color, and architectural detailing.

The City's Historic Preservation Ordinance and the above objectives and policies are aimed at preserving publicly and privately owned historic resources. These existing and proposed regulations provide the maintenance of the City's historic preservation program, the identification of resources, the evaluation of resources by qualified professionals, and the treatment of resources in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

The implementation of the Historic Preservation Ordinance and the above objectives and policies would reduce the potential impacts on historical resources. However, in some instances, historical resources may need to be demolished due to health and safety reasons. In addition, modifications to historical resources may be proposed and as discussed in the Historic Preservation Ordinance, the Secretary of the Interior's Standards for the Treatment of Historic Properties would need to be implemented. However, after the procedures identified in the Historic Preservation Ordinance are followed and all feasible mitigation measures are imposed, potential significant impacts to an historic resource could remain. Since the Historic Preservation Ordinance or the objectives or policies identified above do not prevent the City from approving a project posing a significant impact to an historical resource, the potential impact is considered significant.

In addition to known historical resources, development in accordance with the General Plan and Development Code Update could result in potential impacts to unknown resources that are located below the ground surface. Based on data from the Greenwood and Associates' archaeological report for the Fulton Corridor Specific Plan and Downtown Neighborhoods Community Plan project, there is a moderate to high potential for buried historic deposits in the Downtown Fresno area. Therefore, during grading and construction activities associated with future developments in accordance with the General Plan and Development Code Update, potential impacts to historic deposits could be significant.

Cumulative Impact Analysis

Future development in areas outside the Planning Area as well as other cumulative development, such as the High Speed Rail, could result in impacts to known and unknown historical resources. These resources could be buildings in adjoining jurisdictions, such as the counties of Fresno and Madera, and the City of Clovis. Current regulations to preserve historical resources are expected to reduce potential impacts to known resources. Cities or counties could implement all feasible measures to reduce impacts to known historical resources; however, the impacts may remain significant. In addition, construction activities could result in potential significant impacts to unknown buried historical resources. Development within the Planning Area as well as outside the Planning Area could result in significant impacts to historical resources. Since the proposed General Plan and Development Code Update could result in significant impacts to historical resources, the project's contribution to cumulative impacts would be cumulatively considerable and therefore cumulatively significant.

Mitigation Measures

Project Specific

MM CUL-1 If previously unknown resources are encountered before or during grading activities, construction shall stop in the immediate vicinity of the find and a qualified historical resources specialist shall be consulted to determine whether the resource requires further study. The qualified historical resources specialist shall make recommendations to the City on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines and the City's Historic Preservation Ordinance.

If the resources are determined to be unique historical resources as defined under Section 15064.5 of the CEQA Guidelines, measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds.

No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any historical artifacts recovered as a result of mitigation shall be provided to a City-approved institution or person who is capable of providing long-term preservation to allow future scientific study.

Cumulative

Implementation of Mitigation Measure CUL-1 is required.

Level of Significance After Mitigation

Project Specific

Potentially significant impact.

Cumulative

Potentially significant impact.

Archaeological Resource

Impact CUL-2	**The project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?**

Project Specific Impact Analysis

Prehistoric archaeological resources are those cultural resources deposited before Europeans established a Franciscan Mission in California (1769). These resources include any deposits, features or isolated artifacts. Historical archaeological resources are discussed in Impact CUL-1 above. Under PRC 21083.2(h), prehistoric archaeological resources can be divided into two classes, unique and non-unique. Unique resources must be treated as if they are significant and avoidance of those resources is the first choice, while non-unique resources do not meet criteria in 21083.2(g) and therefore need not be avoided under CEQA Guidelines. Based on the data sources reviewed for the Planning Area and identified above in Section 5.5.3 of this Draft MEIR, there have been no prehistoric archaeological resources found within the Planning Area. Since the banks of the San Joaquin River has yielded prehistoric archaeological resources upstream and downstream of the Planning Area, grading and construction activities within previously undisturbed soils within the vicinity of the San Joaquin River could result in significant impact to unknown resources. In addition, given the limited area within the Planning Area that has been surveyed by a professional archaeologist (0.3 percent of the Planning Area), the prehistoric archaeological sensitivity of the majority of the Planning Area is uncertain. Due to the nominal amount of prehistoric archaeological information within the majority of the Planning Area, the potential to impact prehistoric archaeological resources during grading and construction activities within previously undisturbed soils is considered significant.

Cumulative Impact Analysis

Due to the nominal amount of prehistoric archaeological information in the vicinity of the Planning Area, future development in areas outside the Planning Area as well as other cumulative development, such as the High Speed Rail, could result in impacts to unknown prehistoric archaeological resources during excavation and/or construction activities. These potential impacts from cumulative development could be significant. Since future development within the Planning Area could result in significant impacts to unknown prehistoric archaeological resources, the project's contribution to cumulative impacts would be cumulatively considerable and therefore cumulatively significant.

Mitigation Measures

Project Specific

MM CUL-2 Subsequent to a preliminary City review of the project grading plans, if there is evidence that a project will include excavation or construction activities within previously undisturbed soils, a field survey and literature search for prehistoric archaeological resources shall be conducted. The following procedures shall be followed.

If prehistoric resources are not found during either the field survey or literature search, excavation and/or construction activities can commence. In the event that buried prehistoric archaeological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified archaeologist shall be consulted to determine whether the resource requires further study. The qualified archaeologist shall make recommendations to the City on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines. If the resources are determined to be unique prehistoric archaeological resources as defined under Section 15064.5 of the CEQA Guidelines, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any prehistoric archaeological artifacts recovered as a result of mitigation shall be provided to a City-approved institution or person who is capable of providing long-term preservation to allow future scientific study.

If prehistoric resources are found during the field survey or literature review, the resources shall be inventoried using appropriate State record forms and submit the forms to the Southern San Joaquin Valley Information Center. The resources shall be evaluated for significance. If the resources are found to be significant, measures shall be identified by the qualified archaeologist. Similar to above, appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. In addition, appropriate mitigation for excavation and construction activities in the vicinity of the resources found during the field survey or literature review shall include an archaeological monitor. The monitoring period shall be determined by the qualified archaeologist. If additional prehistoric archaeological resources are found during excavation and/or construction activities, the procedure identified above for the discovery of unknown resources shall be followed.

Cumulative

Implementation of Mitigation Measure CUL-2 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Unique Paleontological Resource / Site or Unique Geologic Feature

Impact CUL-3	**The project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.**

Project Specific Impact Analysis

Based on a review of geologic maps of the Planning Area, there are two primary surficial deposits: 1) Pleistocene non-marine and 2) Quaternary non-marine fan deposits. The Pleistoscene non-marine deposits are considered to have a high potential sensitivity. The Quaternary non-marine deposits consist of Pleistocene-Holocene alluvial sediments. Since these deposits include Pleistocene sediments, they are also considered to have a high potential for sensitivity. Therefore, excavation and/or construction activities within the Planning Area that are associated with the General Plan and Development Code Update have the potential to impact paleontological/geological resources during excavation and construction activities within previously undisturbed soils. Although many areas have been previously disturbed by farming activities or previous structural development, the project could include future development that will require excavations or construction within previously undisturbed soils. The potential to impact paleontological/geological resources is considered significant.

Cumulative Impact Analysis

Future development in areas outside the Planning Area as well as other cumulative development, such as the High Speed Rail, could result in impacts to paleontological/geological resources during excavation and/or construction activities within previously undisturbed soils. These potential impacts from cumulative development could be significant. Since future development within the Planning Area could result in significant impacts to paleontological/geological resources, the project's contribution to cumulative impacts would be cumulatively considerable and therefore cumulatively significant.

Mitigation Measures

Project Specific

MM CUL-3 Subsequent to a preliminary City review of the project grading plans, if there is evidence that a project will include excavation or construction activities within previously undisturbed soils, a field survey and literature search for unique

paleontological/geological resources shall be conducted. The following procedures shall be followed:

If unique paleontological/geological resources are not found during either the field survey or literature search, excavation and/or construction activities can commence. In the event that unique paleontological/geological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified paleontologist shall be consulted to determine whether the resource requires further study. The qualified paleontologist shall make recommendations to the City on the measures that shall be implemented to protect the discovered resources, including but not limited to, excavation of the finds and evaluation of the finds. If the resources are determined to be significant, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any paleontological/geological resources recovered as a result of mitigation shall be provided to a City-approved institution or person who is capable of providing long-term preservation to allow future scientific study.

If unique paleontological/geological resources are found during the field survey or literature review, the resources shall be inventoried and evaluated for significance. If the resources are found to be significant, mitigation measures shall be identified by the qualified paleontologist. Similar to above, appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. In addition, appropriate mitigation for excavation and construction activities in the vicinity of the resources found during the field survey or literature review shall include a paleontological monitor. The monitoring period shall be determined by the qualified paleontologist. If additional paleontological/geological resources are found during excavation and/or construction activities, the procedure identified above for the discovery of unknown resources shall be followed.

Cumulative

Implementation of Mitigation Measure CUL-3 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Human Remains

Impact CUL-4 **The project could disturb human remains, including those interred outside of formal cemeteries.**

Project Specific Impact Analysis

There is currently no evidence that the Planning Area contains prehistoric cemeteries or Native American cemeteries, however, various cemeteries are located throughout the Planning Area. The General Plan and Development Code Update identifies these cemeteries as Public Facilities on the Land Use Map. Future development within the Planning Area would not impact existing cemeteries. Although there is no record of isolated human remains or unknown cemeteries, there is always a possibility that ground-disturbing activities associated with future development may uncover previously unknown buried human remains. In the event that human remains are encountered, the potential impact is considered significant.

Cumulative Impact Analysis

Although no known prehistoric or Native American human remains have been identified within or in the vicinity of the Planning Area, there is a possibility that ground-disturbing activities associated with cumulative development may uncover previously unknown buried human remains. The uncovering of human remains is considered a significant impact. Since, there is a possibility for the project to uncover previously unknown buried human remains, the project's contribution to cumulative impacts on human remains would be cumulatively considerable and therefore cumulatively significant.

Mitigation Measures

Project Specific

MM CUL-4 In the event that human remains are unearthed during excavation and grading activities of any future development project, all activity shall cease immediately. Pursuant to Health and Safety Code (HSC) Section 7050.5, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98(a). If the remains are determined to be of Native American descent, the coroner shall within 24 hours notify the Native American Heritage Commission (NAHC). The NAHC shall then contact the most likely descendent of the deceased Native American, who shall then serve as the consultant on how to proceed with the remains. Pursuant to PRC Section 5097.98(b), upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.

Cumulative

Implementation of Mitigation Measure CUL-4 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.6 - Geology and Soils

5.6.1 - Introduction

The analysis in this section is based on the Geologic Hazards Investigation prepared by Krazan & Associates, Inc. in June 2012, which included a review of County and State geological hazards mapping. The Geologic Hazards Investigation is provided in Appendix E-1.

5.6.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding geology and soils is the Planning Area because potential development under the General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative geologic impacts is the Planning Area as well as areas within one mile of the Planning Area because sedimentation, erosion, and other soils-related effects have the potential to effect areas downstream, downwind, or downhill from within the Planning Area as well as from outside the Planning Area.

Regional Setting

The City of Fresno Planning Area is located along the eastern margin of the southern San Joaquin Valley portion of the Great Valley Geomorphic Province of California. The San Joaquin Valley is bordered to the north by the Sacramento Valley portion of the Great Valley, to the east by the Sierra Nevada, to the west by the Coast Ranges, and to the south by the Transverse Ranges. The San Joaquin sedimentary basin is separated from the Sacramento basin to the north by the buried Stockton arch and associated Stockton Fault. The 450-mile long Great Valley is an asymmetric structural trough that has been filled with a prism of Mesozoic and Cenozoic sediments up to 5 miles thick.

The Sierra Nevada, located east of the San Joaquin Valley, is a gently southwesterly tilted fault block comprised of igneous and metamorphic rocks of pre-Tertiary age that comprise the basement beneath the San Joaquin Valley. The Coast Ranges, located west of the San Joaquin Valley, are comprised of folded and faulted sedimentary and metasedimentary rocks of Mesozoic and Cenozoic age.

The San Joaquin River and the Kings River are the principal rivers in the Planning Area, with the alluvial fans formed by these rivers serving as the predominant geomorphic features in the area. The Planning Area is generally characterized by low alluvial fans and plains, which constitute a belt of coalescing alluvial fans of low relief between the dissected uplands, adjacent to the Sierra Nevada and the valley trough. Recent alluvial fan deposits from streams emerging from highlands surrounding the Great Valley and Pleistocene non-marine sedimentary deposits (Riverbank Formation) composed of older alluvium and dissected fan deposits underlain the subject site area.

Lithology

The thick accumulation of deposits within the San Joaquin Valley range in age from Jurassic to Holocene and include both marine and continental rocks and deposits. The 1965 Geologic Map of California, Fresno Sheet, indicates that the near-surface deposits in the City of Fresno Planning Area consist of Quaternary recent fan deposits and Quaternary Older alluvium (Pleistocene Nonmarine Sedimentary deposits).

The subsurface information obtained in conjunction with previous subsurface investigations performed within the Planning Area indicates that the surface and near-surface deposits generally consist of sandy silts, silty sands, sands, clayey sands, sandy clays, and clayey silts. These observed deposits are consistent with those mapped in the Planning Area.

Structures and Faults

The City of Fresno Planning Area is underlain by a homoclinal series of Cenozoic deposits dipping four to six degrees to the southwest toward the center of the San Joaquin Valley. The contact between the Cenozoic and basement rocks dips nearly eight degrees southwest, or at a slightly greater inclination than does the on-lapping homoclinal Cenozoic sequence. No active faults are mapped within the Planning Area.

Adjacent to the San Joaquin Valley, the Sierra Nevada and Coast Ranges are geologically young mountain ranges that possess active and potentially active fault zones. Major active faults and fault zones occur at some distance to the east, west, and south of the Planning Area.

Numerous active faults are present within the central Coast Ranges west of the Planning Area, including the San Andreas Fault located approximately 61 miles west of the area. The fault is considered active and serves as a primary concern in evaluating seismic hazards throughout western Fresno County. The 684-mile-long San Andreas Fault Zone is the principal element of the San Andreas Fault system, a network of faults with predominately dextral strike-slip displacement that collectively accommodates the majority of relative north-south motion between the North America and Pacific plates. The creeping section of the San Andreas Fault is approximately 61 miles from the Planning Area at its closest point. The San Andreas Fault Zone is considered to be the Holocene and historically active dextral strike-slip fault that extends along most of coastal California from its complex junction with the Mendocino Fault zone to the north, southwest to the northern Transverse Range, and inland to the Salton Sea, where a well-defined zone of seismicity transfers the slip to the Imperial fault along a right-releasing step.

Two major surface-rupturing earthquakes have occurred on the San Andreas Fault in historic time: the 1857 Forth Tejon and 1906 San Francisco earthquakes. Additional historic surface rupturing earthquakes include the unnamed 1812 earthquake along the Mojave section and the northern part of the San Bernardino Mountains section, and a large earthquake in the San Francisco Bay area that occurred in 1838 that was probably on the Peninsula section. Historic fault creep rates are as high as 32 millimeters per year for the 82-mile-long creeping section in central California, with creep rates gradually tapering to zero at the northwestern and southeastern ends of the section.

One of the nearest seismotectonic source is the Great Valley Fault Zone (Coast Ranges-Central Valley boundary zone), located approximately 34 miles west of the Planning Area. The Great Valley Fault zone is the geomorphic boundary of the Coast Ranges and the Central Valley and is underlain by a 300-mile long seismically active fold and thrust belt that has been the source of recent earthquakes, such as the 1983 magnitude 6.5 Coalinga and the 1985 magnitude 6.1 Kettleman Hills earthquakes. Nearly the entire thrust system is concealed or "blind." The basal detachment of this thrust system dips at a shallow angle to the west. East-directed thrusting over ramps in the detachment and west-directed thrusting on backthrusts are responsible for the uplift along the eastern range front of the Coast Ranges. Based on earthquake focal mechanisms, movement on the thrust zone is generally perpendicular to the strike of the geomorphic boundary and trend of the San Andreas Fault system. Shortening along the geomorphic boundary is driven by a component of the Pacific-North American Plate motion that is normal to the plate boundary. The Great Valley Fault Zone is considered the dominant seismic feature with potential for affecting the Planning Area.

The Ortigalita Fault zone is a major Holocene dextral strike-slip fault in the central Coast Ranges that is an eastern part of the larger San Andreas Fault system. The Ortigalita Fault zone is approximately 54 miles west of the Planning Area. The Ortigalita Fault zone extends from roughly 12.4 miles northwest of San Luis Reservoir southeast to the vicinity of Panoche Valley. The Ortigalita Fault zone is characterized by echelon fault traces separated by pull-apart basins. The fault zone is divided into four sections. The Little Panoche Valley section is the southernmost section and is closest to the Planning Area. The Little Panoche Valley section is late Holocene active. Late Quaternary slip rates and recurrence intervals are unknown, although the recurrence interval for the entire Ortigalita Fault zone is about 2,000 to 5,000 years.

Regional structure within the western Sierra Nevada north of the Planning Area is complex and generally consists of blocks separated by steeply eastward-dipping, north, and northwest striking reverse faults of the Foothills Fault system. The Foothills Fault system is located within approximately 32 miles north of the Planning Area. Based on mapping and historical seismicity, the seismicity of the Sierra Nevada foothills has been generally considered low by the scientific community. However, on August 1, 1975, a 5.7 Richter magnitude earthquake occurred near Oroville within the northern Sierra Nevada. Surface rupture along the Cleveland Hill Fault (part of the Foothills Fault System) was associated with the 1975 Oroville earthquake. As a result of this event, numerous studies were undertaken to evaluate further the seismicity of the Sierra Nevada foothills. Of particular note are the geologic and seismicity studies conducted by Woodward-Clyde Consultants (WCC) to evaluate the proposed Auburn Dam site. Based on these studies, WCC concluded that seismic events in the Sierra Nevada foothills are associated with very small, geologically infrequent, incremental displacements having minor geomorphic surface expression.

In addition, the eastern border of the southern San Joaquin Valley is cut by a series of en-eschelon rangefront faults. These faults are mainly northwest trending normal faults, down dropped to the west and with a near vertical dip. One of the range-front faults, the Clovis Fault, is mapped extending from an area just south of the San Joaquin River to a few miles south of Francher Creek approximately six miles northeast of the Planning Area. No evidence has been found of historic ground movement along this feature. These range-front faults have generally been considered

inactive, with no recognized Quaternary displacement. However, a September 1973 magnitude 4.4 earthquake that occurred approximately 4.3 miles north of the Planning Area may be related to this fault system.

The Nunez Fault is located approximately six to seven miles northwest of Coalinga and is roughly 48 miles southwest of the Planning Area. The fault is about 2.6 miles long and is considered active based on surface rupture associated with the 1983 Coalinga earthquake. The fault is divided into two north and south trending segments. Approximately 2.1 miles of right-reverse surface rupture occurred on the segments. Total displacement and timing of past fault movements are poorly constrained.

Tensional forces resulting in normal faults are reported to be related to crustal stress relief in the southeast portion of the San Joaquin Valley. Numerous relatively short, normal faults traverse this region. Creep activity is the prominent mode of slip on those faults in this region that are active. These movements have continued on an intermittent basis from the early Miocene to recent times. This faulting is directly related to and controls the accumulation of oil in several oil fields within the westerly portion of the valley. Most authors agree that current creep movements can be ascribed to subsidence promoted by extensive withdrawal of petroleum, and in some cases, groundwater. Those faults considered to be active in the southern valley are Kern Front and Pond Faults located at least 70 miles south of the Planning Area.

The Sierra Nevada and Owens Valley Fault Zones bound the eastern edge of the Sierra Nevada block more than 90 miles east of the Planning Area. The Owens Valley Fault zone branches to the east of the Sierra Nevada Fault zone approximately 2 miles south of the Alabama Hills. The Owens Valley Fault zone is roughly 75 miles long and extends to the west side of Owens Lake to a few miles north of Big Pine. The maximum width of the fault zone is about 2 miles. The Owens Valley Fault generated one of California's greatest historical earthquakes (Owens Valley Earthquake of 1872) and poses a significant hazard to the communities on the eastern side of the Sierra Nevada Mountains. The White Wolf Fault, responsible for a 1952 earthquake that caused extensive damage in the greater Bakersfield area, is located in the tectonically active Tehachapi Mountains at the southerly terminus of the valley, over 100 miles south of the Planning Area.

Planning Area Setting

General Setting and Surface Features

The City of Fresno Planning Area encompasses an approximate 166 square miles, just south of the San Joaquin River, in the central portion of Fresno County, California. The natural topography within the Planning Area generally trends from the northeast towards the southwest. The historically natural, agricultural, and manmade flow for drainage channels predominately follows the northeast to southwest trend. However, because the Planning Area was historically developed for agricultural use, there are also many subchannels designed to transport water in a northwest-southeast direction.

Surface faulting is absent from the Planning Area and the majority of the area is relatively flat. However, slopes associated with the San Joaquin River bluff are on the order five feet to greater than

100 feet high. The bluff slopes in the vicinity of existing developments were generally well maintained and appeared to be relatively stable. However, the bluff slopes in predominately undeveloped and/or agricultural areas are in relatively good to poor condition with varying degrees of instability and disrepair.

Subsurface Conditions

Subsurface soil conditions in the Planning Area have been previously explored by drilling hundreds of geotechnical borings to depths ranging from approximately 5 to 150 feet below existing site grade, using a truck-mounted drill rig. Penetration tests were performed to evaluate soil consistency and to obtain information regarding engineering properties of the subsoils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System.

The subsurface conditions encountered appear typical of those found in the geologic region of the Planning Area. Generally, the upper soils consisted of approximately 6 to 12 inches of very loose silty sand, silty sand with trace clay, sandy silt, clayey sand, or clayey gravel. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated.

Below the loose surface soils, approximately two to four feet of loose/soft to very dense/hard clays, silts, sands, and gravels are typically encountered. Previous field and laboratory tests suggest that these soils are typically moderately strong and slightly to moderately compressible. The clayey soils had a low to high expansion potential. Penetration resistance ranged from less than 5 to greater than 100 blows per foot. Dry densities ranged from 80 to 120 per cubic foot (pcf). Representative soil samples typically consolidate approximately 0.5 to 12 percent under 2 kilos per square foot (ksf) load when saturated. Representative soil samples had angles of internal friction ranging from 11 to 40 degrees. Representative samples of the clayey soils had expansion indices ranging from 0 to l00+.

Below 3 to 5 feet, predominately clays, silts, sands, and gravels are usually encountered. Previous field and laboratory tests suggest that these soils are typically moderately strong and slightly compressible. Penetration resistance ranges from 10 to greater than 100+ blows per foot. Dry densities ranged from 90 to 140 pcf. Representative soil samples typically consolidate approximately two to three percent under a 2 ksf load when saturated. These soils usually have slightly stronger strength characteristics than the upper soils and extend to the termination depth of the borings.

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Groundwater was encountered near the surface in the vicinity of existing ponds, lakes, ditches, and canals, to depths greater than 100 feet below site grade during the field investigations. Review of groundwater elevation maps prepared by the California Department of Water Resources dating from 1961 to 2012 indicates that depth to free groundwater in the vicinity of the site ranged from one foot to greater than 100 feet below the existing grade within the Planning Area.

Geological Subgrade

The general soil profile within the City of Fresno Planning Area consists predominately of silty sands, sandy silts, clayey sands, sandy clayey silts, and sands. With the exception of a limited occurrence of near-surface loose soils, penetration resistance and laboratory testing indicate that these materials are typically at least medium dense. The Site Class, per Section 16 13.3.2 of the 2013 California Building Code, is assigned to a site based upon the types of soils present and their engineering properties. Site Class D is most consistent with the soil conditions in the Planning Area. However, within isolated locations through the Planning Area, and in close proximity to water features, Site Class E conditions (soft soil profile) may be encountered.

Geologic-related Hazards Settings

Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, fine-grained granular soils behave similarly to a fluid when subjected to high-intensity ground shaking. Liquefaction occurs when shallow groundwater; low density, fine, clean sandy soils; and high intensity motion occurs. Effects of liquefaction can include sand boils, settlement, and bearing capacity failures below foundations.

The predominant soils anticipated to be encountered within the Planning Area consist of varying combinations of very loose/very soft to very dense/hard silts, clays, sands, and gravels. Moderate cohesion strength is associated with the clayey soils. Groundwater has been encountered near the surface during exploratory drilling, in close proximity to water filled features such as canals, ditches, ponds, and lakes. Historically, groundwater in the Planning Area has been encountered at depths as shallow as 0 feet to greater than 100 feet below the ground surface.

Seismic Settlement and Lateral Spreading

Subsidence of the land surface can be induced by both natural and human phenomena. Natural phenomena that can cause subsidence can result from tectonic deformations and seismically induced settlements; from consolidation, hydrocompaction, or rapid sedimentation; from oxidation or dewatering of organic-rich soils; and from subsurface cavities. Subsidence related to human activity can result from withdrawal of subsurface fluids or sediment, such as pumping of groundwater.

Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a stream bank, the open side of fill embankments, or the sides of levees. The potential for failure from subsidence and lateral spreading is highest in areas where the groundwater table is high, where relatively soft and recent alluvial deposits exist, and where creek banks are relatively high. One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Due to the subsurface conditions within the Planning Area, and the relatively low to moderate seismicity of the region, the City of Fresno Planning Area is not located in an area within a seismic settlement or lateral spread hazard area.

Land Subsidence

Portions of the San Joaquin Valley have been subject to land subsidence due to fluid withdrawal (groundwater and petroleum). Land subsidence affects 3,500 square miles of productive farm land in the San Joaquin Valley as intense pumping of groundwater continues. Over 20 feet of subsidence has occurred in western Fresno County. Subsidence was first recognized in the valley in 1935, when surveys discovered differential settlements in areas of intensive pumping. With the accelerated use of groundwater for agriculture, subsidence has continued to the present. Today, one-third of the entire San Joaquin Valley is subsiding and damage costs and remedial expenditures represent many millions of dollars. Damage caused by subsidence has been restricted principally to significant changes in gradients of canals, aqueducts, and drainage systems, and breakage of deep water-well casings.

Within the San Joaquin Valley, subsidence is concentrated in the southern part and west side of the valley where rainfall is sparse and groundwater recharge is minimal. The subsidence has been greatest in three areas: an elongated trough close to the mountains west of Fresno, where more than 20 feet of subsidence occurred between 1920 and 1963 and total subsidence is approximately 28 feet; a location 30 miles south of Tulare, where more than 12 feet of subsidence has occurred; and an area located south of Bakersfield, where more than 8 feet of subsidence has occurred. These three areas are not located within the Planning Area. Subsidence rates vary greatly from year to year, and subsidence continues in all areas except south of Tulare where surface water imports have reversed the downward trends of water levels.

Expansive Soils

Expansive soils are composed largely of clays, which greatly increase in volume when saturated with water and shrink when dried. Because of this effect, building foundations may rise during the rainy season and fall during the dry season. If this expansive movement varies underneath different parts of a single building, foundations may crack, structural portions of the building may be distorted, and doors and windows may become warped so that they no longer function properly. The potential for soil to undergo shrink and swell is greatly enhanced by the presence of a fluctuating, shallow groundwater table. Volume changes of expansive soils can result in the consolidation of soft clays following the lowering of the water table or the placement of fill. The surface and near-surface soils observed throughout the City of Fresno Planning Area consist of varying combinations of clays, silts, sands, gravels, and cobbles. The clayey soils are considered to be slightly to moderately expansive.

Slope Stability, Slope Failure, and Landslides

Landslides are the release of rock, soil, or other debris and its subsequent movement down a slope or hillside. They are generally caused or controlled by a combination of geology, topography, weather, and hydrology, and can be influenced by development practices. Landslides vary greatly in size and composition, ranging from a thin mass of soil a few yards wide to deep-seated bedrock slides miles across. The travel rate of a landslide can range from a few inches per month to many feet per second depending on the slope, type of materials, and moisture content.

Any slope of 15 degrees or greater is susceptible to mud or landslides. Landslides and other ground failures occur during earthquakes, triggered by the strain induced in soil and rock by ground shaking

vibrations, and during non-earthquake conditions, most frequently during the rainy season. Both natural and man-made factors contribute to these slope failures.

Ground failure occurs when stresses in the ground exceed the resistance of earth materials to deformation or rupture. This instability can be triggered by earthquake shaking, which instantaneously places high stresses on earth materials by loss of soil strength due to saturation or seismic shaking. Ground failure can also be triggered by manmade changes, such as loading a steep slope or unstable soils.

Landslides are perhaps the most common form of ground failure that is not caused by earthquakes. In areas where a severe slope stability problem exists, landslide damage can best be avoided by not building on the unstable ground. In some landslide-prone areas, landslides can be totally removed or stabilized. Through good planning and careful controlled design, landslide losses can be all but eliminated.

Although slope failures are not expected to produce a regional disaster, there is a persistent risk of damage to public and private property, including individual residences, roads, canals, reservoirs, and other facilities. The two most important factors influencing the performance of slopes are the nature of the bedrock or surficial deposits and the slope angle. However, there are a number of other factors that have a profound effect on the stability of a particular hillside. These include the presence or absence of deep-rooted vegetation; surface and subsurface drainage conditions; thickness and engineering characteristics of soils and underlying weathered, partially decomposed rock; orientation of bedding; or locally high rainfall can exert a controlling effect on the intensity of natural processes occurring on a particular hillside.

City and County General Plans historically have recognized that major slope areas in excess of 26 percent are "not readily available" and "undevelopable," recognizing the cost and engineering difficulties of grading steep slopes as well as their inherent unsuitability. This development limit generally agrees with customary limits throughout the State, and varies only slightly from the 30 percent standard reference developed by the State Division of Mines and Geology as the maximum developable slope. This is a statewide reference that does not reflect special conditions such as clayey soils.

Whether a landslide will or will not occur at any specific, presently stable slope usually cannot be predicted under "natural conditions" because of the range of natural conditions and changes which occur with time. However, land that has experienced land sliding in the past is believed to be generally more slide-prone and is also more sensitive to man-induced changes, such as grading, watering, removing or changing the type of vegetation, and changing drainage patterns, among many possible factors.

5.6.3 - Regulatory Setting

Federal

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1997 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities.

State

Alquist-Priolo Earthquake Fault Zoning Act

In response to the severe fault rupture damage of structures by the 1971 San Fernando earthquake, the State of California enacted the Alquist-Priolo Earthquake Fault Zoning Act in 1972. This act required the State Geologist to delineate Earthquake Fault Zones (EFZs) along known active faults that have a relatively high potential for ground rupture. Faults that are zoned under the Alquist-Priolo Act must meet the strict definition of being "sufficiently active" and "well-defined" for inclusion as an EFZ. The EFZs are revised periodically, and extend 200 to 500 feet on either side of identified fault traces. No structures for human occupancy may be built across an identified active fault trace. An area of 50 feet on either side of an active fault trace is assumed to be underlain by the fault, unless proven otherwise. Proposed construction in an EFZ is permitted only following the completion of a fault location report prepared by a California Registered Geologist. This Act does not apply to areas within the Planning Area because no active faults cross the Planning Area.

California Building Code

Title 24, Part 2, of the California Code of Regulations, also known as the California Building Code (CBC), sets forth minimum requirements for building design and construction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. The CBC is reviewed every three years by the California Building Standards Commission. The Commission makes certain State modifications, and adopts the new code edition for use throughout the State. Once the Commission votes to adopt the new code edition, it will become effective on the first of January of the upcoming year, regardless of whether local cities or counties formally adopt it. The current version, the 2013 California Buildings Standard Code, became effective on January 1, 2014.

The California Building Standards Code is a compilation of three types of building standards from three different origins:

- Building standards that have been adopted by state agencies without change from building standards contained in national model codes
- Building standards that have been adopted and adapted from the national model code standards to meet California conditions
- Building standards, authorized by the California legislature, that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns

In the context of earthquake hazards, the California Building Standards Code's design standards have a primary objective of assuring public safety and a secondary goal of minimizing property damage and maintaining function during and following a seismic event. Recognizing that the risk of severe seismic ground motion varies from place to place, the California Building Standards Code seismic code provisions will vary depending on location (Seismic Zones 0, 1, 2, 3, and 4; with 0 being the least stringent and 4 being the most stringent). The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC.

Counties and cities may modify their adoption of the California Buildings Standard Code to address local conditions. Most California cities and counties modify the State adopted version of the Building Standards Code to address local circumstances related to the local climate, topography, or geology. Since modifications cannot be less restrictive, California Building Standards Code provides a minimum standard for protecting public health, safety and welfare that is applicable throughout the Planning Area and study area for cumulative impacts.

Local

2025 Fresno General Plan

The 2025 Fresno General Plan contains objectives and policies that address geology and soils. The following General Plan objective and policies are applicable to the proposed project.

Safety Element

I-3 Objective: Ensure the public's health, safety, and welfare by recognizing potentially geologically unstable conditions that could endanger the lives and property of the Fresno-Clovis Metropolitan Area residents.

I-3-a Policy: The City of Fresno shall enforce the latest adopted Uniform Building Code and the Dangerous Building Ordinance (Article 12 of Fresno Municipal Code, Chapter 12) to ensure seismic protection for new and existing construction.

I-3-c Policy: In areas having potential geologic and/or soils hazards, development shall not have on-site drainage or disposal for wastewater, stormwater runoff, swimming pool/spa water, unless a soil analysis by a registered civil engineer (or engineering geologist specializing in soil geology) concludes that on-site drainage/disposal will not induce, worsen or spread geologic hazards.

I-3-d Policy: Development shall be prohibited in areas where analysis by a registered civil engineer or registered geologist determines that no corrective measures could feasibly mitigate potential geologic hazards.

I-4 Objective: Minimize the loss of life and property on the San Joaquin River bluffs that could occur due to geologic hazards.

I-4-a Policy: Maintain and enforce the requirements of the city's Bluff Preservation (BP) Overlay Zone District. Development within 300 feet of the toe of the San Joaquin River bluffs shall require an engineering soils investigation and evaluation report that demonstrates that the site is, or methods by which the site could be made, sufficiently stable to support the proposed development.

I-4-b Policy: The minimum setback from the San Joaquin River bluff edge (as the bluff edge is defined in the Fresno Municipal Code) for all future structures (including swimming pools, spas, and accessory structures) shall be thirty (30) feet. However, a building setback of less than thirty (30) feet may be permitted if it can be demonstrated to the satisfaction of the City's Building Official and Planning and Development Department Director that a proposed structure will meet the objective of the Bluff Preservation Overlay Zone District, as stated in the Fresno Municipal Code; but in no case shall the minimum building setback from the bluff edge be less than twenty (20) feet for any structure, and no rear yard encroachments shall be allowed within that twenty (20) feet.

Public Facilities Element

E-19 Objective: Preserve groundwater quality and ensure that the health and safety of the community is not impaired by use of private on-site disposal systems.

E-19-a Policy: Continue to require mandatory abatement of existing septic systems and mandatory connection to the city's public sewage collection and disposal system including those areas outside the city's adopted sphere of influence where determined necessary for public health and safety reasons.

E-19-b Policy: Discourage use of septic systems, community wastewater disposal systems or other non-regional sewage treatment and disposal systems within the Fresno Metropolitan Area and including areas located outside the city's sphere of influence if these types of wastewater treatment facilities would cause discharges that could result in groundwater degradation, or if such systems are not economically feasible.

City of Fresno Municipal Code

Section 11-101. California Building Code

The City of Fresno Municipal Code has incorporated and adopted the CBC, 2013 Edition, as promulgated by the California Building Standards Commission, which incorporates the adoption of the 2012 edition of the of the International Building Code, as amended with necessary California amendments and the 2012 International Building Code of the International Code Council, with the exception of Appendix B. Together with the City's amendments to the CBC provided in Section 11-102, these shall be referred to as the Fresno Building Code. One copy of the CBC is on file and available for use by the public in the Development and Resource Management Department, Building and Safety Services Division.

Section 12-1022. Soils Report

(a) **Preliminary Soils Report.** A preliminary soils report, prepared by a civil engineer registered in this state, and based upon adequate test borings, shall be required for every subdivision for which a final map is required and shall be submitted to the City Engineer.

(b) **Waiver.** A preliminary soils report may be waived by the City Engineer if he finds that, due to the knowledge the city has as to the soils qualities of the soils in the subdivision, no preliminary analysis is necessary.

(c) **Soils Investigation.** If the city has knowledge of, or the preliminary soils report indicates, the presence of critically expansive soils or other soils problems, which, if not corrected, would lead to structural defects, a soils investigation of each lot in the subdivision may be required by the City Engineer. Such soils investigation shall be done by a civil engineer registered in this state, who shall recommend the corrective action, which is likely to prevent structural damage to each structure proposed to be constructed in the area where such soils problems exist.

(d) **Approval of Corrective Action.** The Commission may approve the subdivision or portion thereof where such soils problems exist if it determines that the recommended action is likely to prevent structural damage to each structure to be constructed, and as a condition to the issuance of any building permit may require that the approved recommended action be incorporated in the construction of each structure.

(e) **Geologic Impact Standards.** To minimize potential geologic and soil hazards, the following provisions shall apply to all subdivisions **and** development within Bluff Zones I, II and III of the San Joaquin River Bluffs environs:

(1) General provisions for grading, drainage, and erosion:

(i) Locations of streets, utilities and other facilities shall be approved by the Director and the Director of the Department of Public Works.

(ii) Requirements for the location, design, construction and maintenance of surface and subsurface drainage facilities shall be as determined by the Fresno Metropolitan Flood Control District.

(iii) All development within Bluff Zones I, II and III shall comply with the applicable provisions of the Uniform Building Code as adopted and amended by the City of Fresno.

(iv) Drainage of storm and irrigation water shall be directed away from the Bluff Face to public rights-of-way or to drainage facilities approved by the Fresno Metropolitan Flood Control District. A drainage plan shall be provided and approved by the Director for each separate lot within the Bluff Influence Area, establishing methods for conveying surface water from roofs and landscaping, and drain water from all swimming pools or decorative pools to approved locations away from the Bluff Face.

(v) To minimize erosion, the following shall apply to all graded, altered or unstable bluff areas:

1. Landscaping with drought-tolerant, low-fuel plants, compatible with the bluff environs, from a list prepared by the Director of the Parks and Recreation Department shall be provided;

2. Landscape irrigation shall utilize drip irrigation or low precipitation systems, and must be approved by the civil engineer prior to installation;

3. Hydroseeding, netting and mulch shall be utilized to re-establish plant life, to control erosion and to discourage rodent burrowing.

(2) **Soils investigation.** The following types of soil evaluations shall be performed and reported:

(i) **Bluff Zone I.** A civil engineer or soils engineer registered in this state shall investigate and report on soil and geologic conditions, utilizing methods consistent with accepted practice. The report shall evaluate soils and geologic conditions for development proposals located outside Bluff Zone II and shall be similar in scope to a preliminary soils investigation required under subsection (a), above; the investigation and report shall identify potential surface and subsurface drainage problems that may ultimately affect the stability of the bluffs and any measures to mitigate such effects.

(ii) **Bluff Zone II.** A civil engineer or soils engineer shall provide a detailed Soils Investigation and Evaluation Report using **methods** consistent with accepted practice and shall include the following:

1. Evaluation of existing stability;

2. Evaluation of post-development slope stability;

3. Documentation of existing conditions for rock falls, block caving, creep failures, shear failures, excessive erosion and sloughing;

4. Evaluation of slope angles, subsurface drainage, proposed grading, structures, utility trenches, potential rodent population, storm drain disposal, surface irrigation and drainage, erosion, traffic vibration, potential seismic hazards, and on-site sewage disposal approximate to the bluffs;

5. Evaluation of the influence of future development and grading along the Bluff Toe for its effect on slope stability;

6. Evaluation of the adverse effect of increased surface and subsurface drainage;

7. Coordination, review and approval of site grading and drainage plans prepared by the project civil engineer for conformance to soils and geologic reports;

8. Laboratory tests to evaluate the soil parameters to be used in determination of slope stability;

9. Determination and establishment of the location of the Bluff Toe, Bluff Edge and of any building setbacks.

(iii) **Bluff Zone III.** A civil engineer or soils engineer registered in this state shall complete a Soils Investigation and Evaluation Report, involving detailed study of individual lots within the River Bluff Influence Area, as follows:

1. Zone III soils investigations will address the details of the configuration, location, type and loading of the proposed structures and drainage plan;

2. The report shall provide detailed recommendations for foundations, drainage, and other items critical to bluff stability.

(3) Filing of Soils Investigation and Evaluation Reports shall be required as follows:

(i) A Zone I, Zone II or Zone III Soils Investigation and Evaluation Report and a grading plan shall be filed at the time of filing any tentative tract map or parcel map providing for lots or portions of lots within Zone I, Zone II or Zone III, or at the time of filing any application for rezoning or for special permits for parcels of land within Zone I, Zone II or Zone III;

(ii) For parcels of land within Zone I, Zone II or Zone III, that are not the subject of the filing of a tentative map or tentative parcel map, or that are not the subject of any application for rezoning or a special permit, a Zone I, Zone II or Zone III Soils Investigation and

Evaluation Report and a grading plan shall be filed with any request for a building permit.

(4) **Certification.** The Soils Investigation and Evaluation Reports shall be certified as follows:

(i) The engineer responsible for the soils investigation and evaluation report and for the grading plan shall certify that the proposed project will not cause any significant increase in the risk of damage to the bluff from erosion, slippage, subsidence or other movement when grading, drainage and other slope protection have been done in accordance with the soils investigation and evaluation report and the grading plan. The certificate may be executed on the face of the subdivision map or parcel map or may be contained in a separate instrument delivered to the Director.

(ii) The engineer responsible for the soils investigation and evaluation report and for the grading plan for parcels of land for which certification is not provided above shall file written certification with any request for a building permit that the proposed project will not cause any significant increase in the risk of damage to the bluff from erosion, slippage, subsidence or other movement, when grading, drainage and other slope protection have been done in accordance with the soils investigation and evaluation report and the grading plan.

(5) **Completion of Erosion Controls.** All erosion control measures shall be completed before the issuance of occupancy permits for residences constructed on lots within or partially within Zone II, and shall be completed before the issuance of building permits for structures constructed on lots within or partially within Zone III.

Section 12-1023. Grading and Erosion Control

Every map approved pursuant to this article shall be conditioned on compliance with the requirements for grading and erosion control, including the prevention of sedimentation or damage to off-site property, set forth in Appendix Chapter 70 of the Uniform Building Code, 1973 Edition, Volume I, as adopted and amended by the city as part of this Code.

County of Fresno General Plan

The County of Fresno General Plan contains goals and policies that address geology and soils. The following General Plan goal and policies are applicable to the proposed project.

Public Facilities Element

Policy PF-D.6. Onsite Sewage Disposal Systems. The County shall permit individual on-site sewage disposal systems on parcels that have the area, soils, and other characteristics that permit installation of such disposal facilities without threatening surface or groundwater quality or posing any other health hazards and where community sewer service is not available and cannot be provided. (RDR)

Health and Safety Element

Goal HS-D. To minimize the loss of life, injury, and property damage due to seismic and geologic hazards.

Policy HS-D.2. The County shall ensure that the General Plan and/or County Ordinance Code is revised, as necessary, to incorporate geologic hazard areas formally designated by the State Geologist (e.g., Earthquake Fault Zones and Seismic Hazard Zones). Development in such areas, including public infrastructure projects, shall not be allowed until compliance with the investigation and mitigation requirements established by the State Geologist can be demonstrated.

Policy HS-D.3. The County shall require that a soils engineering and geologic-seismic analysis be prepared by a California-registered engineer or engineering geologist prior to permitting development, including public infrastructure projects, in areas prone to geologic or seismic hazards (i.e., fault rupture, groundshaking, lateral spreading, lurchcracking, fault creep, liquefaction, subsidence, settlement, landslides, mudslides, unstable slopes, or avalanche).

Policy HS-D.4. The County shall require all proposed structures, additions to structures, utilities, or public facilities situated within areas subject to geologic-seismic hazards as identified in the soils engineering and geologic-seismic analysis to be sited, designed, and constructed in accordance with applicable provisions of the Uniform Building Code (Title 24 of the California Code of Regulations) and other relevant professional standards to minimize or prevent damage or loss and to minimize the risk to public safety.

Policy HS-D.8. The County shall require a soils report by a California-registered engineer or engineering geologist for any proposed development, including public infrastructure projects, that requires a County permit and is located in an area containing soils with high “expansive” or “shrink-swell” properties. Development in such areas shall be prohibited unless suitable design and construction measures are incorporated to reduce the potential risks associated with these conditions.

Policy HS-D.9. The County shall seek to minimize soil erosion by maintaining compatible land uses, suitable building designs, and appropriate construction techniques. Contour grading, where feasible, and revegetation shall be required to mitigate the appearance of engineered slopes and to control erosion.

Policy HS-D.11. The County shall not approve a County permit for new development, including public infrastructure projects where slopes are over thirty (30) percent unless it can be demonstrated by a California-registered civil engineer or engineering geologist that hazards to public safety will be reduced to acceptable levels.

Policy HS-D.12. In known or potential landslide hazard areas, the County shall prohibit avoidable alteration of land in a manner that could increase the hazard, including concentration of water through drainage, irrigation, or septic systems, undercutting the bases of slopes, removal of vegetative cover, and steepening of slopes.

County of Fresno Code of Ordinances

Section 15.28.010. Chapter 18, Chapter 33 and Appendix J of the 2013 California Building Code and Section R300 of the California Residential Code are adopted by reference and except as herein otherwise provided are applicable to and shall cover all grading and excavation within the unincorporated area of the County of Fresno.

5.6.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to geology and soils are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines. Accordingly, geology and soils impacts resulting from the proposed project are considered significant if the project would:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

   i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. (See Earthquakes, Impact GEO-1)

   ii. Strong seismic ground shaking? (See Seismic Ground Shaking, Impact GEO-2)

   iii. Seismic-related ground failure, including liquefaction? (See Seismic Ground Failure, Impact GEO-3)

   iv. Landslides? (See Landslides, Impact GEO-4)

b) Result in substantial soil erosion or the loss of topsoil? (See Erosion or Topsoil Loss, Impact GEO-5)

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? (See Unstable Geologic Location, Impact GEO-6)

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? (See Expansive Soil, Impact GEO-7)

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater? (See Wastewater Disposal Systems, Impact GEO-8)

5.6.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Earthquakes

Impact GEO-1	**The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:**
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Project Specific Impact Analysis

The proposed General Plan Update would accommodate future development within the General Plan Update Planning Area. According to the Fault Rupture Zones Map prepared by the California Department of Conservation in 2007, the Planning Area is not located within a Fault-Rupture Hazard Area. Moreover, no active faults have been identified within the Planning Area. The nearest zoned fault to the Planning Area is a portion of the Nunez Fault, located approximately 48 miles southwest of the Planning Area. Therefore, because no active faults occur within the Planning Area, impacts associated with fault rupture would be less than significant.

Cumulative Impact Analysis

Since the nearest zoned fault is located approximately 48 miles from the Planning Area, cumulative development within one mile of the Planning Area would experience less than significant fault rupture impacts. With future development within the Planning Area not being exposed to a zoned fault and fault ruptures are site specific, the implementation of the proposed project would not contribute to cumulative impacts associated with a fault rupture. Therefore, the project's contribution to fault rupture impacts would be less than cumulatively considerable and thus less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Seismic Ground Shaking

Impact GEO-2	**The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:**
	ii) Strong seismic ground shaking.

Project Specific Impact Analysis

As with most areas within the State of California, the Planning Area would be exposed to ground shaking from seismic events on local and regional faults. However, the Fresno area has historically experienced a low to moderate degree of seismicity. Between 1800 and 2012, 114 events have occurred with magnitudes greater than 4.0 within 60 miles of the Planning Area, and 136 events exceeded magnitude 5.0 within 100 miles of the Planning Area.

A review of geological literature indicates that groundshaking of VII intensity (Modified Mercalli Scale) was felt in the Planning Area from the 1872 Owens Valley Earthquake, which is the largest known earthquake to have historically affected the Planning Area. A VII intensity represents negligible damage in buildings of good design and construction, and slight to moderate damage in well-built ordinary structures. The most recent significant earthquake to affect the Fresno area is the 1983 Coalinga earthquake, a magnitude 6.7 event that occurred in the Coastal Range, west of the City. The Coalinga earthquake had a Modified Mercalli Intensity of VII in the Planning Area, but no significant damage was reported in the Planning Area.

Although the Planning Area occurs in an area with historically low to moderate level of seismicity, strong ground shaking could occur within the Planning Area during seismic events and occurrences have the possibility to result in significant impacts. Major seismic activity along the nearby Great Valley Fault Zone or the Nunez Fault, or other associated faults, could affect the Planning Area through strong seismic ground shaking. Strong seismic ground shaking could potentially cause structural damage to existing or proposed projects in the Planning Area, possibly resulting in damage to facilities and interruption of service.

Proposed projects in the Planning Area would be designed to withstand strong ground shaking, because all built projects are required to comply with the CBC to minimize the potential effects of ground shaking and other seismic activity. To reduce ground shaking impacts, the General Plan Update also includes the following objective and policies, and the City of Fresno Municipal Code includes Sections 11-101, 12-1022, and 12-1023, which are discussed in Section 5.6.4 above.

Noise and Safety

Objective NS-2. Minimize risks of property damage and personal injury posed by geologic and seismic risks.

Policy NS-2-a. Seismic Protection. Ensure seismic protection is incorporated into new and existing construction, consistent with the Fresno Municipal Code.

Policy NS-2-b. Soil Analysis Requirement. Identify areas with potential geologic and/or soils hazards, and require development in these areas to conduct a soil analysis and mitigation plan by a

registered civil engineer (or engineering geologist specializing in soil geology) prior to allowing on-site drainage or disposal for wastewater, stormwater runoff, or swimming pool/spa water.

Policy NS-2-c. Landfill Areas. Require proposed land uses on or near landfill areas to be designed and maintained to comply with California Code of Regulations, Title 27, Section 21190, Post Closure Land Use.

Policy NS-2-d. Bluff Preservation Overlay Zone. Maintain the requirements of the Bluff Preservation Overlay Zone District, which include provisions to:

- Require proposed development within 300 feet of the toe of the San Joaquin River bluffs to undertake an engineering soils investigation and evaluation report that demonstrates that the site is sufficiently stable to support the proposed development, or provide mitigations to provide sufficient stability; and
- Establish a minimum setback of 30 feet from the San Joaquin River bluff edge for all future structures and rear yards.

With the implementation of the above objective and policies as well as adherence to Municipal Code Section 12-1022 and other applicable sections, the implementation of development in accordance with the General Plan Update would reduce potential seismic ground shaking impacts to less than significant.

Cumulative Impact Analysis

The implementation of cumulative projects in the Planning Area and immediately adjacent areas (i.e., within one mile of the Planning Area) would not increase the potential for impacts associated with seismic ground shaking to occur. Cumulative projects would be exposed to similar ground shaking during seismic events, but would not increase the potential for impacts to occur within the Planning Area. Cumulative projects will also be required to comply with state and federal regulations, including the CBC, which would reduce potential seismic ground shaking impacts to less than significant levels. Since implementation of the General Plan Update would not contribute to or increase the potential for cumulative seismic ground shaking impacts, the project's contribution to cumulative impacts would be less than cumulatively considerable, and therefore, less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Seismic Ground Failure

Impact GEO-3	**The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:**
	iii) Seismic-related ground failure, including liquefaction.

Project Specific Impact Analysis

The predominant soils within the Planning Area consist of varying combinations of loose/very soft to very dense/hard silts, clays, sands, and gravels. Groundwater has been encountered near the ground surface in close proximity to water-filled features such as canals, ditches, ponds, and lakes. Based on these characteristics, the potential for soil liquefaction within the Planning Area ranges from very low to moderate due to the variable density of the subsurface soils and the presence of shallow groundwater. Implementation of the General Plan Update could result in the exposure of people or structures to liquefaction impacts that would be considered significant. However, the General Plan Update includes an objective and policies and the Fresno Municipal Code includes standards to reduce potential liquefaction impacts. These objective and policies include Objective NS-2 and Policies NS-2-a through NS-2-d. With the implementation of the objective, policies, and standards, potential soil liquefaction impacts would be less than significant.

In addition to liquefaction, the Planning Area could be susceptible to induced settlement of loose unconsolidated soils or lateral spread during seismic shaking events. Based on the nature of the subsurface materials and the relatively low to moderate seismicity of the region, seismic settlement and/or lateral spread are not anticipated to represent a substantial hazard within the Planning Area during seismic events. If induced settlement or lateral spread does occur, development projects could experience significant impacts. However, as each development project is proposed, implementation of the General Plan Update Objective NS-2 and Policies NS-2-a through NS-2-d and the Fresno Municipal Code, including Sections 11-101, 12-1022, and 12-1023, would reduce potential settlement and lateral spread impacts to less than significant levels.

Cumulative Impact Analysis

Development of cumulative projects in areas immediately adjacent to the Planning Area (i.e., within one mile) could expose people or structures to seismic-related ground failures such as liquefaction and lateral spread; however, cumulative projects will also be required to comply with the same Federal and State regulations, and to similar local regulations, as proposed development projects under the General Plan Update. Adherence to these standards would reduce potential seismic-related ground failure impacts associated with cumulative development to less than significant levels. Since the proposed project would also result in less than significant impacts, the project's

contribution to effects associated with seismic-related ground failure would be less than cumulatively considerable and thus less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Landslides

Impact GEO-4	**The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:**
	iv) Landslides.

Project Specific Impact Analysis

The Planning Area occurs within an area that consists of mostly flat topography within the Central Valley. Accordingly, there is no risk of large landslides in the majority of the Planning Area. However, there is the potential for landslides and slumping along the steep banks of rivers, creeks, or drainage basins such as the San Joaquin River bluff and the many unlined basins and canals that trend throughout the Planning Area.

The City of Fresno Municipal Code Section 12-2022 requires a preliminary soils report to be prepared for every subdivision and special geotechnical investigations to be performed in the vicinity of the San Joaquin River bluff prior to any new developments or modifications to the bluff area. These special investigations are identified as Bluff Zone I, II, and III investigations, which have specific requirements for evaluation of existing slope stability; post-development slope stability; documentation of existing conditions for rock falls, block carving, creep failures, sheer failures, excessive erosion and sloughing; evaluation of slope angles, subsurface drainage, proposed grading, structures, utility trenches, potential rodent population, storm drain disposal, surface irrigation, and drainage, erosion, traffic vibration, potential seismic hazards, on-site sewage disposal approximate to the bluffs, influence of future development and grading along the bluff toe for its effect on slope stability; and the adverse effect of increased surface and subsurface drainage. Compliance with these and other provisions of the City's Municipal Code would ensure that implementation of the General Plan Update would not expose people or structures to potential substantial adverse impacts

associated with landslides. Therefore, the project would result in less than significant impacts related to landslides.

Cumulative Impact Analysis

Cumulative projects could be proposed in areas immediately adjacent to the Planning Area (i.e., within one mile), which is primarily relatively flat. There are areas adjacent to the Planning Area that have steep hillsides, such as the areas adjacent to the San Joaquin River, or in areas near the slopes of unlined basins and canals. Cumulative projects will be required to adhere to federal and state regulations, including the foundation support and grading parameters of the CBC, as well as to their own local ordinances, such as Chapter 15.28 of the County of Fresno Ordinance Code, the City of Clovis Municipal Code Section 9.2.308, and the County of Madera Code of Ordinances, Title 17. Adherence to these federal, state, and local requirements would ensure that potential landslide impacts from cumulative development remain less than significant. Since implementation of the General Plan Update would result in less than significant impacts pertaining to landslides, and because cumulative projects would also result in less than significant impacts pertaining to landslides, the project's contribution to cumulative landslide impacts would be less than cumulatively considerable, and thus a less than cumulatively significant impact.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Soil Erosion or Topsoil Loss

Impact GEO-5 The project would not result in substantial soil erosion or the loss of topsoil.

Project Specific Impact Analysis

Natural forces, both chemical and physical, are continually at work breaking down soils. Erosion poses two hazards: (1) it removes soils, thereby undermining roads and buildings and producing unstable slopes, and (2) it deposits eroded soil in reservoirs, lakes, and drainage structures, and on roads as mudslides. Natural erosion is frequently accelerated by human activities such as site preparation for construction and alteration of topographic features. The following analysis focuses on the potential geotechnical effects of erosion related to project development. For a discussion of

potential effects on water quality due to erosion and sedimentation caused by construction activities or urban runoff, please see Section 5.9, Hydrology and Water Quality.

Implementation of the proposed General Plan Update would result in site preparation activities, such as grading and trenching, at future project sites located throughout the Planning Area. The development of any onsite or offsite storm drainage facilities (e.g., new or expanded channels or peak attenuation facilities such as swales or basins) would permanently alter existing topography. As discussed in Impact GEO-4, side slopes of channels or excavations during construction can be eroded by natural forces if proper slope angles are not maintained. Future projects would also result in the addition of impervious surfaces within the Planning Area, and depending on the location of the project, could possibly result in the alteration of topographic features at the project site. The alteration of topographic features could lead to increased erosion by creating unstable rock or soil surfaces, by changing the permeability or runoff characteristics of the soil, or by modifying or creating new pathways for drainage. Because much of the Planning Area is relatively flat and the locations of projects that would substantially alter topography are limited, there would be minimal geotechnical effects related to erosion. Since the Fresno Municipal Code Section 12-1022 requires the preparation of a preliminary soils report that would identify any potential site-specific soil issues, foundation support and grading parameters would be incorporated into the design as required by the Code. Further, Fresno Municipal Code Section 12-1023 requires every approved map to be conditioned on compliance with the requirements for grading and erosion control, including the prevention of sedimentation or damage to off-site property, set forth in Appendix Chapter 70 of the Uniform Building Code, 1973 Edition, Volume I, as adopted and amended by the city as part of this Code. Compliance with these policies and with other pertinent regulations will ensure that potential soil erosion impacts, or the potential loss of topsoil, would be less than significant.

Cumulative Impact Analysis

Cumulative projects in areas immediately adjacent to the Planning Area (i.e., within one mile) would result in similar construction and operational erosion impacts and impacts to topsoil. However, individual cumulative projects would also be required to comply with mandatory regulations during construction and operation. The jurisdictions in areas immediately adjacent to the Planning Area, such as the County of Fresno, City of Clovis, and the County of Madera, have implemented regulations to ensure the identification of potential soils impacts and the implementation of corrective actions. These regulations include Ordinance Code Section 15.28 (County of Fresno), Municipal Code Section 9.2.308 (City of Clovis), and County Code, Title 17 (County of Madera). The implementation of these regulations would reduce potential soil erosion and minimize the loss of topsoil associated with cumulative projects, thus ensuring that impacts to such resources remain less than significant. Since future development in accordance with the General Plan Update would also result in less than significant soil erosion and loss of topsoil impacts, the project's contribution to cumulative soil impacts would be less than cumulatively considerable, and thus less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Unstable Geologic Location

Impact GEO-6	**The project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.**

Project Specific Impact Analysis

Issues associated with liquefaction and lateral spreading are discussed in Impact GEO-3, and the potential for landslides are discussed in Impact GEO-4, above. As previously discussed, impacts associated with liquefaction, lateral spreading, and landslides would be less than significant. Portions of the San Joaquin Valley have been subject to land subsidence or collapse due to groundwater and petroleum extraction. Damage caused by subsidence or collapse has been restricted principally to significant changes in gradients of canals and aqueducts, and breakage of deep-water well casings. Within the San Joaquin Valley, subsidence or collapse is concentrated in the southern part and the west side of the valley where rainfall is sparse and groundwater recharge is minimal. Although subsidence or collapse is a significant concern in western Fresno County, as well as other portions of the San Joaquin Valley, the Planning Area is not known to be subject to such subsidence or collapse hazards. Accordingly, the impacts associated with this subsidence or collapse would be less than significant.

Cumulative Impact Analysis

As discussed in Impact GEO-3 and Impact GEO-4, above, the project's contribution to cumulative liquefaction, lateral spreading, and landslides is less than cumulatively considerable. As discussed above, subsidence or collapse occurs in the southern part and west side of the San Joaquin Valley, where rainfall is sparse and groundwater recharge is minimal. Neither the Planning Area nor the areas within one mile of the Planning Area are subject to such subsidence or collapse. Since all projects must comply with the federal, state, and pertinent local regulations regarding structural stability, as cumulative development occurs, less than significant subsidence or collapse impacts would occur. Since the proposed project would experience less than significant impacts associated with subsidence or collapse impacts and these potential impacts are site-specific, the project's

contribution to cumulative subsidence or collapse is less than cumulatively considerable, and thus less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Expansive Soil

Impact GEO-7	**The project could be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), however, substantial risks to life or property would not be created.**

Project Specific Impact Analysis

The surface and near-surface soils observed throughout the Planning Area consist of varying combinations of clays, silts, sands, gravels, and cobbles. The clayey soils are considered to be slightly to moderately expansive. Previously developed areas within the Planning Area contained expansive clayey soils, and it is anticipated that there are localized areas within the Planning Area that contain expansive soils. However, the specific locations are not known at this time. As future projects in accordance with the General Plan Update are proposed, preliminary soil reports in compliance with the City of Fresno Municipal Code Ordinance Section 12-1022 are required to be prepared to identify potential site-specific soil issues such as expansive soils and include foundation support and grading parameters in the project design. Further, grading and erosion control measures are required under Section 12-1023 of the City of Fresno Municipal Code. The implementation of the requirements in the City of Fresno Municipal Code would reduce potential expansive soil impacts to less than significant levels.

Cumulative Impact Analysis

Cumulative projects proposed for the areas within one mile of the Planning Area could be associated with expansive soils. However, individual cumulative projects would be required to comply with the same mandatory federal and state regulations. In addition, the jurisdictions that abut the Planning Area, such as the County of Fresno, City of Clovis, and the County of Madera, have implemented local regulations to ensure that potential expansive soils impacts are identified and corrective actions are taken. These regulations include Ordinance Code Section 15.28 (County of Fresno), Municipal Code Section 9.2.308 (City of Clovis), and County Code, Title 17 (County of Madera).

Compliance with these regulations would reduce potential expansive soil impacts associated with cumulative projects to less than significant. Since implementation of the General Plan Update would result in less than significant expansive soil impacts, the project's contribution to cumulative soil impacts would be less than cumulatively considerable, and thus less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Wastewater Disposal Systems

Impact GEO-8	**The project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.**

Project Specific Impact Analysis

Although septic tanks are allowed within the portion of the Planning Area that is currently under the jurisdiction of the County of Fresno, the implementation of the General Plan Update would require mandatory abatement of existing septic systems. This requirement is the same as the requirement identified in the 2025 General Plan Economic Development Element, E-19-a Policy. As development is proposed in compliance with the General Plan Update, septic systems would be removed and public sewage collection and disposal systems would be installed. Potential soil impacts associated with septic tanks would not occur because no new septic tanks would be installed. Therefore, the proposed General Plan Update would result in no impacts associated with soils that are incapable of supporting septic tanks.

Cumulative Impact Analysis

Cumulative development within one mile of the Planning Area could propose to install septic tank systems in the future, particularly within areas under the jurisdiction of the County of Fresno, County of Madera, and City of Clovis. While it is possible that soils in the vicinity of future cumulative projects that use septic systems could be incapable of adequately supporting the use of septic tanks, development under the General Plan Update would not contribute to potential impacts on the soils. Since the proposed project would not involve the installation of new septic tanks, the implementation of the proposed project would not contribute to potential cumulative impacts

related to soils supporting septic systems. Therefore, the proposed project would result in no cumulative impacts related to soils that are incapable of supporting septic systems.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

No impact.

Cumulative

No impact.

5.7 - Greenhouse Gases

5.7.1 - Introduction

This section contains the following components:

- Environmental Setting: Describes greenhouse gases and climate change.
- Regulatory Setting: Describes the federal, state, and local regulatory setting for greenhouse gases.
- Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation: Assesses the significance of greenhouse gases that may be emitted as part of the project and applies mitigation measures, if necessary. Project emissions are estimated by FirstCarbon Solutions; spreadsheets are contained in Appendix F-1.

5.7.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding greenhouse gas is the City of Fresno Planning Area because potential development under the City of Fresno General Plan and Development Code Update is limited to areas within the Planning Area where the emissions are generated. It should be noted that greenhouse gas impacts are inherently cumulative impacts.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative greenhouse gas impacts is the State of California. This analysis will be based on a summary of projections approach as provided in Section 15130(b)(1)(B) of the CEQA Guidelines. The applicable projections include those provided by the State pursuant to AB 32 and the ARB Scoping Plan prepared to address AB 32 requirements.

Regional Setting and Overview

The City of Fresno is located in the County of Fresno in the San Joaquin Valley Air Basin (Air Basin). The Air Basin consists of Kings, Madera, San Joaquin, Merced, Stanislaus, and Fresno counties; as well as a portion of Kern County. The local agency with jurisdiction over air quality in the Basin is the San Joaquin Valley Air Pollution Control District (the District or SJVAPCD).

Gases that trap heat in the atmosphere are referred to as greenhouse gases. The effect is analogous to the way a greenhouse retains heat. Common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Natural processes and human activities emit greenhouse gases. The presence of greenhouse gases in the atmosphere affects the earth's temperature. It is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

Climate change is driven by forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. Positive forcing tends to warm the surface while negative forcing tends to cool it. Radiative forcing values are typically expressed in watts per square meter. A feedback is a climate process that can strengthen or weaken a forcing. For example, when ice or snow melts, it reveals darker land underneath which absorbs more radiation and causes more warming. The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere. The global warming potential of a gas is essentially a measurement of the radiative forcing of a greenhouse gas compared with the reference gas, carbon dioxide.

Individual greenhouse gas compounds have varying global warming potential and atmospheric lifetimes. Carbon dioxide, the reference gas for global warming potential, has a global warming potential of one. The global warming potential of a greenhouse gas is a measure of how much a given mass of a greenhouse gas is estimated to contribute to global warming. To describe how much global warming a given type and amount of greenhouse gas may cause, the carbon dioxide equivalent is used. The calculation of the carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions, since it normalizes various greenhouse gas emissions to a consistent reference gas, carbon dioxide. For example, methane's warming potential of 21 indicates that methane has 21 times greater warming effect than carbon dioxide on a molecule-per-molecule basis. A carbon dioxide equivalent is the mass emissions of an individual greenhouse gas multiplied by its global warming potential. Greenhouse gases defined by Assembly Bill (AB) 32 (see the Climate Change Regulatory Environment section for a description of AB 32) include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. They are described in Table 5.7–1. A seventh greenhouse gas, nitrogen triflouride (NF_3) was added to Health and Safety Code section 38505(g)(7) as a greenhouse gas of concern. California's latest emission inventory does not include NF_3; however, future State inventories will likely include it. This chemical is used in electronics manufacture for semiconductors and liquid crystal displays and has a high global warming potential of 17,200. Little or no manufacturing using NF_3 is expected in Fresno,

Table 5.7–1: Description of Greenhouse Gases

Greenhouse Gas	Description and Physical Properties	Sources
Nitrous oxide	Nitrous oxide (laughing gas) is a colorless greenhouse gas. It has a lifetime of 114 years. Its global warming potential is 310.	Microbial processes in soil and water, fuel combustion, and industrial processes.
Methane	Methane is a flammable gas and is the main component of natural gas. It has a lifetime of 12 years. Its global warming potential is 21.	Methane is extracted from geological deposits (natural gas fields). Other sources are landfills, fermentation of manure, and decay of organic matter.
Carbon dioxide	Carbon dioxide (CO_2) is an odorless, colorless, natural greenhouse gas. Carbon dioxide's global warming potential is 1. The concentration in	Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic

Greenhouse Gas	Description and Physical Properties	Sources
	2005 was 379 parts per million (ppm), which is an increase of about 1.4 ppm per year since 1960.	outgassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood.
Chlorofluorocarbons	These are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. They are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). Global warming potentials range from 3,800 to 8,100.	Chlorofluorocarbons were synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited their production in 1987.
Hydrofluorocarbons	Hydrofluorocarbons are a group of greenhouse gases containing carbon, chlorine, and at least one hydrogen atom. Global warming potentials range from 140 to 11,700.	Hydrofluorocarbons are synthetic manmade chemicals used as a substitute for chlorofluorocarbons in applications such as automobile air conditioners and refrigerants.
Perfluorocarbons	Perfluorocarbons have stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface. Because of this, they have long lifetimes, between 10,000 and 50,000 years. Global warming potentials range from 6,500 to 9,200.	Two main sources of perfluorocarbons are primary aluminum production and semiconductor manufacturing.
Sulfur hexafluoride	Sulfur hexafluoride is an inorganic, odorless, colorless, and nontoxic, nonflammable gas. It has a lifetime of 3,200 years. It has a high global warming potential, 23,900.	This gas is man-made and used for insulation in electric power transmission equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas.
Sources: Compiled from a variety of sources, primarily Intergovernmental Panel on Climate Change 2007a and 2007b.		

Other greenhouse gases include water vapor, ozone, and aerosols. Water vapor is an important component of our climate system and is not regulated. Ozone and aerosols are short-lived greenhouse gases; global warming potentials for short-lived greenhouse gases are not defined by the Intergovernmental Panel on Climate Change (IPCC). Aerosols can remain suspended in the atmosphere for about a week and can warm the atmosphere by absorbing heat and cool the atmosphere by reflecting light.

Black carbon is formed by incomplete combustion of fossil fuels, biofuels, and biomass. Sources of black carbon within a jurisdiction may include exhaust from diesel trucks, vehicles, and equipment, as well as smoke from biogenic combustion. Biogenic combustion sources of black carbon include the burning of biofuels used for transportation, the burning of biomass for electricity generation and heating such as fireplaces, prescribed burning of agricultural residue, and natural and unnatural

wildfires. Black carbon is not a gas but an aerosol—particles or liquid droplets suspended in air. Black carbon only remains in the atmosphere for days to weeks, as opposed to other greenhouse gases that can remain in the atmosphere for years. Black carbon can be deposited on snow, where it absorbs sunlight, reduces sunlight reflectivity, and hastens snowmelt. Direct effects include absorbing incoming and outgoing radiation; indirectly, black carbon can also affect cloud reflectivity, precipitation, and surface dimming (cooling).

Although there could be health effects resulting from changes in the climate and the consequences that climate change can bring about, inhalation of greenhouse gases at levels currently in the atmosphere would not result in adverse health effects, with the exception of ozone and aerosols (particulate matter). The potential health effects of ozone and particulate matter are discussed in criteria pollutant analyses in the MEIR Air Quality Section. At very high indoor concentrations (not at levels existing outside), carbon dioxide, methane, sulfur hexafluoride, and some chlorofluorocarbons can cause suffocation, as the gases can displace oxygen (Centers for Disease Control and Prevention 2010, Occupational Safety and Health Administration 2003).

Consequences of Climate Change in California

In California, climate change may result in consequences such as the following (from California Climate Change Center 2006 and Moser et al. 2009):

- **A reduction in the quality and supply of water from the Sierra snowpack.** If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. This can lead to challenges in securing adequate water supplies. It can also lead to a potential reduction in hydropower.
- **Increased risk of large wildfires.** If rain increases as temperatures rise, wildfires in the grasslands and chaparral ecosystems of southern California are estimated to increase by approximately 30 percent toward the end of the 21st century because more winter rain will stimulate the growth of more plant "fuel" available to burn in the fall. In contrast, a hotter, drier climate could promote up to 90 percent more northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation.
- **Reductions in the quality and quantity of certain agricultural products.** The crops and products likely to be adversely affected include wine grapes, fruit, nuts, and milk.
- **Exacerbation of air quality problems.** If temperatures rise to the medium warming range, there could be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if rising temperatures remain in the lower warming range. This increase in air quality problems could result in an increase in asthma and other health-related problems.
- **A rise in sea levels resulting in the displacement of coastal businesses and residences.** During the past century, sea levels along California's coast have risen about seven inches. If emissions continue unabated and temperatures rise into the higher anticipated warming

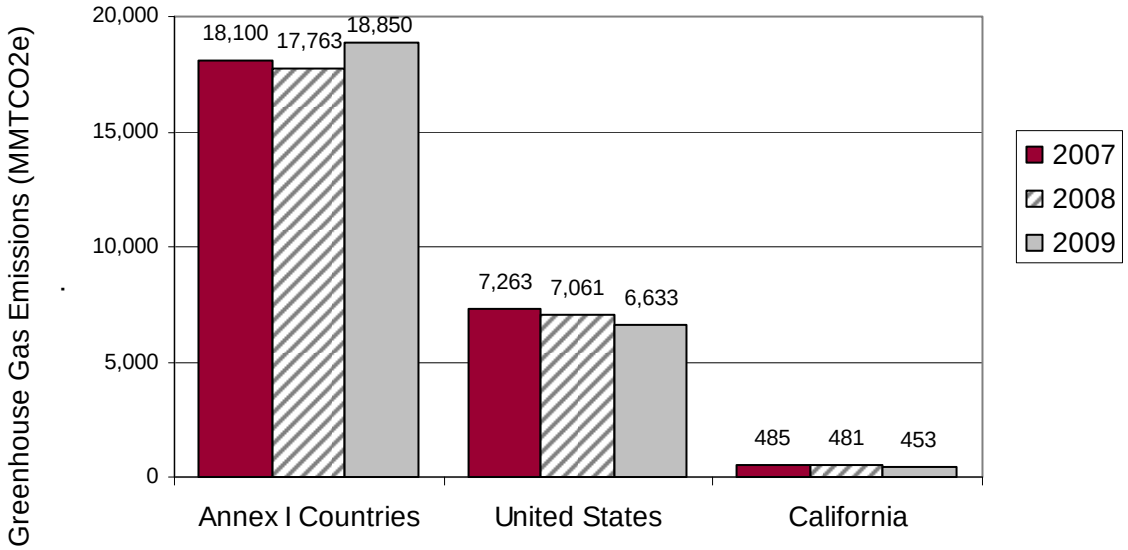
range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

- **An increase temperature and extreme weather events.** Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in California. More heat waves can exacerbate chronic disease or heat-related illness.
- **A decrease in the health and productivity of California's forests.** Climate change can cause an increase in wildfires, an enhanced insect population, and establishment of non-native species.

Emissions Inventories

Emissions worldwide were approximately 49,000 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) in 2004 (Intergovernmental Panel on Climate Change 2007b). Greenhouse gas emissions in 2007, 2008, and 2009 are shown in Figure 5.7-1. Annex I parties refers to countries that joined the United Nations Framework Convention on Climate Change.

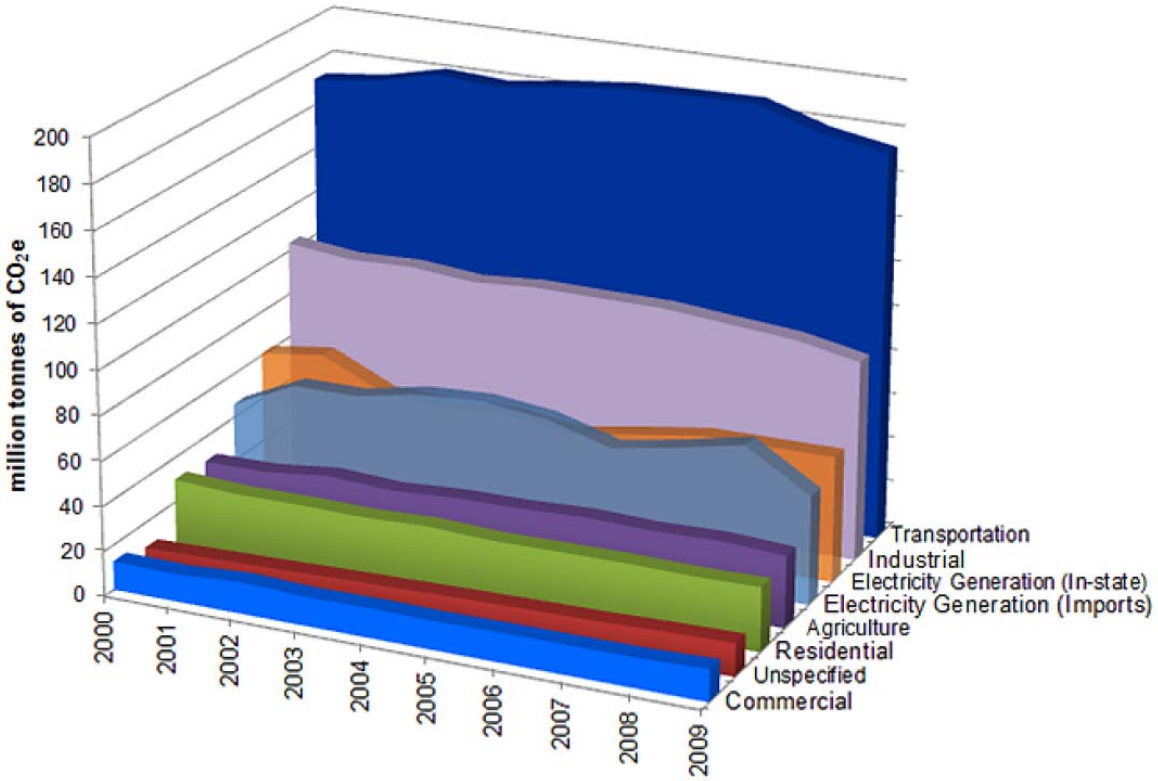
Figure 5.7-1: Greenhouse Gas Emissions Trends



Prepared by Michael Brandman Associates using the following data sources:
California Air Resources Board 2011
U.S. Environmental Protection Agency 2011
United Nations Framework Convention on Climate Change 2010

As shown in Figure 5.7-2, the main contribution of greenhouse gas emissions in California from the year 2000 through 2009 was transportation (Source: California Air Resources Board 2011b). The second highest sector was industrial, which includes sources from refineries, general fuel use, oil and gas extraction, cement plants, and cogeneration heat output.

Figure 5.7-2: Greenhouse Gas Emission Trends by Sector in California



5.7.3 - Regulatory Setting

International

Climate change is a global issue involving greenhouse gas emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce greenhouse gases.

Intergovernmental Panel on Climate Change. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

United Nations Framework Convention on Climate Change (Convention). On March 21, 1994, the United States joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions at average of 5 percent against 1990 levels over the 5-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. .The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

National

Prior to the last decade, there have been no concrete federal regulations of greenhouse gases or major planning for climate change adaptation. The following are actions regarding the federal government, greenhouse gases, and fuel efficiency.

Greenhouse Gas Endangerment. *Massachusetts v. EPA* (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four greenhouse gases, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act. The Court held that the Administrator must determine whether emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- *Endangerment Finding*: The Administrator found that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- *Cause or Contribute Finding*: The Administrator found that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing greenhouse gas emissions standards for vehicles, as discussed in the section "Clean Vehicles" below.

The EPA denied 10 petitions for Reconsideration of the Endangerment and Cause or Contribute Findings in 2010. Some of the petitioners included the Ohio Coal Association, Peabody Energy Company, and the State of Texas.

In September 2011, the EPA Office of Inspector General evaluated the EPA's compliance with established policy and procedures in the development of the endangerment finding, including processes for ensuring information quality. The evaluation concluded that the technical support document should have had more rigorous EPA peer review.

In June 2012, a federal appeals court rejected a lawsuit by 13 states against the EPA. The suit alleged that the EPA violated the law by relying almost exclusively on data from the United Nations Intergovernmental Panel on Climate Change rather than doing its own research or testing data according to federal standards. The states include Virginia, Texas, Alabama, Florida, Hawaii, Indiana, Kentucky, Louisiana, Mississippi, Nebraska, North Dakota, Oklahoma, South Carolina, South Dakota, and Utah. A petition for writ of certiorari to the United States Court of Appeals for the District of Columbia Circuit was denied by the Supreme Court on October 15, 2013.

Clean Vehicles. Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On May 7, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States. The final rule became effective July 6, 2010.

The first phase of the national program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration are working on a second-phase joint rulemaking to establish national standards for light-duty vehicles for model years 2017 and beyond.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce greenhouse gas emissions and improve fuel efficiency of *heavy-duty trucks and buses on September 15, 2011, effective November 14, 2011*. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20-percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For

heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles and a 15-percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the agencies are proposing engine and vehicle standards starting in the 2014 model year, which would achieve up to a 10-percent reduction in fuel consumption and carbon dioxide emissions by 2018 model year.

Mandatory Reporting of Greenhouse Gases. The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory greenhouse gas reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule, which became effective January 1, 2010. The rule requires reporting of greenhouse gas emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of greenhouse gas emissions are required to submit annual reports to the EPA.

New Source Review. The EPA issued a final rule on May 13, 2010 that establishes thresholds for greenhouse gases that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the federal code of regulations, the EPA states:

> This rulemaking is necessary because without it the [Prevention of Significant Deterioration] and title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the [Clean Air Act], greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to [greenhouse gas] sources, starting with the largest [greenhouse gas] emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from [Prevention of Significant Deterioration] and title V permitting for [greenhouse gas] emissions until at least April 30, 2016.

The EPA estimates that facilities responsible for nearly 70 percent of the national greenhouse gas emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest greenhouse gas emitters—power plants, refineries, and cement production facilities.

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units. As required by a settlement agreement, the EPA proposed new source

performance standards for emissions of carbon dioxide for new affected fossil fuel-fired electric utility generating units on March 27, 2012. The proposed rule was re-issued on January 8, 2014. New sources greater than 25 megawatt would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour, based on the performance of widely used natural gas combined cycle technology. EPA expects the final rule to be issued in 2015.

Cap and Trade. Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. Examples in the United States include the Acid Rain Program and the NO_x Budget Trading Program and Clean Air Interstate Rule in the northeast. The Clean Air Interstate Rule (CAIR) and the Acid Rain Program (ARP) are both cap and trade programs designed to reduce emissions of sulfur dioxide (SO2) and nitrogen oxides (NOx) from power plants. The ARP, established under Title IV of the 1990 Clean Air Act (CAA) Amendments, requires power plants to make major emission reductions of SO2 and NOx, the primary precursors of acid rain. CAIR addresses regional interstate transport of soot (fine particulate matter) and smog (ozone) pollution. CAIR requires certain eastern states to limit annual emissions of SO2 and NOx, which contribute to the formation of fine particulate matter. It also requires certain states to limit ozone season NOx emissions, which contribute to the formation of ozone during the summer ozone season (May through September). There is no federal greenhouse gas cap-and-trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap and trade.

The Regional Greenhouse Gas Initiative is an effort to reduce greenhouse gases among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps carbon dioxide emissions from power plants, auctions carbon dioxide emission allowances, and invests the proceeds in energy programs in an effort to further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008.

The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce regional greenhouse gas emissions to 15 percent below 2005 levels by 2020. The partners are California, British Columbia, Manitoba, Ontario, and Quebec. Its cap-and-trade program is estimated to be fully implemented in 2015.

State

Legislative Actions to Reduce Greenhouse Gases.

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce greenhouse gases of any state in the nation. Some legislation such as the landmark AB 32 California Global Warming Solutions Act of 2006 was specifically enacted to address greenhouse gas emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide greenhouse gas reductions. This section describes the major provisions of the legislation.

AB 32. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. "Greenhouse gases" as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of greenhouse gases. ARB is the state agency charged with monitoring and regulating sources of greenhouse gases. AB 32 states the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

The ARB Board approved the 1990 greenhouse gas emissions level of 427 $MMTCO_2e$ on December 6, 2007 (California Air Resources Board 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. Emissions in 2020 in a "business as usual" scenario are estimated to be 596 $MMTCO_2e$, which do not account for reductions from AB 32 regulations (California Air Resources Board 2008). At that level, a 28 percent reduction was required to achieve the 427 million MTCO2e 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 million MTCO2e. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels (ARB 2010). The ARB also prepared updated emission inventories for 2000 through 2011 to show progress achieved to date (ARB 2013). Executive Order S-3-05 includes a target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 million MTCO2e
- 2000: 463 million MTCO2e (an average 8-percent reduction needed to achieve 1990 base)
- 2010: 450 million MTCO2e (an average 5-percent reduction needed to achieve 1990 base)
- 2020: 545 million MTCO2e BAU (an average 21.7-percent reduction needed to achieve 1990 base)

Under AB 32, the ARB published its Final Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California. Discrete early action measures are currently underway or are enforceable by January 1, 2010. The ARB has 44 early action measures that apply to the transportation, commercial, forestry, agriculture, cement, oil and gas, fire suppression, fuels, education, energy efficiency, electricity, and waste sectors. ARB has completed regulations

implementing all Early Action Measures. The ARB estimated that the 44 recommendations are expected to result in reductions of at least 42 $MMTCO_2e$ by 2020, representing approximately 25 percent of the 2020 target.

The ARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 (California Air Resources Board 2008). The Scoping Plan identifies recommended measures for multiple greenhouse gas emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 greenhouse gas target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

In addition, the Scoping Plan differentiates between "capped" and "uncapped" strategies. Capped strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the inclusion of these emissions within the cap-and trade program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. Uncapped strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional greenhouse gas emission reductions.[1]

[1] On March 17, 2011, the San Francisco Superior Court issued a final decision in *Association of Irritated Residents v. California Air Resources Board* (Case No. CPF-09-509562). While the Court upheld the validity of the ARB Scoping Plan for the implementation of AB 32, the Court enjoined ARB from further rulemaking under AB 32 until ARB amends its CEQA environmental review of the Scoping Plan to address the flaws identified by the Court. On May 23, 2011, ARB filed an appeal. On June 24, 2011, the Court of Appeal granted ARB's petition staying the trial court's order pending consideration of the appeal. In the interest of informed

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 greenhouse gas limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (ARB 2014).

The ARB has no legislative mandate to set a target beyond the 2020 target from AB 32 or to adopt additional regulations to achieve a post-2020 target. The Update estimates that reductions averaging 5.2 percent per year would be required after 2020 to achieve the 2050 goal. With no estimate of future reduction commitments from the State, identifying a feasible strategy including plans and measures to be adopted by local agencies is not possible. Implementation of the City's General Plan Update will help support both the short term and long-term objectives of the Update. However, there is no way of determining whether the City would need to take additional actions beyond its existing programs and the land use and transportation strategies contained in the General Plan Update until such a time as new State targets and a new Scoping Plan is adopted.

SB 375. Passing the Senate on August 30, 2008, SB 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of greenhouse gas emissions, which emits over 40 percent of the total greenhouse gas emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing greenhouse gas emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies. The Fresno Council of Governments has adopted emissions reductions for per capita light duty vehicles from 2005 levels of 4.7 percent by 2020 and 7.6 percent by 2035.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28 states that CEQA findings determinations for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the greenhouse gas emission reduction targets.

decision-making, on June 13, 2011, ARB released the expanded alternatives analysis in a draft Supplement to the AB 32 Scoping Plan Functional Equivalent Document. The ARB Board approved the Scoping Plan and the CEQA document on August 24, 2011.

2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

Fresno COG adopted the 2014 Regional Transportation Plan (RTP) on June 26, 2014, which contains the Sustainable Communities Strategy. The RTP describes the RTP/SCS as seeking to guide the Fresno region toward a more sustainable future by integrating land use, housing, and transportation planning to create communities that are more compact, walkable, and transit oriented. Sustainability is defined as simultaneously meeting current economic, environmental, and community needs, while ensuring that the ability of future generations to meet their needs is not jeopardized. Aprosperous economy, a healthy environment, and social equity are described as the "Three Es" of sustainability. (Fresno COG, 2014)

AB 1493 Pavley Regulations and Fuel Efficiency Standards. California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. On January 21, 2009, the ARB requested that the EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed that the EPA assess whether the denial of the waiver was appropriate. On June 30, 2009, the EPA granted the waiver request. On September 8, 2009, the U.S. Chamber of Commerce and the National Automobile Dealers Association sued the EPA to challenge its granting of the waiver to California for its standards. California assisted the EPA in defending the waiver decision. The U.S. District Court for the District of Columbia denied the Chamber's petition on April 29, 2011. The EPA subsequently granted the requested waiver in 2009, which was upheld by the by the U.S. District Court for the District of Columbia in 2011

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22-percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30-percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and greenhouse gas emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce greenhouse gases from new cars by 34 percent from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is

available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

SB 1368. In 2006, the State Legislature adopted Senate Bill (SB) 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for greenhouse gas emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California's energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the performance standard for greenhouse gas emissions required by SB 1368. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007.

Renewable Electricity Standards. On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Governor Schwarzenegger also directed the ARB (Executive Order S-21-09) to adopt a regulation by July 31, 2010, requiring the state's load serving entities to meet a 33-percent renewable energy target by 2020. The ARB Board approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23.

Executive Orders Related to Greenhouse Gas Emissions

California's Executive Branch has taken several actions to reduce greenhouse gases through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

Executive Order S-13-08. Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the " . . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-3-05. Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for greenhouse gas emissions:

- By 2010, reduce greenhouse gas emissions to 2000 levels.
- By 2020, reduce greenhouse gas emissions to 1990 levels.
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Low Carbon Fuel Standard - Executive Order S-01-07. The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009. The Low Carbon Fuel Standard was challenged in the United States District Court in Fresno in 2011. The court's ruling issued on December 29, 2011 included a preliminary injunction against ARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012 pending final ruling on appeal, allowing the ARB to continue to implement and enforce the regulation. The 9th Circuit's decision filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that Low Carbon Fuel Standards adopted by ARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court of Appeal (California) ruled ARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for Low Carbon Fuel Standards. In a partially-published opinion, the Court of Appeal reversed the trial court's judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of ARB approving Low Carbon Fuel Standards (LCFS) regulations promulgated to reduce greenhouse gas (GHG) emissions. However, the court tailored its remedy to protect the public interest by allow the LCFS regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy."

SB 97 and the CEQA Guidelines Update. Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code originally stated "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code.

The Office of Planning and Research prepared amendments to the CEQA Guidelines for addressing greenhouse gas emissions to comply with SB 97. The amendments became effective on March 18, 2010. The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of greenhouse gas emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of greenhouse gas emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, little guidance is offered on the crucial next step in this assessment process—how to determine whether the project's estimated greenhouse gas emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. Greenhouse gas mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze greenhouse gas emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable; however, it does not answer the question of when emissions are cumulatively considerable.

Section 15183.5 permits programmatic greenhouse gas analysis and later project-specific tiering, as well as the preparation of Greenhouse Gas Reduction Plans. Compliance with such plans can support a determination that a project's cumulative effect is not cumulatively considerable, according to proposed Section 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in Appendix G was amended to include greenhouse gas questions.

California Regulations and Building Codes

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

Title 24. California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions. The newest version of Title 24 was adopted by the California Energy Commission (CEC) on May 31, 2012 and was scheduled to become effective on January 1, 2014. On December 11, 2013, the CEC extended the compliance date to July 1, 2014 to allow more time for the building industry and local building departments to prepare.

Title 20. California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. Twenty-three categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

California Green Building Standards Code is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect January 1, 2011. It does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

The California Green Building Standards Code (California Code of Regulations Title 24, Part 11 code) requires:

- Short-term bicycle parking. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.1.2).
- Designated parking. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling. (5.410.1).
- Construction waste. A minimum 50-percent diversion of construction and demolition waste from landfills, increasing voluntarily to 65 and 80 percent for new homes and 80-percent for commercial projects. (5.408.1, A5.408.3.1 [nonresidential], A5.408.3.1 [residential]). All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled. (5.408.3).

- Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:
  1. The installation of water-conserving fixtures or
  2. Using nonpotable water systems (5.303.4).
- Water use savings. 20-percent mandatory reduction in indoor water use with voluntary goal standards for 30, 35 and 40-percent reductions. (5.303.2, A5303.2.3 [nonresidential]).
- Water meters. Separate water meters for buildings in excess of 50,000 square feet or buildings projected to consume more than 1,000 gallons per day. (5.303.1).
- Irrigation efficiency. Moisture-sensing irrigation systems for larger landscaped areas. (5.304.3).
- Materials pollution control. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring and particleboard. (5.404).

Building commissioning. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies. (5.410.2).

San Joaquin Valley Air Pollution Control District

The project is within the San Joaquin Valley Air Basin, which is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (District). The District has authority to regulate stationary sources of emissions and prepares plans to attain air quality standards. The District does not have authority to regulate mobile and area wide sources of greenhouse gases; however, due to their expertise in air quality programs, the District offers technical assistance and guidance to local agencies in addressing greenhouse gas impacts.

Climate Change Action Plan

On August 21, 2008, the District Governing Board approved a proposal, called the Climate Change Action Plan, to begin a public process to bring together stakeholders, land use agencies, environmental groups, and business groups, and to conduct public workshops to develop comprehensive policies for CEQA guidelines, a carbon exchange bank, and voluntary greenhouse gas emissions mitigation agreements for the Governing Board's consideration. The Climate Change Action Plan contained the following goals and actions:

Goals

1. Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with greenhouse gas emissions increases.
2. Assist Valley businesses in complying with mandates of AB 32 (Global Warming Solutions Act of 2006).

3. Ensure that climate protection measures do not cause increases in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

Actions

1. Authorize the Air Pollution Control Officer to develop greenhouse gas significance threshold(s) or other mechanisms to address CEQA projects with greenhouse gas emissions increases. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in the spring of 2009.

2. Authorize the Air Pollution Control Officer to develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary greenhouse gas reductions created in the Valley. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in spring 2009.

3. Authorize the Air Pollution Control Officer to enhance the District's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB 32 emission reporting requirements to submit simultaneous streamlined reports to the District and the state of California with minimal duplication.

4. Authorize the Air Pollution Control Officer to develop and administer voluntary greenhouse gas emission reduction agreements to mitigate proposed greenhouse gas increases from new projects.

5. Direct the Air Pollution Control Officer to support climate protection measures that reduce greenhouse gas emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted areas.

CEQA Greenhouse Gas Guidance

On December 17, 2009, the District Governing Board adopted "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA" and the policy: "District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency." The District concluded that the existing science is inadequate to support quantification of the impacts that project-specific greenhouse gas emissions have on global climatic change. The District found that the effects of project-specific emissions to be cumulative, and without mitigation, their incremental contribution to global climatic change could be considered cumulatively considerable. The District found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas emissions, whether through project design elements or mitigation.

The District's approach is intended to streamline the process of determining if project-specific greenhouse gas emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and have a certified Final CEQA document.

For non-exempt projects, those projects for which there is no applicable approved plan or program, or those projects not complying with an approved plan or program, the lead agency would evaluate the project against performance-based standards and would require the adoption of design elements, known as a Best Performance Standard, to reduce greenhouse gas emissions. The Best Performance Standards have not yet fully been established, though they must be designed to effect a 29-percent reduction when compared with the "business-as-usual" projections identified in ARB's AB 32 Scoping Plan.

"Business-as-usual" is the emissions occurring in 2020 if the average baseline emissions during the 2002–2004 period were grown to 2020 levels, without control. These standards thus would carry with them pre-quantified emissions reductions, eliminating the need for project specific quantification. Therefore, projects incorporating Best Performance Standards would not require specific quantification of greenhouse gas emissions, and automatically would be determined to have a less than significant cumulative impact for greenhouse gas emissions.

For stationary source permitting projects, Best Performance Standards means, "The most stringent of the identified alternatives for control of greenhouse gas emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class." The District has identified Best Performance Standards for the following sources: boilers; dryers and dehydrators; oil and gas extraction, storage, transportation, and refining operations; cogeneration; gasoline dispensing facilities; volatile organic compound control technology; and steam generators.

For development projects, Best Performance Standards means, "Any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual."

Projects not incorporating Best Performance Standards would require quantification of greenhouse gas emissions and demonstration that business-as-usual greenhouse gas emissions have been reduced or mitigated by 29 percent. Quantification of greenhouse gas emissions would be required for all projects for which the lead agency has determined that an environmental impact report is required, regardless of whether the project incorporates Best Performance Standards.

San Joaquin Valley Carbon Exchange

The District initiated work on the San Joaquin Valley Carbon Exchange in November 2008. The purpose of the carbon exchange is to quantify, verify, and track voluntary greenhouse gas emissions

reductions generated within the San Joaquin Valley. To investigate the various issues concerning the development of a mechanism to register greenhouse gas emission reductions, the District formed a technical workgroup consisting of District staff, land use agency representatives, industry representatives, agricultural representatives, environmental group representatives, and other interested parties. The workgroup met several times in public meetings during late 2008 and early 2009 to discuss several areas of concern regarding a greenhouse gas emission reduction registration program, including:

- The differences between the upcoming AB 32 cap-and-trade program and a greenhouse gas emission reduction registration program.
- Potential uses of registered greenhouse gas emission reductions. Registered greenhouse gas emission reductions could possibly be used to provide mitigation in the CEQA process, as a means to comply with a greenhouse gas cap-and-trade program, or other purposes.
- A review of other greenhouse gas emission reduction registration programs currently in existence, including the Chicago Climate Exchange, New York Climate Exchange, Northeast Climate Exchange, Climate Action Reserve, and South Coast Air Quality Management District's SoCal Climate Solutions Exchange.
- Required elements of a District-administered greenhouse gas emission reduction registration program, including the establishment of criteria for greenhouse gas emission reduction registration, the use of ARB protocols, and the requirement to quantify some emission reductions.
- The advantages and disadvantages of development of a greenhouse gas emission reduction registration program.
- Alternatives to the development of a District-administered greenhouse gas emission reduction registration program were discussed, including the District's possible role in California Climate Action Reserve as an emission reduction project verifier and/or providing technical assistance to project proponents to quantify and mitigate their projects greenhouse gas emissions as part of the CEQA process.

Rule 2301

While the Climate Change Action Plan indicated that the greenhouse gas emission reduction program would be called the San Joaquin Valley Carbon Exchange, the District incorporated a method to register voluntary greenhouse gas emission reductions into its existing Rule 2301 - Emission Reduction Credit Banking through amendments of the rule. Amendments to the rule were adopted on January 19, 2012. The purposes of the amendments to the rule include the following:

- Provide an administrative mechanism for sources to bank voluntary greenhouse gas emission reductions for later use.
- Provide an administrative mechanism for sources to transfer banked greenhouse gas emission reductions to others for any use.

- Define eligibility standards, quantitative procedures, and administrative practices to ensure that banked greenhouse gas emission reductions are real, permanent, quantifiable, surplus, and enforceable.

Local

City of Fresno

The City of Fresno has a long history of support for programs that improve air quality and sustainability. The current 2025 Fresno General Plan adopted in 2000 and Air Quality Element of the 2025 General Plan in 2009 provide a strong start in reducing the air quality and greenhouse gas impacts and improving the sustainability of development in the City. The proposed General Plan Update and Greenhouse Gas Reduction Plan provides additional support for greenhouse gas reductions and sustainability as described below.

The Greenhouse Gas Reduction Plan (GHG Plan) (Appendix F-2) provides a comprehensive assessment of the benefits of these General Plan and Development Code Update policies along with existing plans, programs, and initiatives that reduce greenhouse gas emissions. In addition, the GHG Plan includes an emission reduction target for demonstrating consistency with State GHG reduction targets. The analysis prepared to quantify greenhouse gas emissions and emission reductions provides the basis for the GHG Plan targets and for CEQA significance findings of implementing the General Plan and Development Code Update and the GHG Plan.

Proposed General Plan and Development Code Update

The proposed General Plan Update sets forth the following guiding and implementing policies that are relevant to greenhouse gases.

Policy ED-1-c: Promote, educate, and market the benefits of a "Buy Local" campaign. Explores a "Buy Local" target for Public Works and other City purchasing decisions.

Policy UF-1-c: Legible City Structure. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people and pedestrian-oriented activity in Downtown; among a small number of prominent east-west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lands and streets.

Policy UF-12-a: BRT Corridors. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.

Policy UF-12-b: Activity Centers. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.

Policy UF-12-d: Appropriate Mixed-Use. Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one or adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.

Policy UF-12-e: Access to Activity Centers. Promote adoption and implementation of standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.

Policy UF-12-f: Mixed-Use in Activity Centers. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.

Policy UF-12-g: Impacts on Surrounding Uses. Establish design standards and buffering requirements for high-intensity Activity Centers to protect surrounding residential uses from increased impacts from traffic noise and vehicle emissions, visual intrusion, interruption of view and air movement, and encroachment upon solar access.

Policy UF-13-a: Future Planning to Require Design Principles. Require future planning, such as Specific Plans, neighborhood plans or Concept Plans, for Development Areas and BRT Corridors designated by the General Plan to include urban design principles and standards consistent with the Urban Form, Land Use, and Design Element.

Objective UF-14: Create an urban form that facilitates multi-modal connectivity.

Policy UF-14-a: Design Guidelines for Walkability. Develop and use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.

Policy UF-14-b: Local Street Connectivity. Design local roadways to connect throughout neighborhoods and large private developments with adjacent major roadways and pathways of existing adjacent development. Create access for pedestrians and bicycles where a local street must dead end or be designed as a cul-de-sac to adjoining uses that provide services, shopping, and connecting pathways for access to the greater community area.

Policy UF-4-c: Block Length. Create development standards that provide desired and maximum block lengths in residential, retail, and mixed-use districts order to enhance walkability.

Objective LU-2: Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residences.

Policy LU-2-a: Infill Development and Redevelopment. Promote development of vacant, underdeveloped, and redevelopable land within the City Limits where urban services are available by considering the establishment and implementation of supportive regulations and programs.

Policy LU-2-b: Infill Development for Affordable Housing. Consider a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City limits as a strategy to help to meet the affordable housing needs of the community.

Policy LU-2-c: Infill Design Toolkit. Develop and distribute an infill design toolkit, consistent with the City's Infill Development Act to support and encourage infill development.

Policy LU-2-d: Infrastructure Upgrades. Facilitate urban infill by building and upgrading community and neighborhood public infrastructure and services in order to enhance public health and convenience, and the overall experience and quality of city living.

Policy LU-3-b: Mixed-Use Urban Corridors that Connect the Downtown Planning Area. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon Road corridors, as shown on Figure LU-1: General Plan Land Use Diagram.

LU-3-c: Zoning for High Density on Major BRT Corridors. Encourage adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish the long-term growth and development potential for Downtown.

Policy LU-5-f: High Density Residential Uses. Promote high-density residential uses to support Activity Centers and BRT Corridors, affordable housing, and walkable access to transit stops.

Policy LU-6-b: Commercial Development Guidelines. Consider adopting commercial development guidelines to assure high quality design and site planning for large commercial developments, consistent with the Urban Form policies of this Plan.

Policy LU-6-g: Lodging Facilities Location. Site lodging facilities and related accommodations near major transportation facilities.

Policy LU-8-b: Access to Public Facilities. Ensure that major public facilities and institutions have adequate multi-modal access and can be easily reached by public transit.

Policy D-1-g: Reducing Surface Parking. Consider adopting and implementing incentives to replace existing large surface parking lots in centers with parking structures, and incorporated them into high-density mixed-use developments.

Objective D-3: Create unified plans for Green Streets, using distinctive features reflecting Fresno's landscape heritage.

Policy D-3-a: Green Street Tree Planting. Create a Green Street Tree Planting Program, with a well-balanced variety and spacing of trees to establish continuous shading and visual continuity for each streetscape. Strive to achieve coherent linkages between public and private spaces, prioritizing tree

planting along tree-deficient Arterial and Collector Roadways in neighborhoods characterized by lower per capita rates of vehicle ownership.

Policy D-3-b: Funding for Green Street Tree Planting Program. Pursue funding for the Green Street Tree Planting Program, including landscaping of median islands.

Policy D-3-c: Local Streets as Urban Parkways. Develop local streets as "urban parkways," where appropriate, with landscaping and pedestrian spaces.

Policy D-4-b: Incentives for Pedestrian-Oriented Anchor Retail. Consider adopting and implementing incentives for new pedestrian-friendly anchor retail at intersections within Activity Centers and along corridors to attract retail clientele and maximize foot traffic.

Policy D-4-f: Development Code Update for Design Concepts. Ensure that standards in the Development Code implement General Plan design concepts for each land use type.

Objective MT-1: Create and maintain a transportation system that is safe, efficient provides access in an equitable manner, and optimizes travel by all modes.

Policy MT-1-g: Complete Streets Concept Implementation. Provide transportation facilities based upon a Complete Streets concept that facilitates the balanced use of all viable travel modes (pedestrians, bicyclists, motorists, and transit users), meeting the transportation needs of all ages and abilities and providing mobility for a variety of trip purposes, while also supporting other City goals. Implementation actions will include:

- Meeting the needs of all users within the street system as a whole; each individual street does not need to provide all modes of travel, but travel by all modes must be accommodated throughout the Planning Area;
- Continuing to adopt refined street cross-section standards as appropriate in response to needs identified;
- Encourage conversion of one-way streets to two-way streets to improve location circulation, access, and safety;
- Considering the impact of streets on public health by addressing storm water runoff quality, air quality, and water conservation among other factors; and
- Adhering to the water efficient landscape standards adopted by the City for median and streetscape plantings and irrigation methods.

Policy MT-1-j: Transportation Improvements Consistent with Community Character. Prioritize transportation improvements that are consistent with the character of surrounding neighborhoods and supportive of safe, functional and Complete Neighborhoods; minimize negative impacts upon sensitive land uses such as residences, hospitals, schools, natural habitats, open space areas and historic and cultural resources. In implementing this policy, the City will design improvements to:

- Facilitate provision of multi-modal transportation opportunities;
- Provide added safety, including appropriate traffic calming measures;
- Promote achievement of air quality standards;
- Provide capacity in a cost effective manner; and
- Create improved and equitable access with increased efficiency and connectivity.

Policy MT-1-e: Ensure Interconnectivity Across Land Uses. Update development standards and design guidelines applicable to public and private property to achieve Activity Centers, neighborhoods and communities which are well connected by pedestrian, bicycle, appropriate public transportation and automobile travel facilities.

Policy MT-2-c: Reduce VMT through Infill Development. Provide incentives for infill development that would provide jobs and services closer to housing and multi-modal transportation corridors, and vice versa, in order to reduce citywide vehicle miles travelled.

Policy MT-2-d: Street Redesign where Excess Capacity Exists. Evaluate opportunities to reduce right of way and/or redesign streets to support non-automobile travel modes along streets with excess roadway capacity where adjacent land use is not expected to change over the planning period.

Policy MT-2-f: Optimization of Roadway Operations. Optimize roadway operations by continuing to expand the use of techniques such as the City's intelligent transportation system (ITS) to manage traffic signal timing coordination in order to improve traffic operations and increase traffic-carrying capacity, while reducing unnecessary congestion and decreasing air pollution emissions. In order to facilitate roadway optimization and as a potential revenue source for the optimization, the following strategies need to be implemented:

- Dig Once Policy. Install conduit for telecommunications use when trenching or construction occurs.
- Telecommunications Strategy. Develop a costing mechanism for allowing the use of excess conduit within the City for use by communication carriers. The Policy shall follow regulations of the California Public Utilities Commission.
- Grant Funding. Pursue grant funding to assist in construction and/or implementation of fiber-optic or other telecommunication infrastructure for additional public services such as education, economic development, reaching underserved populations, and public safety communications.

Policy MT-2-g: Transportation Demand Management and Transportation System Management. Pursue the implementation of Transportation Demand Management and Transportation System Management strategies to reduce peak hour vehicle traffic demands and supplement the capacity of the transportation system.

Policy MT-2-b: Reduce Vehicle Miles Traveled and Trips. Partner with major employers and other responsible agencies, such the San Joaquin Valley Air Pollution Control District and the Fresno Council of Governments, to implement trip reduction strategies, such as eTRIP, to reduce total vehicle miles traveled and the total number of daily and peak hour vehicle trips, thereby making better use of the existing transportation system.

Objective MT-2: Make efficient use of the City's existing and proposed transportation system and strive to ensure the planning and provision of adequate resources to operate and maintain it.

Policy MT-1-k: Multi-Modal Level of Service Standards. Develop and use a tiered system of flexible, multi-modal Level of Service standards for streets designated by the Circulation Diagram (Figure MT-1). Strive to accommodate a peak hour vehicle LOS of D or better on street segments and at intersections, except where Policies MT-1-m through MT-1-p provide greater specificity. Establish minimum acceptable service levels for other modes and use them in the development and environmental review process.

Policy MT-1-l: Level of Service in the Downtown Area. Within the Downtown Planning Area accept vehicle LOS F conditions during peak hours for street segments and intersections specified in community and Specific plans as may be adopted by the City. Where there is an overlap in policies regarding LOS in the Downtown Planning Area, this policy shall supersede.

Policy MT-1-m: Standards for Planned Bus Rapid Transit Corridors and Activity Centers. Strive to maintain the following vehicle LOS standards on major roadway segments and intersections along Bus Rapid Transit Corridors and in Activity Centers:

- LOS E or better at all times, including peak travel times, unless the City Traffic Engineer determines that mitigation to maintain this LOS would be infeasible and/or conflict with the achievement of other General Plan policies.
- Accept LOS F conditions in Activity Centers and High Intensity Transit Corridors only if provisions are made to improve the overall system and/or promote non-vehicular transportation and transit as part of a development project or a City-initiated project. In accepting LOS F conditions, the City Traffic Engineer may request limited analyses of operational issues at locations near Activity Centers and along Bus Rapid Transit Corridors, such as queuing or left-turn movements.
- Give priority to maintaining pedestrian service first, followed by transit service and then by vehicle LOS, where conflicts between objectives for service capacity between different transportation modes occur.
- Identify pedestrian-priority and transit-priority streets where these modes would have priority in order to apply a multi-modal priority system, as part of the General Plan implementation

Policy MT-2-n. Peak Hour Vehicle LOS. Maintain a peak-hour vehicle LOS standard of D or better for all roadway areas outside of identified Activity Center and Bus Rapid Transit Corridor districts, unless

the City Traffic Engineer determines that mitigation to maintain this LOS would be infeasible and/or conflict with the achievement of other General Plan policies.

Policy MT-2-o: LOS Deviations Outside of Activity Centers and Areas Designated for Mixed-Use. Accept vehicle LOS E or F conditions outside of identified multi-modal districts only if provisions commensurate with the level of impact and approved by the City Traffic Engineer are made to sufficiently improve the overall transportation system and/or promote non-vehicular transportation as part of a development project or City-initiated project.

Policy MT-2-i: Local Street Standards. Establish and implement local roadway standards addressing characteristics such as alignment, width, continuity and traffic calming to provide efficient neighborhood circulation; to allow convenient access by residents, visitors and public service and safety providers; and to promote neighborhood integrity and desired quality of life by limiting intrusive pass-through traffic.

Policy MT-3-b: Preserve street trees lining designated scenic corridors or boulevards. Replace trees of the predominant type and in a comparable patter to existing plantings if there is no detriment to public safety.

Objective MT-4: To establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.

Policy MT-4-a: Bicycle, Pedestrian, and Trails Master Plan. To the extent consistent with this General Plan, continue to implement and periodically update the Bicycle, Pedestrian, and Trails Master Plan to meet State standards and requirements for recommended improvements and funding proposals as determined appropriate and feasible.

Policy MT-4-d: Prioritization of Bikeway Improvements. Prioritize bikeway components that link existing separated sections of the system, or that are likely to serve the highest concentration of existing or potential cyclists, particularly in those neighborhoods with low vehicle ownership rates, or that are likely to serve destination areas with the highest demand such as schools, shopping areas, recreational trail heads, and employment centers.

Policy MT-4-h: Bicycle Parking Facilities. Promote the installation of bicycle locking racks and bicycle parking facilities at public buildings, transit facilities, public and private parking lots, and recreational facilities. Establish and adopt standards for bicycle parking in the Development Code.

Policy MT-4-i: Bicycling and Public Transportation. Promote the integration of bicycling with other forms of transportation, including public transit. Continue to provide bike racks or space for bicycles on FAX buses.

Policy MT-4-j: Street Maintenance for Bicycle Safety. Provide regular sweeping and other necessary maintenance to clear bikeways of dirt, glass, gravel, and other debris and maintain the integrity of the bicycling network.

Policy MT-4-k: Bicycle Safety, Awareness, and Education. Promote bicycle ridership by providing secure bicycle facilities, promoting traffic safety awareness for both bicyclists and motorists, promoting the air quality benefits, promoting non-renewable energy savings, and promoting the public health benefits of physical activity.

Policy MT-6-l: Environmentally Sensitive Path and Trail Design. Develop paths and trails with minimum environmental impact by taking the following actions.

- Surface paths and trails with materials that are conducive to maintenance and safe travel, choosing materials which blend in with the surrounding area whenever possible;
- Design paths and trails to follow contour lines where the least amount of grading (fewest cuts and fills) and least disturbance of the surrounding habitat would occur;
- Beautify trail rights-of-way in a manner consistent with intended use, safety, and maintenance;
- Use landscaping to stabilize slopes, create physical or visual barriers, and provide shaded areas.
- Preserve and incorporate native plant species into the landscaping.

Objective MT-8: Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize adverse environmental impacts.

Policy MT-9-e: Area Specific Transit Improvements. Continue to evaluate and pursue where appropriate the planning and implementation of special area specific transit improvements, such as street car facilities.

Policy MT-8-g: High Speed Train. If the State moves forward with HST, ensure it is constructed through Fresno in a manner that minimizes impacts to surrounding property owners and creates the most opportunity for redevelopment around the HST Station.

Policy MT-8-h: Move Forward with High Speed Train Station Area Planning. Work with local residents, property and business owners, and other stakeholders to develop a station area plan to provide the most opportunity for growth and prosperity in concert with the development of the Fresno HST station.

Objective MT-9: Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, reliable, cost-effective service and financially feasible.

Policy MT-8-a: Street Design Coordinated with Transit. Coordinate the planning, design and construction of the major roadway network with transit operators to facilitate efficient direct transit routing throughout the Planning Area.

Policy MT-9-a: Equitable Transit Provision. Provide transit that can serve all residents, including older residents and persons with disabilities.

Policy MT-9-b: Transit Service Productivity Evaluation. Continue to evaluate transit service productivity and cost efficiency indicators in the City's Short-Range Transit Plan, and make necessary and appropriate service adjustments when operationally and financially feasible.

Policy MT-9-c: Addressing Unmet Transit Needs. Continue to participate in the Council of Fresno County Governments' annual unmet transit needs evaluation process, particularly with respect to identifying need for access to medical and educational services; perform market analysis to identify potential transit choice riders; and pursue public education and information programs to identify changes in demand characteristics and opportunities to increase ridership.

Policy MT-8-d: Coordination of Transportation Modes. Plan, design and implement transportation system improvements promoting coordination and continuity of transportation modes and facilities, such as shared parking or park and ride facilities at Activity Centers.

Policy MT-8-b: Transit Serving Residential and Employment Nodes. Identify the location of current and future residential and employment concentrations and Activity Centers throughout the transit service area in order to facilitate planning and implementation of optimal transit services for these uses. Work with California State University, Fresno to determine locations within the campus core for bus stops.

Policy MT-8-e: Regional Coordination. Continue to work with local and regional governmental institutions to promote efficient transportation policies and coordinated programs.

Policy MT-8-i: Legislative Support. Monitor State and federal legislation that creates incentives to reduce auto dependency and support the use of alternatives to the single occupant vehicle that is consistent with the City's General Plan.

Policy MT-9-f: Encourage Telecommuting. Support measures that will facilitate the expanded use of telecommunications technologies to reduce congestion, expansion of regional transportation facilities consistent with this General Plan, energy use, and air emissions (i.e., work at home, dispersed telecommute work centers, teleconferencing).

Policy MT-11-b: Railroad Improvements. Continue to participate in and advocate for collaborative efforts to improve railroad transportation facilities and reduce conflicts with the street system, including relocation and/or consolidation of the BNSF and UP mainline railroad track facilities.

Policy POSS-3-c: Link Parks with Walkways. Link public open space to adjacent schools and Activity Centers through a series of landscaped linear walkways and bikeways that enhance and encourage pedestrian use.

Policy POSS-3-f: Park Design Guidelines. Create, maintain, and enforce park design guidelines, including provisions for:

- Minimum and maximum shade.
- Protections from shading by adjacent buildings.
- Accessibility to persons with disabilities.
- Street trees and landscaped median strips in adjacent arterial roads.
- Art and points of attraction.
- Landscape and hardscape features.
- Street furniture, signage, and lighting.
- Food sales and entertainment.
- Restroom facilities, play structures, and picnic shelters.
- Landscape design synthesis with input from civil engineers and hydrologists, educators and daycare providers, fitness trainers and coaches, police officers and experts in crime prevention through environmental design, as appropriate.
- Sports field areas designed to allow periodic changes in field locations to minimize wear areas and provide sufficient fields to host regional, state, or national tournaments.
- Using topography to create interesting and visually appealing spaces and forms.
- Use of waterways as a key design influence, a focus of restoration, and an opportunity to provide for public enjoyment of views.
- Reflecting the agricultural and horticultural heritage of the site or area.
- Connecting with surrounding areas in a way that encourages expanded pedestrian activity.
- Creating individual places within a park that respond to the needs of a broad range of park users, from youth to the elderly.
- Creating places of delight that engage the senses, such as water features or moving installations.
- Creating places that engage the mind, by treating park features as opportunities for interpretation and questioning.
- Using sustainable design practices, and highlighting these as opportunities for learning.

Objective POSS-5: Provide for long-term preservation, enhancement, and enjoyment of plant, wildlife, and aquatic habitat.

Policy POSS-5-a: Habitat Area Acquisition. Support federal, State, and local programs to acquire significant habitat areas for permanent protection and/or conjunctive educational and recreational use.

Policy POSS-5-c: Buffers for Natural Areas. Require development projects, where appropriate and warranted, to incorporate natural features (such as ponds hedgerows and wooded strips) to serve as buffers for adjacent natural areas with high ecological value.

Policy POSS-5-d: Guidelines for Habitat Conservation. Establish guidelines for habitat conservation and mitigation programs including:

- Protocols for the evaluation of the site's environmental setting and proposed design and operating parameters of proposed mitigation measures.
- Methodology for the analysis depiction of land to be acquired or set aside for mitigation activities.
- Parameters for specification of the types and sources of plant material used for any revegetation, irrigation requirements, and post-planting maintenance and other operational measures to ensure successful mitigation.
- Monitoring at an appropriate frequency by qualified personnel and reporting of data collected to permitting agencies.

Objective PU-7: Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

Policy PU-7-a: Reduce Wastewater. Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.

Policy PU-7-b: Reduce Stormwater Leakage. Reduce storm water infiltration into the sewer collection system, where feasible, through a program of replacing old and deteriorated sewer collection pipeline; eliminating existing stormwater sewer cut-ins to the sanitary sewer system; and avoiding any new sewer cut-ins except when required to protect health and safety.

Policy PU-7-c: Biosolid Disposal. Investigate and consider implementing economically effective and environmentally beneficial methods of biosolids handling and disposal.

Policy PU-7-d: Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting and water exchange elements.

Policy PU-8-e: Repairs. Continue to evaluate existing water production and distribution systems and facilitate necessary repair or enhancement of damaged or antiquated facilities.

Policy PU-8-g: Review Project Impact on Supply. Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.

Objective PU-9: Provide adequate solid waste facilities and services for the collection, transfer, recycling, and disposal of refuse.

Policy PU-9-a: New Techniques. Continue to collaborate with affected stakeholders and partners to identify and support programs and new techniques of solid waste disposal such as recycling, composting, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.

Policy PU-9-b: Compliance with State Law. Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.

Objective RC-2: Promote land uses that conserve resources.

Policy RC-2-a: Link Land Use to Transportation. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Policy RC-4-a: Support Regional Efforts. Support and lead, where appropriate, regional, State and federal programs and actions for the improvement of air quality, especially the SJVAPCD's efforts to monitor and control air pollutants from both stationary and mobile sources and implement Reasonably Available Control Measures in the Ozone Attainment Plan.

Policy RC-4-c: Evaluate Impacts with Models. Continue to require the use of computer models used by SJVAPCD to evaluate the air quality impacts of plans and projects that require such environmental review by the City.

Policy RC-4-d: Forward Information. Forward information regarding proposed General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals that require air quality evaluation, and amendments to development regulations to the SJVAPCD for their review of potential air quality and health impacts. .

Policy RC-4-e: Support Employer-Based Efforts. Support and encourage employer implementation of staggered work hours and employee incentives to use carpools, public transit and other measures to reduce vehicular use and traffic congestion.

Policy RC-4-f: Continue to control and reduce air pollution emissions from vehicles owned by the City and municipal operations and facilities by undertaking the following:

- Expand the use of alternative fueled and electric vehicles in City fleets.
- Create preventive maintenance schedules that will ensure efficient engine operation.

- Include air conditioning recycling and charging stations in the City vehicle maintenance facilities, to reduce freon gases being released into the atmosphere and electrostatic filtering systems in City maintenance shops, when feasible or when required by health regulations.
- Use satellite corporation yards for decentralized storage and vehicle maintenance.
- Convert City-owned emergency backup generators to natural gas fuels whenever possible, and create an advanced energy storage system.

Policy RC-4-g: FAX Actions. Continue to improve Fresno Area Express (FAX) bus transit system technical performance, reduce emission levels, streamline system operations, and implement BRT where supportive land uses are proposed by Figure LU-1: Land Use Diagram .

Policy RC-4-i: Methane Capture. Continue to pursue opportunities to reduce air pollution by using methane gas from the old City landfill and the City's wastewater treatment process.

Policy RC-4-j: All Departments. Continue to develop and implement in all City departments operational policies to reduce air pollution.

Objective RC-5: In cooperation with other jurisdictions and agencies in the San Joaquin Valley Air Basin, take timely, necessary, and the most cost-effective actions to achieve and maintain reductions in greenhouse gas emissions and all strategies that reduce the causes of climate change in order to limit and prevent the related potential detrimental effects upon public health and welfare of present and future residents of the Fresno community.

Policy RC-5-b: Greenhouse Gas Reduction Plan. As is consistent with State law, prepare and adopt a Greenhouse Gas Reduction Plan as part of the Master Environmental Impact Report to be concurrently approved with the Fresno General Plan in order to achieve compliance with State mandates, assist development by streamlining the approval process, and focus on feasible actions the City can take to minimize the adverse impacts of growth and development on global climate change. The Greenhouse Gas Reduction Plan shall include, but not be limited to:

- A baseline inventory of all known or reasonably discoverable sources of GHGs that currently exist in the city and sources that existed in 1990.
- A projected inventory of the GHGs that can reasonably be expected to be emitted from those sources in the year 2035 with the implementation of this General Plan and foreseeable communitywide and municipal operations.
- A target for the reduction of emissions from those identified sources.
- A list of feasible GHG reduction measures to meet the education target, including energy conservation and "green building" requirements in municipal buildings and private development.

- Periodically update municipal and community-wide GHG emissions inventories to determine the efficacy of adopted measures and to guide future policy formulation needed to achieve and maintain GHG emissions reduction targets.

Policy RC-5-c: Increase efforts to incorporate requirements for GHG emission reductions in land use entitlement decisions, facility design, and operational measures subject to City regulation through the following measures and strategies:

- Promote the expansion of incentive-based programs that involve certification of projects for energy and water efficiency and resiliency. These certification programs and scoring systems may include public agency "Green" and conservation criteria, Energy Star™ certification, CALGreen Tier 1 or Tier 2, Leadership in Energy Efficient Design (LEED™) certification, etc.
- Promote appropriate energy and water conservation standards and facilitate mixed-use projects, new incentives for infill development, and the incorporation of mass transit, bicycle and pedestrian amenities into public and private projects.
- Require energy and water audits and upgrades for water conservation, energy efficiency, and mass transit, pedestrian, and bicycle amenities at the time of renovation, change in use, change in occupancy, and change in ownership for major projects meeting review thresholds specified in an implementing ordinance.
- Incorporate the City's "Guidelines for Ponding Basin/Pond Construction and Management to Control Mosquito Breeding" as conditions of approval for any project using an on-site stormwater basin to prevent possible increases in vector-borne illnesses associated with global climate change.
- Periodically evaluate the City's facility maintenance practices to determine whether there are additional opportunities to reduce GHGs through facility cleaning and painting, parks maintenance, road maintenance, and utility system maintenance.
- Periodically evaluate standards and mitigation strategies for highly vehicle-dependent land uses and facilities, such as drive-through facilities and auto-oriented development.

Policy RC-5-d: SCS and CAP Conformity Analysis. Ensure that the City includes analysis of a project's conformity to an adopted regional Sustainable Community Strategy or Alternative Planning Strategy (APS), an adopted Climate Action Plan (CAP), and any other applicable City and regional greenhouse gas reduction strategies in affect at the time of project review.

Policy RC-5-e: Ensure Compliance. Ensure ongoing compliance with GHG emissions reduction plans and programs by requiring that air quality measures are incorporated into projects' design, conditions of approval, and mitigation measures.

Policy RC-4-g: Toolkit. Provide residents and project applicants with a "toolkit" of feasible measures that can be used to reduce GHG emissions, including educational materials on energy-efficient and "climate-friendly" products.

Policy RC-6-b: Water Plans. Adopt and implement ordinances, standards, and policies to achieve the intent of the City of Fresno Urban Water Management Plan, Fresno-Area Regional Groundwater Management Plan, and City of Fresno Metropolitan Water Resources Management Plan to ensure a sustainable supply of water.

Policy RC-6-d: Prepare, adopt, and implement the City of Fresno Recycled Water Master Plan.

Policy RC-6-h: Conditions of Approval. Include in the Development Code standards for imposing conditions of approval for development projects to ensure long-term maintenance of adequate clean water resources. Require findings that adequate water supply must exist prior to any discretionary project approval for residential and commercial development requiring annexation (excluding County Islands), as required by law.

Objective RC-7: Promote water conservation through standards, incentives and capital investments.

Policy RC-7-a: Water Conservation Program Target. Maintain a comprehensive conservation program to help reduce per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees:

- Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.
- Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements.
- Adopt and implement policies in the event that an artificial lake is proposed for development.
- Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area.
- Expand efforts to educate the public about water supply issues and water conservation techniques.

Policy RC-7-b: Water Pricing and Metering. Develop a tiered water cost structure for both residential and commercial users that will properly price water based on its true cost; require all new development to be metered for water use; and charge all customers the true, full cost of their water supply, including costs of acquisition, initial treatment, conveyance, and wastewater treatment, operations, and maintenance, and remediation.

Policy RC-7-c: Best Practices for Conservation. Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation as warranted and appropriate.

Policy RC-7-h: Landscape Water Conservation Standards. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other State regulations.

- Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance.
- Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.

Policy RC-7-e: Retrofit City Facilities, and Consider Incentives Programs to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites. Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.

Policy RC-7-h: Landscape Water Conservation Standards. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other state regulations.

- Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance.
- Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.

Objective RC-8: Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

Policy RC-8-a: Existing Standards and Programs. Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.

Policy RC-8-b: Energy Reduction Targets. Strive to reduce per capita residential electricity use to 1,800 kWh per year and non-residential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings.

Policy RC-8-d: Incentives. Consider providing an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Policy RC-7-i: PACE Financing. Develop a residential Property Assessed Clean Energy (PACE) program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.

Policy RC-8-e: Energy Use Disclosure. Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

Policy RC-8-f: City Heating and Cooling. Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.

Policy RC-8-g: Revolving Energy Fund. Create a City Energy Fund, which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Policy RC-8-h: Solar Assistance. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Policy RC-8-i: Renewable Target. Adopt and implement a program to increase the use of renewable energy to meet a given percentage of the city's peak electrical load within a given time frame.

Policy RC-8-j: Alternative Fuel Network. Create a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

Objective RC-11: Strive to reduce the solid waste going to landfills to zero by 2035

Policy RC-11-a: Waste Reduction Strategies. Maintain current targets for recycling and re-use of all types of waste material in the city, and enhance waste and wastewater management practices to reduce natural resource consumption through the following measures:

- Continue to require recyclable material collection and storage areas in all residential development.
- Establish recycling collection and storage area standard for commercial and industrial facilities to the recycling areas according to the anticipated types and amounts of recyclable material generated.
- Provide educational materials to residents on how and what to recycle and how to dispose of hazardous waste.
- Provide recycling canisters and collection in public areas where trashcans are also provided.
- Institute a program to evaluate major waste generators and identify recycling opportunities for their facilities and operations.

- Continue to partner with the California Integrated Waste Management Board on waste diversion and recycling programs and the CalMax (California Materials Exchange) program.
- Evaluate the feasibility of a residential, restaurant, and institutional food waste segregation and recycling program, to reduce the amount of organic material sent to landfill and minimize the emissions generated by decomposing organic material.
- Evaluate the feasibility of "carbon footprinting" for the City's wastewater treatment facilities, biomass and composting operations, solid waste collection and recycling programs.
- Expand yard waste collection to divert compostable waste from landfills.
- Study the feasibility and cost-benefit analysis of a municipal composting program to collect and compost food and yard waste, including institutional food and yard waste, using the resulting compost matter for City park and median maintenance.

Policy RC-11-b: Zero Waste Strategy. Create a strategic and operations plan for fulfilling the City Council resolution committing the City to a Zero Waste goal.

Policy HCR-2-j: Window Replacement. Evaluate window replacements in federally funded housing projects on a project-by-project basis with consideration for health, safety, historic values, sustainability, and financial feasibility.

Policy HCR-3-a: Adaptive Reuse. Promote the adaptive reuse and integration of older buildings into new projects as part of the City's dedication to nurturing a sustainable Fresno.

Policy HC-3-f: New Drive-Through Facilities. Include in the Development Code design review to reduce vehicle emissions resulting from queued idling vehicles at drive-through facilities in proximity to residential neighborhoods.

Policy HC-3-d: Green Standards for Affordable Housing. Provide appropriate incentives for affordable housing providers, agencies, non-profit, and market rate developers to use LEED and CALGreen Tier 1 or Tier 2 standards or third-party equivalents.

Policy HC-5-f: Urban Agriculture. Promote a full range of urban agriculture activities, including farmers' markets, farm stands, community gardens, on-site garden produce market stands, and urban farms. Support associations involved in these activities, and undertake the following:

- Amend the zoning ordinance and streamline permitting procedures to include provisions for Community Gardens, On-site Garden Produce Market Stands and Urban Farms that allow sale of foods grown locally.
- Permit community gardens as land uses allowable by right under the following conditions:
  - On vacant residentially zoned lots under two acres in size through the filing of an agreement with the City between a community group, or other persons(s), and the land owner; or
  - On developed land operated and owned or leased by a community institution; or

  - On City-owned or other public land, subject to City or agency approval

- Create a policy of reduced planning application and plan check fees for urban agriculture projects.
- Make publically available an inventory of City-owned surplus land that could be used for urban agriculture.
- Continue to allow and promote community gardens in City-owned parks.
- Support the planning of community gardens within walking distance of high-density residential areas to compensate for the reduced amount of open space in these areas.
- Emphasize opportunities for urban agriculture in all areas of the city, schools, parks, residential food deserts, and especially in areas of the city with a relatively high proportion of 'food insecure' individuals.

5.7.4 - Thresholds of Significance

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The Environmental Checklist in Appendix G of the State CEQA Guidelines is used as a framework for determining whether greenhouse gas emissions impacts are significant. Accordingly, greenhouse gas emissions resulting from the proposed project are considered significant if the project would:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? (See Greenhouse Gas Emissions Impact GHG-1.)

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases? (See Conflict with Plan, Policy, or Regulation that Reduces Emissions Impact GHG-2.)

Section 15064.4(b) of the CEQA Guideline amendments for greenhouse gas emissions states that a lead agency may take into account the following three considerations in assessing the significance of impacts from greenhouse gas emissions.

- **Consideration #1**: The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.
- **Consideration #2**: Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- **Consideration #3**: The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding

compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The following excerpt is from the July 2014 draft version of the District's Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI). The excerpt restates information from the guidance document: Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects Under CEQA adopted by the SJVAPCD Governing Board on December 17, 2009.

- Projects complying with an approved GHG emission reduction plan or GHG mitigation program, which avoids or substantially reduces GHG emissions within the geographic area in which the project is located would be determined to have a less than significant individual and cumulative impact for GHG emissions. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA compliant environmental review document adopted by the lead agency. Projects complying with an approved GHG emission reduction plan or GHG mitigation program would not be required to implement Best Performance Standards (BPS).
- Projects implementing BPS would not require quantification of project specific GHG emissions. Consistent with CEQA Guideline, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.
- Projects not implementing BPS would require quantification of project specific GHG emissions and demonstration that project specific GHG emissions would be reduced or mitigated by at least 29 percent, compared to Business as Usual (BAU), including GHG emission reductions achieved since the 2002-2004 baseline period, consistent with GHG emission reduction targets established in ARB's AB 32 Scoping Plan. Projects achieving at least a 29 percent GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG.

Threshold Based on ARB Updated Inventory and Projections

The ARB prepared an update to the state GHG inventory and 2020 projections accounting for revised growth projections and progress achieved to date. The 2020 BAU inventory was revised from 596 MMTCO2e to 545 MMTCO2e. Based on this revised projection, a 21.7 percent decrease in emissions from BAU statewide from all sources will be required to achieve 1990 emission levels (427 MMTCO2e). The SJVAPCD threshold of 29 percent is no longer required to show consistency with AB 32 targets. Therefore, this analysis is based on whether the growth projected for the City of Fresno General Plan is consistent with the State's updated 21.7 percent reduction target.

Progress Beyond 2020

The AB 32 targets and Scoping Plan focus on achieving reductions that are adequate to reduce business as usual emissions in 2020 to 1990 levels. The 2020 planning horizon was viewed as a near term target for which specific strategies and measures could be implemented to achieve the target. There are no legislated targets for years beyond 2020. However, Executive Order S-3-05 includes a goal of reducing emissions to 80 percent below 1990 levels by 2050. With General Plan buildout

predicted for 2056, a post-2020 framework for determining impacts is necessary. SB 375 includes targets for 2035; however, they only apply to passenger car and light truck emissions and include no mandates that apply directly to the City.

The ARB Scoping Plan did not set targets for the state beyond 2020; however, as 2020 approaches, the state has begun the process to adopt targets for a later year or years. The ARB adopted the First Update to the Climate Change Scoping Plan (Update) in May 2014 (ARB 2014). The Update provides a discussion of what types of actions would be required to achieve the 2050 goal. Without a new legislative mandate, it is unclear if the ARB will be able to pursue a new round of regulatory reductions to achieve a target for 2030 or 2050. The Legislature has a bill in process that would provide authority for affected state agencies to pursue the next round of regulations to reduce greenhouse gases, but the final provisions and outcome of the bill are uncertain.

The ARB has assessed several studies to identify the types of strategies that could be implemented to achieve the 2050 target (ARB 2012). The ARB found that studies generally show that 80 percent reductions are technically achievable, mostly with technologies that are commercially available today, but that rapid market penetration will be required to significantly accelerate emission reductions through the following: ·

- Energy demand reduction via efficiency and activity changes.
- Large-scale electrification of on-road vehicles and building and industrial appliances.
- Decarbonization of electricity and fuel supplies through renewable or other near zero carbon technologies.

Each study explores varying combinations of strategies within these three categories, with some common trends:

- Large, ongoing efficiency improvements in transportation, buildings, and industry can be readily achieved.
- A large amount of electrification for light-duty vehicles, rail, buses, and a few heavy-duty categories is necessary.
- A large amount of electrification of space and water heating in buildings and machinery in industrial operations is also necessary.
- Near-zero carbon electricity supply is essential, particularly as the electricity grid supplies energy for transportation and traditional residential, commercial, and industrial activities.
- Advanced, low carbon liquid fuels and reduced vehicle travel are important and highly influential in reducing transportation sector emissions.
- While energy and transportation represent the largest emission sources that will need to be addressed, better use of natural carbon sinks and pursuing reductions within many other GHG-emitting sectors is also needed.

- Aggressive strategies in all areas need to be coordinated and initiated immediately to enable sufficient market uptake by 2050.

Development anticipated during the buildout of the General Plan can support the implementation of the above listed strategies with its land use and transportation policies that reduce mobile source emissions and resource conservation policies that reduce energy use and encourage alternative energy sources. The Greenhouse Gas Reduction Plan will provide details regarding local actions that implement the policies. Although the Greenhouse Gas Reduction Plan focuses on the near term 2020 target, it also accounts for post-2020 reductions from existing regulations and local measures to the extent possible.

Continued improvements in energy efficiency will primarily be achieved through periodic tightening of energy efficiency standards, but also through local programs and voluntary measures. The California Public Utilities Commission adopted the Long Term Energy Efficiency Strategic Plan that aims to achieve wide spread implementation of zero-net energy buildings by 2020 for new residential construction and by 2030 for new commercial construction, among other goals. Net zero energy consumption is achieved through a combination of increased energy efficiency and onsite power production using clean distributed generation (primarily solar panels and solar water heating) (CPUC 2011).

After building regulations are in place that require net-zero energy consumption, there will still be a need to improve energy efficiency so that excess building energy production will be available to accommodate increased demand throughout the grid. As technology advances, the state can be expected to continue tightening energy efficiency regulations. The state encourages but does not require local government to exceed energy efficiency requirements. The rapid pace of regulatory energy efficiency standards with updates proceeding about every three years makes it very difficult for local agencies and developers to adapt to the changes. For example, the latest changes to Title 24 going into effect in 2014 is expected to provide a 25 percent reduction in energy consumption by residential development and 30 percent by commercial development compared to the previous 2008 Title 24 standards (CEC 2012). The feasibility for developers to exceed these standards on a consistent basis remains to be determined. In the interim, voluntary incentive and recognition programs such as Energy Star and LEED certification encouraged by the General Plan can be used to demonstrate that exceeding the new standards is technically and economically feasible.

A GHG threshold approach based on CEQA Guidelines Section 15064.4(b) consideration #3 requires projects comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions". Until such a time as the applicable regulations or requirements are adopted by the relevant public agency through a public review process that include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions, no post-2020 reduction thresholds should be applied per this CEQA provision.

Under GHG threshold approach Consideration #2, the Lead Agency can determine whether the project emissions exceed a threshold of significance that the lead agency determines applies to the

project. For a General Plan Update, such a threshold based on absolute project emissions is not a suitable measure. However, the City could identify a quantitative threshold applicable to individual projects implementing the General Plan that would provide an amount of emissions that would not result in a significant impact. This is sometimes referred to as a small project exemption where the cumulative effect of the predicted number of small projects would not interfere with achieving a larger plan goal or target. A threshold that results in 90 percent of emissions being subject to additional mitigation has been used in other locales.

5.7.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Greenhouse Gas Emissions

Impact GHG-1	**The project would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.**

Project Specific Impact Analysis

The proposed project includes the creation of a greenhouse gas reduction plan for the City. That plan includes strategies to reduce per capita greenhouse gas emissions to 1990 levels by 2020. The plan demonstrates that even though there is increased growth, the City would still be reducing greenhouse gas emissions through 2020 and per capita emission rates drop substantially. The benefits of adopted regulations become flat in later years and growth starts to exceed the reductions from all regulations and measures. Although it is highly likely that regulations will be updated to provide additional reductions, none are reflected in the analysis since only the effect of adopted regulations is included.

City of Fresno Planning Area Greenhouse Gas Emissions

The amendments associated with the General Plan Update allow for increased land for residential, commercial, mixed use, and public facilities, which may increase greenhouse gas emissions in the City. The update also decreases the acreage in the industrial and “other” land use designation. The “other” category includes land designated Buffer Area and includes roads, canals, and railroads.

Greenhouse gas emissions in the City of Fresno for 2010 and 2020 are shown in Table 5.7–2. The emissions were estimated using ARB and EPA emission factors and the General Plan Update growth projections. The modeling assumptions and results are provided in Appendix F-1. Construction related GHG emissions are included in this table in the offroad equipment category.

Table 5.7–2: City of Fresno Planning Area 2010 Baseline and 2020 Business as Usual Greenhouse Gas Emissions

Source	2010 (MTCO2e)	2020 (MTCO2e)
Motor vehicles	1,795,666	2,337,015
Electricity - residential	289,745	345,142

Source	2010 (MTCO2e)	2020 (MTCO2e)
Electricity - commercial	319,817	366,817
Natural gas - residential	400,169	476,679
Natural gas - commercial	448,706	514,647
Waste	123,945	147,628
Offroad equipment	1,051	1,138
ODS substitutes (refrigerants)	273,422	576,784
Total	**3,652,521**	**4,765,850**
Source: Michael Brandman Associates, Appendix F-1.		

Emission Reductions from State of California Regulations

The following discussion describes the state regulations that result in emission reductions within the City of Fresno. For details regarding the reduction estimates, see the calculations in Appendix F-1.

Motor Vehicles

Pavley I and LEV III. Regulations reducing motor vehicle emissions include Pavley I and LEV III, which reduce emissions from light duty cars and trucks. Pavley I applies to vehicles sold between 2009 and 2016. LEV III, also known as the Advanced Clean Cars Program, applies to vehicles sold between 2017 and 2025. Reductions from Pavley I are incorporated into the mobile source modeling assumptions in ARB's EMFAC 2011. LEV III reductions have not been incorporated into the EMFAC model and are estimated based on ARB analysis accomplished to support adoption of the regulation. These regulations provide an incremental improvement as old less efficient vehicles are retired and new more efficient vehicles meeting the new standards are purchased. For this reason, reductions will continue to accrue well after 2025 even if new regulations are not adopted in the future. EMFAC only includes modeling years through 2040, so later years assume the 2040 rate will remain flat pending adoption of the next round of vehicle standards.

Low Carbon Fuel Standard (LCFS). The LCFS mandates a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. The LCFS is incorporated into EMFAC 2011 and is reflected in the modeling results. The LCFS provides reductions for all vehicle classifications.

Tire Pressure Regulation. A properly inflated tire helps to reduce fuel GHG emissions by reducing tire-rolling resistance. Low rolling resistance tires for passenger and light duty vehicles can result in a 1 to 2 percent reduction in GHGs.

Low Friction Oil Regulation. Engine oil formulations can also affect a vehicle's GHG emissions, because the more easily the internal parts of the engine move, the more efficiently the engine will run. This, in turn, reduces the engine load and fuel used. Requiring passenger cars to use low friction engine oils can result in a 2 percent GHG reduction.

Heavy Duty Vehicle Aerodynamic Efficiency. This measure would require existing trucks/trailers to be retrofitted with the best available technology and/or ARB approved technology. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. The 2020 estimated GHG reductions could be up to 6.4 MMTCO2E nationwide, of which about 0.93 MMTCO2E or about 15 percent would occur within California.

Medium and Heavy Duty Vehicle Hybridization. Hybrid technology provides the greatest benefit when used in vocational applications that have significant urban, stop-and-go driving, idling, and power take-off operations in their duty cycle. Such applications include parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks. The ARB Scoping Plan estimates that hybridization provides an estimated reduction of 0.5 MMTCO2e per year in 2020.

Energy Generation and Efficiency Regulations.

The state has adopted regulations that result in greenhouse gas reductions from the utilities on the production side and from consumers on the demand side. The following regulations are included in the assessment.

Renewable Portfolio Standard (RPS). The RPS requires utilities to increase the amount of power generated from renewable sources to 33 percent by 2020. Reductions are estimated by taking PG&E's 2010 emission rate and comparing it to their rate predicted for 2020. The differential is applied as an emission reduction compared to business as usual. PG&E reported its renewable power sales at 23.8 percent in 2013.

Title 24 Energy Efficiency Regulation. Title 24 reduces emissions through energy conservation in new and remodeled buildings. The latest version of Title 24 scheduled to go into effect in 2014 provides a 25 percent reduction in residential energy consumption and a 30 percent reduction in non-residential energy consumption.

California Green Building Code Standards. The Green Building Code Standards include measures requiring mandatory water conservation measures and other measures not addressed under Title 24. No additional reductions are included below.

Title 20 Appliance Efficiency Standards. Title 24 requires certain appliances to meet energy efficiency standards. No reductions are included below because a methodology to capture the reductions has not been identified.

High Global Warming Potential Gas Regulations. The state has adopted refrigerant management regulations that apply to commercial air conditioning and refrigeration systems. The regulations require increased leak detection and related repairs and maintenance. ARB estimated that the regulation would reduce emissions from regulated sources by 50 percent.

The emission reductions from each measure and total reductions achieved by all measures by the year 2020 are provided in Table 5.7–3. Details regarding the estimates are provided in Appendix F-1.

Table 5.7–3: Emission Reductions from State of California Regulations for Fresno Business as Usual Inventory

Source Group	State Measures	2020 Emissions (MTCO2e/year)
Motor Vehicles	Pavley and Low Carbon Fuel Standard	508,766
	Low Emission Vehicle Program III	32,253
	Tire Pressure Program and Tread Standard	8,817
	Low Friction Oil	22,820
	Aerodynamic Efficiency/Hybridization	14,833
	Subtotal	**587,489**
Electricity - residential	Renewable Portfolio Standards	119,131
	Title 24 Energy Efficiency Standards	17,520
Electricity – commercial	Renewable Portfolio Standards	126,612
	Title 24 Energy Efficiency Standards	2,970
	Subtotal	**266,233**
Natural Gas – Residential	Title 24 Energy Standards	11,037
Natural Gas – Commercial	Title 24 Energy Standards	7,399
	Subtotal	**18,435**
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	288,392
	Total	**1,160,550**

Source: First Carbon Solutions – Appendix F-1

The emission reductions described above were used to adjust the business as usual inventory. The results of the analysis show that compliance with regulations applicable to development projects in the City of Fresno will achieve a reduction of 24.4 percent compared to the business as usual scenario. The reduction exceeds the 21.7 percent reduction required to show consistency with AB 32 targets and would be considered less than significant for growth occurring through 2020 (see Table 5.7–4).

Table 5.7–4: City of Fresno Planning Area 2020 Emissions Reductions Compared to Business as Usual

Source	2020 BAU (MTCO2e/year)	2020 with Existing Regulations (MTCO2e/year)	Percent Reduction
Motor vehicles	2,337,015	1,749,526	25.14%
Electricity - residential	345,142	208,492	39.59%
Electricity - commercial	366,817	237,234	35.33
Natural gas - residential	476,679	465,642	2.32%
Natural gas - commercial	514,647	507,249	1.44%
Waste	147,628	147,628	0.00%
Offroad equipment	1,138	1,138	0.00%
ODS substitutes (refrigerants)	576,784	288,392	50.00%
Total	**4,765,850**	**3,605,301**	**24.35%**
Threshold for Consistency with AB 32 Targets			**21.65%**
Significance in 2020?			**LTS**

Source: Michael Brandman Associates, Appendix F-1.
LTS = Less than significant impact

Emissions Resulting from General Plan Update Buildout

Emissions were assessed for years beyond 2020 to ensure that the full impact of the project was disclosed. Buildout of the General Plan is expected to occur by 2056. The General Plan buildout projections and population projections used in the assessment are consistent with rates used by Fresno COG for the regional transportation model. Emission estimates prepared for 2035, 2050, and 2056 are provided in this section.

Many of the regulations provide cumulative reductions that accrue each year. For example, new vehicles compliant with LEV III standards replace older higher emitting vehicles each year until most old vehicles are no longer in service. Once most or all older vehicles have been retired, reductions become flat and growth begins to offset the reductions achieved.

The year 2035 was selected for analysis to coincide with one of the regional target years from SB 375. SB 375 only applies to emissions from light duty cars and trucks. No comprehensive regulatory milestones exist that would define a reduction equivalent to the 2020 target which is based on consistency with the state's plan to reduce emissions to 1990 levels by 2020. Without a similar legislated goal for later years, the amount of emission reductions needed from the City would be speculative. The General Plan's policies are supportive of achieving the VMT reductions expected for SB 375.

The City's projected emissions and reductions accounting for state regulations are presented in Table 5.7–5. The results show a 32.6 percent reduction compared to 2035 BAU emissions and a per capita emission rate of 3.56 MTCO2e per person after regulations are applied. The reductions accrue primarily from full implementation of the LEV III motor vehicle regulation, Low Carbon Fuel Standard, Renewable Portfolio Standard, Title 24 Energy Efficiency Regulation, and the Refrigeration Management Regulations.

Table 5.7–5: City of Fresno Planning Area 2035 Greenhouse Gas Emissions

Source	2035 BAU (MTCO2e/year)	2035 with Existing Regulations (MTCO2e/year)	Percent Reduction
Motor vehicles	3,036,848	1,764,456	41.9
Electricity - residential	414,999	247,572	37.2
Electricity - commercial	450,581	287,828	40.3
Natural gas - residential	573,160	548,579	4.3
Natural gas - commercial	632,169	610,726	3.4
Waste	177,508	177,508	0%
Offroad equipment	1,314	1,314	0%
ODS substitutes (refrigerants)	694,734	347,367	50%
Total	**5,981,313**	**3,985,350**	**33.37**
Per Capita Emissions	**7.66**	**4.48**	
Source: Michael Brandman Associates, Appendix F-1.			

Since no comprehensive state target has been adopted for 2035, it is not known if additional reductions would be required by state regulations or local measures. If the State ultimately sets targets based on achieving 80 percent reduction below 1990 levels by 2050, additional reductions beyond currently adopted regulations will almost certainly be needed by 2035. Therefore, impacts in 2035 are potentially significant. The emission estimates for 2050 and project buildout in 2056 are presented in Table 5.7–6.

Executive Order S-03-05 includes a goal of reducing emissions to 80 percent below 1990 levels by 2050. This level of reduction is the amount estimated by climate scientists to be necessary to reach levels that will stabilize the climate. This reduction applies to global emissions, so reductions in California or the United States would need to be matched by reductions throughout the world to reach the required levels.

Table 5.7–6: Emissions in 2050 and at Project Buildout in 2056

Source	2050 (MTCO2e/year)	2056 (MTCO2e/year)
Motor vehicles	2,711,894	2,914,488
Electricity - residential	317,710	337,694
Electricity - commercial	362,433	393,513
Natural gas - residential	670,082	712,228
Natural gas - commercial	776,525	843,115
Waste	207,525	220,578
Offroad equipment	1,314	1,314
ODS substitutes (refrigerants)	812,214	863,300
Total	**5,859,698**	**6,286,229**
No target set past 2020		
Significance in 2050 and 2056?	**SU**	**SU**

Notes: SU = Significant Unavoidable Impact
Motor vehicle emissions include reductions included in EMFAC for Pavley I. Electricity emissions include compliance with RPS.

The State has not adopted comprehensive targets for any year past 2020. As was described above, State Executive Order S-03-05 identified a goal of reducing emissions to 80 percent below 1990 levels by 2050. As a local entity, this executive order does not require the City to comply with the goal of reducing emissions to 80 percent below 1990 levels by 2050. Determining consistency with a goal where a local role is not defined would be speculative. However, actions taken by the City that result in continued greenhouse gas reductions would support the State's goal.

A measure of progress toward a 2050 target could be determined on a per capita basis for Fresno by identifying a per capita emission reduction of 80 percent below 2020 levels. Levels from 2020 can be used as a substitute for 1990 levels because under AB 32, 2020 emissions must be reduced to 1990 levels. The per capita emissions rate in 2020 is 3.2 MTCO2e per person. Achieving an 80 percent reduction below 2020 levels would result in a per capita emission rate of 0.637 MTCO2e per person by 2050. The actions needed to achieve reductions of this magnitude are described in the Progress Beyond 2020 discussion in Section 5.7.4, above. The City of Fresno does not have regulatory authority that would allow this level to be achieved with its own actions. The State is likely to pursue reductions that make continued progress toward the goal over the next several decades, but the outcome is uncertain due to economic and technological considerations. Therefore, impacts after 2020 are considered significant and unavoidable.

Policies or Ordinances Related to Greenhouse Gas Emissions

The General Plan Update sets the City of Fresno on a course of action that will provide substantial decreases in greenhouse gas emissions through project buildout and will serve to reduce the

significant greenhouse gas impacts. In addition, the City has a number of programs and ordinances that provide reductions in greenhouse gases. Although these actions provide an important contribution from all development that will occur by 2056, it remains uncertain whether they are adequate to reduce impacts to less than significant. The GHG Plan (Appendix F-2) provides a comprehensive analysis of the benefits of the General Plan Update policies, programs, and ordinances in relation to an emission reduction target for the City to demonstrate consistency with AB 32 greenhouse gas reduction targets.

The General Plan contains the following objectives and policies that would reduce emissions in the following categories:

- Motor vehicle emissions, through encouraging infill development and increasing pedestrian, transit, and bicycle usage: ED-1-c, UF-1-c, UF-12-a, UF-12-b, UF-12-d, UF-12-e, UF-12-f, UF-12-g, UF-13-a, UF-14, UF-14-a, UF-14-b, UF-14-c, LU-2, LU-2-a, LU-2-b, LU-2-c, LU-2-d, LU-3-b, LU-5-f, LU-6-b, LU-6-g, LU-8-b, D-1-g, D-4-b, D-4-f, MT-1, MT-1-g, MT-1-j, MT-1-c, MT-1-l, MT-1-m, MT-2-n, MT-2-o, MT-2-c, MT-2-d, MT-2-f, MT-2-g, MT-2-b, MT-2, MT-1-k, MT-2-i, MT-4, MT-4-a, MT-4-d, MT-4-h, MT-4-i, MT-4-j, MT-4-k, MT-6-l, MT-9-e, MT-8-g, MT-8-h, MT-9, MT-8-a, MT-9-a, MT-9-b, MT-9-c, MT-8-d, MT-8-b, MT-8-e, MT-8-i, MT-9-f, MT-11-b, POSS-3-c, POSS-3-f, RC-2-a, RC-4-e, RC-4-g, RC-5-c, RC-8-j, HCR-3-f, and HC-5-f.
- Electricity and natural gas emissions through energy efficiency and green building: RC-5-c, RC-4-g, RC-8-a, RC-8-b, RC-8-d, RC-7-i, RC-8-e, RC-8-g, HCR-2-j, and HC-3-f. Policies RC-8-h and RC-8-i encourage solar and renewable energy use.
- Policies to reduce water usage, thereby reducing energy required to transport and treat water: PU-8-e, PU-8-b, RC-6-b, RC-6-d, RC-6-h, RC-7, RC-7-a, RC-7-b, RC-7-c, RC-7-h, RC-7-e, and RC-7-h.
- Waste: PU-9, PU-9-a, PU-9-b, RC-4-i, RC-11, RC-11-a, RC-11-b, and HCR-3-a.

Specific City Policies and Programs that Will Achieve Emission Reductions

In addition to the General Plan Update policies listed above, the City has already taken actions and is planning for new actions that will provide additional reductions. The City's specific plans, community plans, and programs are intended to stand on their own merit, but support the General Plan Update with their greater level of detail for transportation infrastructure, specific areas, communities, and neighborhoods. Brief descriptions of these programs and actions are provided below.

Development Code Update. The Development Code establishes a basis for determining whether specific development proposals are in harmony with the Vision of the General Plan Update. It is a regulatory tool that provides direction on how development or redevelopment will occur in the Planning Area. The Development Code will provide guidelines and design criteria that support the increased density envisioned in the General Plan Update.

Bus Rapid Transit. The overall vision of the BRT Master Plan is to demonstrate how improved efficiency, speed, and service can attract new transit ridership, improve customer satisfaction, and benefit the broader community by providing a quality of service similar to light rail systems through the use of bus technology. "Bus Rapid Transit" (BRT) is an integrated system of facilities, equipment, services, and amenities that improve the speed, reliability, and identity of bus transit. BRT is, in many respects, rubber-tired light rail transit (LRT) with greater operating flexibility and potentially lower costs. The BRT mode is quickly becoming an effective way to move people efficiently and in a cost effective manner—in terms of both capital and operating costs. Full implementation of the BRT system is estimated to increase daily ridership along the corridor served by 14,000 to 28,000 riders per day depending on the level of service ultimately provided.

Fresno Area Express (FAX) Transit Plan. The Fresno Area Express (FAX) a department of the City operates both fixed bus routes and paratransit service seven days a week. The system consists of 20 bus routes carrying over 12 million passenger per year. Many routes currently operate on 30-minute headways in the peak hour; however, recently several routes have been increased to 15-minute headways due to passenger demand. Three of FAX's routes currently serve more than 4,500 passengers each on a daily basis. Passenger demand on Route 28 is approaching 8,000 passengers per day and is quickly filling buses now operating every 15 minutes during the peak hour.

2010 City of Fresno Bicycle, Pedestrian and Trails Master Plan. The Bicycle, Pedestrian, and Trails Master Plan (BMP) is intended to guide and influence bikeway policies, programs, and development standards to make bicycling in the City of Fresno more safe, comfortable, convenient, and enjoyable for all bicyclists. In 2010, the City of Fresno had 137 miles of bikeways: 14 miles of Class I Bike Paths, 116 miles of Class II Bike Lanes, and 7 miles of Class III Bike Routes. Fresno Area Express (FAX) is currently equipped to accommodate bicyclists through their provision of bike racks on every bus, although they have identified that additional bicycle capacity is needed. Short term and long-term bicycle parking is provided at certain locations throughout the City, although bicyclists are not guaranteed bike parking at a majority of destinations. According to Census 2000 Journey to Work data, 0.9 percent of Fresno residents currently use the bicycle as their primary means of commuting to work. Although the BMP is a separate document not part of this Plan, the General Plan recognizes the BMP identifies more detailed implementation strategies with cost estimates and prospective funding sources, evaluates priorities of prospective improvements, and identifies a complete inventory of both short and long-range bicycle improvements

Fresno Green. The City is committed to building "green," thus constructing buildings and communities that are "sustainable" and environmentally responsible. The benefits are not easily quantified: cleaner air, pedestrian friendly neighborhoods, support for local businesses and agriculture, more green spaces, preservation of natural resources and our local architectural heritage, and healthier indoor environments. The City prepared the document, Creating a Sustainable Community, Handbook for Fresno Green Residential and Non-Residential Checklists. There are three routes that one can take to become a branded Fresno Green project:

1. Satisfy the requirements of one of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Programs;

2. Qualify for Build It Green's GreenPoint rating system for residential building; or
3. Follow the Fresno Green checklists. Fresno Green has in fact borrowed from these national and state programs but was specifically developed to be more holistic in approach to the "greening of communities." Thus, credits exist for historic preservation, historic landscapes and public art. Many credits are also specifically tied to the City's 2025 General Plan and similar policies in the General Plan Update.

Fresno Green includes a Tree Program that requires development to achieve 50% shade coverage in 5 years to qualify for credits under the program. Shade programs can reduce the urban heat island effect and reduce energy consumption from building cooling.

Downtown Neighborhoods Community Plan (DNCP). The City is going through the approval process for the DNCP, which seeks to revitalize the entire area surrounding Downtown Fresno. The project coincides with the planning for a High Speed Rail (HSR) station in Downtown Fresno. The project includes the preparation of a Downtown Development Code and also provides adaptive reuse guidelines to help catalyze the revitalization of the entire Fulton Corridor Specific Plan (FCSP) area and the DNCP area by facilitating the conversion of older, economically distressed, or historically significant buildings to residential, mixed-use, commercial, civic, and/or entertainment uses.

Fulton Corridor Specific Plan (FCSP). The FSCP provides detailed planning for the Fulton Mall. Downtown Fresno contains a number of thoroughfares that have been vacated to create pedestrian-only streets, most notably the Fulton Mall. Fulton Mall is a stand-alone project approved by the City Council in spring 2014. Other closures include Mariposa Street between M and N Streets, and between O and P Streets. The malls were originally installed to concentrate pedestrian activity and bolster the retail performance of Downtown, but over time have failed at generating a vibrant street life and commercial success. The FCSP is intended to provide a blueprint for addressing this issue.

SB 375 Sustainable Communities Strategy. The ARB set passenger vehicle greenhouse gas (GHG) emission reduction targets for 2020 and 2035 for each of the 18 Metropolitan Planning Organization (MPO) regions in California under the Sustainable Communities and Climate Protection Act of 2008 (SB 375). The City participated with Fresno COG in developing a Sustainable Community Strategy (SCS) to help meet the targets and to qualify for the CEQA streamlining provisions contained in SB 375. The SCS is included in the 2014 Regional Transportation Plan and Sustainable Communities Strategy adopted by the Fresno COG Board on June 26, 2014. The targets for Fresno County are a percent reduction passenger vehicle CO_2 per capita from 2005 of 4.7 percent in 2020 and 7.6 percent in 2035. Modeling was conducted by Fresno COG using land use scenarios consistent with the proposed General Plan Update and Policies to determine that the reductions were feasible. New travel models were developed to estimate the changes in travel. The new models are designed to better evaluate the types of land use and transportation policies likely to be considered in the RTP/SCSs. The models provide sensitivity to changes in land use and travel estimates.

San Joaquin Valley Blueprint. The San Joaquin Valley COGs conducted the Blueprint planning process in an effort to develop and help implement a vision for growth in the Valley to the year 2050. On April 1, 2009, the San Joaquin Valley (SJV) Regional Policy Council adopted Scenario B+ as the

Preferred Blueprint Growth Scenario for the San Joaquin Valley to the year 2050. This scenario identifies an average development density of 6.8 dwelling units per acre for new residential to the year 2050. The Fresno General Plan Update includes full development through the year 2056 and provides an average density for new single family and multiple family residential development of 9.13 units per acre (145,374 units/15,923 acres). This average density will support the focused growth envisioned in the Blueprint.

Greenhouse Gas Reduction Plan. The City has conducted the necessary work to set development on the path toward achieving the 2020 targets and future targets to be set by the State. The Greenhouse Gas Reduction Plan will include quantification of policies and programs that will show the local contribution beyond regulations that can be achieved with the implementation of the General Plan and other programs and actions in the City.

Cumulative Impact Analysis

Greenhouse gas impacts are by their nature cumulative impacts. Localized impacts of climate change are the result of the cumulative impact of global emissions. The combined benefits of reductions achieved by all levels of government help to slow or reverse the growth in greenhouse gas emissions. In the absence of comprehensive international agreements on appropriate levels of reductions achieved by each country, another measure of cumulative contribution is required. California has defined reductions required by the state in AB 32 (1990 emission levels by 2020). This serves to define California's share of the reductions regardless of the activities or lack of activities of other areas of the U.S. or the world. Therefore, a cumulative threshold based on consistency with state targets and actions to reduce greenhouse gases is an appropriate standard of comparison for significance determinations at the General Plan level.

The cumulative impacts of General Plan implementation after 2020 has no comprehensive state target or action plan that provides a similar basis of comparison. The regional targets adopted to comply with SB 375 only apply to a fraction the mobile source inventory in 2020 and 2035. As described earlier, the state is in the process of identifying a reduction target for 2030, but the actual strategy required to reach a target has not been determined. Finally, in preliminary assessments of options to achieve the 2050 goal, the state concluded that reliance on technical advancements and accelerated market penetration of new technologies would be required. Developing a community 2050 target without an adopted state strategy would be highly speculative. The General Plan will likely be updated several times before 2050. Each update will provide an opportunity to identify community targets to coincide with state targets and to adjust the strategy to ensure that the City of Fresno does its part in achieving greenhouse gas reductions.

The General Plan policies will continue to provide greenhouse gas reductions beyond 2020 since they apply to all development that will occur between adoption and buildout unless superseded by new policies. The amount of local reductions needed beyond 2020 is uncertain pending adoption of state targets for later years. In addition, the long-term effectiveness of the General Plan policies and programs that avoid, reduce, or minimize greenhouse gas emissions is not known. Therefore, cumulative impacts related to the growth under the General Plan and Development Code Update are significant and unavoidable. The City will track the effectiveness of implementation of the General

Plan and the Greenhouse Gas Reduction Plan on an annual basis to identify progress in meeting emission reduction targets. The Greenhouse Gas Reduction Plan will require update when and if later targets are adopted by the ARB.

Mitigation Measures

Project Specific

No mitigation measures beyond implementation of General Plan policies is feasible.

Cumulative

No mitigation measures beyond implementation of General Plan policies is feasible

Level of Significance After Mitigation

Project Specific

Significant impact.

Cumulative

Significant impact.

Conflict with Plan, Policy, or Regulation that Reduces Emissions

Impact GHG-2	**The project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.**

Project Specific Impact Analysis

Currently, the only applicable plan, policy or regulation for the City of Fresno is the Air Resources Board's Scoping Plan implementing AB 32. The Greenhouse Gas Reduction Plan will serve as the applicable plan once adopted. The Greenhouse Gas Reduction Plan is designed to provide a comprehensive strategy that demonstrates consistency with AB 32 and the Scoping Plan.

Scoping Plan

The California State Legislature adopted AB 32 in 2006. AB 32 focuses on reducing greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) to 1990 levels by the year 2020. In addition to the greenhouse gases listed in AB 32, a seventh greenhouse gas, nitrogen triflouride (NF3) was added to Health and Safety Code section 38505(g)(7) as a greenhouse gas of concern. Pursuant to the requirements in AB 32, the ARB adopted the Climate Change Scoping Plan (Scoping Plan) in 2008, which outlines actions recommended to obtain that goal. The Scoping Plan calls for an "ambitious but achievable" reduction in California's greenhouse gas emissions, cutting approximately 29 percent from business-as-usual emission levels projected for 2020, or about 10 percent from today's levels. On a per-capita basis, that means reducing annual emissions of 14 tons of carbon dioxide for every man, woman and child in California down to about 10 tons per person by 2020.

The ARB's First Update to the Scoping Plan (ARB 2014) does not include any new reduction measures; therefore, the 2008 Scoping Plan will be used in this analysis.

The Scoping Plan contains a variety of strategies to reduce the State's emissions. As shown in Table 5.7–7, the strategies are generally not applicable to the project, but reduce emissions from development that will occur within the Plan Area.

Table 5.7–7: Scoping Plan Reduction Measures

Scoping Plan Reduction Measure	City Applicability
1. California Cap-and-Trade Program Linked to Western Climate Initiative. Implement a broad-based California Cap-and-Trade program to provide a firm limit on emissions. Link the California cap-and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California. Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.	When this cap-and-trade system begins, products or services (such as electricity) would be covered and the cost of the cap-and-trade system would be transferred to the consumers.
2. California Light-Duty Vehicle Greenhouse Gas Standards. Implement adopted standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.	This is a statewide measure that cannot be implemented by a project applicant or lead agency. When this measure is initiated, the standards would be applicable to the light-duty vehicles in the City.
3. Energy Efficiency. Maximize energy efficiency building and appliance standards; pursue additional efficiency including new technologies, policy, and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California.	This is a measure for the state to increase its energy efficiency standards. However, the General Plan contains policies to increase energy efficiency, such as: RC-5-c, RC-4-g, RC-8-a, RC-8-b, RC-8-d, RC-7-i, RC-8-e, RC-8-g, HCR-2-j, and HC-3-f.
4. Renewable Portfolio Standard. Achieve 33 percent renewable energy mix statewide. Renewable energy sources include (but are not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.	The Pacific Gas and Electric Company, which would provide power to the project, is in the process of increasing the percent of renewable energy in its portfolio. It is required to increase this percentage by the year 2020 pursuant to various regulations.
5. Low Carbon Fuel Standard. Develop and adopt the Low Carbon Fuel Standard.	This is a statewide measure that cannot be implemented by a project applicant or lead agency. When this measure is initiated, the standard would be applicable to the fuel used by vehicles in the City.
6. Regional Transportation-Related Greenhouse Gas Targets. Develop regional greenhouse gas emissions reduction targets for passenger vehicles. This measure refers to SB 375.	The General Plan contains the following objectives and policies that would reduce motor vehicle use, encourage infill development, increase pedestrian, transit, and bicycle usage: ED-1-c, UF-1-c, UF-12-a, UF-12-b, UF-12-d, UF-12-e, UF-12-f, UF-12-g, UF-13-a, UF-14, UF-14-a, UF-14-b, UF-14-c, LU-2, LU-2-a, LU-2-b,

Scoping Plan Reduction Measure	City Applicability
	LU-2-c, LU-2-d, LU-3-b, LU-5-f, LU-6-b, LU-6-g, LU-8-b, D-1-g, D-4-b, D-4-f, MT-1, MT-1-g, MT-1-j, MT-1-c, MT-1-l, MT-1-m, MT-2-n, MT-2-o, MT-2-c, MT-2-d, MT-2-f, MT-2-g, MT-2-b, MT-2, MT-1-k, MT-2-i, MT-4, MT-4-a, MT-4-d, MT-4-h, MT-4-i, MT-4-j, MT-4-k, MT-6-l, MT-9-e, MT-8-g, MT-8-h, MT-9, MT-8-a, MT-9-a, MT-9-b, MT-9-c, MT-8-d, MT-8-b, MT-8-e, MT-8-i, MT-9-f, MT-11-b, POSS-3-c, POSS-3-f, RC-2-a, RC-4-e, RC-4-g, RC-5-c, RC-8-j, HCR-3-f, and HC-5-f.
7. Vehicle Efficiency Measures. Implement light-duty vehicle efficiency measures.	When this measure is initiated, the standards would be applicable to the light-duty vehicles in the City.
8. Goods Movement. Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.	The project does not propose any changes to maritime, rail, or intermodal facilities or forms of transportation.
9. Million Solar Roofs Program. Install 3,000 MW of solar-electric capacity under California's existing solar programs.	This measure is to increase solar throughout California, which is being done by various electricity providers and existing solar programs. In addition, General Plan Policies RC-7-h and RC-7-i encourage solar and renewable energy use.
10. Medium/Heavy-Duty Vehicles. Adopt medium and heavy-duty vehicle efficiency measures.	This is a statewide measure that cannot be implemented by a project applicant or lead agency. When this measure is initiated, the standards would be applicable to the vehicles that access the project site.
11. Industrial Emissions. Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.	Industrial sources achieve consistency with the Scoping Plan through compliance with SJVAPCD permitting, Cap and Trade, and RPS regulations. The SJVAPCD requires industrial projects subject to Air Permits to include best practice standards (BPS) to reduce emissions by amounts consistent with Scoping Plan targets.
12. High Speed Rail. Support implementation of a high-speed rail system.	This is a statewide measure that cannot be implemented by a project applicant or lead agency.
13. Green Building Strategy. Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	The General Plan contains policies to increase green building, such as RC-5-c, RC-4-g, RC-8-a, RC-8-b, RC-8-d, RC-7-i, RC-8-e, RC-8-g, HCR-2-j, and HC-3-f.

Scoping Plan Reduction Measure	City Applicability
14. High Global Warming Potential Gases. Adopt measures to reduce high global warming potential gases.	When this measure is initiated, it would be applicable to the high global warming potential gases that would be used in the City (such as in air conditioning and refrigerators).
15. Recycling and Waste. Reduce methane emissions at landfills. Increase waste diversion, composting, and commercial recycling. Move toward zero-waste.	The General Plan contains policies to help to decrease waste, including: PU-9, PU-9-a, PU-9-b, RC-4-j, RC-11, RC-11-a, RC-11-b, and HCR-3-a. The General Plan also contains the following policies to reduce wastewater: PU-7, PU-7-a, PU-7-b, PU-7-c, PU-7-d, and RC-4-i.
16. Sustainable Forests. Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.	The following General Plan policies encourage urban forests: D-3, D-3-a, D-3-b, D-3-c, POSS-3-f, POSS-5, POSS-5-a, POSS-5-c, POSS-5-d, and MT-3-b.
17. Water. Continue efficiency programs and use cleaner energy sources to move and treat water.	The General Plan contains water conservation policies such as the following: PU-8-e, PU-8-b, RC-6-b, RC-6-d, RC-6-h, RC-7, RC-7-a, RC-7-b, RC-7-c, RC-7-h, RC-7-e, and RC-7-h.
18. Agriculture. In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.	Limited agricultural lands exist within the City of Fresno Planning Area. No dairies are located near the City, so no digester projects are anticipated.
Source of ARB Scoping Plan Reduction Measure: Air Resources Board 2008. Source of Project Consistency or Applicability: Michael Brandman Associates.	

The General Plan Update includes numerous policies listed in Table xx that support state efforts to reduce greenhouse gases as detailed in the Scoping Plan. No General Plan policies were identified that conflict with or obstruct Scoping Plan strategies. The Scoping Plan future year inventories include growth projected for development throughout the State, including Fresno. This impact is considered less than significant.

Cumulative Impact Analysis

The analysis provided above is applicable to project level and cumulative impacts.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.8 - Hazards and Hazardous Materials

5.8.1 - Introduction

This chapter provides information on safety hazards within the City of Fresno Planning Area, including environmental effects associated with hazardous materials, emergency response, and the potential for aircraft crash hazards. Information used to prepare this section is based on the City of Fresno 2025 General Plan, City of Fresno General Plan Update, applicable Airport Land Use Compatibility Plans (ALUCPs), and data from federal, state, and local agencies containing information regarding hazardous materials use, wastes, and environmental contamination. The County of Madera suggested that their updated emergency plans are evaluated; however, the City of Fresno General Plan and Development Code Update would not affect the County of Madera emergency response plans.

5.8.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding hazards and hazardous materials is the Planning Area because potential development under the General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative hazardous materials impacts is the City of Fresno Planning Area and the immediate surrounding County of Fresno County of Madera, and City of Clovis areas because the cumulative context for analysis of potential hazards and hazardous materials impacts is, in general, site-specific. However, there could be contamination in some areas that is conveyed through soil or the groundwater that could cumulatively affect areas within the City of Fresno Planning Area. This analysis will be based on a summary of projections approach as provided in Section 15130(b)(1)(B) of the CEQA Guidelines. The applicable projections include growth identified in Fresno County 2000 General Plan, County of Madera General Plan, and the City of Clovis General Plan.

The study area for the analysis of cumulative airport hazards impacts is the area within the Airport Land Use Compatibility Plan for each of the airports including the Fresno-Yosemite International Airport, Chandler Executive Airport, and Sierra Skypark. This analysis will be based on a summary of projections approach as provided in Section 15130(b)(1)(B) of the CEQA Guidelines. The applicable projections include growth identified in Fresno County 2000 General Plan.

Hazardous Materials

Hazardous Materials Definitions

Hazardous materials, as defined by the California Code of Regulations, are substances with certain physical properties that could pose a substantial present or future hazard to human health or the

environment when improperly handled, disposed, or otherwise managed. Hazardous materials are grouped into the following four categories, based on their properties:

- Toxic - causes human health effects
- Ignitable - has the ability to burn
- Corrosive - causes severe burns or damage to materials
- Reactive - causes explosions or generates toxic gases

A hazardous waste is any hazardous material that is discarded, abandoned, or slated to be recycled. The criteria that define a material as hazardous also define a waste as hazardous. If improperly handled, hazardous materials and hazardous waste can result in public health hazards if released into the soil or groundwater or through airborne releases in vapors, fumes, or dust. Soil and groundwater having concentrations of hazardous constituents higher than specific regulatory levels must be handled and disposed of as hazardous waste when excavated or pumped from an aquifer. The California Code of Regulations, Title 22, Sections 66261.20-24 contains technical descriptions of toxic characteristics that could cause soil or groundwater to be classified as hazardous waste.

Hazardous Materials Use

Hazardous materials are routinely used, stored, and transported in the Planning Area and are associated with industrial and commercial/retail businesses, as well as in educational facilities, hospitals, and households. Hazardous waste generators in the Planning Area include industries, businesses, public and private institutions, and households. Federal, state, and local agencies maintain comprehensive databases that identify the location of facilities using large quantities of hazardous materials, as well as facilities generating hazardous waste. Some of these facilities use certain classes of hazardous materials that require risk management plans to protect surrounding land uses.

The Fresno County Health Department's Certified Unified Program Agency (CUPA) is responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that:

- Require Hazardous Materials Business Plans;
- Require California Accidental Release Prevention plans or Federal Risk Management Plans;
- Operate Underground Storage Tanks;
- Operate Aboveground Storage Tanks;
- Generate Hazardous Waste(s);
- Have Onsite Treatment of Hazardous Waste(s)/Tiered Permits.

Compliance is achieved through routine inspections of all regulated facilities, and investigation of citizen-based complaints and inquiries regarding improper handling and/or disposal of hazardous materials and/or hazardous wastes. Hazardous waste source reduction is a primary goal of the CUPA. Additionally, the agency provides oversight for the remediation of contaminated sites.

Hazardous Waste Storage and Leaking Sites

State laws relating to the storage of hazardous materials in underground storage tanks include permitting, monitoring, closure, and cleanup requirements. Regulations set forth construction and monitoring standards, monitoring standards for existing tanks, release reporting requirements, and closure requirements. A Permit to Operate from Fresno County Environmental Health Department is required in order to operate an underground storage tank system within the Planning Area. Environmental Health staff inspects UST facilities on an annual basis to assure compliance with applicable laws and regulations. The purpose of this program is to assure that hazardous materials stored in underground tanks are not released into the groundwater and/or the environment. The Permit to Operate incorporates a set of conditions for operation and continuous monitoring of the underground storage tank system.

Sites within the Planning Area that have been previously contaminated by hazardous materials are required to be identified and cleaned up. These contaminated sites are mainly associated with leaking underground storage tanks and are predominately clustered south of downtown, Fresno Yosemite International Airport, Palm Bluffs Corporate Center (located in northwest Fresno) and along the Union Pacific Railroad Tracks. Releases, leaks, or disposal of chemical compounds, such as petroleum, on or below ground surface can cause contamination in underlying soil and groundwater. Disturbance of previously contaminated areas may expose the public to hazards from physical or airborne contact. Due to these threats from hazardous materials, the City of Fresno coordinates with local, state and federal agencies to ensure potential threats are minimized. Below is a brief description of six of the databases that provide information about hazardous materials sites within the Planning Area.

1. **Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS):** CERCLIS contains data on potentially hazardous waste sites that have been reported to the United States Environmental Protection Agency (US EPA) by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites, which are either proposed to or on the National Priorities List (NPL) and sites, which are in the screening and assessment phased for possible inclusion on the NPL. The CERCLIS database lists five Federal Superfund sites within the Planning Area.

2. **Department of Toxic Substances Control EnviroStor Database:** The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. This is one of a number of lists that comprise the "Cortese List" (a list of all hazardous materials sites compiled pursuant to Government Code Section 65962.5). The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been

recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the EnviroStor database in January 2014 identified a total of 116 sites in the Planning Area. Table 5.8-1 lists current Active sites within the Planning Area.

Table 5.8-1: Facilities in the City of Fresno Listed on the DTSC EnviroStor Database

Site Facility Name	Site / Facility Type	Cleanup Status	Address Description
Valley Foundry And Machine Works	State Response	Active	2510 South East Avenue
Fresno Sanitary Landfill	Federal Superfund – Listed	Active – Land Use Restrictions	SW Corner Of Jensen & West Avenues
T H Agriculture & Nutrition, L.L.C.	Federal Superfund – Delisted	Certified / Operation & Maintenance – Land Use Restrictions	7183 East Mckinley Avenue
FMC Corporation – Fresno	State Response	Active	2501 South Sunland Avenue
H S Mann Metal Waste Company	Federal Superfund	Active	SW Corner of Jensen and West Avenue
Weir Floway Inc.	State Response	Active - Land Use Restrictions	2494 South Railroad Avenue, P.O. Box 164
Pinedale Area Groundwater	State Response	Backlog	Pinedale/N. Fresno Area
South Fresno Regional Groundwater Plume	State Response	Active	North Of Church Avenue At South East Ave
Former Burlington Northern Santa Fe Ice House	State Response	Active	3090 E Church Ave
Fresno Battery Exchange	State Response	Active	1403 East Jensen Avenue
Commercial Electroplaters	State Response	Active	2940 South Elm Avenue
Fresno Air Terminal/Old Hammer Field (J09ca0823)	State Response	Active	Mckinley And Clovis Avenues
Basic Training Center No. 8 (J09ca7280)	State Response	Active	1121 S. Chance Avenue
South Fresno PCE Groundwater Plume	State Response	Active	2376 S. Railroad Avenue
New High School and	School Investigation	Active	Fowler Ave. /Jensen Ave.

Site Facility Name	Site / Facility Type	Cleanup Status	Address Description
Middle School			
Source: Department of Toxic Substances Control- Envirostor Database 2014			

3. **GeoTracker Database:** The Geotracker database is the California Water Resources Control Boards' (Water Board) data management system for managing sites that impact groundwater, especially those that require groundwater cleanup (such as Underground Storage Tanks, Department of Defense, Site Cleanup Program) as well as permitted facilities such as operating underground storage tanks (USTs) and land disposal sites (Geotracker, 2012). Per the Geotracker database, the Planning Area contains 130 sites, in which the cleanup status is open.

4. **Water Board Sites:** The Water Board has identified a list of solid waste disposal sites with waste constituents above hazardous waste levels outside the waste management unit. The following two sites, shown in Table 5.8-2, are located in the Planning Area (Cortese List Data Resources, 2012):

Table 5.8-2: Waste Management Units

Discharger System No.	Waste Mgmt. Unit Name	Facility Name	Agency Name
5F 2 5D100300001-01	Mckinley Ave. Yard	T.H. Agriculture and Nutrition	North American Phillips
5F 3 5D100319001-01 10-AA-0013	Orange Avenue Disposal Company	Orange Avenue Landfill	Orange Avenue Disp Co. Inc.

5. **List of "active" Cease and Desist Orders (CDOs) and Cleanup and Abatement Orders (CAOs) from Water Board:** This list contains many Cease and Desist Orders and Cleanup and Abatement Orders that do not concern the discharge of wastes that are hazardous materials. Many of the listed orders concern, as examples, discharges of domestic sewage, food processing wastes, or sediment that do not contain hazardous materials, but the Water Boards' database does not distinguish between these types of orders (Cortese List Data Resources, 2012). As shown in Table 5.8-3 below, 11 of the 13 facilities in the Planning Area are active facilities. None of the sites are listed as hazardous waste; however, the waste type for the Malga facility is not listed.

Table 5.8-3: Facilities in the City of Fresno Listed on the Water Board List of "Active" CDO and CAOs

Facility ID	Facility Name	Agency Name	Description	Address	Facility Waste Type	Status
273127	Orange Cove WWTF	Orange Cove City	Sewage Systems	1 Parlier & Monson	Municipal/Domestic Wastewater	Active
205463	American Avenue Landfill	Fresno County PWD	Refuse Systems	18950 American	Solid Waste Class II – Designated Wastes	Active
246108	Orange Ave Landfill	Orange Avenue Disposal Company, Inc.	Refuse Systems	3280 ORANGE Avenue	Nonhazardous solid wastes	Active
273158	WISH I AH CARE CENTER WWTF	Privately-Owned Business	Sewerage Systems	35680 Wish I AH	Municipal/Domestic Wastewater	Active
257951	Sandy Point & River Bend MHPs	Privately-Owned Business	Operators	17604 East Kings Canyon Road	Municipal/Domestic Wastewater	Active
273126	Mendota WWTF	Mendota City	Sewerage Systems	Bass, Mendota	Municipal/Domestic Wastewater	Active
253104	Former ROCHA & Sons Dairy	Privately-Individual	Dairy Farms	9389 Kamm, Selma	Animal Feeding Facility	Active
273132	San Joaquin WWTF	City of San Joaquin	Sewerage Systems	PO Box 758	Municipal/Domestic Wastewater	Active
234841	Kerman WWTF	Kerman City	General Farms	15480 Church	Municipal/Domestic Wastewater	Active
273180	Malaga CWD WWTF	Malaga CWD	Sewerage Systems	3749 MAPLE	Nonhazardous domestic sewage	Active
230023	Helm Fertilizer Plant	J R Simplot Co.	Nitrogenous Fertilizers	12688 COLORADO	Industrial	Active
224347	Fertilizer Plan	J R Simplot Co.	Nitrogenous Fertilizers	12688 COLORADO	Industrial	Active
269508	USA SS #96	USA PETROLEUM CORPORATION	Gasoline Service Stations	5698 KINGS CANYON	Gasoline Service Stations	Active

Source: Cortese List Data Resources, 2014.

6. **Department of Toxic Substances Control:** Section 65962.5(a)(1) requires that DTSC "shall compile and update as appropriate, but at least annually, and shall submit to the Secretary for Environmental Protection, a list of all the following: (1) [a]ll hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code (Cortese List Data Resources, 2012).

The hazardous waste facilities identified in HSC § 25187.5 are those where DTSC has taken or contracted for corrective action because a facility owner/operator has failed to comply with a date for taking corrective action in an order issued under HSC § 25187, or because DTSC determined that immediate corrective action was necessary to abate an imminent or substantial endangerment. This is a very small and specific subgroup of facilities, and they are not separately posted on the DTSC or Cal/EPA's website. (Cortese List Data Resources, 2012). There are no facilities listed in the Planning Area.

Hazardous Materials Incidents Emergency Response

The unauthorized releases of hazardous materials into the environment could create many environmental impacts including impacts to properties, natural environment and human health. The significance of these impacts could vary according to the location and quantity of the substance released. Hazardous releases can occur in area that treats, stores, transports and uses hazardous materials; however, certain areas within the State and Planning Area are at higher risk for releases. In the event of an unauthorized release of hazardous materials/substances, emergency response measures must be implemented to ensure the protection of human and natural environmental health from risk.

The Planning Area includes a developed urban area with industrial uses concentrated in the southern portion of the Planning Area. Agriculture is one of the City's major industries. The potential for hazardous materials incidents are heightened. Accidental releases of pesticides, fertilizers, and other agricultural chemical may be harmful to the public's health, safety, and the environment. In addition, the Planning Area contains major transportation routes, such as State Highways 99, 180, 41, and 168. Varieties of chemicals are transported utilizing one of the two railroad lines. The Fresno Yosemite International Airport, Fresno Chandler Executive Airport, and the Sierra Sky Park are located within the Planning Area. These facilities, along with the transportation routes and industrial uses listed above, transport hundreds of thousands of tons of hazardous materials through and into the Planning Area each year. Due to the urban nature of the Planning Area and its location among several routes that regularly transport hazardous materials through and around the Planning Area, the area faces risks associated with the potential for hazardous materials emergencies. The City of Fresno Fire Department recognizes the potential for a large chemical release to occur which could expose thousands of people to hazardous or toxic vapors.

The City of Fresno Fire Department Hazardous Materials Response Team (HMRT) has embraced an all-hazards approach to emergency response to ensure that the Planning Area receives effective protection from the risk of hazardous materials releases.

The Fire Department HMRT is comprised of sixty personnel trained to the Hazardous Materials Technician and/or Specialist requirements. Fourteen personnel are on duty each day with a minimum of nine of those persons, trained to the Technician/Specialist level. The HMRT utilizes two State Office of Emergency Services (OES) Type 1 Hazmat response rigs, and a Mass Decontamination trailer. The HMRT is deployed from two strategically located fire stations. The HMRT OES Type 1 response rig is assigned to a fire station with a fire engine and a fire truck. The second Type 1 response rig is assigned to a station staffed with HMRT personnel assigned to a fire engine. The second station is also the location of the Mass Decontamination trailer. The deployment plan requires the dispatch of the closest response company in conjunction with the HMRT to hazardous materials emergencies.

The Fresno City Hazardous Materials Response Teams have partnered with the OES to deploy regionally or statewide to support any jurisdiction through the State Master Mutual Aid System (www.fresno.gov).

Emergency Response

In addition to emergency response to hazardous materials incidents, both the City of Fresno and the County of Fresno implement programs to facilitate emergency preparedness for other types of incidents within the Planning Area. Specifically, the City of Fresno has an Emergency Operations Plan that describes what the City's actions will be during a response to an emergency. This plan also describes the role of the Emergency Operations Center (EOC) and the coordination that occurs between the EOC, City Departments, and other response agencies. The plan establishes a requirement for the emergency management organization to mitigate any significant emergency disaster affecting the City of Fresno. The plan also identifies the policies, responsibilities, and procedures required to protect the health and safety of City communities, public and private property, and the environmental effects of natural or technological disasters. In addition, the plan establishes the operation concepts and procedures associated within initial response operations (field response) to emergencies, the extended response operations (City of Fresno Emergency Operations Center Activities), and the recovery process. Furthermore, the plan complies with the State of California Emergency Operations Plan "Cross Walk" checklist for determining whether an emergency plan has addressed critical elements of California's Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS).

The County of Fresno has a Multi-Hazard Mitigation Plan, which is a multi-jurisdictional plan that aims to reduce or eliminate long-term risk to people or property from natural disasters and their effects that is applicable to the city and areas outside of the City but within the Planning Area.

Standardized Emergency Management System

In addition to the City Emergency Operations Plan and the County Multi-Hazard Mitigation Plan, the SEMS is the system required by Government Code Section 8607 (a) for managing response to multi-agency and multi-jurisdiction emergencies in California. SEMS consists of five organizational levels, which are activated as necessary: field response, local government, operational area, OES Mutual Aid Regions, and State OES.

Emergency Operations Center

The primary City of Fresno EOC is a borrowed meeting area located at the Municipal Services Building, 2101 G Street, Building A. During a disaster/emergency, the City of Fresno EOC will support field response operations in mitigating incidents within the incorporated areas of the City of Fresno. The primary emphasis will be placed on saving lives, protecting property, and preserving the environment. The City of Fresno EOC will operate using the SEMS/National Incident functions, principles, and components. It will implement the action planning process, identifying and implementing specific objectives for each operational period.

The City of Fresno EOC will serve as the coordination and communications between the City of Fresno and Fresno County Operational Area EOC. The Operational Area EOC will be activated whenever an emergency or disaster impacts the City, cities, or special district(s). The Fresno Operational Area EOC will utilize the discipline-specific mutual aid coordinators to coordinate fire, law enforcement, public works, and medical specific resources. Other resource requests that do not fall into these four disciplines will be coordinated by the requesting branch/section/unit within the Appropriate SEMS EOC Section.

Emergency Response Routes

The City does not maintain formal evacuation routes, as the most appropriate routes away from an area that may have been affected by a major disaster would be determined by the location and type of incident. Plans for such incidents would also be heavily subject to change.

Airport Hazards

Three airports occur within the City of Fresno, with Fresno Yosemite International Airport being the largest. Each of the three airports is described below.

Fresno Yosemite International Airport

Fresno Yosemite International Airport (FYI) occurs in the eastern portion of the City along East Clinton Way. FYI is a joint use civilian/military airport. It is used by commercial air carriers, air cargo operators, charter operators, the State of California, general aviation, and the United States military. The California Air National Guard (CANG) occupies a 58-acre area adjacent to McKinley Avenue in the southeast portion of FYI. A helicopter repair and maintenance unit of the Army National Guard, the California Division of Forestry, and a number of corporate aviation businesses occupy facilities north of the runways. About 250 general aviation aircraft are based at FYI and two Fixed Base Operators (FBOs) offer a wide range of aeronautical services. According the FYI Safety Compatibility Zones Map, existing residential structures are located within Safety Zone 1-Runway Protection Zone (RPZ).

Fresno Chandler Executive Airport

Fresno Chandler Executive Airport occurs in the southwestern portion of the City at the intersection of Kearny Boulevard and Thorne Avenue. The airport is designated as a general aviation reliever airport for FYI. One small cargo carrier operates out of the facility, and nine general aviation

businesses operate out of the airport. Approximately 180 general aviation aircraft are based at Fresno Chandler Executive Airport. There are currently no plans to expand the airport.

Sierra Sky Park

Sierra Sky Park airport occurs in the northern portion of the City adjacent to the San Joaquin River along Herndon Avenue. The facility is a privately owned public use general aviation airport. Sierra Sky Park functions as a reliever airport for small general aviation aircraft, and includes a hangar and office complex. There are currently no plans to expand the facility.

Fire Hazards

The Planning Area is located within the Central Valley, and is relatively flat. The majority of the Planning Area occurs as developed properties or agricultural lands. Similar uses surround the Planning Area with the City of Clovis to the east, and mostly agricultural properties to the north, west, and south. The Sierra Nevada foothills to the north and east of the Planning Area and the City of Clovis provide the nearest areas where large expanses of undeveloped properties occur. Because of the topography and the distance between the developed portions of the Planning Area and undeveloped areas, the primary fire hazard concern within the Planning Area consists of the potential for structure fires in developed areas.

5.8.3 - Regulatory Setting

Potential hazards and the use and transportation of hazardous substances are regulated by an overlapping set of adopted City, County, State, and federal plans, policies and regulations. In general, federal and State legislation empowers regulation by local agencies; however, both State and federal agencies such as the Federal Aviation Administration (FAA) (airports) and Regional Water Quality Control Board (RWQCB) (ground and surface water contamination) retain a substantial direct regulatory role. The City addresses these issues primarily in its Municipal Code and to a lesser extent in its 2025 General Plan. Hazardous materials are also regulated by the City of Fresno Fire Department and the San Joaquin Valley Air Pollution Control District (SJVAPCD). The Fresno Council of Governments maintains the Airport Land Use Plan (ALUP), and the City Municipal Code contains the Airport Zoning Ordinance that addresses land use and safety regulations in the airport zone.

Federal

Toxic Substances Control Act

Established in 1976 and amended on December 31, 2002, the Toxic Substances Control Act (TSCA) (15 United States Code [USC] Section 2601-2692) grants the EPA power to require proper reporting, record-keeping, and testing requirements related to chemical substances and/or mixtures. Specifically, the TSCA addresses the production, importation, use, and disposal of specific chemicals, including polychlorinated biphenyls (PCBs), asbestos, radon, and lead-based paints (LBP). The TSCA establishes the EPA's authority to require the notification of the use of chemicals, require testing, maintain a TSCA inventory, and require those importing chemicals under Sections 12(b) and 13 to comply with certification and/or other reporting requirements. This federal legislation also phased out the use of asbestos-containing materials in new building materials and sets requirements for the

use, handling, and disposal of asbestos-containing materials. Disposal standards for lead-based paint wastes are also detailed in the TSCA.

The Emergency Planning and Community Right-To-Know Act

The Emergency Planning and Community Right-To-Know Act (also known as Title III of the Federal Superfund Amendments and Reauthorization Act, or "SARA III") (42 United States Code 11001 et seq.), was established by the EPA to allow for emergency planning at the State and local level regarding chemical emergencies, to provide notification of emergency release of chemicals, and to address community right-to-know regarding hazardous and toxic chemicals. SARA III was designed to increase community access and knowledge about chemical hazards as well as facilitate the creation and implementation of State/Native American tribe emergency response commissions, responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs). Section 1910.1200(c) Title 29 of the CFR defines "chemicals or hazardous materials" for the purposes of SARA III.

Federal Air Regulations, Part 77.

The Federal Aviation Administration (FAA) is charged with the review of construction activities that occur in the vicinity of airports. Its role in reviewing these activities is to ensure that new structures do not result in a hazard to navigation. The regulations in the Federal Air Regulations (14 CFR, Part 77) are designed to ensure that no obstructions in navigable air space are allowed to exist that would endanger the public. Proposed structures are also evaluated against Terminal En Route Procedures, which ensure that a structure does not adversely impact flight procedures. Tall structures, including buildings, construction cranes, and cell towers in the vicinity of an airport can be hazardous to the navigation of airplanes. Federal Air Regulations Part 77 identifies the maximum height at which a structure would be considered an obstacle at any given point around an airport. The extent of the off-airport coverage that needs to be evaluated for tall structure impacts can extend miles from an airport facility. In addition, Federal Air Regulations Part 77 establishes standards for determining whether objects constructed near airports will be considered obstructions in navigable airspace, sets forth notice requirements of certain types of proposed construction or alterations, and provides for aeronautical studies to determine the potential impacts of a structure on the flight of aircraft through navigable airspace.

Federal Insecticide, Fungicide, and Rodenticide Act.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 United States Code 136 et seq.) was originally passed in 1947. It has been amended several times, most extensively in 1972, and most recently by the Food Quality Protection Act of 1996. The purpose of FIFRA is to establish federal jurisdiction over the distribution, sale, and use of pesticides. It also gives EPA the authority to study the effects of pesticide use. Other key provisions of FIFRA require pesticide applicators to pass a licensing examination for status as "qualified applicators," create a review and registration process for new pesticide products, and ensure thorough and understandable labeling that includes instructions for use.

Hazardous Materials Transportation Act (HMTA) – safe transport of hazardous materials.

The U.S. Department of Transportation regulates hazardous materials transportation between states under Title 49, Chapter 1, Part 100-185 of the Code of Federal Regulations. Within California, Caltrans and the CHP enforce federal law. Together, these agencies determine driver training requirements, load labeling procedures, and specifications for container types to be used.

Federal Emergency Management Agency (FEMA)

With respect to emergency planning, FEMA is responsible for ensuring the establishment and development of policies and programs for emergency management at the federal, State, and local levels. Enforcement of these laws and regulations is delegated to State and local environmental regulatory agencies.

Resource Conservation and Recovery Act

The 1976 Federal Resource Conservation and Recovery Act (RCRA) and the 1984 RCRA Amendments regulate the treatment, storage, and disposal of hazardous and non-hazardous wastes. The legislation mandated that hazardous wastes be tracked from the point of generation to their ultimate fate in the environment. This includes detailed tracking of hazardous materials during transport and permitting of hazardous material handling facilities.

The 1984 RCRA amendments provide the framework for a regulatory program designed to prevent releases from USTs. The program establishes tank and leak detection standards, including spill and overflow protection devices for new tanks. The tanks must also meet performance standards to ensure that the stored material will not corrode the tanks. Owners and operators of USTs had until December 1998 to meet the new tank standards. As of 2001, an estimated 85 percent of USTs complied with the required standard.

Comprehensive Environmental Response, Compensation and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 introduced active federal involvement to emergency response, site remediation, and spill prevention, most notably the Superfund program. The act was intended to be comprehensive in encompassing both the prevention of, and response to uncontrolled hazardous substances releases. The act deals with environmental response, providing mechanisms for reacting to emergencies and chronic hazardous material releases. In addition to establishing procedures to prevent and remedy problems, it establishes a system for compensating appropriate individuals and assigning appropriate liability. It is designed to plan for, and respond to, failure in other regulatory programs and to remedy problems resulting from action taken before the era of comprehensive regulatory protection.

State

California Health and Safety Code

The California Environmental Protection Agency has established rules governing the use of hazardous materials and the management of hazardous wastes. California Health and Safety Code Sections 25531, et seq., incorporate the requirement of Superfund Amendments and Reauthorization Act and the Clean Air Act as they pertain to hazardous materials. Health and Safety Code Section 25534

directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop a Risk Management Plan (RMP). The RMP must be submitted to the appropriate local authorities, the designated local administering agency, and the EPA for review and approval.

San Joaquin Valley Air Pollution Control District (SJVAPCD)

The San Joaquin Valley Unified Air Pollution Control District has regulations that require compliance with the asbestos demolition and renovation requirements developed by the United States Environmental Protection Agency in the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation, 40 CFR, Part 61, Subpart M. (San Joaquin Valley Pollution Control District Asbestos Bulletin, 2012).

Local

City of Fresno Municipal Code

Chapter 10, Article 14 of the City of Fresno Municipal Code pertains to the recovery of expenses associated with hazardous spills. Specifically, this section states that "Any person causing a release or threatened release which results in an emergency action shall be liable to the City of Fresno for the recoverable costs resulting from the emergency action."

Fresno County Environmental Health Department - Hazardous Materials Business Plans

Facilities that store, use or handle hazardous materials above reportable amounts are required to prepare and file a Hazardous Materials Business Plan for the safe storage and use of chemicals. In the event of an emergency, firefighters, health officials, planners, public safety officers, health care providers and others rely on the Business Plan. Implementation of the Business Plan should prevent or reduce damage to the health and safety of people and the environment when a hazardous material is released (Fresno County Department of Environmental Health, 2012).

A Business Plan must be submitted by businesses that handle a hazardous material, or a mixture containing a hazardous material, in quantities equal to or greater than:

1. 500 pounds of a solid.
2. 55 gallons of a liquid.
3. 200 cubic feet of a compressed gas at standard temperature and pressure.
4. The federal Threshold Planning Quantity (TPQ) for Extremely Hazardous Substances.
5. Radioactive materials in quantities for which an Emergency Plan is required as per Parts 30, 40, or 70, Chapter 1 of Title 10 of Code of Federal Regulations.

The Business Plan must include: 1) the type and quantity of hazardous materials; 2) site map; 3) risks of using these materials; 4) spill prevention; 5) emergency response; 6) employee training and 7) emergency contacts (Fresno County Department of Environmental Health, 2012).

Airport Land Use Commission Airport Land Use Plans

The specific safety regulations for the Fresno-Yosemite International Airport, Fresno Chandler Downtown Airport, and Sierra Sky Park Airport are identified in Impact HAZ-5 and Impact HAZ-6, below.

2025 Fresno General Plan

Below are the objectives and policies that relate to hazards and hazardous materials from the Safety Element of the currently adopted Fresno 2025 General Plan.

Fire Hazards

1-1. OBJECTIVE: Maintain a high level of fire protection for large and tall structures constructed in the City of Fresno.

I-1-a. Policy: Adopt appropriate standards, as necessary, for fire protection and fire suppression within high-rise buildings.

- The City of Fresno shall enforce the latest adopted version of the California Code of Regulations Title 24 standards regarding high-rise buildings, to ensure the highest level of fire protection for new and existing construction.
- The City of Fresno shall pursue to the fullest extent possible the existing city ordinance and Uniform Fire Code (UFC) and National Fire Protection Association (NFP A) standards for the installation of automatic fire sprinkler systems for all new construction and for existing construction where trade-offs are allowed by local ordinance.
- Maintain and enforce the provisions of Fresno Municipal Code that relate to fire protection requirements (public service delivery plan and fire access lanes/areas) for mid-rise and high-rise buildings.
- The City of Fresno shall maintain adequate personnel and equipment, based at appropriate locations, to expeditiously meet the fire prevention, life safety, and emergency mitigation needs for large and tall structures.

1-2. OBJECTIVE: Ensure the public's health, safety, and welfare by implementing appropriate controls and emergency response capability to deal with those materials that, because of their quantity, concentration, physical or chemical characteristics, pose a significant present or potential hazard to human health, safety, or the environment.

I-2-a. Policy: Maintain and enforce the latest adopted California Building Code and Uniform Fire Code standards to ensure safe processing and storage of hazardous materials.

1-2-b. Policy: Maintain a close liaison with the Fresno County Environmental Health Department, Cal-EPA Division of Toxics, and the State Office of Emergency Services to assist in developing and maintaining hazardous material business plans, inventory statements, risk management prevention plans, and contingency/emergency response action plans.

Hazardous Materials

I-6. OBJECTIVE: Reduce and control the adverse effects of hazardous materials on the public's health, safety, and welfare to promote the public health and welfare of local residents and the productive capacity of industry.

1-6-a. Policy: Hazardous materials will be defined as those that, because of their quantity, concentration, physical or chemical characteristics, pose significant potential hazards to human health, safety, or the environment. Specific federal, state, and local definitions and listings of hazardous materials will be used by the City of Fresno.

I-6-b. Policy: The city will coordinate and cooperate with other local, state, and federal agencies with expertise and responsibility for hazardous materials.

1-6-c. Policy: Approval of annexations and development projects (including issuance of building permits) will be subject to state and federal requirements for adequate assessment and mitigation measures on listed hazardous material sites and for business activities that involve more than threshold amounts of hazardous materials.

1-6-d. Policy: As may be appropriate, the city shall require and evaluate the results of "Level I" and further site investigations before approving development entitlements on, or annexation of, property.

1-6-e. Policy: Through the environmental review process for land use plans and other development projects, the city will continue to identify and assess the health- and safety-related implications of storage, use, and disposal of hazardous materials.

1-6-f. Policy: All commercial and industrial special permits will be conditioned upon proper containment, use, safeguarding, and disposal of hazardous materials.

I-6-g. Policy: The city will continue to prevent, assess, and seek remediation for, any hazardous material contamination within, and affecting, its planning area.

1-6-h. Policy: The city will continue to aid in the identification and mapping of waste disposal sites (including abandoned wastes), and to assist in the survey of the kinds, amounts, locations, etc., of hazardous wastes.

1-6-i. Policy: The city will utilize conditions for development. projects, will adopt and enforce ordinances, and will use its police powers for land use regulation, code enforcement and nuisance abatement in order to prohibit the inappropriate use of, and/or discharge of, toxic and hazardous materials to the atmosphere, to wastewater collection and storm drainage systems, to groundwater, and to surface bodies of water, when such use or discharge threatens public health, safety, or general welfare.

1-6-j. Policy: Disaster and emergency response preparedness and planning for the city will include procedures and policies appropriate to hazardous materials.

I-6-k. Policy: The city will continue to support and assist with special household hazardous waste collection activities, to reduce the amount of this material ·being improperly discarded.

1-6-1. Policy: The city will continue to assist in providing information to the public on hazardous materials.

5.8.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to hazards and hazardous materials are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, hazards and hazardous materials impacts resulting from the proposed project are considered significant if the project would:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? (See Routine Use, Impact HAZ-1)

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the hazardous materials into the environment? (See Accident Conditions, Impact HAZ-2)

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? (See Schools, Impact HAZ-3)

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? (See Hazardous Materials Site Listing, Impact HAZ-4)

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? (See Airports, Impact HAZ-5)

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? (See Private Airstrip, Impact HAZ-6)

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? (See Emergency Plans, Impact HAZ-7)

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? (See Wildland Fires, Impact HAZ-8)

5.8.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

The impact assessment below identifies potential project-related impacts associated with implementation of the proposed General Plan and Development Code Update.

Routine Use

Impact HAZ-1	**The project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.**

Project Specific Impact Analysis

It is anticipated that implementation of the proposed General Plan and Development Code update could result in the exposure of persons to hazards and/or hazardous materials during construction as well as during the life of the General Plan. Thus, potential construction-related and long-term (i.e. operational) hazards impacts are discussed below.

Potential Short-Term Construction Impacts

The proposed General Plan udpate includes infill development and intensification of land uses within the City of Fresno Planning Area. Therefore, existing structures within the Planning Area may need to be demolished and new buildings will be constructed. Demolition of existing buildings in the Planning Area could expose persons working or living in the Planning Area to potentially hazardous materials including but not limited to asbestos and lead from lead-based paints. Various regulations and guidelines pertaining to abatement of, and protection from, exposure to asbestos and lead have been adopted for demolition activities. These requirements include: San Joaquin Valley Air Pollution Control District requirements for demolitions and renovations; Construction Safety Orders 1529 (pertaining to asbestos) and 1532.1 (pertaining to lead) from Title 8 of the CCR, Part 61, Subpart M of the Code of Federal Regulations (CFR) (pertaining to asbestos); and lead exposure guidelines provided by the Department of Housing and Urban Development (HUD). In California, asbestos and lead abatement must be performed and monitored by contractors with appropriate certifications from the State Department of Health Services. In addition, the California Occupational Safety and Health Administration (Cal/OSHA) has regulations concerning the use of hazardous materials, including requirements for safety training, availability of safety equipment, hazardous materials exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces the hazard communication program regulations, which include provisions for identifying and labeling hazardous materials, describing the hazards of chemicals, and documenting employee-training programs. All demolition that could result in the release of lead and/or asbestos must be conducted according to Cal/OSHA standards.

Grading and excavation of sites for new development may expose construction workers and the public to known or potentially unknown hazardous substances present in the soil or groundwater. There are sites containing hazardous materials located throughout the City (City of Fresno. Map Atlas Existing Conditions Report, 2011), which pose as potential health hazards. However, new development on contaminated areas that would occur as a result of implementation of the General Plan and Development Code Update would be required to be remediated (i.e., cleaned up), prior to

the commencement of construction activities. These activities would be under the supervision of the Department of Toxic Substances Control (DTSC), Fresno County Division of Environmental Health, and/or Regional Water Quality Control Board (RWQCB), depending on the site characteristics. Potential soil contamination in these areas must be properly identified and cleaned up prior to any development activities on any of these sites to prevent exposure of people and the environment to these hazards. Additionally, it is also possible that old underground storage tanks (USTs) that were in use prior to permitting and record keeping requirements may be present throughout the Planning Area. If an unidentified underground storage tank were uncovered or disturbed during construction activities, it would need to be sealed and abandoned in place or removed. Removal activities could pose both health and safety risks, such as the exposure of workers, tank handling personnel, and the public to tank contents or vapors. Potential risks, if any, posed by underground storage tanks would be minimized by managing the tank according to Fresno County standards as enforced and monitored by the Department of Environmental Health. The extent to which groundwater may have been affected, if at all, depends on the type of contaminant, the amount released, and depth to groundwater at the time of the release, if any, occurred. If groundwater contamination has been identified, remediation activities would be required by the RWQCB, DTSC, or other appropriate regulatory agency prior to the start of any new construction activities.

To reduce potential project-specific impacts regarding routine transport, use, or disposal of hazardous materials in the City of Fresno, the General Plan Update includes the following objective and policies:

Objective NS-4: Minimize the risk of loss of life, injury, serious illness, and damage to property resulting from the use, transport, treatment, and disposal of hazardous materials and hazardous wastes.

Policy NS-4-a: Processing and Storage. Require safe processing and storage of hazardous materials, consistent with the California Building Code and the Uniform Fire Code, as adopted by the City.

Policy NS-4-b: Coordination. Maintain a close liaison with the Fresno County Environmental Health Department, Cal-EPA Division of Toxics, and the State Office of Emergency Services to assist in developing and maintaining hazardous material business plans, inventory statements, risk management prevention plans, and contingency/emergency response action plans.

Policy NS-4-c: Soil and Groundwater Contamination Reports. Require an investigation of potential soil or groundwater contamination whenever justified by past site uses. Require appropriate mitigation as a condition of project approval in the event soil or groundwater contamination is identified or could be encountered during site development.

Policy NS-4-d: Site Identification. Continue to aid federal, State, and County agencies in the identification and mapping of waste disposal sites (including abandoned waste sites), and to assist in the survey of the kinds, amounts, and locations of hazardous wastes.

Policy NS-4-e: Compliance with County Program. Require that the production, use, storage, disposal, and transport of hazardous materials conform to the standards and procedures established

by the County Division of Environmental Health. Require compliance with the County's Hazardous Waste Generator Program, including the submittal and implementation of a Hazardous Materials Business Plan, when applicable.

Policy NS-4-f: Hazardous Materials Facilities. Require facilities that handle hazardous materials or hazardous wastes be designed, constructed, and operated in accordance with applicable hazardous materials and waste management laws and regulations.

Policy NS-4-g: Hazmat Response. Include policies and procedures appropriate to hazardous materials in the City's disaster and emergency response preparedness and planning, coordinating with implementation of Fresno County's Hazardous Materials Incident Response Plan.

Policy NS-4-i: Public Information. Continue to assist in providing information to the public on hazardous materials.

Potential Long-Term Operational Impacts

New development associated with the proposed General Plan and Development Code Update would result in the addition of new buildings and infrastructure as well as population to the Planning Area. Development under the proposed General Plan would result in the addition of land uses, which could generate hazardous materials, as well as added population, which could be exposed to future hazardous materials releases. Additionally, new development that would be constructed under the proposed General Plan that involves routine transport, use, or disposal of hazardous materials will be required to conform to City of Fresno ordinances and regulations regarding the transport, use and disposal of hazardous materials. New businesses that handle a hazardous material, or a mixture containing a hazardous material, in quantities equal or greater than 500 pounds of a solid, 55 gallons of a liquid, 200 cubic feet of a compressed gas at a standard room temperature and pressure, the federal Threshold Planning Quantity (TPQ) for Extremely Hazardous Substances, and radioactive materials in quantities for which an Emergency Plan is required as per Parts 30, 40, or 70, Chapter 1 of Title 10 of Code of Federal Regulation (CFR) will be required to conform to the City of Fresno approved Hazardous Materials Business Plan. The Hazardous Materials Business Plan includes business owner/operator identification form, business activities form, hazardous materials inventory, site map and building diagram(s), written emergency response plans, and written employee training programs. Less than significant project-specific impacts are anticipated because all generation, transport, and treatment of hazardous materials are required to comply with applicable federal, State and local requirements. Additionally, as described below, the proposed General Plan update contains objectives and policies that are specific to hazards and hazardous materials.

To reduce potential project-specific impacts regarding routine transport, use, or disposal of hazardous materials in the City of Fresno, the General Plan Update includes Objective NS-4 and Policies NS-4-a through NS-4-I as discussed above and the following policy.

Policy NS-4-h: Household Collection. Continue to support and assist with the County's special household hazardous waste collection activities, to reduce the amount of this material being improperly discarded.

With the implementation of the above objective and policies, project impacts regarding the exposure of hazards to the public or the environment through the routine transport, use, or disposal of hazardous materials will remain less than significant.

Cumulative Impact Analysis

Cumulative effects are anticipated regarding the routine transport, use, or disposal of hazardous materials related to agricultural use and industrial uses within and beyond the Planning Area. Agricultural uses are located within and adjacent to the areas surrounding the Planning Area. Agricultural and industrial uses include the routine transportation, use and disposal of hazardous materials including pesticides, insecticides, petroleum, and other hazardous substances. The implementation of the General Plan and Development Code Update could contribute to cumulative effects. However, those effects would be reduced with the implementation of the objective and policies identified above. The project's contribution to potential cumulative effects from routine transport, use, and disposal of hazardous materials would not be considerable with the implementation of Objective NS-4 and Policies NS-4-a through NS-4-h. Therefore, the proposed project would result in less than significant cumulative impacts.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Accident Conditions

Impact HAZ-2	**The project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.**

Project Specific Impact Analysis

The City of Fresno Fire Department recognizes the potential for a large chemical release to occur which could expose thousands of people to hazardous/toxic vapors. A variety of chemicals are transported via the two railroad lines or the four freeways, which transect the City. The City of Fresno Fire Department Hazardous Materials Response Team has embraced an all-hazards approach to emergency response to ensure that the community receives a robust, competent level of service to all hazardous materials events (City of Fresno Hazardous Materials Team, 2012). Implementation of the General Plan and Development Code Update could result in significant impacts with regard to

the creation of a hazard to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. To reduce potential impacts from the accidental release of hazardous materials into the environment within the Planning Area, the General Plan Update includes Objective NS-4 and Policies NS-4-e-NS-4-g (identified in Impact HAZ-1, above) within the Noise and Safety Element. Implementation of the Objective and Policies would result in less than significant impacts related to upset and accident conditions involving the release of hazardous materials into the environment.

Cumulative Impact Analysis

The implementation of cumulative development that is located outside of the Planning Area, such as development that would occur within the Counties of Fresno and Madera and the City of Clovis, could result in potential impacts regarding significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Any accidental release of hazardous materials into the environment would be responded to by the City of Fresno Fire Department Hazardous Materials Response Team. The Fresno County Emergency Response Team would provide assistance to the public and other agencies by responding to hazardous materials spills and accidents. The County of Madera Emergency Response Team would respond to hazardous materials spills and accidents within their jurisdiction. Overall, cumulative development could contribute to accidental releases of hazardous materials into the environment. The following implementing objective and policies from the proposed General Plan would reduce potential impacts regarding the creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving release of hazardous materials into the environment: Objective NS-4 and Policies NS-4-e NS-4-f, and NS-4-g within the Noise and Safety Element. With the implementation of the objective and policies, the project's contribution to potential cumulative upset or accident conditions would not be considerable. Therefore, the implementation of the project would result in less than significant cumulative impacts.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Schools

Impact HAZ-3	**The project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.**

Project Specific Impact Analysis

As detailed in the Fire Stations and Hazardous Materials Map in the City of Fresno, 2011 Map Atlas Existing Conditions Report, existing EPA Environmental sites, including underground storage tanks, hazardous materials sites and environmentally regulated sites, are scattered across the Planning Area. As detailed in the Existing Conditions Report, contaminated sites in the Planning Area are largely associated with leaking underground storage tanks and are predominantly clustered south of downtown, Fresno-Yosemite International Airport, Palm Bluffs Corporate Center (located in northwest Fresno) and along the Union Pacific Railroad Tracks. It is anticipated that future development under the General Plan and Development Code could occur within one-quarter mile of an existing or proposed school. However, all generation, transport, and treatment of hazardous materials are required to comply with applicable federal, State and local requirements. Therefore, impacts in this regard are anticipated to be less than significant.

To reduce potential impacts from hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school, the General Plan Update includes the following objectives and policies within the Noise and Safety Element: Objective NS-4 and Policies NS-4-b, NS-4-e NS-4-f, NS-4-g, and NS-4-i. In addition, the following policy would further reduce potential hazardous impacts.

Healthy Communities Element

Policy HC-3a: Restrict new residential development, schools, and parks within 500 feet of a limited access freeway, in order to reduce exposure to concentrations of toxic air pollutants and noise."

With the implementation of the objective and policies identified above, the project's potential for hazardous materials impacts to schools would be less than significant.

Cumulative Impact Analysis

Schools that are proposed along the edge of the Planning Area could be exposed to hazardous releases outside of the Planning Area. Adherence to existing federal, state, and local regulations regarding the use and disposal of hazardous materials and wastes would reduce potential impacts on human health and safety. Additionally, hazardous materials impacts within one-quarter mile of a school could be reduce because the nearby City of Clovis and the County of Fresno have their own regulations, hazardous materials business plans, and emergency response teams for the use, treatment, storage and accidental release of a hazardous material. Therefore, cumulative development in the vicinity of the Planning Area would result in less than significant impacts on schools. Since the proposed project would also result in less than significant hazardous materials impacts to schools and the potential impacts would be further reduced by the objective and policies identified above, the project's contribution to cumulative hazardous materials impacts to schools would not be considerable, and thus a less than significant cumulative impact would occur.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Hazardous Materials Site Listing

Impact HAZ-4	**The project would be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, but would not create a significant hazard to the public or the environment.**

Project Specific Impact Analysis

Contaminated sites are mainly associated with leaking underground storage tanks and are predominately clustered south of downtown, Fresno Yosemite International Airport, Palm Bluffs Corporate Center (northwest Fresno) and along the Union Pacific Railroad Tracks. These sites may include Superfund, Environmental Protection Agency, Storage and Disposal Facilities, Toxic Release Inventory System, National Discharge Elimination System Majors, Large Quantity Generators, Major Discharge of Air Pollutants, Corrective Actions, Risk Management Plan, Section Seven Tracking System (pesticides) and Brownfield Properties, as defined by the Environmental Protection Agency (City of Fresno Map Atlas 2011).

Cortese list data resources were searched to determine the extent of any sites within the City of Fresno Planning Area, which are included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5. The provisions in Government Code Section 65962.5 are commonly referred to as the "Cortese List." Information on the California Environmental Protection Agency's website includes five data resources that provide information regarding the facilities or sites identified as meeting the "Cortese List" requirements (Cortese List Data Resources 2012).

1) List of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database.
2) List of Leaking Underground Storage Tank Sites by County and Fiscal Year from Water Board GeoTracker database.
3) List of solid waste disposal sites identified by Water Board with waste constituents above hazardous waste levels outside the waste management unit.

4) List of "active" CDO and CAO from Water Board.

5) List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by the Department of Toxic Substances Control.

Each of the above sources was reviewed for the City of Fresno to ascertain the extent of hazardous waste in the City with regard to the Cortese List Data Resources provided on the California Environmental Protection Agency's website.

It is anticipated that with development in accordance with the General Plan Update that projects could be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. However, before a development would be permitted to occur on such a site, the site would be required to be remediated and mitigated for on-site hazardous materials to a level that would permit development onsite. Thus, impacts in this regard are anticipated to be less than significant.

To reduce potential impacts from development on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, the General Plan Update includes the following objectives and policies within the Noise and Safety Element: Objective NS-4 and Policies NS-4-a through NS-4-g and NS-4-i.

Cumulative Impact Analysis

The contribution of the project's impact regarding development located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, could be significant and cumulatively considerable. Hazardous Materials sites located within and outside of the Planning Area could potentially cause significant environmental effects due to onsite and offsite migration of contaminants affecting other properties. Redevelopment or development would be required to comply with all applicable regulations for remediation of hazards, such as compliance with appropriate guidelines of the Underground Storage Tank Program. Any development that would handle, transport or store hazardous materials within the vicinity of the Planning Area, such as the City of Clovis, County of Madera, and the County of Fresno, would also be required to comply with applicable federal, State and local requirements. Therefore, potential cumulative hazardous materials impacts would be less than significant. Since, the proposed project would also result in less than significant hazardous materials impacts and these impacts would be further reduced with Objective NS-4, Policies NS-4-a through NS-4-g, the project's contribution to cumulative hazardous materials impacts would not be considerable and would be less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Airports

Impact HAZ-5	**The project is located within an airport land use plan and within two miles of a public airport or public use airport, and the project could result in a safety hazard for people residing or working in the project area.**

Project Specific Impact Analysis

As detailed in the Safety Element of the 2025 General Plan for the City of Fresno, there are two public airports in the City of Fresno: (1) Fresno-Yosemite International Airport and (2) Fresno Chandler Downtown Airport. The 2025 General Plan also states that in conjunction with the Fresno-Yosemite International Airport, the Air National Guard maintains an airbase for military flight and training operations. Per the Noise Element of the City's 2025 General Plan, the Air National Guard is stationed at the Fresno Yosemite International Airport. Implementation of the proposed General Plan and Development Code Update would increase the population within the Planning Area and as such may expose those working or living in the area to potential safety hazards associated with airport operations. As detailed in the Safety Element of the current 2025 City of Fresno General Plan, each airport has its own specific plan and airport land use plan designed to provide for public safety. Information about each airport's land use plan is provided below.

1) **Fresno-Yosemite International Airport:** The Fresno-Yosemite International Airport (FYI) Compatibility Land Use Plan states that the FYI airport was formerly known as the Fresno Air Terminal (FAT). The FYI Airport is the largest and busiest commercial service airport in California's Central Valley and is owned and operated by the City of Fresno. FYI is a joint use civilian/military airport and is used by commercial air carriers, air cargo operators, charter operators, the State of California, general aviation, and the United States military (Fresno Yosemite International Airport Compatibility Land Use Policy Plan, 2012).

   The intent of land use safety compatibility is to minimize the risks associated with an off-airport aircraft accident or emergency landing. Risks to both people and property on the ground in the vicinity of the airport and to people on board aircraft are considered. The safety zone boundaries are based upon general aviation aircraft accident location data contained in the California Airport Land Use Planning Handbook ("Caltrans Handbook") along with data regarding the runway configuration and aircraft operation procedures at FYI.

   1) Land Uses or land use characteristics, which may affect safe air navigation or because of their nature and proximity to an airport, may be incompatible with the airport and shall be avoided in the vicinity of FYI.

2) The criteria, which shall be used to evaluate whether a land use is acceptable with respect to its airport proximity, are set forth in Table 3, entitled Airport Land Use Safety Compatibility Criteria. The indicated Safety Compatibility Zones (SCZs), as defined in the Caltrans Handbook, shall be used.

Note: Within the SCZs 3 and 4, the following shall apply:

a) Existing development that conforms to existing zoning regulations in effect prior to February 20, 1987 may be rebuilt in the event it is destroyed by fire or Act of God.

b) The regulations identified in the Caltrans Handbook are not intended to take development rights such that the economic viable use of land is unduly restricted. Therefore, development of vacant property or redevelopment of property in accordance with the zoning regulations in effect prior to February 20, 1987 shall not be prohibited on the basis of the restrictions set forth in Table 3. This provision shall not apply to schools, hospitals, nursing homes, churches, auditoriums, concert halls, amphitheaters or other uses that would result in a large concentration of people.

3) Land uses which attract wildlife that pose a hazard to aviation activities are a special concern adjacent to airports. Examples of land use, which may attract hazardous wildlife, include landfills and bodies of standing water. In reviewing a project for safety compatibility, the most current version of the FAA Advisory Circular No. 150/5200-33 (Hazardous Wildlife Attractants On or Near Airports) shall be considered. The review area identified in this circular is outlined as the boundary within 10,000 feet of the Airport Operations Area.

Northwest of the FYI Airport, there is currently the Leaky Acres recharge basin. Due to this use potentially attracting wildlife, there are special operational provisions that the City follows and has an agreement with the FYI Airport to ensure that the recharge basin does not cause aviation issues.

Airport Land Use Safety Compatibility Criteria are shown in Table 5.8-4 below.

Table 5.8-4: Airport Land Use Safety Compatibility Criteria

Land Use Characteristic	Safety Zones					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Residential Uses	--	(A)	(B)	(C)	--	+
Other Uses in Structures	--	(D,E)	(E)	(E)	--	+
Other Uses Not in Structures	(D,F)	(D)	+	+	--	+

Land Use Characteristic	Safety Zones					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Special Characteristics (In or Outside of Structures)						
Distracting Lights or Glare	--	--	--	--	--	+
Sources of Smoke or Electrical Interference	--	--	--	--	--	+
Attractor of Birds	--	--	--	--	--	+
Source: Table 3 Fresno Yosemite International Airport Land Use Compatibility Plan 2012						

Interpretation

+ Compatible: Use is acceptable with little or no risks

() Conditional: Land use proposals that fall within this category must be reviewed on a case-by-case basis by Commission or jurisdiction having authority. The Commission or jurisdiction having authority may determine the use to be acceptable under conditions cited below:

A Density no greater than one dwelling unit per acre.
B Density no greater than two dwelling units per acre.
C Density no greater than five dwelling units per acre.
D No uses attracting more than 10 persons per acre.
E No schools, hospitals, nursing homes, or similar uses.
F Characteristic cannot reasonably be avoided or located outside the indicated safety zone.
-- Incompatible: Use is unacceptable due to associated high risks.

Based on a review of the FYI Airport Zones as shown in Exhibit 5.8-1, the implementation of the General Plan Update will result in three locations being inconsistent with the Fresno Yosemite Airport Safety zones; one location within Zone 1-Runway Protection Zone (RPZ), one location within Zone 3-Inner Turning and one location within Zone 5 Sideline.

The vacant land proposed for low density residential northwest of the intersection of E Garland Avenue and N Dearing Avenue is located within Fresno Yosemite Airport Safety Zone 1-RPZ. Under the Fresno Yosemite Airport Compatibility and Land Use Plan, this use is unacceptable due to associated high risks. This inconsistency represents a significant airport safety impact.

The land designated low density residential (1-3 dwelling units per acre) located northwest of the airport is located within the Fresno Yosemite Airport Safety Zone 3-Inner Turning. Under the FYI Compatibility and Land Use Plan, residential uses should have a density no greater than two dwelling

units per acre. Since the land use designation allows up to three dwelling units per acre, this land use designation could be inconsistent with the compatibility zone that allows no greater than two dwelling units per acre. Therefore, this inconsistency represents a potentially significant airport safety impact.

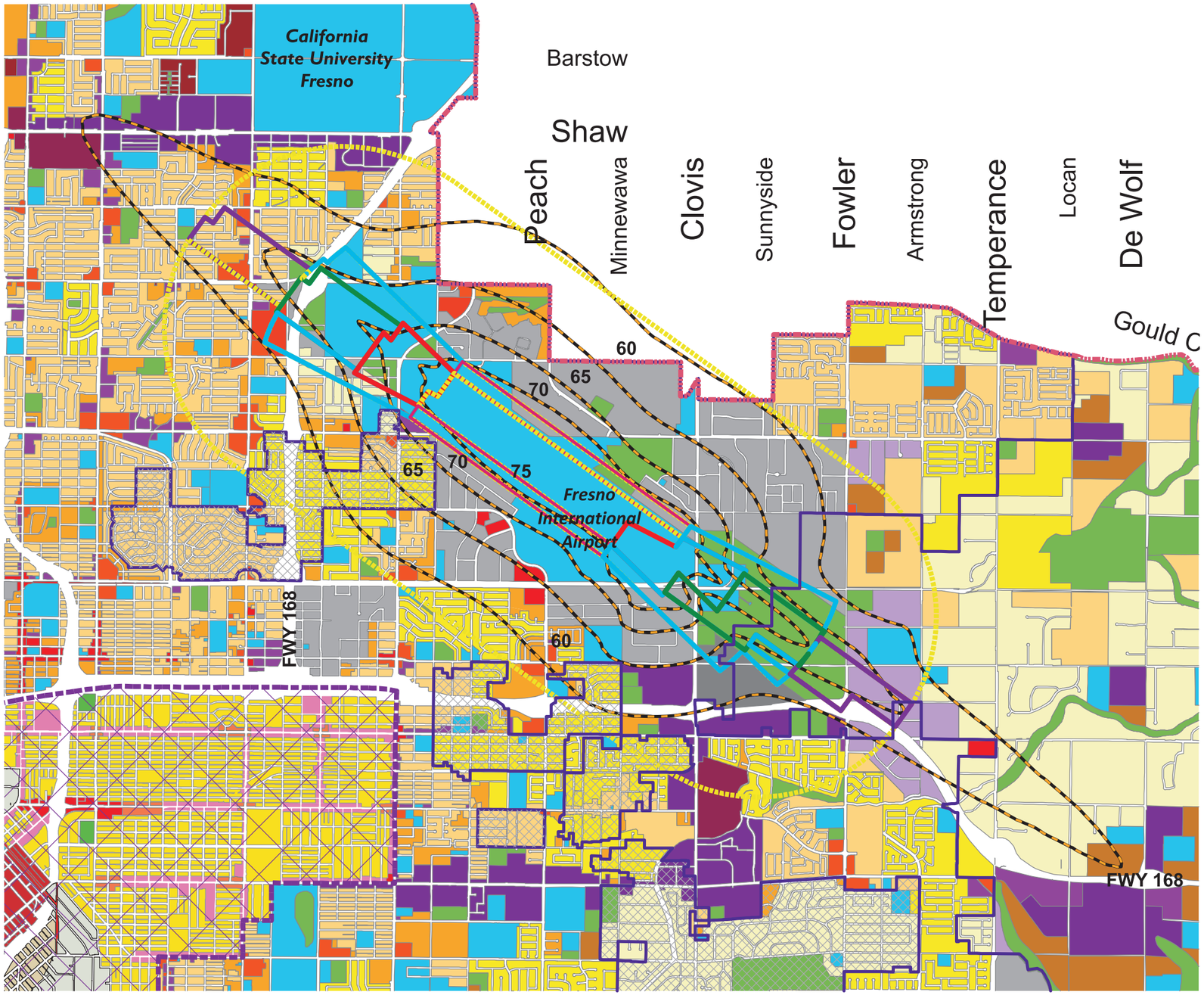
The vacant land proposed for light industrial uses northeast of the airport is located within the Fresno Yosemite Airport Safety Zone 5-Sideline. Under the FYI Compatibility and Land Use Plan, residential uses, other uses in structures, and other uses not in structures are considered incompatible and unacceptable due to associated high safety risks. Therefore, this inconsistency represents a potentially significant airport safety impact.

2) **Fresno Chandler Downtown Airport:** The land use policy plan for this airport sets forth the criteria which the Airport Land Use Commission (ALUC) will use in evaluating amendments of general, community and specific plans, airport master plans, rezoning applications, zoning ordinance text amendments, and building code amendments proposed in the vicinity of the Fresno Chandler Downtown Airport (FCH). Additionally, as stated in the airport's land use plan: The following projects, if located within the Airport Review Area, shall be referred to the ALUC for a determination of consistency with the airport's land use policy plan: the adoption or amendment of general, community and specific plans, airport master plans, rezoning applications, zoning ordinance text amendments, and building code amendments. ALUC determination of consistency does not apply to conditional use permits, variances, subdivision or parcel maps, although the ALUC may be requested to review these projects and make a recommendation (Fresno-Chandler Downtown Airport Land Use Policy Plan, 2000).

The Fresno-Chandler Downtown Airport Land Use Policy Plan contains restrictions of land uses or land use characteristics which may affect safe air navigation or which, because of their nature and proximity to an airport, may be incompatible with the airport shall be avoided in the vicinity of FCH.

The criteria, which shall be used to evaluate whether a land use is acceptable with respect to its airport proximity, are set forth in Table C-2, entitled "Safety Compatibility Criteria" in the Fresno Chandler Downtown Airport Land Use Policy Plan. The indicated Safety Compatibility Zones shall be used in conjunction with the Environs Plan Map (Figure D-1 of the Land Use Policy Plan). Land uses which attract concentrations of birds, are a special concern within the traffic pattern zone of airports. In reviewing a project for safety compatibility, this possibility should be considered. Sanitary landfills can attract birds and generate airborne debris, posing a threat to aircraft operations, which cannot be satisfactorily mitigated by conventional operating procedures. Landfills should, therefore, not be permitted in proximity to FCH.

As detailed in the airspace protection section of the Airport Land Use Policy Plan, no structure, tree or other object shall be permitted to exceed the height limits established in accordance with Part 77, Subpart C, of the Federal Aviation Regulations (FAR), with certain exceptions, depending on existing conditions (Fresno-Chandler Downtown Airport Land Use Policy Plan, 2000).



Legend

Downtown Boundary

Sphere of Influence

Sphere of Influence

City Limits

County Island

FYI Noise Contours

60

65

70

75

FYI Airport Safety Zones

Zone 3-Inner Turning

Zone 2-Inner Approach/Departure

Zone 1-RPZ

Zone 4-Outer Approach/Departure

Zone 5-Sideline

Zone 6-Traffic Pattern

0 0.15 0.3 0.6 0.9 1.2

Miles

Source: City of Fresno. FYI Airport Land Use Compatibility Plan, Adopt. 3-31-2011.

FirstCarbon® SOLUTIONS

Exhibit 5.8-1
Fresno Yosemite International Airport Zones

Based on a review of the FCH Airport Zones as shown on Exhibit 5.8-2, the General Plan Update includes residential uses that are proposed within Runway Protection Zone 1, Inner Safety Zone 2, Inner Training Zone 3 that are located southeast of the airport runways. In addition to land use designations that could accommodate future residential uses within these safety zones, there are existing residences located within these areas. According to the Fresno Chandler Downtown Airport Land Use Policy Plan, no residential uses are allowed in Safety Zone 1 and single-family residential uses are allowed in safety zones 2 and 3. Following is a discussion for Safety Zones 1, 2, and 3.

Safety Zone 1 – The General Plan Update includes a Neighborhood designation within Safety Zone 1 on two vacant lots northeast of the Kearney Boulevard and Thorne Avenue intersection. The planned land uses for these two lots are not consistent with the Fresno Chandler Downtown Airport Land Use Policy Plan.

In addition, the General Plan Update includes a Medium Density designation (single family) along portions of four lots generally northwest of the W. Hawes Avenue and Thorne Avenue intersection. Currently, these four lots encompass approximately 0.5 acre. The Medium Density designation allows from 5 to 12 units per acre; however, the Fresno Chandler Downtown Airport Land Use Policy Plan prohibits residential within the backyards of these four lots.

Safety Zone 2 – Medium Density and Neighborhood designations are identified southeast of the runways. These land use designations provide for single family residential which is permitted in the Fresno Chandler Downtown Airport Land Use Policy Plan for Safety Zone 2.

Safety Zone 3 – For this safety zone, Medium Density and Neighborhood designations are also identified southeast of the runways. These land use designations provide for single family residential which is permitted in the Fresno Chandler Downtown Airport Land Use Policy Plan for Safety Zone 3.

As discussed above, the proposed General Plan includes an inconsistency with the regulations identified for Safety Zone 1 in the Fresno Chandler Downtown Airport Land Use Policy Plan. Therefore, these inconsistencies represent a potentially significant airport safety impact.

The following objective and policies from the proposed General Plan Update would reduce potential airport safety impact associated with the Fresno Yosemite International Airport:

Objective NS-5: Protect the safety, health, and welfare of persons and property on the ground and in aircraft by minimizing exposure to airport-related hazards.

Policy NS-5-a: Land Use and Height. Incorporate and enforce all applicable Airport Land Use Compatibility Plans (ALUCPs) through land use designations, zoning, and development standards to support the continued viability and flight operations of Fresno's airports and to protect public safety, health, and general welfare.

- Limit land uses in airport safety zones to those uses listed in the applicable ALUCPs as compatible uses, and regulate compatibility in terms of location, height, and noise.

- Ensure that development, including public infrastructure projects, within the airport approach and departure zones complies with Part 77 of the Federal Aviation Administration Regulations (Objects Affecting Navigable Airspace), particularly in terms of height.

Policy NS-5-b: Airport Safety Hazards. Ensure that new development, including public infrastructure projects, does not create safety hazards such as glare from direct or reflective sources, smoke, electrical interference, hazardous chemicals, fuel storage, or from wildlife, in violation of adopted safety standards.

Policy NS-5-c: Aviation Easements. Employ avigation easements in order to secure and protect airspace required for unimpeded operation of publicly owned airports.

Commentary: Avigation easements are established in the form of land use covenants and are binding upon present and subsequent property owners.

Policy NS-5-d: Disclosure. As a condition of approval for residential development projects, require sellers to prepare and provide State Department of Real Estate Disclosure statements to property buyers notifying of noise and safety issues related to airport operations.

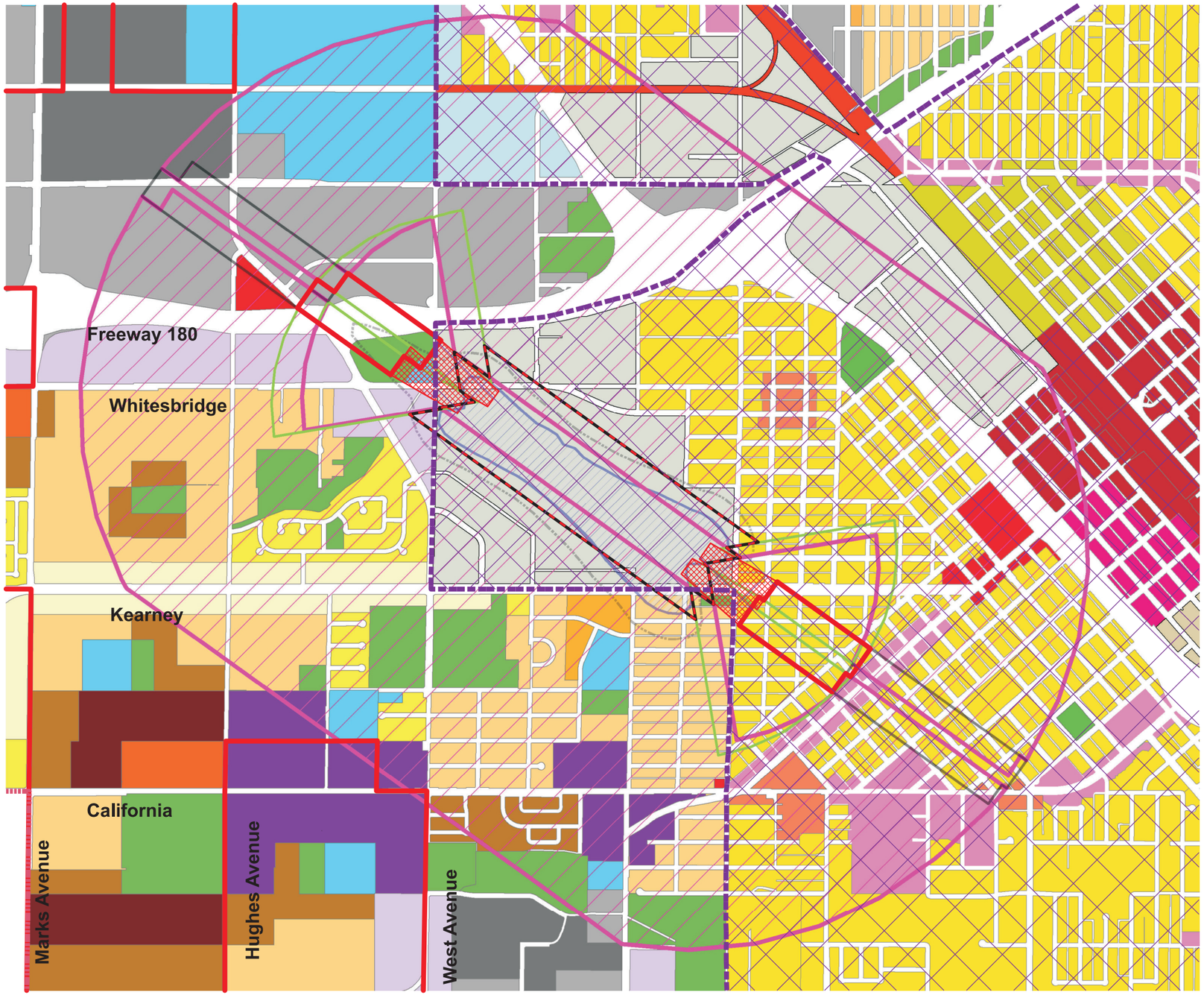
Policy NS-5-e: Planned Expansion. Allow for the orderly expansion and improvement of publicly-owned airports, while minimizing adverse environmental impacts associated with these facilities.

- Periodically update airport facility master plans in accordance with FAA regulations.
- Require land use within the boundaries of the Fresno-Yosemite International Airport and Chandler Downtown Airport to conform to designations and policies specified in adopted City of Fresno compatible land use plans.
- Provide local jurisdictions surrounding the City's publicly owned airports with specific guidelines for effectively dealing with the presence and operation of these airports.

With the implementation of the objective and policies identified above, the potential airport hazard impacts associated with the proposed project would remain significant.

Cumulative Impact Analysis

The implementation of cumulative development along with the General Plan Update will result in three locations being inconsistent with the Fresno Yosemite Airport Safety Zones and one location being inconsistent with the Fresno Chandler Downtown Airport Land Use Policy Plan. Since these inconsistencies would occur under the proposed project, the project's contribution to cumulative airport hazard impacts would be considerable and would be considered significant.



Legend

Downtown Boundary

Sphere of Influence

Sphere of Influence

City Limits

County Island

fcda-ssz Sideline Safety Zone

fcda-ssz Sideline Safety Zone

fcda-isz Inter Safety Zone

fcda-isz Inter Safety Zone

fcda-rpz Runway Protection Zone

fcda-rpz Runway Protection Zone

fcda-osz Outer Safety Zone

fcda-osz Outer Safety Zone

fcda-itz Inner Turning Zone

fcda-itz Inner Turning Zone

fcda-tpz Traffic Pattern Zone

FCDA CNEL Noise Contours

60

65

0 0.05 0.1 0.2 0.3 0.4

Miles

Source: City of Fresno GIS.

FirstCarbon® SOLUTIONS

Exhibit 5.8-2
Fresno-Chandler Downtown Airport Zones

One inconsistency for 1 –RPZ, Airport Safety Zone 3-Inner Turning, and Zone 5-Sideline. This inconsistency represents a significant cumulative airport safety impact. The implementation of the General Plan Update will contribute substantially to this potential significant airport safety impact. Mitigation measures MM HAZ-1 through MM HAZ-5 should be implemented to reduce significant cumulative impacts to a less than significant cumulative effect.

Mitigation Measures

Project Specific

MM HAZ-1 Re-designate the existing vacant land proposed for low density residential northwest of the intersection of E Garland Avenue and N Dearing Avenue and located within Fresno Yosemite International Airport Zone 1- RPZ to Open Space.

MM HAZ-2 Limit the proposed low density residential at 1-3 dwelling units per acre located northwest of the airport and located within Fresno Yosemite International Airport Zone 3-Inner Turning to 2 dwelling units per acre or less.

MM HAZ-3 Re-designate the current area within Fresno Yosemite International Airport Zone 5-Sideline located northeast of the airport to Public Facilities-Airport or Open Space.

MM HAZ-4 Redesignate the current vacant lots at the northeast corner of Kearney Boulevard and Thorne Avenue to Public Facilities-Airport or Open Space.

MM HAZ-5 Prohibit residential uses within Safety Zone 1 northwest of the W. Hawes Avenue and Thorne Avenue intersection

Cumulative

Implementation of Mitigation Measures HAZ-1 through HAZ-5 shall be implemented.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Private Airstrip

Impact HAZ-6	**The project is within the vicinity of a private airstrip, and the project would not result in a safety hazard for people residing or working in the project area**

Project Specific Impact Analysis

Sierra Sky Park is a privately owned, public use general aviation airport located approximately ten miles northwest of the Fresno Downtown Area. The Land Use Policy Plan for this airport sets forth the criteria, which the City of Fresno will use in evaluating development proposals proposed for adoption of plan amendments in the vicinity of the Sierra Sky Park Airport. Plan amendments and re-

zonings initiated by the City Council are then referred to the Airport Land Use Commission for consistency with the Commission's Sierra Sky Park Land Use Policy Plan.

The Land Use Policy Plan for the Sierra Sky Park Airport intends to safeguard the general welfare of its inhabitants within the vicinity of the airport. Specifically, the plan seeks to protect the public from the adverse effects of aircraft noise and operations, to ensure that people and facilities are not located in areas incompatible with airport operations, and to ensure that no structures or activities adversely affect navigable airspace. The implementation of this policy plan will limit urban encroachment on Sierra Sky Park and allow for its continued operation (Sierra Sky Park Land Use Policy Plan, 1998).

The Plan addresses those areas and issues, which are affected by, or affect, aircraft operations and the use of Sierra Sky Park. Threats to the continuation of flight operations, or to the property, health and welfare of persons on the ground shall be considered legitimate interests of this plan (Sierra Sky Park Land Use Policy Plan, 1998).

The following safety points shall apply as listed in the Sierra Sky Park Land Use Policy Plan:

1. Land uses or land use characteristics which may affect safe air navigation or which, because of their nature and proximity to an airport, may be incompatible with the airport, shall be avoided in the vicinity of Sierra Sky Park.
2. The criteria, which shall be used to evaluate whether a land use is acceptable with respect to its airport proximity are set for in Table 2 of the Land Use Policy Plan, Table 5.8-6 below. The indicated compatibility criteria shall be used in conjunction with the Land Use Policy Plan Map.
3. Land uses, which attract concentrations of birds, are a special concern because of the agricultural uses near Sierra Sky Park. In applying the Compatibility Criteria to agricultural areas, attention should be given to whether a particular type of agricultural use commonly attracts birds.
4. Sanitary landfills can attract birds and generate airborne debris, posing a threat to aircraft operations, which cannot be satisfactorily mitigated by conventional operations procedures. Landfills should therefore, not be permitted in proximity to Sierra Sky Park.

Table 5.8-5: Airport/Land Use Compatibility Criteria

Land Use Characteristic	Runway and Clear Zones (1)	Inner Approach Zones (2)	Outer Approach Zones (3)
Residential Uses	--	(A, E,G)	(B,E,G)
Other Uses in Structures	--	(C,D,E)	(D,E)
Other Uses Not in Structures	(C)	(C)	+
Special Characteristics:	--	--	--

Land Use Characteristic	Runway and Clear Zones (1)	Inner Approach Zones (2)	Outer Approach Zones (3)
Distracting Light or Glare			
Sources of Smoke or electronic Interference	--	--	--
Attractor of Birds	--	--	--

Notes:
1. See Policy Plan Map for location of zones.
2. The inner approach zone extends to the point below where the approach surface intersects the horizontal surface.
3. The outer approach zone extends to the point of the junction of the horizontal and conical zones.

Source: Sierra Sky Park Airport Land Use Policy Plan, 1998

Interpretation

+ Acceptable: Use is acceptable

() Conditionally Acceptable: Use is acceptable under conditions cited below:

A Density no greater than three dwelling units per acre.
B Outer Approach Zone: Density no greater than two-five dwelling units per acre.
C No uses attracting more than 10 persons per acre
D No schools, hospitals, nursing homes, churches, or similar uses or structures for large assemblages of persons.
E. At least 20% of area to be landscaped open space in a clustered configuration.
F Allowed only if cannot reasonably be avoided or located outside the indicated zone.
G Density Transfer Provision – a conditional use permit shall be required of any property owner who seeks the privilege of "transferring" the number of dwelling units which such property owner could have constructed in the Inner and Outer Approach Zone onto the remainder of the impacted parcel which lies outside said zone and which is under the same ownership, using the underlying land use designation of the 1984 Fresno General Plan.

-- Unacceptable: Use is unacceptable.

As detailed in the airspace protection section of the Land Use Policy Plan, no structure, tree or other object shall be permitted to exceed the height limits established in accordance with Part 77, Subpart C, of the Federal Aviation Regulations (FAR), with certain exceptions, depending on existing conditions (Sierra Sky Park Land Use Policy Plan, 1998).

Based on a review of the Sierra Sky Park Airport Zones as shown in Exhibit 5.8-3, the proposed land uses in the General Plan Update includes an office use at the southwest corner of Herndon Avenue and N. Brawley Avenue. Currently, this land contains some agriculture and some undeveloped areas. According to the Airport/Land Use Compatibility Criteria for Sierra Sky Park, land uses are allowed with this area; however, there is a restriction on the use intensification. The Compatibility Criteria prohibits uses attracting more than 10 persons per acre. The future implementation of an office use at this location would be required to comply with the intensification requirement as well as the

height limit. Compliance with these existing regulations would result in a less than significant impact on airport safety.

Cumulative Impact Analysis

The implementation of cumulative development along with the General Plan Update would not result in inconsistencies with the Sierra Sky Park Land Use Policy Plan. Since the project would result in less than significant impacts on airport safety, the project's contribution to cumulative airport hazard impacts would not be considerable, and therefore, the project would result in a less than significant cumulative airport hazard impact.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

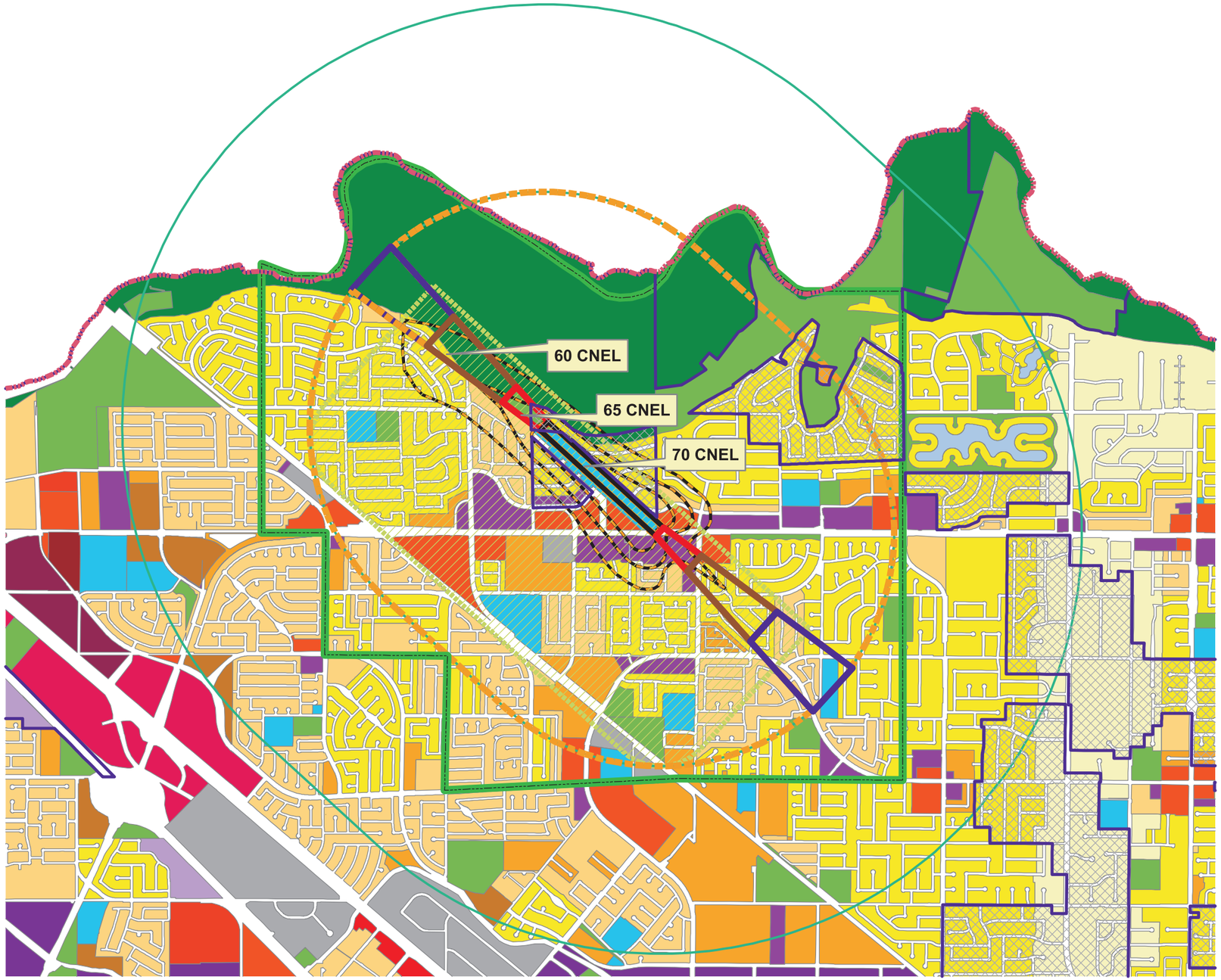
Less than significant impact.

Emergency Plans

Impact HAZ-7	**The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.**

Project Specific Impact Analysis

The City's Police and Fire Departments are the lead agencies for all local emergency response efforts. The City's full-time Emergency Preparedness Officer (EPO) is responsible for ensuring that Fresno's emergency response plans are up-to-date and implemented properly. The EPO also facilitates cooperation between City departments and other local, state and federal agencies that would be involved in emergency response operations (City of Fresno Emergency Response Plan Overview. 2012). The City of Fresno EOC will serve as the coordination and communication between the City of Fresno and Fresno County Operational Area EOC. A potentially significant impact could occur if the EOC is under redevelopment or construction during an emergency.



Legend

- Sphere of Influence
- City Limits
- County Island

SSP_CNEL

- 60
- 65
- 70

Safety Zones

- Clear Zone
- Conical Surface
- Horizontal Surface
- Inner Approach Zone
- Outer Approach Zone
- Primary Surface
- Traffic Pattern
- Primary Review Area Boundary

0 0.05 1 0.2 0.3 0.4

Miles

Source: City of Fresno GIS. FYI Airport Land Use Compatibility Plan, Adopt. 3-31-2011

FirstCarbon® SOLUTIONS

Exhibit 5.8-3
Sierra Sky Park Airport Zones

The following objective and policies in the General Plan Update would reduce potential impacts to emergency response and evacuation.

Noise and Safety Element

Objective NS-6: Foster an efficient and coordinated response to emergencies and natural disasters.

Policy NS-6-a: County Multi-Jurisdiction Hazard Mitigation Plan. Adopt and implement the Fresno County Multi-Jurisdiction Hazard Mitigation Plan and City of Fresno Local Hazard Mitigation Plan Annex.

Commentary: The federal Disaster Mitigation Act of 2000 requires that cities, counties, and special districts have a Local Hazard Mitigation Plan to be eligible to receive FEMA hazard mitigation funds. Cities and counties can adopt and use all or part of a regional multi-jurisdictional plan, such as the one prepared by Fresno County, in lieu of preparing all or part of a Local Hazard Mitigation Plan.

Policy NS-6-b: Disaster Response Coordination. Maintain coordination with other local, State, and Federal agencies to provide coordinated disaster response.

Policy NS-6-c: Emergency Operations Plan. Update the City's Emergency Operations Plan periodically, using a whole community approach, which integrates considerations for People with access and functional needs in all aspects of planning.

Policy NS-6-d: Evacuation Planning. Maintain an emergency evacuation plan in consultation with the Police and Fire Departments and other emergency service providers, which shows potential evacuation routes and a list of emergency shelters to be used in case of catastrophic emergencies.

Policy Guidance: The evacuation plan can be flexible in order to consider many scenarios and multiple modes of transportation beyond private automobiles. It should provide special provisions for disadvantaged populations, such as those with physical handicaps or those with low or very low incomes, and for areas with fewer resources through neighborhood emergency preparedness programs.

Policy NS-6-e: Critical Use Facilities. Ensure critical use facilities (e.g. City Hall, police and fire stations, schools, hospitals, public assembly facilities, transportation services) and other structures that are important to protecting health and safety in the community remain operational during an emergency.

- Site and design these facilities to minimize their exposure and susceptibility to flooding, seismic and geological effects, fire, and explosions.
- Work with the owners and operators of critical use facilities to ensure they can provide alternate sources of electricity, water, and sewerage in the event that regular utilities are interrupted in a disaster.

Policy NS-6-f: Emergency Vehicle Access. Require adequate access for emergency vehicles in all new development, including adequate widths, turning radii, hard standing areas, and vertical clearance.

Policy NS-6-g: Emergency Preparedness Public Awareness Programs. Continue to conduct programs to inform the general public, including people with access and functional needs, of the City's emergency preparedness and disaster response procedures.

With the implementation of the above objective and policies, potential interference with an adopted emergency response plan or emergency evacuation plan would be reduced; however, the impact could remain significant.

Cumulative Impact Analysis

Development outside of the Planning Area could affect emergency response and evacuation; however, this potential effect would not be a cumulative effect on the City's Emergency Operation Center. Since the proposed project could result in a significant impact on the Emergency Operations Center if the Center is under redevelopment during an emergency, the proposed project's contribution to a cumulative emergency or evacuation impact is considered considerable and therefore, a significant cumulative impact.

Mitigation Measures

Project-Specific

MM HAZ-6 Establish an alternative Emergency Operations Center in the event the current Emergency Operations Center is under redevelopment or blocked.

Cumulative

Implementation of Mitigation Measure HAZ-6 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Wildland Fires

Impact HAZ-8	**The project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.**

Project Specific Impact Analysis

As detailed in the City of Fresno Map Atlas Existing Conditions Report, dated August 2011, although the City of Fresno is proximate to high and very high fire hazard designated areas, the city is largely categorized as little or no threat or moderate fire hazard, which is largely attributed to paved areas. Some small areas along the San Joaquin River Bluff area in northern Fresno are prone to wildfires

due to relatively steep terrain/vegetation, and these areas are classified as high fire hazard areas. Land, which is currently vacant, is designated as multi-use on the City's Proposed General Plan (Map Atlas Existing Conditions Report, 2011). Thus, development under the proposed General Plan Update adjacent to the San Joaquin River Bluff would be subject to dangers from wildland fires. As such, the proposed project is anticipated to have a potentially significant impact in this regard.

The following implementing objectives and policies within the General Plan Update would reduce potential impacts from wildfires.

Objective PU-2: Ensure that the Fire Department's staffing and equipment resources are sufficient to meet all fire and emergency service level objectives and are provided in an efficient and cost effective manner.

Policy PU-2-a: Unify Fire Protection. Pursue long-range transfer of fire protection service agreements with adjacent fire districts that, in concert with existing automatic aid agreements, will lead to the eventual unification of fire protection services in the greater Fresno area.

Policy PU-2-b: Maintain Ability. Strive to continually maintain the Fire Department's ability to provide staffing and equipment resources to effectively prevent and mitigate emergencies in existing and new high-rise buildings and in other high-density residential and commercial development throughout the city.

Policy PU-2-c: Rescue Standards. Develop appropriate standards, as necessary, for rescue operations, including, but not limited to, confined space, high angle, aswift water rescues, and the unique challenges of a high speed rail corridor.

Objective PU-3: Enhance the level of fire protection to meet the increasing demand for services from an increasing population.

Policy PU-2-d: Station Siting. Use the General Plan, community plans, Specific Plans, neighborhood plans, and Concept Plans, the City's Geographic Information Systems (GIS) database, and a fire station location program to achieve optimum siting of future fire stations.

Policy PU-2-e: Service Standards. Strive to achieve a community wide risk management plan that include the following service level objectives 90 percent of the time:

- *First Unit on Scene* – First fire unit arriving with minimum of three firefighters and ability to apply suppressing agent within 6 minutes and 20 seconds from emergency call (7 minutes and 30 seconds with 9-11 processing time).
- *Effective Response Force* – Provide sufficient number of firefighters on scene of an emergency (17 for low risk, 23 for high risk) within nine minutes and 20 seconds from time of alert to arrival.

Policy PU-3-a: Fire Prevention Inspections. Develop strategies to enable the performance of annual fire and life safety inspection of all industrial, commercial, institutional, and multi-family residential buildings, in accordance with nationally recognized standards for the level of service necessary for a large Metropolitan Area, including self-certification program.

Policy PU-3-b: Reduction Strategies. Develop community risk reduction strategies that target high service demand areas, vulnerable populations (e.g. young children, older adults, non-English speaking residents, persons with disabilities, etc.) and high life hazards occupancies.

Policy PU-3-d: Review All Development Applications. Continue Fire Department review of all development applications, provide comments and recommend conditions of approval that will ensure adequate on-site and off-site fire protection systems and features are provided.

Policy PU-3-e: Building Codes. Adopt and enforce amendments to construction and fire codes, as determined appropriate, to systematically reduce the level of risk to life and property from fire, commensurate with the City's fire suppression capabilities.

Policy PU-3-f: Adequate Infrastructure. Continue to pursue the provision of adequate water supplies, hydrants, and appropriate property access to allow for adequate fire suppression throughout the City.

Policy PU-3-g: Cost Recovery. Continue to evaluate appropriate codes, policies, and methods to generate fees or other sources of revenue to offset the ongoing personnel and maintenance costs of providing fire prevention and response services.

It is anticipated that implementation of the above objectives and policies from the proposed General Plan Update will reduce project impacts to wildland fires to a less than significant level.

Cumulative Impact Analysis

Implementation of the proposed project along with cumulative development could create a potentially significant cumulative impact associated with the risk of loss, injury or death involving wildland fires. However, implementation of the General Plan Update objectives and policies would reduce project specific impacts related to wildfires. Therefore, the Project's contribution to potentially significant wildfire hazards would not be cumulatively considerable and would be less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.9 - Hydrology and Water Quality

5.9.1 - Introduction

This section of the Master EIR evaluates the potential environmental effects related to hydrology and water quality associated with implementation of the proposed General Plan and Development Code Update. The analysis includes a review of surface water, groundwater, flooding, stormwater, and water quality.

The General Plan Update includes policies in the Public Utilities and Services Element and the Resource Conservation and Resilience Element that guide development and infrastructure practices to protect surface water and groundwater from the degradation of runoff and pollution.

5.9.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding hydrology and water quality is the City of Fresno Planning Area and the immediate surrounding County of Fresno and City of Clovis areas because potential development under the City of Fresno General Plan and Development Code Update could affect areas inside and outside the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative hydrology and water quality impacts is the Fresno-Clovis Metropolitan Area because the Fresno Metropolitan Flood Control District (District) includes an area of approximately 400 square miles and covers the entire portion of the Fresno-Clovis Metropolitan Area. The study area for the analysis of cumulative groundwater impacts is the Kings River Sub-basin.

Precipitation

Precipitation in the Planning Area occurs mostly as rain during the months of November through April. Climate data collected from 1948 to 2012 shows that annual rainfall averaged 10.89 inches, but is variable. Recorded annual rainfall has ranged from a low of 3.01 inches in 2013 to a high of 21.61 inches in 1983 (Western Regional Climate Center, 2014).

Hydrology

The San Joaquin River and the Kings River are the principal rivers that influence the hydrology in the Planning Area. The western slopes of the Sierra Nevada drain to the west via the San Joaquin and Kings Rivers. The Kings River is connected to the San Joaquin River by the James Bypass, a man-made canal. Floodwater from the Kings River is diverted to the San Joaquin River. Three dams control flows on the two rivers. The Friant and Mendota Dams are located on the San Joaquin River. These two dams provide some flood control; however, these two dams were not designed for the purpose of flood control. The Pine Flat Dam was built for the purpose of flood control. In addition to the dams on the two rivers, there are reservoirs and detention basins that have been constructed

to prevent flooding. These facilities include the Redbank Dam and the Redbank-Fancher Creeks Flood Control Project. This Project consists of two dams (Big Dry Creek Dam and Fancher Creek Dam), three detention basins (Redbank Creek, Pup Creek, and Alluvial Drain Detention Basins), and canals to convey discharges in and around the City of Fresno. These facilities were designed to protect developed areas from a 200-year storm event (County of Fresno, 2000).

Stormwater Drainage

Storm drainage facilities within the Fresno-Clovis Metropolitan area are planned, implemented, operated and maintained by the Fresno Metropolitan Flood Control District (FMFCD). The storm drainage facilities are documented in the Storm Drainage Master Plan (SDMP), which is developed and updated by FMFCD. The master plan drainage system for the Planning Area consists of over 130 individual drainage areas or urban watersheds. Drainage area boundaries are determined by geographic and topographic features and the economics of providing storm drainage service to the watershed. The storm drainage facilities within a drainage area consist of storm drain inlets, pipeline, retention basins, urban detention (water quality) basins, and stormwater pump stations. Surface grading improvements such as streets, curbs, gutters, and valley gutters are part of the City of Fresno infrastructure, but the general grading of these features is governed by the SDMP to provide a coherent implementation of drainage within the Planning Area.

Storm drain inlets are located at low points in the topography as determined by the SDMP. Pipeline alignments and sizes are also shown on the SDMP. Pipeline alignments are subject to change as development proposals are put forward by development projects. Retention basins and urban detention basins locations and geometry are part of the SDMP as well. Basins are sited in the topographic low point of the drainage area. All of the storm drainage pipelines are directed to the retention and urban detention basins. Retention basins store and percolate stormwater from the drainage area. Urban detention basins provide quiescent (still) conditions for the removal or settling out of suspended solids prior to discharge of the stormwater to the San Joaquin River.

The Fresno-Clovis Metropolitan area consists of drainage areas that are completed, e.g., all of the master planned facilities are constructed and functional; or in the process of being completed, e.g. portions of the retention basins, pipelines, and inlets are constructed and portions are not. For the drainage areas that are in the planning stage, e.g., the drainage area is planned and documented, the retention basin land may have been purchased, but no construction has occurred. Implementation of the SDMP occurs in response to development activity in newly developing areas and through Capital Improvement Project (CIP) planning in previously developed areas. Funding for storm drainage facilities occurs through the collection of drainage fees assessed on parcels as they develop through grant funding from the State of California and the Federal Government, through low interest infrastructure improvement bonds, and in the past, through assessment districts. Drainage fees fund the majority of the construction of master plan facilities in newly developing areas. Grants, infrastructure loans, and assessment districts fund the majority of construction in previously developed drainage areas.

Groundwater

The Planning Area is underlain by the Kings River Sub-basin, which, along with six other sub-basins, comprises the San Joaquin Valley Groundwater Basin. In turn, the San Joaquin Basin is located within the Tulare Lake Hydrologic Region. The Tulare Lake Hydrologic Region spans approximately 10.9 million acres (17,000 square miles) and includes most of Fresno County. The Region encompasses the southern one-third of the Central Valley Regional Water Quality Control Board (RWQCB).

The Kings River Sub-basin extends from the Sierra Nevada foothills on the east to the San Joaquin Valley trough on the west, and from the San Joaquin River on the north to roughly the Fresno County line on the south.

Historically, water demand within the Planning Area obtained its water supply by extracting groundwater from the Kings Sub-basin. Groundwater levels in the Planning Area have declined by an average of 1.5 feet per year since 1990. In the past 80 years, the water level has decreased from 30 feet below ground surface to more than 128 feet below ground surface, according to 2009 data provided by the City. According to Figures 4.4 and 4.5 provided in the Urban Water Management Plan adopted in 2008, included in the Urban Plan, there was cone of depression from Herndon Avenue in the north to Jensen Avenue in the south and from Maple Avenue to Brawley Avenue in the east-west direction in both the lower and upper aquifer zones. A groundwater mound is located near the Fresno-Clovis Regional Wastewater Reclamation Facility (Regional Facility) as a result of the disposal of treated effluent at the FCRWRF percolation basins.

Groundwater used by the City to meet its demands is replenished by three different methods:

- Natural recharge
- Subsurface inflow
- Intentional recharge

Natural recharge occurs through rainfall, irrigation, canal and stream flows that seep into the soil and replenish the aquifer below. Based on City data, the natural recharge was approximately 24,400 AF in 2010. According to the Metropolitan Plan Update, the average annual natural recharge is 37,000 AF within the Planning Area. As additional development occurs throughout the Planning Area, there will be less pervious surfaces to allow natural recharge to occur. However, as the City annexes portions of the Planning Area, the amount of natural recharge allocated to the City will increase. At buildout, the natural recharge is estimated to be approximately 27,000 AF/year.

Subsurface recharge occurs from the movement of groundwater from external sources such as the Sierra Nevada moving into the local aquifer. Since the groundwater table surrounding the Planning Area is higher than inside the Planning Area, subsurface water tends to flow from surrounding areas with a higher groundwater table into the aquifer within the Planning Area that has a lower groundwater table. Based on City data, the annual subsurface inflow to the City is approximately 22,500 AF in 2010. By the year 2025, the City anticipates that groundwater operations (i.e., subsurface inflows and outflows) would be balanced and subsurface flows will not be directed to the

Planning Area. Therefore, during and after the year 2025, subsurface water flows will not be a water supply source for the City since the water levels within the Planning Area would match the levels of the entire region.

Intentional recharge is provided by directing surface water into the underground aquifer by means of groundwater recharge basins located throughout the Planning Area. Currently, the City's primary recharge facility is Leaky Acres, located just northwest of Fresno-Yosemite International Airport. Other recharge facilities include Fresno Metropolitan Flood Control District (FMFCD) storm drainage basins and the Alluvial Groundwater Recharge System (AGRS) owned and operated by the City of Clovis. Based on the 2008 UWMP, the average intentional recharge between 1985 and 2007 was approximately 44,200 AF/year. The maximum intentional recharge was approximately 62,000 AF/year in 2003. Based on information provided by City staff. The intentional recharge quantity in 2009 was approximately 54,600 AF and in 2010, the intentional recharge was approximately 53,100 AF.

Based on the natural groundwater recharge (24,400 AF), subsurface inflow (22,500 AF), and intentional recharge (453,100 AF) that occurred in 2010, the total groundwater recharge during normal year supply is approximately 100,000 AF. At buildout, the City anticipates that the natural groundwater recharge will increase to 27,000 AF/year, subsurface inflow will be 0 AF/year, and intentional groundwater recharge will increase to 75,100 AF/year due to an increase in the capacity of surface water treatment. The total groundwater recharge at buildout will be approximately 102,100 AF/year.

In 2004, the Northeast Surface Water Treatment Facility (NESWTF) located at Chestnut and Behymer Avenues began operation. The NESWTF has reduced the dependence on groundwater pumping by the City needed to meet water demand. Prior to NESWTF operation, 100 percent of the City's water demand was met through groundwater pumping. The addition of the NESWTF has reduced the percentage of total water demand provided by groundwater from 100 percent prior to 2004 to approximately 87 percent in 2010, according to the 2010 Urban Water Management Plan.

The City currently has approximately 272 active wells, which pump an average of 146 million gallons of water per day (MGD). Groundwater pumping data provided by the City indicates that approximately 128,578 AF was pumped in 2010. Between 2006 and 2010, the City pumped an average of approximately 139,207 AF/year. This average groundwater pumping has exceeded the current estimated groundwater safe yield of approximately 100,000 AF/year.

In the near future, groundwater will continue to be an important part of the City's supply but will not be relied upon as heavily as has historically been the case The 2010 UWMP projects that groundwater pumped by the City will decrease from approximately 128,578 AF/year in 2010 to approximately 85,000 AF/year at buildout of the General Plan Update. This would represent a decrease in the groundwater percentage of total water supply from 87 percent to 36 percent. This reduction in groundwater pumping will recharge the aquifer by approximately 15,000 acre-feet per year because the safe yield is approximately 1000,000 acre-feet per year. In order to meet this

projection, the City is planning to rely on expanding their delivery and treatment of surface water supplies and groundwater recharge activities.

Water Quality

Surface Water

San Joaquin River

The primary surface water feature within the General Plan Update Planning Area is the San Joaquin River, which generally serves as the Planning Area's northern boundary. At 366 miles long, the San Joaquin River is the largest river in Central California, spanning from the Sierra Nevada Mountains to the San Francisco Bay via the San Joaquin Valley. Much of the water that flows through the San Joaquin River is used for irrigation purposes. Much of the agricultural production in the San Joaquin Valley depends on water that at least originated from the San Joaquin River.

The San Joaquin River has been identified by the Central Valley RWQCB as having numerous beneficial uses, including municipal and domestic water supply, agricultural, industrial, recreational, freshwater and wildlife habitat, and migration and spawning grounds. Water quality in the San Joaquin River is affected by both natural and anthropogenic sources, including soil erosion; stormwater runoff; wastewater discharges, industrial, residential, and agricultural runoff; recreational activity; and flora and fauna. While the segment of the San Joaquin River in the Planning Area is not considered substantially impaired, significant downstream portions of the River throughout the Valley and near the Sacramento-San Joaquin Delta are affected by various constituents and pollutants, usually as a result of agricultural runoff. However, the portion of the San Joaquin River in the Planning Area appears on the State Water Resources Control Board's 2010 Impaired Water Bodies/303(d) List for invasive species (non-native fish species).

Millerton Lake

Aside from the San Joaquin River, another prominent surface water feature in the general Planning Area is Millerton Lake, which is located upstream and just outside of the of the Planning Area's northeast boundary. The Lake was created by the construction of Friant Dam on the San Joaquin River by the United States Bureau of Reclamation in 1942. While Millerton Lake's secondary uses include recreation, hydroelectric power generation, and flood control, the primary purpose of the Lake is the storage of irrigation water for the San Joaquin Valley. Millerton Lake is included on the 2010 Impaired Water Bodies/303(d) List for mercury.

Other Surface Waters

In addition to these larger surface water features, a network of agricultural canals and flood control channels traverse the Planning Area. Numerous agricultural ponds, recharge basins, and other similar features dot the Planning Area's landscape.

The City began to use surface water as a source of potable water supply in 2004, when the Surface Water Treatment Facility (SWTF) became operational and began delivering approximately 20 mgd of potable water to residents of northeast Fresno. In 2009, the SWTF treated 19,600 AF, which offset groundwater demand by 12 percent. The City is currently implementing various improvements that

would ultimately increase production to near annual design capacity levels of 30,800 AF. Surface water starts as snow melt in the Sierra Nevada before traveling down the San Joaquin and Kings Rivers via Millerton Lake and Pine Flat Reservoir. These locations serve as temporary storage locations before the surface water is delivered via the Enterprise Canal to the SWTF, where the water is treated to drinking water standards.

Ground Water

Groundwater quality throughout the Tulare Lake Hydrologic Region is generally suitable for most urban and agricultural uses, and meets primary and secondary drinking water standards for municipal use. Local impairments are found in the Tulare Lake Hydrologic Region's groundwater supply, however, with high TDS, nitrate, arsenic, and organic compounds acting as the primary constituents of concern within the Region. With the exception of the western portion of the Tulare Lake Hydrologic Region, the Region lacks any substantial low permeability units that would isolate deep from shallow aquifers. As such, most of the aquifer underlying the Planning Area is unconfined. As a single, unconfined aquifer, the groundwater basin within the Planning Area has been designated as a Sole Source Aquifer as authorized by Section 14246 of the Federal Safe Drinking Water Act of 1974. This designation means that Planning Area is dependent on a single source of groundwater and that this sole source must be protected from contamination.

While the groundwater supply within the Kings River Subbasin generally meets drinking water standards, extensive contamination occurs throughout the Planning Area. Of the City's 272 groundwater wells, 96 wells are impacted by one contaminant plume, 33 wells are impacted by two contaminant plumes, and 5 wells are impacted by three contaminant plumes. Thirty-four of the City's active wells currently have wellhead treatment systems.

Several different types of pollutants have contaminated the groundwater in portions of the Planning Area. Major contaminant plumes include dibromochloropropane (DBCP), ethylene dibromide (EDB), trichloropropane (TCP), other volatile organic compounds (VOCs) like trichlorethylene (TCE), tetrachloroethylene (PCE), nitrate, manganese, radon, chloride, and iron. Nitrate, pesticides, and nutrients in agricultural drainage are currently found within much of the Planning Area's groundwater supply, and their levels exceed some drinking water standards established by the State. While nitrates may occur naturally, their presence is often attributed to anthropogenic reasons. Leaking septic tanks, which are prevalent in the less dense southeast portion of the City, are also a substantial source of nitrate contamination.

Another major problem facing the Planning Area's groundwater supply is the presence of Dibromo-Chloropropane (DBCP) in the City's groundwater wells. This fumigant was widely used in the 1960's to control nematodes in vineyards and is now present in down gradient groundwater wells.

Floodplain

The City of Fresno is located in the alluvial fans of numerous foothill streams and creeks that drain the western slope of the Sierra Nevada foothills. These streams include Big Dry Creek, Alluvial Drain, Pup Creek, Dog Creek, Redbank Creek, Mud Creek, and Fancher Creek. Numerous smaller, unnamed drainage courses also drain into the Planning Area from the rural areas east of the Planning Area.

Based on a review of the Federal Emergency Management Agency's Flood Insurance Rate Maps (FIRM) for the Planning Area, there are areas that are subject to the 100-year frequency flood zone (see Exhibit 5.9-1). The primary area that is subject to the 100-year flood zone is along the San Joaquin River below the bluffs. There are additional areas in the vicinity of the Fresno International Airport, the Southeast Development Area in the vicinity of the Redbank Creek Dam, adjacent to Highway 180 east of Clovis Avenue, and within an industrial area east of SR-99, south of California Avenue and north of Jensen Avenue. In addition, various detention basins are subject to the 100-year flood zone.

5.9.3 - Regulatory Setting

Federal

Clean Water Act

The Clean Water Act (CWA) established a basic structure for regulating discharges of pollutants into Waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. The "Clean Water Act" became the Act's common name with amendments in 1977.

Under the CWA, the Environmental Protection Agency (EPA) has implemented pollution control programs and established water quality standards for all contaminants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a National Pollutant Discharge Elimination System (NPDES) permit was obtained. Point sources are discrete conveyances such as pipes or manmade ditches. While residential structures that are either connected to a municipal system or otherwise do not discharge into surface waters are not required to obtain a NPDES permit, industrial, municipal, and similar facilities must obtain permits to discharge directly into surface waters. In California, the NPDES program is administered through the nine Regional Water Quality Control Boards (RWQCB).

Non-point sources are similarly regulated through a General Construction Activity Stormwater NPDES permit. Construction activities subject to this permit include clearing, grading, excavating, and general disturbances to the ground. Stormwater Pollution Prevention Plans (SWPPPs) are required for the issuance of a General Construction Activity Stormwater NPDES permit and typically include the implementation of structural and non-structural Best Management Practices (BMPs) to reduce impacts related to surface water quality.

National Pollutant Discharge Elimination System (NPDES) Permit

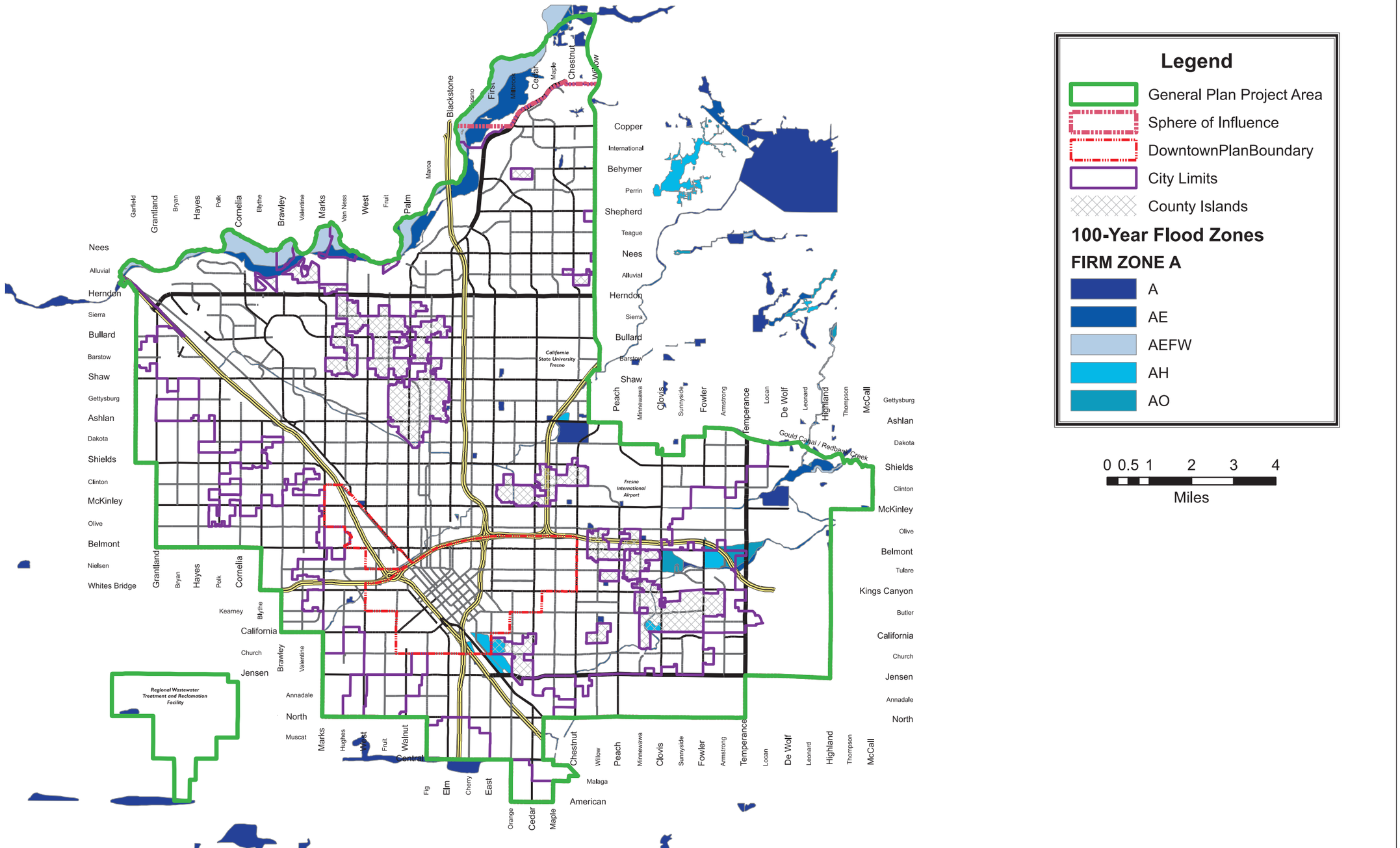
Section 402 of the CWA established the NPDES to control water pollution by regulating point sources that discharge pollutants into Waters of the United States. In the State of California, the EPA has authorized the State Water Resources Control Board (SWRCB) as the permitting authority to implement the NPDES program. The SWRCB issues two-baseline general permits; one for industrial operations, the other for construction activities (General Construction Permit). Additionally, the NPDES program includes the regulation of stormwater discharges from cities, counties, and other municipalities under Order No. R8-2009-0030 (waste discharge requirements for stormwater).

Under the General Construction Permit, stormwater discharges from construction sites with a disturbed area of one or more acres are required to obtain either individual NPDES permits for stormwater discharges or be covered by the Construction General Permit. Coverage under the Construction General Permit is accomplished by completing and filing a Notice of Intent with the SWRCB. Each Applicant under the Construction General Permit is required to both prepare a SWPPP prior to the commencement of grading activities and to ensure implementation of the SWPPP during construction activities. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction activities. BMPs may include programs, technologies, processes, practices, and devices that control, prevent, remove, or reduce pollution. The SWPPP would also address BMPs developed specifically to reduce pollutants in stormwater discharges following the completion of construction activities.

Safe Drinking Water Act (Federal)

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. This SDWA focuses on all waters either designed or potentially designed for drinking water use, whether from surface water or groundwater sources. The SDWA and subsequent amendments authorized the EPA to establish health-based standards, or maximum contaminant levels (MCLs), for drinking water to protect public health against both natural and anthropogenic contaminants. All owners or operators of public water systems are required to comply with these primary (health-related) standards. State governments, which can be approved to implement these primary standards for the EPA, also encourage attainment of secondary (nuisance-related) standards. At the federal level, the EPA administers the SDWA and establishes MCLs for bacteriological, organic, inorganic, and radiological constituents (United States Code Title 42, and Code of Federal Regulations Title 40). At the state level, California has adopted its own SDWA, which incorporates the federal SDWA standards with some other requirements specific only to California (California Health and Safety Code, Section 116350 et seq.).

The 1996 SDWA amendments established source water assessment programs pertaining to untreated water from rivers, lakes, streams, and groundwater aquifers used for drinking water supply. According to these amendments, the EPA must consider a detailed risk and cost assessment, as well as best available peer-reviewed science, when developing standards for drinking water. These programs are the foundation of protecting drinking water resources from contamination and avoiding costly treatment to remove pollutants. In California, the Drinking Water Source Assessment and Protection (DWSAP) program fulfills these federal mandates. The California Department of Public Health is the primary agency for developing and implementing the DWSAP program, and is responsible for performing the assessments of existing groundwater sources.



Source: City of Fresno GIS. FEMA Flood Zone Data.

FirstCarbon SOLUTIONS

Exhibit 5.9-1
100-Year Flood Zones

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969, which became Division 7 of the California Water Code, authorized the SWRCB to provide comprehensive protection for California's waters through water allocation and water quality protection. The SWRCB implements the requirement of the CWA Section 303, which states that water quality standards must be established for certain waters through the adoption of water quality control plans under the Porter-Cologne Act. The Porter-Cologne Act established the responsibilities and authorities of the nine RWQCBs, which include preparing water quality plans within the regions, identifying water quality objectives, and instituting waste discharge requirements. Water quality objectives are defined as limits or levels of water quality constituents and characteristics established for reasonable protection of beneficial uses or prevention of nuisance. Beneficial uses consist of all the various ways that water can be used for the benefit of people and wildlife. The Porter-Cologne Act was later amended to provide the authority delegated from the EPA to issue NPDES permits regulating discharges to Waters of the United States.

Local

The existing City of Fresno regulations regarding hydrology and water quality are presented below.

City of Fresno General Plan

The City of Fresno General Plan contains goals, objectives, and policies that address hydrology and water quality. The following General Plan goals, objectives, and policies are applicable to the proposed project:

Safety Element

I-5. OBJECTIVE: Protect the lives and property of current and future residents of the Fresno Clovis Metropolitan Area (FCMA) from the hazards of periodic floods. Recognize and institute adequate safeguards for the particular flooding hazards of areas on the San Joaquin riverbottom and bluffs.

I-5-a. Policy: Support the full implementation of the Fresno Metropolitan Flood Control District (FMFCD) Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities.

I-5-b. Policy: The San Joaquin River will not be channelized, and levees will not be used in the river corridor for flood control, excepting those alterations in river flow that are approved with surface mining and subsequent reclamation activities for mined sites (e.g., temporary berms and small side channel diversion to control water flow through ponds).

I-5-c. Policy: Ensure implementation of the Fresno Metropolitan Flood Control District control programs for the Fresno County Stream Group, including completion of the Redbank-Fancher Creek Flood Control Project, and the FMFCD rural streams program to provide protection to the urban community from waters originating outside the urban area.

I-5-d. Policy: Ensure implementation of the Fresno Metropolitan Flood Control urban drainage system program, including completion of the urban storm drainage systems to provide protection to the urban community from waters originating within the urban area.

I-5-e. Policy: Ensure implementation of land grading and development policies which protect area residents from flooding caused by urban runoff produced by events which exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities.

I-5-f. Policy: The minimum level of design flood protection shall be the 100-year (one percent) event, as established by the best and most current available data from the U.S. Army Corps of Engineers and the California Department of Water Resources, pursuant to Federal Emergency Management Agency (FEMA) direction.

I-5-g. Policy: Establish special building standards for private structures, public structures, and infrastructure elements in the San Joaquin riverbottom, which would protect:

- construction in this area from being damaged by the intensity of flooding in the riverbottom.
- water quality in the San Joaquin River watershed from flood damage-related nuisances and hazards (e.g., the release of raw sewage).
- public health, safety, and general welfare from the effects of flood events.

I-5-h. Policy: Complete studies, addressing the limitations of the area's geological and hydrological status and all the relevant features of the proposed project, will be required prior to the approval of any construction or development project proposed in the San Joaquin riverbottom or below the top of the San Joaquin River bluffs.

- Designated Floodway Map developed by the State Board of Reclamation.
- Mapping of the 100-year floodplain with the best available current data and its relationship to the finished project.
- Central Valley Project easements on the property.
- Surrounding topography, river channel configuration and flow characteristics, and on- and off-site drainage features.
- The presence of wetlands, natural vegetation, and wildlife, for which the Clean Water Act and related federal and state legislation may require wit the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game.
- Existing sand and gravel mining and processing facilities in the vicinity.
- Grading activity proposed for the construction of the project.
- Residential uses, and proposed structures and accessory structures.

- Vehicular and pedestrian access for ingress, egress, and emergency response access; primary and secondary roadway and driveway with appurtenant bridges, trestles, and culverts.
- Water wells, septic tanks, and on-site propane or other fuel tanks.
- Utility infrastructure (water, sewer, power, and telecommunication lines).
- Fencing and walls.
- Ability to provide flood warning and rapid evacuation of the site.

In consideration of these and other relevant factors that may arise during project review, the proposed construction or development project may be denied, or additional flood protection measures may be required.

I-5-i. Policy: The City of Fresno shall preserve flood-prone areas within the City of Fresno and its Sphere of Influence, particularly the San Joaquin riverbottom for uses, which will not have permanent improvements that would be adversely affected by periodic floods.

I-5-j. Policy: The City of Fresno shall continue to assign open space zoning to all undeveloped areas, which are within the Designated Floodway of the San Joaquin River and the floodway channels of Dry Creek, Redbank Creek, Francher Creek, and other streams.

I-5-k. Policy: Except in the San Joaquin riverbottom (where new residential subdivisions are not allowed by the multi-use open space land use designation), the City of Fresno shall require developers of residential subdivisions to preserve those portions of development sites as open space, which may be subject to 100-year flood events, unless the flood hazard can be substantially mitigated by development project design. This shall be a condition of subdivision map and special permit approval.

The density of developable adjacent land may be increased to allow the same number of dwelling units as if the entire site were developed. In such instances, the open space area should be incorporated into the project design to provide amenity and passive open space for future residents. This open space should be improved and maintained by the developer, or through the use of mechanisms as homeowners association fees or maintenance districts.

I-5-m. Policy: A valid beneficial use of the San Joaquin River Corridor is to transport floodwater, and this use must be protected. Riverbottom land uses will be managed with the following objectives:

- to control and reduce erosion in the floodway.
- to maintain the combined existing flow capacity in the river channel and the designated floodway by establishing ordinances and policies to prevent nuisance blocking of flood flow.
- to maintain the river stage required to pass any given flow, so as not to increase the extent of flooded area (no increase in the designated floodway), unless any resulting loss in private land value is first purchased from willing sellers.

- to coordinate any snagging and clearing activities for river channel enhancement with resource agencies to minimize conflicts with natural habitat preservation and mineral extraction activities (including reclamation).

I-5-n. Policy: As new information becomes available, maps of record which designate areas subject to flooding will be amended.

- Assist the U.S. Army Corps of Engineers, State Department of Water Resources, FEMA, and the Fresno Metropolitan Flood Control District, with mapping projects for floodplains. Establish the updating of floodplain maps in the San Joaquin riverbottoms as a main priority in order to protect health, safety, and general welfare in the riverbottom.
- Maps of the inundation areas for dam failures on the San Joaquin River, Kings River, and the Fresno Stream Group will also be maintained for city emergency preparedness and other planning purposes.
- Provide and utilize updated flood map and inundation information for review of development projects.

I-5-o. Policy: Pursuant to state law, the city shall prepare and update emergency dam failure inundation plans, evacuation plans and other emergency response plans for designated flood-prone areas, including the San Joaquin riverbottom.

Resource Conservation Element

G-2. Objective: Maintain a comprehensive, long-range water resource management plan that provides for appropriate management of all sources of water available to the Planning Area and ensures that sufficient and sustainable water supplies of good quality will be economically available to accommodate existing and planned urban development.

G-2-b. Policy: Implement the Fresno Metropolitan Water Resources Management Plan, and update this plan as necessary, to ensure cost-effective use of water resources and continued availability of good-quality groundwater and surface water supplies.

G-2-c. Policy: Continue interagency efforts toward completion of a Groundwater Management Plan, pursuant to the provisions added to the California Water Code by Assembly Bill 3030.

G-3. Objective: Protect water resources in the area from further degradation in quality.

G-3-a. Policy: Monitor key pollutants to determine directions and rates of contaminant travel, in order to achieve cost-effective and timely intervention for containment and remediation of contamination, and to indicate which areas may require water treatment to supply acceptable-quality drinking water.

G-3-b. Policy: Continue to participate in interagency committees and task forces (with local, state, and federal representation, as may be needed) to share information, to efficiently utilize financial

resources devoted to evaluating water quality problems, and to facilitate cost-effective management of water pollution.

G-3-c. Policy: Support continued efforts to identify and mitigate detriments to surface and ground water quality that may result from stormwater discharge from urbanized areas.

G-3-d. Policy: Continue to implement water system policies that ensure compliance with Federal and State Safe Drinking Water Standards.

G-3-e. Policy: Support and encourage actions of the Regional Water Quality Control Board, the State Environmental Protection Agency, and the local health department to control and prevent water contamination, including leaking underground storage tank and abandoned storage tank abatement programs.

G-3-f. Policy: Continue programs to collect and treat sewage to enhance water quality and reclaim water resources in a manner that protects the Fresno Sole Source Aquifer.

G-3-g. Policy: Restrict urban development in areas that are not served by a wastewater treatment/management system that is capable of preventing the buildup of compounds that would degrade the aquifer. Oppose the development of new sewage disposal facilities either within the planning area or upgradient (north and east) of the planning area, unless the treatment produce effluent that:

- will not degrade the aquifer in the long term.
- will not introduce contaminants into surface water that would negatively affect its potential economic use of drinking water.
- will not deleteriously affect downstream agricultural and urban uses.
- will not degrade sensitive riparian habitat.

G-4. Objective: Manage, use, and replenish water resources to maintain a balanced "water budget" in the Fresno area.

G-4-b. Policy: In cooperation with other agencies, enhance the recharge of groundwater as may be necessary.

G-4-c. Policy: Address localized groundwater deficiencies and groundwater quality problems that exist or may arise in portions of the planning area.

Public Facilities Element

E-22. Objective: Manage and develop the City of Fresno's water facilities to ensure a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.

H-22-g. Policy. Continue to implement water system policies that require the provision of a potable water supply that complies with the standards of the Federal and State Safe Drinking Water Acts for consumptive use, and meets applicable standards of volume and pressure for fire suppression purposes.

H-22-h. Policy. Implement appropriate measures consistent with water system policies, including the removal of pump stations from active use, installation of wellhead treatment facilities, construction of aboveground storage and surface water treatment facilities, and enhancement of transmission grid mains to ensure adequate water quality and quantity.

City of Fresno Municipal Code

Chapter 6, Municipal Services and Utilities, Article 7, Urban Storm Water Quality Management and Discharge Control, of the Fresno Municipal Code establishes provisions regarding stormwater discharges. The purpose and intent of Article 7 is to ensure the health, safety, and general welfare of residents, and to protect the water quality of surface water and groundwater resources in a manner pursuant to and consistent with the Federal CWA by reducing pollutants in urban stormwater, discharges to the maximum extent practicable, and by effectively prohibiting non-stormwater discharges to the storm drain system.

5.9.4 - Thresholds of Significance

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impacts on the environment. The criteria used to determine the significance of an impact to hydrology and water quality are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, hydrology and water quality impacts resulting from the proposed project are considered significant if the project would:

a) Violate any water quality standards or waste discharge requirements? (See Water Quality Standards and Requirements, Impact HYD-1)

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted? (See Groundwater Supplies and Recharge, Impact HYD-2)

c) Substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? (See Drainage Pattern: Erosion or Siltation, Impact HYD-3)

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? (See Drainage Pattern: Flooding, Impact HYD-4)

e) Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? (See Runoff Water and Drainage Systems, Impact HYD-5)

f) Otherwise substantially degrade water quality? (See Water Quality, Impact HYD-6)

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? (See Housing Placement: Flood Hazard Area, Impact HYD-7)

h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows? (See Structures: Flood Hazard Areas, Impact HYD-8)

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? (See Flooding: Failure of Levee or Dam, Impact HYD-9)

j) Inundation by seiche, tsunami, or mudflow? (See Sieche, Tsunami, or Mudflow, Impact HYD-10)

5.9.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Water Quality Standards and Requirements

Impact HYD-1	**The project would not violate any water quality standards or waste discharge requirements.**

Project Specific Impact Analysis

Short-Term Construction Impacts

Construction activities associated with buildout of the Planning Area would result in ground-disturbing activities such as grading, excavation, placing fill, trenching, spoil pile storage, and backfilling of trenches. Such earthmoving activates would increase the potential for erosion and sedimentation, particularly during storm events. Additionally, construction equipment and vehicles could deposit constituents such as diesel fuel, hydraulic fluid, oil, and exhaust into the environment that could be conveyed within stormwater runoff to surface waters or groundwater. Construction activities use concrete, solvents, glues, oils, paints, and generate trash, all of which, if they come into contact with rainfall or stormwater runoff can cause pollution in stormwater. While temporary, all of these construction activities and products, including ground-disturbing construction activities could still result in the pollution of stormwater runoff that leaves the construction site that could contribute to downstream surface waters or groundwater degradation.

There are regulatory mechanisms in place that would reduce the effects of construction activities on water quality, including the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. Development within the Planning Area would be required to comply with the requirements of the NPDES Construction General Permit. The NPDES Permit Program, which is administered in the Planning Area region by the Central Valley RWQCB, helps control pollution in stormwater by regulating sources of pollution at construction sites that would result in the discharge

of pollutants into the stormwater and subsequent receiving waters during both construction and operations activities.

Any development project disturbing one or more acres of soil must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). Construction activities subject to the Construction General Permit includes clearing, grading, and other ground-disturbing activities such as stockpiling or excavation. The Construction General Permit requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Among other mandated items that are included in a SWPPP, are features designed to eliminate contact of rainfall and stormwater runoff with sources of pollution that occur on construction sites, of which a primary source is soil erosion as a result of unstabilized soils coming in contact with water and wind. These features are known as Best Management Practices (BMPs). Common BMPs to limit pollution in stormwater runoff from construction sites include maintaining or creating drainages to convey and direct surface runoff away from bare areas and installing physical barriers such as berms, silt fencing, waddles, straw bales, and gabions.

The required preparation, implementation, and participation with the Construction General Permit, including the SWPPP and BMPs, would reduce project construction impacts on water quality to less than significant levels. Therefore, short-term construction impacts associated with water quality standards and waste discharge requirements would be less than significant.

Long-Term Project Impacts

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would increase the amount of paved impervious surfaces within the Planning Area. This increase in impervious surfaces would increase stormwater runoff rates and volumes over the rates and volumes from undeveloped land. The Fresno Metropolitan Flood Control District (FMFCD) is responsible for developing and implementing the Storm Drainage Master Plan for the City of Fresno. As land is developed, the FMFCD works with the developers and the City to implement the storm drainage system to collect and dispose of the increased runoff rates and volumes and prevent them from entering local surface waters, including the San Joaquin River, local creeks, and numerous irrigation canals that cross through the Planning Area. The storm drainage systems that are implemented for the Planning Area consist of streets, curbs and gutters that direct runoff to storm drain inlets, which direct runoff to underground pipelines. The underground pipelines convey stormwater to retention and urban detention (water quality) basins located at strategic locations within the Planning Area. The stormwater retention basins dispose of runoff through percolation into the groundwater and, in emergencies, through pumping to designated irrigation canals. The urban detention (water quality) basins discharge to the San Joaquin River. Discharges from the retention basins and the urban detention (water quality) basins could affect water quality in the receiving waters by potentially increasing the concentration of sediment and pollution found in stormwater.

Typically, stormwater runoff from urban development contains an array of constituents, including automotive fluids (e.g., fuel, oils, and antifreeze), combustion and exhaust byproducts (e.g., lead, cadmium, and nickel), sediments, fertilizers, pesticides, herbicides, and nutrients and bacteria pollutants from domestic and agricultural animal waste. These constituents are expelled into the environment throughout the year, where they settle onto the ground surface. During the wet season, stormwater runoff conveys these pollutants downstream, resulting in polluted stormwater runoff, especially during the first storm events of the season.

The City of Fresno is a co-permittee with the Fresno Metropolitan Flood Control District, the County of Fresno, the City of Clovis, and California State University Fresno in the Phase 1 NPDES Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). This Phase 1 MS4 Permit requires that the City and its co-permittees implement water quality and watershed protection measures for all development projects. The waste discharge requirements contained in the NPDES Permit have been designed to be consistent with the water quality standards and goals established in the Central Valley RWQCB's Basin Plan. The Phase 1 MS4 Permit prohibits discharges from violating applicable water quality standards or creating a nuisance or water quality impairment in receiving waters. Participation in the Phase 1 MS4 permit and implementation of the Storm Drainage Master Plan will reduce impacts to surface waters to acceptable levels and long-term project impacts to surface or groundwater quality will not exceed acceptable levels.

Additionally, the General Plan Update includes the following policies designed to reduce water quality impacts:

Parks, Opens Space, & Schools Element

Policy POSS-6-b. Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Avoid discharge of runoff from urbanuses to the San Joaquin River or other riparian corridors.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas only upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. Institute remedial measures promptly if unacceptable levels of contaminant(s) occur.

Public Utilities and Services Element

Policy PU-5-a: Mandatory Septic Conversion. Continue to evaluate and pursue where determined appropriate of the mandatory abatement of existing private wastewater (septic) disposal systems and mandatory connection to the public sewage collection and disposal system.

Policy PU-5-b: Non-Regional Treatment. Discourage, and when determined appropriate, oppose the use of private wastewater (septic) disposal systems, community wastewater disposal systems or other non-regional sewage treatment and disposal systems within or adjacent to the Metropolitan

Area if these types of wastewater treatment facilities would cause discharges that could result in groundwater degradation.

Policy PU-5-c: Satellite Facilities. Work with the Regional Water Quality Control Board to ensure that approval of any satellite treatment and reclamation facility proposal is consistent with governing statutes and regulations.

Policy PU-7-a: Reduce Wastewater. Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.

Policy PU-7-b: Reduce Stormwater Leakage. Reduce storm water infiltration to the sewer collection system, where feasible, through a program of replacing old and deteriorated sewer collection pipeline; eliminating existing stormwater sewer cut-ins to the sanitary sewer system; and avoiding any new sewer cut-ins except when required to protect health and safety.

Policy PU-7-c: Biosolid Disposal. Investigate and consider implementing economically effective and environmentally beneficial methods of biosolids handling and disposal.

Policy PU-7-d: Wastewater Recycling. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting and water exchange elements.

Policy PU-7-e: Infiltration Basins. Continue to rehabilitate existing infiltration basins, and if determined appropriate, pursue acquiring additional sites for infiltration basins, as needed.

Policy PU-7-f: Food and Drink Industry. Ensure adequate provision of facilities for the appropriate management of wastewater from wineries and food processing and beverage facilities, including conformance with Waste Discharge Requirements issued by the Regional Water Quality Control Board.

Resource Conservation and Resilience

Policy RC-6-e: Protect Aquifer. Oppose urban development in unincorporated areas that are not served by a wastewater treatment/management system capable of preventing the buildup of compounds that would degrade the aquifer.

Policy RC-5-f: Regulate Sewage Disposal Facilities. Oppose the development of new sewage disposal facilities either within the planning area or up gradient (north and east) of the Planning Area, unless the treatment facilities produce effluent that:

- Will not degrade the aquifer in the long term;
- Will not introduce contaminants into surface water that would negatively affect its potential economic use for drinking water;
- Will not deleteriously affect downstream agricultural and urban uses; and
- Will not degrade sensitive riparian habitat.

Policy RC-6-g: Protect Recharge Areas. Continue to protect areas of beneficial natural groundwater recharge by preventing uses that can contaminate soil or groundwater.

Policy RC-6-h: Conditions of Approval. Include in the Development Code standards for imposing conditions of approval for development projects to ensure long-term maintenance of adequate clean water resources. Require findings that adequate water supply must exist prior to any discretionary project approval for residential and commercial development requiring annexation (excluding County Islands), as required by law.

Noise and Safety Element

Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Along with preparation, implementation, and participation of the NPDES Permit, implementation of the aforementioned General Plan Update polices would reduce long-term project impacts associated with water quality standards and wastewater discharge requirements to less than significant levels.

Cumulative Impact Analysis

Short-Term Construction Impacts

Buildout of the Planning Area, along with construction of related projects in the Planning Area vicinity, would result in activities that could pollute stormwater runoff, particularly ground-disturbing activities that would increase the potential for erosion and sedimentation. Although temporary, these construction activities could still result in pollution of the runoff, including on- and off-site soil erosion, sedimentation, and siltation that could contribute to downstream surface waters or groundwater degradation, ultimately resulting in cumulative impacts.

Construction of projects within the Planning Area would be required to comply with the requirements of the NPDES Construction General Permit. The NPDES Construction General Permit program helps control stormwater pollution by controlling the contact of sources of pollution on construction sites with rainfall and stormwater runoff. Stormwater that is discharged into local receiving waters would also result in the discharge of those pollutants from the construction and operations activities into receiving waters. As stated previously, the Construction General Permit requires that any development project disturbing one or more acres of soil must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ) that is issued by the State Water Resources Control Board. The Construction General Permit requires development and implementation of a

SWPPP, which would include implementable features designed to protect rainfall and stormwater runoff from contact with sources of pollution on construction sites, including unstabilized soil that would be eroded by the stormwater. The Construction General Permit also requires counter measures to protect against wind erosion of unstabilized soils. Theseprotection measures, BMPs, along with the implementation of a SWPPP would reduce construction impacts on water quality, both individually and collectively, to acceptable levels. As a result, less than significant cumulative short-term construction impacts associated with water quality standards and waste discharge requirements would occur within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and short term impacts are considered to be less than significant.

Long-Term Project Impacts

Buildout of the Planning Area, along with construction of related projects in the vicinity of the Planning Area would increase the amount of paved impervious surfaces. This increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. The FMFCD works with the developers of cumulative projects within their jurisdiction to implement a storm drainage system to collect and dispose of the increased runoff rates and volumes and prevent them from entering local surface waters, including the San Joaquin River, local creeks, and numerous irrigation canals that cross through the Planning Area. Because the County of Fresno and City of Clovis are co-permittees in the Phase I MS4 Permit, they are required to implement water quality and watershed protection measures for cumulative projects. Compliance with the MS4 Permit would result in less than significant cumulative long-term impacts associated with water quality standards and waste discharge requirements. Since the implementation of the General Plan Update would result in less than significant long-term impacts on water quality standards and waste discharge requirements, the contribution of the General Plan Update to cumulative impacts would not be considerable and long term cumulative impacts are considered to be less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Groundwater Supplies and Recharge

Impact HYD-2	**The project could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.**

Project Specific Impact Analysis

The City of Fresno relied on groundwater for approximately 87 percent of its domestic water supply in 2010, which is approximately equal to a 128,578 acre feet. The groundwater was withdrawn from the Kings Groundwater Sub-basin of San Joaquin Basin Hydrologic Area. The City projects that groundwater withdrawal will be reduced to 86,000 AF/year by the Year 2025, according to the 2010 UWMP. In 2010, natural groundwater recharge (24,400 AF), subsurface inflow (22,500 AF), and intentional recharge (53,100 AF) occurred for a total groundwater recharge of 100,000 AF/year. At present, the City is creating an overdraft of the Kings Groundwater Sub-basin aquifer as defined by the California State Department of Water Resources.

The City of Fresno has adopted a key objective of balancing its groundwater operations by the Year 2025 (West Yost Associates, 2011). According to the 2010 UWMP, achieving this objective includes implementing a host of strategies, which includes increasing the amount of intentional groundwater recharge from 43,100 AF in 2010 to 63,700 AF in 2025, and 75,100 AF in 2035. In addition, the amount of groundwater that would be pumped would be reduced from 128,578 AF in 2010 to 53,500 AF in 2025, and 85,000 in 2035. Reducing groundwater pumping can occur with an increase in the use of treated surface water from 18,474 AF in 2010 to 123,400 AF/year beginning in 2020. In addition, groundwater pumping can be reduced due to the expansion of the water conservation program, and development of a recycled water program, which is anticipated to be implemented by 2025, for irrigating landscaping. The projected groundwater-pumping rate of 86,000-acre feet per year by the Year 2025 can be more than balanced by the estimated natural recharge of 26,900 AF plus the intentional long-term recharge rate of 63,700 AF in the Year 2025 for a total of 90,300 AF. In 2035, the total groundwater recharge is estimated at 102,100 AF while the groundwater-pumping rate is anticipated to remain at 86,000 AF.

Based on the 2010 UWMP, projected water demand which includes development of the General Plan Update is based on a per capita target. For the years of 2020 and after, the per capita target is 250 gallons per day per capita (gpcd). The projected water demand for the City of Fresno in the Year 2035, based on a population of 780,600 is 218,596 AF/year. To accommodate the 2035 water demand, 123,400 AF/year would need to be provided from treated surface water, 25,000 AF/year would be provided as recycled water, and 70,196 AF/year would be pumped from the groundwater. Depending on the specific conditions each year, there could be some variability in the amount of treated surface water and/or recycled water, and in those situations, up to 86,000 AF/year of groundwater could be pumped while treated surface water and/or recycled water could be reduced.

The projected water demand for the City at full build out of the General Plan Update, based on a population of 970,000 and a per capita water demand of 250 gpcd from the 2010 UWMP, is 271,594

AF/year. Assuming treated water supplies, recycled water supplies, and pumped groundwater remain the same, the total supply of water would be 234,400 AF/year. This water supply would be less than the buildout demand by approximately 37,194 AF/year. As discussed in Section 5.15, Utilities and Service Systems, groundwater pumping would remain at 85,000 AF/year in approximately 2035 and beyond. To accommodate the buildout population of 970,000 people, additional water conservation measures would need to be developed to reduce water demand from 250 gpcd to 215 gpcd. At 215 gpcd, the population of 970,000 people would demand 233,606 AF/year of water. This demand would be less than the total water supply of 234,400 AF/year.

To accommodate the buildout water demand, the treated surface water supply would need to be increase, the recycled water supply would need to be increase, or the amount of groundwater to be pumped would need to be increased. An increase in water conservation could also accommodate the buildout demand.

Additionally, the General Plan Update includes the following policies designed to reduce the potential for groundwater overdraft impacts:

Additionally, the General Plan Update includes the following policies designed to reduce the potential for groundwater overdraft impacts:

Resource Conservation and Resilience Element

Objective RC-6: Ensure that the City has a reliable, long-range source of drinkable water.

Policy RC-6-a: Regional Efforts. Support cooperative, multi-agency regional water resource planning efforts and activities on developing and implementing the Upper Kings Basin Integrated Regional Water Management Plan.

Policy RC-6-b: Water Plans. Adopt and implement ordinances, standards, and policies to achieve the intent of the City of Fresno Urban Water Management Plan, Fresno-Area Regional Groundwater Management Plan, and City of Fresno Metropolitan Water Resources Management Plan to ensure a dependable supply of water.

Policy RC-6-c: Land Use and Development Compliance. Ensure that land use and development projects adhere to the objective of the Metropolitan Water Resource Management Plan to provide sustainable and reliable water supplies to meet the demand of existing and future customers through 2025.

Policy RC-6-d: Recycled Water. Prepare, Adopt, and implement a City of Fresno Recycled Water Master Plan.

Policy RC-6-e: Protect Aquifer. Oppose urban development in unincorporated areas that are not served by a wastewater treatment/management system capable of preventing the buildup of compounds that would degrade the aquifer.

Policy RC-6-i: Natural Recharge. Support removal of concrete from existing canals and change the practice of lining new and existing canals with concrete to allow for natural recharge.

Objective RC-7: Promote water conservation through standards, incentives and capital investments.

Policy RC-7-a: Maintain a comprehensive conservation program to help reduce per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees..

- Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.
- Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements.
- Adopt and implement policies in the event that an artificial lake is proposed for development.
- Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area.
- Expand efforts to educate the public about water supply issues and water conservation techniques.

Policy RC-7-b: Water Pricing and Metering. Develop a tiered water cost structure for both residential and commercial users that will properly price water based on its true cost; require all new development to be metered for water use; and charge all customers the true, full cost of their water supply, including costs of acquisition, initial treatment, conveyance, wastewater treatment, operations, maintenance, and remediation.

Policy RC-7-c: Best Practices for Conservation. Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate.

Policy RC-7-d: Update Standards for New Development. Continue to refine water saving and conservation standards for new development.

Policy RC-7-e: Retrofit City Facilities, and Consider Incentives Programs to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites. Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and

water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems..

Policy RC-7-f: Implementation and Update Conservation Program. Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City of Fresno Water Conservation Program.

Policy RC-7-g: Educate on State Requirements. Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.

Policy RC-7-h: Landscape Water Conservation Standards. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other state regulations.

- Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance.
- Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.

Public Utilities and Services Element

Policy PU-7-d: Wastewater Recycling. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.

Policy PU-7-e: Infiltration Basins. Continue to rehabilitate existing infiltration basins, and if determined appropriate, pursue acquiring additional sites for infiltration basins, as needed.

Objective PU-8: Manage and develop the City's water facilities on a strategic timeline basis that recognizes the long-life cycle of the assets and the duration of the resources, to promote a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.

Policy PU-8-a: Forecast Need. Utilize available and innovative tools, such as computerized flow modeling to determine system capacity, as necessary to forecast demand on water production and distribution systems by urban development, and to determine appropriate facility needs.

Policy PU-8-b: Potable Water Supply and Cost Recovery. Prepare for provision of increased potable water capacity (including surface water treatment capacity) in a timely manner to facilitate planned urban development consistent with the General Plan. Accommodate increase in water demand from the existing community with the capital costs and benefits allocated equitably and fairly between

existing users and new users, as authorized by law, and recognizing the differences in terms of quantity, quality and reliability of the various types of water in the City's portfolio.

Policy PU-8-c: Conditions of Approval. Set appropriate conditions of approval for each new development proposal to ensure that the necessary potable water production and supply facilities and water resources are in place prior to occupancy.

Policy PU-8-d: CIP Update. Continue to evaluate capital improvement plans and update the, as appropriate, to meet the demands of both existing and planned development consistent with the General Plan.

Policy PU-8-e: Repairs. Continue to evaluate existing water production and distribution systems and plan for necessary repair or enhancement of damaged or antiquated facilities.

Policy PU-8-f: Water Quality. Continue to evaluate and implement measures determined to be appropriate and consistent with water system policies, including prioritize the use of groundwater, installing wellhead treatment facilities, constructing above-ground storage and surface water treatment facilities, and enhancing transmission grid mains to promote adequate water quality and quantity.

Policy PU-8-g: Review Project Impact on Supply. Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.

The implementation of the proposed project could result in significant impacts to groundwater levels within the Kings Sub-basin if the increase in water demand is met through an increase of water supply from increased groundwater pumping.

Cumulative Impact Analysis

The Kings Sub-basin is a source of groundwater for the communities of Clovis, Fresno, Sanger, Del Rey, Orange Cove, East Orosi, Orosi, Cutler, Dinuba, Reedley, Parlier, London, Traver, Kingsburg, Selma, Fowler, Easton, Bowles, Laton, Caruthers, Raisin City, Biola, Kerman, Riverdale, Lanare, and San Joaquin. The aquifer also provides groundwater for agricultural irrigation water and numerous private domestic wells. The Kings Basin Integrated Regional Water Management Plan (IRWMP) was developed by the Kings Basin Water Authority to provide regional planning and management of water resources in the Kings Sub-basin to maintain a sustainable supply of the surface and groundwater resources for the water users within the basin (Kings Basin Water Authority, 2012). The first regional goal (RG1) of the Kings Basin IRWMP is to reduce groundwater overdraft in the Kings Sub-basin (Kings Basin Water Authority, 2012). To accomplish this goal, the Kings Basin Water Authority has developed Measurable Objective, Resource Strategies, and Projects and Programs. The current planning horizon of the Kings Basin IRWMP is the Year 2032.

The Kings Basin IRWMP has developed strategies to achieve the regional goal to reduce groundwater overdraft. These include (Kings Basin Water Authority, 2012):

1. Increase conjunctive use of water and groundwater storage
2. Precipitation enhancement
3. Increase surface storage
4. Regional conveyance enhancement
5. Increase recycled water use for recharge
6. Remediation of contaminated groundwater and reinjection of the treated water
7. Encourage the use of stormwater runoff for recharge by agencies that collect and discharge stormwater
8. Increasing number and storage capacities of basins to store flood flows
9. Protect recharge areas from urban development

The Kings Basin Water Authority has developed a project review process to identify projects, rank their ability to achieve the goals of the Authority as articulated in the Kings Basin IRWMP. Participating agencies within the Kings Sub-basin vet projects with the Authority and funds are allocated to finance all or portions of projects that work to achieve the goals, including Goal RG1, reduce groundwater overdraft.

While not an instant solution for the cumulative groundwater overdraft in the Kings Sub-basin, the coalition of water agencies that make up the Kings Water Authority and their stated goal to reduce groundwater overdraft through education and providing funding for projects that work to achieve this goal through implementing the aforementioned strategies will eventually result in a no cumulative overdraft impact on the aquifer. Short-term cumulative impacts on the groundwater aquifer could be significant while long-term cumulative impacts are considered to be less than significant. Since the proposed project is projected to increase water use to meet future demands, this increase could result in significant impacts to groundwater levels within the Kings Sub-basin if the increase in water demand is met through an increase of water supply from increased groundwater pumping. Therefore, the project's contribution to the potential cumulative effect on the groundwater basin is cumulatively considerable, and thus a significant cumulative impact.

Mitigation Measures

Project Specific

Implementation of Mitigation Measures USS-5 and USS-17 is required.

MM HYD-1 The City shall develop and implement water conservation measures to reduce the per capita water use to 215 gallons per capita per day.

MM HYD-2 The City shall continue to be an active participant in the Kings Water Authority and the implementation of the Kings Basin IRWMP.

Cumulative

Implementation of Mitigation Measure USS-5, USS-17, HYD-1, and HYD-2 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Drainage Pattern: Erosion or Siltation

Impact HYD-3	**The project would not substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.**

Project Specific Impact Analysis

Short-Term Construction Impacts

As discussed in Impact HYD-1, construction activities associated with buildout of the proposed project would result in ground-disturbing activities such as grading, excavation, placing fill, trenching, spoil pile storage, and backfilling of trenches. These activities could result in silt laden stormwater that could contribute to downstream surface waters or groundwater degradation.

Development within the Planning Area could propose the realignment of an existing stream or canal. The construction activity to realign the stream or canal could result in erosion of soils within the channel or channel banks during rainfall events that could cause siltation of stormwater runoff that leaves/enter the stream or canal. Silt laden stormwater could contribute to downstream surface water degradation.

There are regulatory mechanisms in place that would reduce the effects of construction activities on drainage patterns and erosion caused by stormwater, including

- The City of Fresno grading plan check process (City of Fresno, 2013)
- The Fresno Metropolitan Flood Control District Storm Drainage Master Plan
- The National Pollutant Discharge Elimination System (NPDES) Construction General Permit (State Water Resources Control Board, 2013)

Development within the Planning Area would be required to obtain a permit to grade land and comply with the City of Fresno grading plan check process. The grading plan check process is a review process that requires anyone who develops property:

1. Properly grade their property in accordance with the California Building Code (CBC)
2. Submit a grading plan showing the proposed grading of the development

3. Obtain approval of the Fresno Metropolitan Flood Control District indicating conformance of the grading plan with the Storm Drainage Master Plan
4. Obtain coverage under the NPDES Construction General Permit and comply with the requirements of the permit, including developing an erosion control site plan.

The Storm Drainage Master Plan contains proposed elevations for tops of curbs in undeveloped area, delineation of storm drain inlet watershed areas, collection system pipeline alignments and sizes, and retention basin or urban detention (water quality) basin locations and geometry. The development of land in conformance with the Storm Drainage Master Plan ensures that development within the Planning Area is graded to drain to storm drainage facilities that are designed to collect and dispose of stormwater from the planned development. Stormwater retention and urban detention (water quality) basins intercept and remove silt from stormwater before it can be discharged to surface water features.

The review of the grading plan checklist for a proposed development within the Planning Area will disclose any plan to alter the course of any creek, stream, or irrigation canal. The City will require any other reviews, permits, and agreements be obtained prior to allowing the grading to proceed. Such reviews could include the US Army Corps of Engineers, the US Fish and Wildlife Service, the California Department of Fish and Game, the Central Valley Flood Protection Agency, the California State Water Resources Control Board, The Central Regional Water Quality Control Board, the Fresno Metropolitan Flood Control District, and the Fresno Irrigation District. The list of possible permits and agreements includes the Clean Water 401 and 404 permits, Endangered Species or Habitat Plan, Section 1603 Streambed Alternation Agreement, and Irrigation Canal Encroachment Permit. The Fresno Metropolitan Flood Control District maintains a Master Plan for Redbank Creek, which flows through the Planning Area and should provide review and approve any development that plans to alter the channel to ensure that it will pass the design flood event.

The NPDES Construction General Permit program, which is administered in the Planning Area region by the Central Valley RWQCB, helps control siltation in stormwater by regulating sources of erosion at construction sites that would result in the discharge of silt laden stormwater from the site and into subsequent receiving waters during both construction and operations activities.

The requirement to obtain a grading permit and follow the grading plan check process and requirements would reduce project construction impacts on grading patterns and erosion to acceptable levels. Therefore, short-term construction impacts associated with grading land, altering streams, or erosion will be less than significant.

Long-Term Project Impacts

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would regrade undeveloped land to new grading patterns, may propose to alter the alignments of existing creeks, streams, or irrigation canals, and would increase impervious surfaces that would increase stormwater runoff rates. Higher rates of stormwater runoff would increase the potential for erosion of soils. FMFCD works with the developers and the City to

implement the storm drainage system to collect and prevent silt laden stormwater from entering local surface waters, including the San Joaquin River, local creeks, and numerous irrigation canals that cross through the Planning Area. The above ground storm drainage infrastructure directs runoff to underground pipelines. The underground pipelines convey stormwater to retention and urban detention (water quality) basins within the Planning Area. Discharges of stormwater from the retention basins and the urban detention (water quality) basins could increase the concentration of sediment in the receiving waters.

Development under the General Plan Update will be required to obtain a grading permit from the City of Fresno and follow the grading plan check process as described above. As a co-permittee in the Phase I NPDES Permit, development associated with the General Plan Update would be reviewed to ensure coverage under the Construction General Permit.

Additionally, the General Plan Update includes the following policies designed to reduce erosion and siltation impacts:

Parks, Open Space, & Schools Element

POSS-6-b: Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Avoid discharge of runoff from urban uses to the San Joaquin River or other riparian corridors.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas only upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. Institute remedial measures promptly if unacceptable levels of contaminant(s) occur.

Noise and Safety Element

Objective NS-3: Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

Policy NS-3-a: Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

Policy NS-3-b: Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

Policy NS-3-d: Landscaped Buffer. Require the perimeter of all permanent stormwater ponding basins to have a landscaped buffer.

Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Along with the grading plan check process, implementation of the aforementioned General Plan Update polices would reduce long-term project impacts associated with alteration of grading patterns or creeks or streams and erosion to less than significant levels.

Cumulative Impact Analysis

Short-Term Construction Impacts

Cumulative impacts from erosion and sedimentation due to alteration of existing grading patterns or streams and irrigation canals could result from construction activities that occur both within the Planning Area and outside of the Planning Area. Buildout of the Planning Area, along with construction of related projects beyond the Planning Area vicinity, would result in activities that could pollute stormwater runoff, particularly ground-disturbing activities that would increase the potential for erosion and sedimentation and alter existing grading patterns. Increased erosion and sedimentation would be temporary, but construction activities could still result in on- and off-site soil erosion, sedimentation, and siltation that could contribute to downstream surface waters degradation, ultimately resulting in cumulative impacts. Alteration of grading patterns would be created by short-term construction projects, but would be long-term in effect.

Construction of projects within the Planning Area, whether within the City limits or within Fresno County (which would be required to annex to the City) would comply with the requirements of the City of Fresno grading plan check process. This process includes preparation of grading plans, review and approval of the grading plan for conformance with the Storm Drainage Master Plan, and conformance with the NPDES Construction General Permit. Construction projects outside of the Planning Area, but within the watersheds of streams or canal tributary to the Planning Area would be required to obtain City of Clovis or the County of Fresno grading permits to develop. The permitting process requires that a grading plan be prepared and reviewed for approval. In Fresno County, this process includes the requirement to provide erosion control measures for unstabilized ground, drainage retention basin or basins to store runoff, and conformance with the NPDES Construction General Permit. (County of Fresno, 2011). In the City of Clovis, the grading permit process requires that a grading plan be prepared, reviewed, and approved by the Fresno Metropolitan Flood Control District for conformance with the Storm Drainage Master Plan, that appropriate erosion control measures will be implemented, and that the development conforms to the NPDES Construction General Permit (Smith, 2013). In all permitting processes, the need for additional permits that are required to alter the alignment of a stream or canal are verified.

The NPDES Construction General Permit program helps control stormwater pollution by controlling erosion on construction site due to rainfall and stormwater runoff. Stormwater that is discharged into local receiving waters would also result in the discharge of siltation from the construction and operations activities into receiving waters. The required preparation, implementation, and participation with the Construction General Permit, including the SWPPP and BMPs, would reduce construction impacts on water quality, both individually and collectively, to acceptable levels. As a result, no cumulative short-term construction impacts associated with silt and sediments in storm water runoff would occur, within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and short-term impacts are considered to be less than significant.

Long-Term Impacts

Buildout of the Planning Area and development within watersheds that are tributary to the Planning Area, but not a part of the Planning Area, would increase the amount of paved impervious surfaces and alteration of grading patterns. The increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. The alteration of grading patterns would direct stormwater runoff from its existing path of travel to different locations.

Development within the Planning Area would be required to adhere to the grading plan check process of the City of Fresno Building and Safety Services Division. The grading plan check process ensures that developments properly grade developments in accordance with the California Building Code, the Storm Drainage Master Plan, and the Construction General Permit. Development within the watersheds tributary to the Planning Area that are within the County of Fresno or the City of Clovis are also required to adhere to the grading plan check process of those entities. These processes ensure that the developments within the areas tributary to the Planning Area properly grade the developments in accordance with their respective ordinances, the Fresno Metropolitan Flood Control District's Storm Drainage Master Plan, the Construction General Permit, and any other permits that are required to alter streams or irrigation canals.

As discussed previously, FMFCD is responsible for developing and implementing the Storm Drainage Master Plan for the City of Fresno. The implementation of the Plan would reduce the potential for erosion and siltation because the storm drainage infrastructure would convey stormwater to retention and urban detention basins where silt could be deposited on the bottom of the basins. Discharges from the retention basins and the urban detention (water quality) basins should not increase sedimentation in receiving waters.

As a result of the grading permit processes, the implementation of the Phase 1 MS4 NPDES Permit and the FMFCD Storm Drainage Master Plan, less than significant cumulative long-term project impacts associated with erosion or sedimentation would occur within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and long-term impacts are considered to be less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Drainage Pattern: Flooding

Impact HYD-4	**The project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.**

Project Specific Impact Analysis

Short-Term Construction Impacts

Construction activities associated with buildout of the Planning Area in accordance with the General Plan Update would result in ground-disturbing activities such as grading, excavation, placing fill, trenching, spoil pile storage, and backfilling of trenches. Such earthmoving activities would change existing surface drainage patterns and increase the potential for flooding, particularly during storm events. While temporary, ground-disturbing construction activities that significantly compact the development site soils could increase runoff rates and volumes that could result in flooding on the construction site or off of the construction site.

Development within the Planning Area could propose the realignment of an existing stream or canal. The construction activity to realign the stream or canal could result in the alteration of drainage patterns that could result in flooding on or off of the construction site.

There are regulatory mechanisms in place that would reduce the effects of construction activities on drainage patterns that would result in flooding on or off of the construction site:

- The City of Fresno grading plan check process (City of Fresno, 2013)
- The Fresno Metropolitan Flood Control District Storm Drainage Master Plan
- The National Pollutant Discharge Elimination System (NPDES) Construction General Permit (State Water Resources Control Board, 2013)

A discussion of each of these regulatory mechanisms is provided in Impact HYD-3, above. Compliance with these required mechanisms would reduce project construction impacts on grading patterns and flooding on and off of the construction site to less than significant.

Long-Term Project Impacts

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would re-grade undeveloped land to new grading patterns, may propose to alter the alignments of existing creeks, streams, or irrigation canals, and would increase impervious surfaces that would increase stormwater runoff rates and volumes. Higher runoff rates and greater volumes of stormwater runoff would increase the potential for flooding of the development site and off site locations. Since the FMFCD is responsible for developing and implementing the Storm Drainage Master Plan for the City of Fresno, the FMFCD works with the developers and the City to implement the storm drainage system to collect and dispose of the increased runoff rates and volumes and prevent flooding as the result of the development and grading of land. The storm drainage systems that are implemented for the Planning Area consist of streets, curbs and gutters that direct runoff to storm drain inlets, which direct runoff to underground pipelines. The underground pipelines convey stormwater to retention and urban detention (water quality) basins located at strategic locations within the Planning Area. The stormwater retention basins dispose of runoff through percolation into the groundwater and, in emergencies, through pumping to designated irrigation canals. The urban detention (water quality) basins discharge to the San Joaquin River.

As development occurs under the General Plan Update, the grading permit process is required to be followed. This process would reduce the potential for long-term flooding impacts to less than significant. Additionally, the General Plan Update includes the following policies designed to reduce flooding impacts:

Noise and Safety Element

Objective NS-3: Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

Policy NS-3-a: Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

Policy NS-3-b: Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-h: Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property..

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Along with the grading plan check process, implementation of the aforementioned General Plan Update polices would reduce long-term project flooding impacts associated with alteration of grading patterns of creeks or streams to less than significant levels.

Cumulative Impact Analysis

Short-Term Construction Impacts

Cumulative impacts from on-site and off-site flooding due to alteration of existing grading patterns or streams and irrigation canals could result from construction activities that occur both within the Planning Area and outside of the Planning Area. Buildout of the Planning Area, along with construction of related projects beyond the Planning Area vicinity, would result in activities that could result in on- and off site flooding, particularly ground-disturbing activities that would increase the compaction of the natural ground and alter existing grading patterns. Increased stormwater runoff due to construction activities would be temporary, but these activities could still result in on- and off-site flooding that could ultimately result in cumulative impacts. Alteration of grading patterns would be created by short-term construction projects, but would be long-term in effect.

Construction of projects within the Planning Area, whether within the City limits or within Fresno County (which would be required to annex to the City) would comply with the requirements of the City of Fresno grading plan check process. This process includes preparation of grading plans, review and approval of the grading plan for conformance with the Storm Drainage Master Plan, and the requirement to drain to permanent Fresno Metropolitan Flood Control District storm drainage master plan facilities or provide temporary stormwater runoff facilities if the permanent facilities are not available. Construction projects outside of the Planning Area, but within the watersheds of streams, canals or storm drainage systems tributary to the Planning Area would be required to obtain City of Clovis or the County of Fresno grading permits to develop. The permitting process requires that a grading plan be prepared and reviewed for approval. In Fresno County, this process includes the requirement to provide erosion control measures for unstabilized ground, and construction of drainage retention basin or basins to store runoff. (County of Fresno, 2011). In the City of Clovis, the grading permit process requires that a grading plan be prepared, reviewed, and approved by the Fresno Metropolitan Flood Control District for conformance with the Storm Drainage Master Plan. In addition, FMFCD also ensures that appropriate erosion control measures be implemented and that the development drains to permanent FMFCD storm drainage master plan

facilities or to temporary storm drainage facilities (Smith, 2013). In all permitting processes, the need for additional permits that are required to alter the alignment of a stream or canal are verified.

As a result, no cumulative short-term construction impacts associated with on or off site flooding would occur within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and short-term impacts are considered to be less than significant.

Long-Term Impacts

Buildout of the Planning Area and development within watersheds that are tributary to the Planning Area, but not a part of the Planning Area, would increase the amount of paved impervious surfaces and alteration of grading patterns. The increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. The alteration of grading patterns would direct stormwater runoff from its existing path of travel to different locations.

Development within the watersheds or drainage areas tributary to the Planning Area that are within the County of Fresno or the City of Clovis are also required to adhere to the grading plan check process of those entities. These processes ensure that the developments within the areas tributary to the Planning Area properly grade the developments in accordance with their respective ordinances, the Fresno Metropolitan Flood Control District's Storm Drainage Master Plan, the Construction General Permit, and any other permits that are required to alter streams or irrigation canals. Compliance with these requirements would reduce potential cumulative flooding impacts to less than significant. Since development associated with the proposed project would require compliance with the City's grading plan check process to reduce potential flooding impacts, the project's contribution to cumulative flooding impacts is less than cumulatively considerable and therefore, less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Runoff Water and Drainage Systems

Impact HYD-5 **The project could create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.**

Project Specific Impact Analysis

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would re-grade undeveloped land to new grading patterns and would increase impervious surfaces that would increase stormwater runoff rates and volumes. Redevelopment of existing land uses, such as changing a residential land use area to a multi-family land use area, which has a greater level of imperviousness, will also increase stormwater runoff rates and volume. Increased runoff rates and greater volumes of stormwater runoff could exceed the capacity of existing or planned stormwater drainage systems or could increase polluted runoff FMFCD's Storm Drainage Master Plan divides the Planning Area into a number of drainage areas or urban watersheds. Each drainage area has its own Master Planned pipeline collection system and retention or urban detention basin. One hundred thirty (130) master planned drainage areas are completely or partially within the Planning Area. Three of the master planned drainage areas have collection systems, but do not have retention basins. The disposal of stormwater from these drainage areas occurs by pumping the stormwater directly into a nearby irrigation canal. Eight of the master planned drainage areas discharge to the San Joaquin River. One drainage area discharges directly to the river. Seven discharge to the river from urban detention (water quality) basins. The storm drainage master plan for the proposed Southeast Growth Area has been developed to a preliminary state. Final master planning will be completed when the General Plan Update process has been approved.

The storm drainage master plan is used to develop costs for the proposed facilities that are used to develop drainage fees. The drainage fees are paid by project proponents at the time they obtain entitlements. The fees are used to pay for the cost of constructing the Master Plan pipeline collection and obtaining land and constructing retention or urban detention basin disposal facilities within each drainage area.

The potential impacts on the existing storm drain facilities from the buildout of the land use identified in the General Plan Update are identified below. These impacts are categorized as impacts that would occur with the buildout of the current 2025 General Plan land uses. After determining the potential impacts that would occur from 2025 General Plan land uses, an evaluation of potential additional impacts from the development of full buildout under the General Plan Update was assessed. The two separate evaluations identify the potential impacts that would occur from full buildout of the General Plan Update compared to existing conditions.

Existing Condition to 2025 General Plan

Runoff Rates and Volumes

The buildout of the Fresno metropolitan area to the 2025 General Plan would result in the development of permeable land uses such as farming or vacant land to impervious land uses such as residential, multifamily residential, commercial, and industrial. Conversion of land to more

impervious land uses that are unmitigated, always results in higher peak stormwater runoff rates and greater volumes of runoff from that land. Where development is an infill condition, such as within existing urbanized areas, master planned storm drainage facilities are generally available and are designed to provide service to the site as long as the development is consistent with the 2025 General Plan land uses. There are locations within the urbanized area where master planned storm drainage facilities are not fully available and runoff from the proposed developments would exceed the ability of existing storm drainage facilities to provide service to the developments. Likewise, there may be cases where the proposed development would result in a greater level of imperviousness than what was planned in the Storm Drainage Master Plan. In these cases, the stormwater runoff from the proposed development would exceed the ability of the existing storm drainage facilities to provide service to the developments.

Much of the area that is planned to be developed within the non-urbanized Planning Area has been master planned for storm drainage, such as the non-urbanized areas have been divided into drainage areas, master plan grading patterns have been documented, and the collection systems and retention basins have been located and sized. In most cases, the retention basins sites for the planned drainage areas have been purchased by FMFCD, but have not been excavated, and there are no existing storm drainage collection systems in place due to the low level of development. The existing storm drainage facilities in these areas consist of roadside drainage swales that follow the natural gradient of the land and they convey and store the runoff from the roadway only. The increased stormwater runoff rates and volumes from development projects within these areas would exceed the capacity of these existing facilities. The master planned storm drainage facilities are designed to collect, convey, and dispose of the runoff from the planned land uses for the 2025 General Plan at full buildout.

One hundred-nineteen drainage areas have projected increases in imperviousness due to the planned land uses in the 2025 General Plan. The drainage areas are illustrated in Appendix B of Appendix G-1. The increase in imperviousness is expressed in Appendix G-1 as increases in equivalent area (CA). Ninety drainage areas will have increases in imperviousness that are equal to or exceed 5 percent. The change in planned land use in the 90 drainage areas would significantly exceed the capacity of the existing drainage collection facilities in these drainage areas, and therefore, would result in potential significant impacts on the existing drainage collection facilities. The change in the planned land use for the remaining 29 drainage areas are not expected to exceed the capacity of the existing drainage collection facilities as the change in imperviousness is projected to be less than five percent. The 119 drainage areas are listed in Table 3 in Appendix G-1. The table is sorted from least to greatest change in imperviousness expressed as change in equivalent area (CA) by percent from the Existing Condition to the 2025 General Plan.

Of the 119 drainage areas that have projected increases in imperviousness, 37 drainage areas are projected to have increases that will result in runoff volumes that would exceed the design capacity of the retention basins for those drainage areas. These exceedances would result in potential significant impacts on the storage capacities of the retention basins. There are 82 drainage areas in which the increases in land uses would not affect the storage capacity provided by the retention

basins. The 37 basins are listed in Table 3 in Appendix G-1. The table is sorted from greatest to least storage deficit in the retention basin design capacity.

Three drainage areas that have urban detention basins that are projected to have increases in imperviousness expressed at equivalent area (CA) in Appendix G-1. The increases are 1.1 percent for Drainage Area DG, 12 percent for Drainage Area DK, and 13 percent for Drainage Area DI. The change in land use could have a significant impact on the weir overflow rates and residence times provided by the detention basins in Drainage Areas DK and DI.

Three drainage areas have pump systems for disposal of stormwater. Of the three drainage areas, Drainage Areas: WW and UU1 have projected increases in imperviousness that could exceed the capacity of the existing pump station. This exceedance would be a significant impact. Drainage Area WW has a projected increase in imperviousness of 4 percent and Drainage Area UU1 has a projected increase of 10 percent.

Sources of Polluted Runoff

The change in land uses from the Existing Condition to the 2025 General Plan would substantially increase the sources of pollution in stormwater runoff by converting undeveloped, agricultural uses to urban uses. The increase in sources would result from the increased number of landowners and uses that would occur within the Planning Area.

Typically, stormwater runoff from urban development contains an array of constituents, including automotive fluids (e.g., fuel, oils, and antifreeze), combustion and exhaust byproducts (e.g., lead, cadmium, and nickel), sediments, fertilizers, pesticides, herbicides, and nutrients and bacteria pollutants from domestic and agricultural animal waste. These constituents are expelled into the environment throughout the year, where they settle onto the ground surface. During the wet season, stormwater runoff conveys these pollutants downstream, resulting in polluted stormwater runoff, especially during the first storm events of the season.

The City of Fresno is a co-permittee with the Fresno Metropolitan Flood Control District, the County of Fresno, the City of Clovis, and California State University Fresno in the Phase 1 NPDES Permit for Stormwater Discharges From Municipal Separate Storm Sewer Systems (MS4s). This Phase 1 MS4 Permit requires that the City and its co-permittees implement water quality and watershed protection measures for all development projects. The waste discharge requirements contained in the NPDES Permit have been designed to be consistent with the water quality standards and goals established in the Central Valley RWQCB's Basin Plan. The Phase 1 MS4 Permit prohibits discharges from violating applicable water quality standards or creating a nuisance or water quality impairment in receiving waters. Participation in the Phase 1 MS4 permit and implementation of the Storm Drainage Master Plan would reduce impacts to surface waters to acceptable levels, and long-term project impacts to surface or groundwater quality would not exceed acceptable levels.

Additionally, the General Plan Update includes the following policies designed to reduce impacts on the capacities of existing storm drain facilities and reduce water quality impacts:

Noise and Safety Element

Policy NS-3-a: Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

Policy NS-3-b: Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-h: Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Parks, Open Space, & Schools Element

POSS-6-b: Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Avoid discharge of runoff from urban uses to the San Joaquin River or other riparian corridors.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas only upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. Institute remedial measures promptly if unacceptable levels of contaminant(s) occur.

Along with preparation, implementation, and participation of the NPDES Permit, implementation of the aforementioned General Plan Update polices would reduce long-term project impacts associated with significant impacts on the capacities of existing storm drain facilities and reduce potential storm water quality to less than significant.

2025 General Plan to General Plan Update

Runoff Rates and Volume

The land use changes between the 2025 General Plan to the General Plan Update are projected to increase the imperviousness in 39 drainage areas over the increase in the Existing Condition to 2025 General Plan. Of these 39 drainage areas, 10 would have projected increases in imperviousness that would exceed the capacity of the storm drainage collection systems. The change in land use is not projected to increase imperviousness to the point where the capacity of the storm drainage collection systems would be exceeded for 29 drainage area collection systems. The 39 drainage areas are listed in Table 4 of Appendix G-1. The table is sorted from least to greatest change in imperviousness expressed at equivalent area (CA) by percent from the 2025 General Plan to the General Plan Update.

The land use changes between the 2025 General Plan to the General Plan Update would reduce the number of drainage areas retention basins that are impacted by increases in imperviousness from 37 to 35. Three drainage areas, CH, L, and P would no longer have storage deficits. Drainage Area U would, however, experience a deficit in storage capacity due to land use changes to the drainage area from the 2025 General Plan land uses to the General Plan Update land uses. Therefore, the project would significantly impact the storage capacity of the retention basins in Drainage Area U. The information for the retention basin in Drainage Area U is provided in Table 4 in Appendix G-1.

Two drainage areas that have urban detention basins are projected to have increases in imperviousness. The increases are small, ranging from 0.6 percent for Drainage Area EK to 1 percent for Drainage Area DG and are projected to have a less than significant impact on the overflow weir rates or residence times in the detention basins.

Of the three drainage areas that have pump systems for disposal of stormwater, only one, Drainage Area VV has a projected increase in imperviousness. The projected increase is 10.7 percent, which could result in stormwater runoff rates exceeding the pump station capacity of the Drainage Area VV pump system. This potential exceedence would be a significant impact on the capacity of the pump station.

Sources of Polluted Runoff

The change in land uses from the 2025 General Plan to the General Plan Update would not substantially increase the sources of pollution in stormwater runoff, as the Planning Area boundaries are identical. Therefore, along with preparation, implementation, and participation of the NPDES Permit, implementation of the aforementioned General Plan Update polices would reduce project specific impacts on water quality associated with the significant increase in stormwater runoff to less than significant.

Cumulative Impact Analysis

Five drainage areas, DN, CZ, Q, T and BU have watershed area and drainage systems that convey runoff that originates outside of the Planning Area into the Planning Area. Drainage Areas CZ, Q, and T straddle the Planning Area boundary and are partially within the City of Fresno and partially within the City of Clovis sphere of influence (City of Clovis, 2013). Drainage Area DN is partially within

Fresno County's planning area (Mintier Harnish, 2013). Two drainage areas, CL and BW have watershed area and drainage systems that convey runoff that originates within the Planning Area out of the Planning Area and into the City of Clovis sphere of influence. Changes to the land uses within the portions of the drainage areas that are outside of the Planning Area could result in changes to runoff rates and volumes that exceed the capacity of existing or planned stormwater drainage systems. This potential exceedence would be a significant cumulative impact. Since the proposed project would result in potential significant impacts on the capacities of existing storm drain facilities, the project's contribution to potential cumulative impacts on the capacities of stormwater facilities would be considerable and a significant cumulative impact.

Buildout of the Planning Area, along with construction and operation of related projects in the Planning Area vicinity, would increase the amount of paved impervious surfaces within the Planning Area. This increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. This increase in runoff would have the potential to increase the amount of polluted runoff; however, all development projects within the Fresno-Clovis area would be required to comply with the MS4 Permit that requires the implementation of water quality and watershed protection measures. Compliance with the MS4 Permit would reduce potential impacts from cumulative projects to less than significant. Since the development under the proposed project would also need to comply with the MS4 Permit and includes specific General Plan Update policies identified above, the project's contribution to potential cumulative impacts would not be considerable, and the project would result in a less than significant cumulative impact.

Mitigation Measures

Project Specific

MM HYD-5.1 The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan collection systems to less than significant.

- Implement the existing Storm Drainage Master Plan (SDMP) for collection systems in drainage areas where the amount of imperviousness is unaffected by the change in land uses.
- Update the SDMP in those drainage areas where the amount of imperviousness increased due to the change in land uses to determine the changes in the collection systems that would need to occur to provide adequate capacity for the stormwater runoff from the increased imperviousness.
- Implementation of the updated SDMP to provide stormwater collection systems that have sufficient capacity to convey the peak runoff rates from the areas of increased imperviousness.
- Require developments that increase site imperviousness to install, operate, and maintain FMFCD approved on-site detention systems to reduce the peak runoff rates resulting from the increased imperviousness to the peak runoff rates that will not exceed the capacity of the existing stormwater collection systems.

MM HYD-5.2 The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan retention basins to less than significant.

- Update the SDMP to analyze the impacts to existing and planned retention basins to determine remedial measures required to reduce the impact on retention basin capacity to less than significant. Remedial measures would include:

  1. Increase the size of the retention basin through the purchase of more land or deepening the basin or a combination for planned retention basins.
  2. Increase the size of the emergency relief pump capacity required to pump excess runoff volume out of the basin and into adjacent canal that convey the stormwater to a disposal facility for existing retention basins.
  3. Require developments that increase runoff volume to install, operate, and maintain, Low Impact Development (LID) measures to reduce runoff volume to the runoff volume that will not exceed the capacity of the existing retention basins.

MM HYD-5.3 The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan urban detention (stormwater quality) basins to less than significant.

- Updating the SDMP to determine the impacts to the urban detention basin weir overflow rates and determine remedial measures required to reduce the impact on the detention basin capacity to less than significant. Remedial measures would include:

  1. Modify overflow weir to maintain the suspended solids removal rates adopted by the FMFCD Board of Directors.
  2. Increase the size of the urban detention basin to increase residence time by purchasing more land. The existing detention basins are already at the adopted design depth.
  3. Require developments that increase runoff volume to install, operate, and maintain, Low Impact Development (LID) measures to reduce peak runoff rates and runoff volume to the runoff rates and volumes that will not exceed the weir overflow rates of the existing urban detention basins.

MM HYD-5.4 The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan pump disposal systems to less than significant.

1. Update the SDMP to determine the extent and degree to which the capacity of the existing pump system will be exceeded.

2. Require new developments to install, operate, and maintain FMFCD design standard on-site detention facilities to reduce peak stormwater runoff rates to existing planned peak runoff rates.
3. Provide additional pump system capacity to maximum allowed by existing permitting to increase the capacity to match or exceed the peak runoff rates determined by the SDMP update.

MM HYD-5.5 The City shall develop and adopt a storm drainage master plan update to the SDMP for the Southeast Growth Area that is designed to collect, convey and dispose of runoff rates and volumes based on the planned land uses of the General Plan Update.

Cumulative

Implementation of Mitigation Measures HYD-5.1 through HYD-5.5 shall be implemented.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Water Quality

Impact HYD-6 The project would not otherwise substantially degrade water quality.

Project Specific Impact Analysis

See water quality discussion under Impact HYD-1. As discussed, short-term construction impacts on water quality would be less than significant with the required preparation, implementation, and participation with the Construction General Permit, including the SWPPP and BMPs. Long-term impacts to surface water and groundwater would be less than significant with participation in the Phase 1 MS4 permit and implementation of the Storm Drainage Master Plan. Additionally, the General Plan Update includes various policies to reduce water quality impacts.

Cumulative Impact Analysis

See water quality discussion under Impact HYD-1. As discussed, the project's contribution to cumulative short-term construction and cumulative long-term operation impacts on water quality would not be considerable because the project would be required to comply with the NPDES Construction General Permit program and the MS4 Permit to reduce impacts to water quality. Therefore, the project would result in less than cumulative significant water quality impacts.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Housing Placement: Flood Hazard Area

Impact HYD-7	**The project would not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.**

Project Specific Impact Analysis

Development of housing in floodplains places those homes in danger of repeated flooding from sources of flooding. The sources of flooding include the San Joaquin River and a number of foothill creeks that flow into the Planning Area. These include Big Dry Creek and its associated Dry Creek Canal, Redbank Creek, and Fancher Creek. Pup Creek, Alluvial Drain, and Dog Creek are tributaries of these three main creeks. Big Dry Creek is regulated by the Big Dry Creek Dam and Reservoir. Fancher Creek is regulated by Fancher Creek Dam and Fancher Creek Detention Basin. Redbank Creek is regulated by Redbank Dam and Redbank Creek Detention Basin.

The San Joaquin River forms the northern boundary of the Planning Area as well as the northern boundary of Fresno County, in this area. The San Joaquin River is regulated by Friant Dam, which creates Millerton Lake reservoir. The dam was constructed in 1942 to provide flood control to the San Joaquin River and to harvest runoff from the San Joaquin River for irrigation purposes. The dam is administered by the US Bureau of Reclamation.

Big Dry Creek Dam, located north of Shepherd Avenue on the DeWolf Avenue alignment was originally constructed in 1948 by the U.S. Army Corps of Engineers to protect the Cities of Clovis and Fresno from this significant source of flooding. The dam was enlarged in 1993 by the U.S. Army Corps of Engineers as part of the Redbank and Fancher Creek Flood Control Project to provide protection to the communities from the probable maximum flood event from Big Dry Creek. The dam is administered by the Fresno Metropolitan Flood Control District. The Redbank Creek Dam, located on the north side of East Shaw Avenue on the North Indianola Avenue alignment, was constructed in 1961 by the Fresno Metropolitan Flood Control District to reduce flood damage to the City of Fresno resulting from Redbank Creek. The dam and reservoir provide a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection for the

community. However, the dam does not control significant inflow to Redbank Creek below the dam. Therefore, the U.S. Army Corps of Engineers constructed the Redbank Creek Detention Basin in 1990, which is located north of East McKinley Avenue and on the west side of North DeWolf Avenue. The Redbank Detention Basin provides the community with a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection. Fancher Creek Dam located at the intersection of East Bullard Avenue alignment and North Newmark Avenue alignment, and along the east side of the Friant Kern Canal, was constructed by the U.S. Army Corps of Engineers in 1991. It provides protection to the community for the 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection on Fancher Creek upstream of the Friant Kern Canal. Significant watershed exists on Fancher Creek below the dam, which could still produce significant flood flows in Fancher Creek. Therefore, the Fresno Metropolitan Flood Control District constructed the Fancher Creek Detention Basin in 2002. The detention basin provides the community with a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection.

The City of Fresno has participated in the Federal Emergency Management Agency (FEMA) Flood Insurance Program (FIP) since its inception in the early 1970's. Participation on the FIP requires that the community adopt the Flood Insurance Rate Maps (FIRMs), appoint a trained Floodplain Administrator, adopt a floodplain ordinance modeled after the FIP model ordinance, and enforce the ordinance and the requirements of Title 40 of the Code of Federal Regulations, Part 60. The 40CFR60 regulations and the floodplain ordinance of the City of Fresno require that all new construction and substantial reconstruction of buildings located within an adopted floodplain be flood proofed and that the Community Floodplain Administrator review for conformance with the floodplain ordinance and 40CFR60, and approve the flood proofing. The City of Fresno has a Community Floodplain Administrator and has adopted a floodplain ordinance that complies with the model ordinance promulgated by FEMA.

FEMA has prepared and the City of Fresno has adopted the Flood Insurance Rate Maps (FIRMs) for the Planning Area. The effective FIRM maps were last revised February 18, 2009. Numerous Letters of Map Revision (LOMRs) have been issued since that revision date. The FIRMS show portions of the Planning Area are within numbered and un-numbered Special Flood Hazard Area (SFHA) Zone A. SFHA Zone A means that these areas are within the floodplain of the base flood or 1 percent exceedence probability flood event. The 1 percent exceedence probability flood event is also known as the 100-year recurrence interval flood event (see Exhibit 5.9-1).

The SFHA zone A areas within the Planning Area are located below the bluff line of the San Joaquin River; along Redbank Creek between the Planning Area boundary and Redbank Detention Basin (North DeWolf Avenue and East Clinton Avenue alignment); northeast of State Route 99 between Ventura Avenue on the north, East Jensen Avenue on the south and South Orange Avenue on the east; and north of West Central Avenue between South Walnut Avenue and South East Avenue.

Developing within these areas would require flood proofing the development in accordance with the City of Fresno floodplain ordinance and 40CFR60. Existing housing within these areas would be required to flood proof at such time as significant reconstruction of the housing occurs. Significant

reconstruction is defined as improving the house to a value that meets or exceeds 50 percent of its assessed value.

Additionally, the General Plan Update includes the following policies designed to reduce flood hazards to housing.

Noise and Safety Element

Objective NS-3: Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

Policy NS-3-a: Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

Policy NS-3-b: Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

Policy NS-3-f: Flooding Emergency Response Plans: Work with responsible agencies to update emergency dam failure inundation plans, evacuation plans and other emergency response plans for designated flood-prone areas, including the San Joaquin riverbottom.

Policy NS-3-h: Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Policy NS-3-j: National Federal Flood Insurance Program. Continue to participate in the National Flood Insurance Program (NFIP) by ensuring compliance with applicable requirements. Review NFIP maps periodically to determine if areas subject to flooding have been added or removed and make adjustments to the Land Use Diagram Figure LU-1.

Policy NS-3-k: 100-Year Floodplain Policy. Require developers of residential subdivisions to preserve those portions of development sites as open space that may be subject to 100-year flood events, unless the flood hazard can be substantially mitigated by development project design.

Policy NS-3-l: 200-Year Floodplain Protection. Promote flood control measures that maintain natural conditions within the 200-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Discourage construction of permanent improvements that would be adversely affected by periodic floods within the 200-year floodplain, particularly in the San Joaquin riverbottom.

Policy NS-3-m: Flood Risk Public Awareness. Continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation. Remind households and businesses located in flood-prone areas of opportunities to purchase flood insurance.

Along with the Flood Plain Ordinance, implementation of the aforementioned General Plan Update policies would reduce project impacts associated with housing located in a 100-year flood hazard area to less than significant.

Cumulative Impact Analysis

The City of Fresno, the City of Clovis, and the County of Fresno are participants in the FIP and have adopted the FEMA FIRMs. Each has adopted floodplain ordinances that conform to the model floodplain ordinance promulgated by FEMA and have appointed Community Floodplain Administrators to review and approve proposed developments within proposed floodplains in conformance with the floodplain ordinances and 40CFR60 (City of Clovis) (County of Fresno, 2011).

The City of Clovis has adopted the following polices regarding development in floodplains in the City's 1993 General Plan (DCE The Planning Center, 1993):

Policy 1.1: Minimize risks of personal injury and property damage associated with natural hazards.

Policy 1.2: Provide flood protection for existing development and for areas planned for new development.

Policy 1.3: Utilize the unprotected 100-year floodplain for low density uses such as agriculture, open space, recreation, and for reclaiming water and wetlands.

The County of Fresno has adopted the following policies regarding development in floodplains in the 2000 General Plan Policy Document (County of Fresno, 2000):

Policy HS-A.3: The County shall ensure that the siting of critical emergency response facilities such as hospitals, fire stations, sheriffs' offices and substations, dispatch centers, emergency operations centers, and other emergency service facilities and utilities are sited and designed to minimize their exposure and susceptibility to flooding, seismic and geological effects, fire, avalanche, and explosions as required by State regulations. Exception to this policy shall be allowed on the condition that the only alternative location would be so distant as to jeopardize the safety of the community, given that precautions are taken to protect the facility.

Policy HS-C.1: The County shall encourage the Fresno Metropolitan Flood Control District to control stormwater flows originating in the streams of the Fresno County Stream Group, generally located east and north of the Fresno-Clovis urban area, by dams or other storage means prior to entering the Fresno-Clovis Metropolitan area.

Policy HS-C.2: The County shall require that the design and location of dams and levees be in accordance with applicable design standards and specifications and accepted design and construction practices.

Policy HS-C.3: The County shall promote a floodplain management approach in flood hazard areas that are presently undeveloped by giving priority to regulation of land uses over development of structural controls as a method of reducing flood damage.

Policy HS-C.4: The County shall encourage the performance of appropriate investigations to determine the 100-year water surface elevations for the San Joaquin River, taking into account recent storm events and existing channel conditions, to identify the potential extent and risk of flooding. New development, including public infrastructure projects, shall not be allowed along the river until the risk of flooding at the site has been determined and appropriate flood risk reduction measures identified.

Policy HS-C.5: Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis.

Policy HS-C.6: The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Existing irrigation canals shall be used to the extent possible to remove excess stormwater. Retention-recharge basins should be located to best utilize natural drainage patterns.

Policy HS-C.7: The County shall continue to participate in the Federal Flood Insurance Program by ensuring compliance with applicable requirements.

Policy HS-C.8: During the building permit review process, the County shall ensure project compliance with applicable Federal Emergency Management Agency (FEMA) standards pertaining to residential and non-residential development in the floodplain, floodway, or floodway fringe.

Policy HS-C.9: The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy HS-C.10: The County shall require that all placement of structures and/or flood proofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy HS-C.11: The County shall encourage open space uses in all flood hazard areas. Land Conservation contracts, open space and scenic easements should be made available to property owners.

Policy HS-C.12: The County shall consider dam failure inundation maps of all reservoirs in making land use and related decisions.

Policy HS-C.13: The County shall continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation.

The participation of the Cities of Fresno, Clovis, and Fresno County in the FIP, their adoption of floodplain ordinances, and the implementation of their respective General Plan policies will not place housing that is not flood proofed within documented 100-year floodplains as mapped by the FIP FIRMs and as a result, no cumulative long-term project impacts associated with placing housing in floodplains would occur. Therefore, implementation of the General Plan Update would not be cumulatively considerable, and the impacts would be considered less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impacts.

Cumulative

Less than significant impacts.

Structures: Flood Hazard Area

Impact HYD-8	**The project would not place within a 100-year flood hazard area structures which would impede or redirect flood flows.**

Project Specific Impact Analysis

Placing structures in floodplains puts those structures in danger of repeated flooding from sources of flooding. The sources of flooding within the Planning Area include the San Joaquin River and a number of foothill creeks that flow into the Planning Area. These include Big Dry Creek and its associated Dry Creek Canal, Redbank Creek, and Fancher Creek. Pup Creek, Alluvial Drain, and Dog Creek are tributaries of these three main creeks. Big Dry Creek is regulated by the Big Dry Creek Dam and Reservoir. Fancher Creek is regulated by Fancher Creek Dam and Fancher Creek Detention Basin. Redbank Creek is regulated by Redbank Dam and Redbank Creek Detention Basin.

As discussed in Impact HYD-7, the San Joaquin River is regulated by Friant Damto provide flood control to the San Joaquin River and to harvest runoff from the San Joaquin River for irrigation purposes. Big Dry Creek Dam protects the Cities of Clovis and Fresno from significant sources of flooding. The dam and reservoir provide a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection for the community. The Redbank Detention Basin provides the community with a 0.5 percent exceedence probability Fancher Creek Dam also provides protection to the community for the 0.5 percent exceedence probability. The Fancher Creek Detention Basin also provides the community with a 0.5 percent exceedence probability.

Title 40 of the Code of Federal Regulations, Part 60 regulations and the floodplain ordinance of the City of Fresno require that placement and flood provision structures within a floodplain not result in a cumulative change in the floodplain water surface that exceeds one foot. In addition, the regulations under 40CFR60 do not allow placement of structures within a regulatory floodway unless that placement will not result in any increase in the floodplain water surface elevation, meaning that there is no displacement or redirection of the floodway. The City's floodplain ordinance requires that a registered Civil Engineer in the State of California certify that no displacement of floodwater will result from the flood proofing of a structure within a floodplain or a regulatory floodway.

Additionally, the General Plan Update includes the following policies designed to reduce flood hazards to structures.

Noise and Safety Element

Objective NS-3: Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

Policy NS-3-a: Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

Policy NS-3-g: Essential Facilities Siting Outside of Floodplains. Avoid siting emergency response and essential public facilities, such as fire and police stations, within a 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy NS-3-h: Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of

approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Policy NS-3-j: National Federal Flood Insurance Program. Continue to participate in the National Flood Insurance Program (NFIP) by ensuring compliance with applicable requirements. Review NFIP maps periodically to determine if areas subject to flooding have been added or removed, and make adjustments to the Land Use Diagram Figure LU-1.

Policy NS-3-k: 100-Year Floodplain Policy. Require developers of residential subdivisions to preserve those portions of development sites as open space that may be subject to 100-year flood events, unless the flood hazard can be substantially mitigated by development project design.

Policy NS-3-l: 200-Year Floodplain Protection. Promote flood control measures that maintain natural conditions within the 200-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Discourage construction of permanent improvements that would be adversely affected by periodic floods within the 200-year floodplain, particularly in the San Joaquin riverbottom.

Policy NS-3-m: Flood Risk Public Awareness. Continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation. Remind households and businesses located in flood-prone areas of opportunities to purchase flood insurance.

Along with the Flood Plain Ordinance, implementation of the aforementioned General Plan Update policies would reduce project impacts associated with structures located in a 100-year flood hazard area to less than significant.

Cumulative Impact Analysis

The City of Fresno, the City of Clovis, and the County of Fresno are participants in the FIP and have adopted the FEMA FIRMs. They have adopted floodplain ordinances that conform to the model floodplain ordinance promulgated by FEMA and have appointed Community Floodplain Administrators to review and approve proposed developments within proposed floodplains in conformance with the floodplain ordinances and 40CFR60 (City of Clovis) (County of Fresno, 2011). These floodplain ordinances require that flood proofing of structures does not divert or displacement of floodwater within a floodplain so as to increase the size of the floodplain.

The City of Clovis has adopted the following polices regarding development in floodplains in the City's 1993 General Plan (DCE The Planning Center, 1993):

Policy 1.1: Minimize risks of personal injury and property damage associated with natural hazards.

Policy 1.2: Provide flood protection for existing development and for areas planned for new development.

Policy 1.3: Utilize the unprotected 100-year floodplain for low density uses such as agriculture, open space, recreation, and for reclaiming water and wetlands.

The County of Fresno has adopted the following policies regarding development in floodplains in the 2000 General Plan Policy Document (County of Fresno, 2000):

Policy HS-C.3: The County shall promote a floodplain management approach in flood hazard areas that are presently undeveloped by giving priority to regulation of land uses over development of structural controls as a method of reducing flood damage.

Policy HS-C.4: The County shall encourage the performance of appropriate investigations to determine the 100-year water surface elevations for the San Joaquin River, taking into account recent storm events and existing channel conditions, to identify the potential extent and risk of flooding. New development, including public infrastructure projects, shall not be allowed along the river until the risk of flooding at the site has been determined and appropriate flood risk reduction measures identified.

Policy HS-C.5: Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis.

Policy HS-C.6: The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Existing irrigation canals shall be used to the extent possible to remove excess stormwater. Retention-recharge basins should be located to best utilize natural drainage patterns.

Policy HS-C.7: The County shall continue to participate in the Federal Flood Insurance Program by ensuring compliance with applicable requirements.

Policy HS-C.8: During the building permit review process, the County shall ensure project compliance with applicable Federal Emergency Management Agency (FEMA) standards pertaining to residential and non-residential development in the floodplain, floodway, or floodway fringe.

Policy HS-C.9: The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy HS-C.10: The County shall require that all placement of structures and/or flood proofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy HS-C.11: The County shall encourage open space uses in all flood hazard areas. Land Conservation contracts, open space and scenic easements should be made available to property owners.

The participation of the Cities of Fresno, Clovis, and Fresno County in the FIP, their adoption of floodplain ordinances, and the implementation of their respective General Plan policies would not result in structures diverting or displacing floodwater. As a result, no cumulative long-term project impacts associated with structures in floodplains would occur, and therefore, implementation of the General Plan Update would not be cumulatively considerable. Thus, the proposed project would result in a less than significant cumulative impact.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant.

Cumulative

Less than significant.

Flooding

Impact HYD-9	**The project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.**

Project Specific Impact Analysis

Development could occur within flood inundation areas where a dam or levee failure could place structures and people at risk of damage, injury and death due to the sudden nature of the release of floodwater during a failure and the resulting depths and velocities of the floodwater. Sources of flooding due to the failure of a dam or levee within the Planning Area include the San Joaquin River floodplain as a result of the failure of Friant Dam, the Redbank Creek floodplain as a result of the failure of Redbank Creek Detention Basin Dam and levee, and the Fancher Creek floodplain as a result of the failure of Fancher Creek Detention Basin Dam and levee.

Annual inspections of the dams and detention basins are conducted by FMFCD personnel and by DSOD personnel of each jurisdictional dam and detention facility. Annual inspection by the U.S. Army Corps of Engineers and FMFCD are conducted of each facility constructed by the U.S. Army Corps of Engineers as part of the Redbank and Fancher Creeks Flood Control Project. Reports prepared for each inspection note deficiencies that are to be rectified. FMFCD personnel or contractors hired by FMFCD make the repairs noted in the inspection reports each year. In addition, annual maintenance operations include mowing of the dams and detention basins to aid in the visual inspection of the facilities, rodent abatement, and repair of eroded areas (FMFCD, 2013).

The City of Fresno has participated in the Federal Emergency Management Agency (FEMA) Flood Insurance Program (FIP) since its inception in the early 1970's. Participation on the FIP requires that the community adopt the Flood Insurance Rate Maps (FIRMs), appoint a trained Floodplain Administrator, adopt a floodplain ordinance modeled after the FIP model ordinance, and enforce the ordinance and the requirements of Tile 40 of the Code of Federal Regulations, Part 60. The 40CFR60 regulations and the floodplain ordinance of the City of Fresno require that all new construction and substantial reconstruction of buildings located within an adopted floodplain be flood proofed and that the Community Floodplain Administrator review for conformance with the floodplain ordinance and 40CFR60 and approve the flood proofing. The City of Fresno has a Community Floodplain Administrator and has adopted a floodplain ordinance that complies with the model ordinance promulgated by FEMA.

FEMA has prepared and the City of Fresno has adopted the Flood Insurance Rate Maps (FIRMs) for the Planning Area. The effective FIRM maps were last revised February 18, 2009. Numerous Letters of Map Revision (LOMRs) have been issued since that revision date. The FIRMS show portions of the Planning Area are within numbered and un-numbered SPHA Zone A. SPHA Zone A means that these areas are within the floodplain of the base flood or 1 percent exceedence probability flood event. The 1 percent exceedence probability flood event is also known as the 100-year recurrence interval flood event.

The SFHA Zone A areas within the Planning Area are located below the bluff line of the San Joaquin River; along Redbank Creek between the Planning Area boundary and Redbank Detention Basin (North DeWolf Avenue and East Clinton Avenue alignment); northeast of State Route 99 between Ventura Avenue on the north, East Jensen Avenue on the south and South Orange Avenue on the east; and north of West Central Avenue between South Walnut Avenue and South East Avenue.

Development within dam inundation areas would be required to be flood proof in accordance with the City of Fresno floodplain ordinance and 40CFR60. Existing structures within these areas would be required to be flood proofed at such time as significant reconstruction of the structures occur. Significant reconstruction is defined as improving the structure to a value that meets or exceeds 50 percent of its assessed value.

Additionally, the General Plan Update includes the following policies designed to reduce potential flooding impacts to structures:

Noise and Safety Element

Objective NS-3: Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

Policy NS-3-f: Flooding Emergency Response Plans. Work with responsible agencies to update emergency dam failure inundation plans, evacuation plans and other emergency response plans for designated flood-prone areas, including the San Joaquin riverbottom.

Policy NS-3-g: Essential Facilities Siting Outside of Floodplains. Avoid siting emergency response and essential public facilities, such as fire and police stations, within a 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Policy NS-3-j: National Federal Flood Insurance Program. Continue to participate in the National Flood Insurance Program (NFIP) by ensuring compliance with applicable requirements. Review NFIP maps periodically to determine if areas subject to flooding have been added or removed, and make adjustments to the Land Use Diagram Figure LU-1.

Policy NS-3-l: 200- Year Floodplain Protection. Promote flood control measures that maintain natural conditions within the 200-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Discourage construction of permanent improvements that would be adversely affected by periodic floods within the 200-year floodplain, particularly in the San Joaquin river bottom.

Policy NS-3-m: Flood Risk Public Awareness. Continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation. Remind households and businesses located in flood-prone areas of opportunities to purchase flood insurance.

Policy NS-3-n: Precipitation Changes. Work with FMFCD to evaluate the planned and existing stormwater conveyance system in light of possible changes to precipitation patterns in the future.

Implementation of the regulatory requirements to operate and maintain dams that are jurisdictional, annual inspections and ongoing maintenance of the dams, participation in the FIP, enforcement of the floodplain ordinance, and implementation of the aforementioned General Plan Update polices would reduce exposure of buildings and people to loss, injury, or loss of life to less than significant.

Cumulative Impact Analysis

There are additional sources of flooding due to levee and dam failure from flood control features that are located east of the Planning Area. These features include Big Dry Creek Dam and reservoir, Little Dry Creek Diversion Levee, Alluvial Drain Detention Basin, Redbank Dam and reservoir, and Fancher Creek Dam and reservoir. Potential failure of these flood control features could result in substantial inundation that could result in significant flooding impacts on existing structures and to people.

Annual inspections of the dams and detention basins are conducted by FMFCD personnel and by DSOD personnel of each jurisdictional dam and detention facility. Annual inspection by the U.S Army Corps of Engineers and FMFCD are conducted of each facility constructed by the U.S. Army Corps of

Engineers as part of the Redbank and Fancher Creeks Flood Control Project. Reports are prepared for each inspection that note deficiencies that are to be rectified. FMFCD personnel or contractors hired by FMFCD make the repairs noted in the inspection reports each year. In addition, annual maintenance operations include mowing of the dams and detention basins to aid in the visual inspection of the facilities, rodent abatement, and repair of eroded areas (FMFCD, 2013).

The City of Fresno, the City of Clovis, and the County of Fresno are participants in the FIP and have adopted the FEMA FIRMs. They have adopted floodplain ordinances that conform to the model floodplain ordinance promulgated by FEMA and have appointed Community Floodplain Administrators to review and approve proposed developments within proposed floodplains in conformance with the floodplain ordinances and 40CFR60 (City of Clovis) (County of Fresno, 2011).

The City of Clovis has adopted the following polices regarding development in floodplains in the City's 1993 General Plan (DCE The Planning Center, 1993):

Policy 1.1: Minimize risks of personal injury and property damage associated with natural hazards.

Policy 1.2: Provide flood protection for existing development and for areas planned for new development.

Policy 1.3: Utilize the unprotected 100-year floodplain for low density uses such as agriculture, open space, recreation, and for reclaiming water and wetlands.

The County of Fresno has adopted the following policies regarding development in floodplains in the 2000 General Plan Policy Document (County of Fresno, 2000):

Policy HS-A.3: The County shall ensure that the siting of critical emergency response facilities such as hospitals, fire stations, sheriffs' offices and substations, dispatch centers, emergency operations centers, and other emergency service facilities and utilities are sited and designed to minimize their exposure and susceptibility to flooding, seismic and geological effects, fire, avalanche, and explosions as required by State regulations. Exception to this policy shall be allowed on the condition that the only alternative location would be so distant as to jeopardize the safety of the community, given that precautions are taken to protect the facility.

Policy HS-C.1: The County shall encourage the Fresno Metropolitan Flood Control District to control stormwater flows originating in the streams of the Fresno County Stream Group, generally located east and north of the Fresno-Clovis urban area, by dams or other storage means prior to entering the Fresno-Clovis Metropolitan area.

Policy HS-C.2: The County shall require that the design and location of dams and levees be in accordance with applicable design standards and specifications and accepted design and construction practices.

Policy HS-C.3: The County shall promote a floodplain management approach in flood hazard areas that are presently undeveloped by giving priority to regulation of land uses over development of structural controls as a method of reducing flood damage.

Policy HS-C.4: The County shall encourage the performance of appropriate investigations to determine the 100-year water surface elevations for the San Joaquin River, taking into account recent storm events and existing channel conditions, to identify the potential extent and risk of flooding. New development, including public infrastructure projects, shall not be allowed along the river until the risk of flooding at the site has been determined and appropriate flood risk reduction measures identified.

Policy HS-C.5: Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis.

Policy HS-C.6: The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Existing irrigation canals shall be used to the extent possible to remove excess stormwater. Retention-recharge basins should be located to best utilize natural drainage patterns.

Policy HS-C.7: The County shall continue to participate in the Federal Flood Insurance Program by ensuring compliance with applicable requirements.

Policy HS-C.8: During the building permit review process, the County shall ensure project compliance with applicable Federal Emergency Management Agency (FEMA) standards pertaining to residential and non-residential development in the floodplain, floodway, or floodway fringe.

Policy HS-C.9: The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy HS-C.10: The County shall require that all placement of structures and/or flood proofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy HS-C.11: The County shall encourage open space uses in all flood hazard areas. Land Conservation contracts, open space and scenic easements should be made available to property owners.

Policy HS-C.12: The County shall consider dam failure inundation maps of all reservoirs in making land use and related decisions.

Policy HS-C.13: The County shall continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation.

Implementation of the regulatory requirements to operate and maintain dams that are jurisdictional, annual inspections, and ongoing maintenance along with participation FIP and enforcement of the floodplain ordinance, and implementation of the aforementioned General Plan Update polices would reduce potential flooding impacts from dam or levee failure to structures to less than significant. As a result, less than significant cumulative long-term project impacts associated with the exposure of buildings and people to loss, injury, or loss of life to due to flooding or as the result of dam or levee failure would occur. Therefore, implementation of the General Plan Update would not be cumulatively considerable and cumulative impacts would be less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Seiche, Tsunami, or Mudflow

Impact HYD-10 The project would not create inundation by seiche, tsunami, or mudflow.

Project Specific Impact Analysis

Official Statewide Tsunami Inundation Maps, coordinated by California Emergency Management Agency (CalEMA), are developed for all populated areas at risk to tsunamis in California. According to CalEMA's MY HAZARD website and Official Statewide Tsunami Inundation Maps, the Planning Area is located outside a tsunami hazard zone.

A seiche is a "standing" wave oscillating in a body of water. This phenomenon occurs in large bodies of water such as bays and lakes. A seiche may occur in any semi- or fully-enclosed body of water. They can be caused by strong winds and earthquakes. The nearest body of water capable of producing a seiche is Big Creek Dry Dam and Reservoir located northeast of the Planning Area. The General Plan Update would not introduce new land uses near the reservoir that could be inundated. Additionally, this is a relatively small reservoir and would not be subject to strong oscillations during an earthquake event.

Fresno is not susceptible to soil erosion with the exception of the San Joaquin River Bluffs. The Bluffs steep slopes and soil composition predispose it to instability and erosion. Adoption of the General Plan Update would not result in a significant increase in development along the Bluffs. The

General Plan Update Noise and Safety Element includes the following objective and implementing policies that would minimize potentially hazardous conditions posed by geologic and soils risks:

Noise and Safety Element

Objective NS-2: Minimize risks of property damage and personal injury posed by geologic and seismic risks.

Policy NS-1-a: Seismic Protection. Ensure seismic protection is incorporated into new and existing construction, consistent with the Fresno Municipal Code.

Policy NS-2-b: Soil Analysis Requirement. Identify areas with potential geologic and/or soils hazards, and require development in these areas to conduct a soil analysis and mitigation plan by a registered civil engineer (or engineering geologist specializing in soil geology) prior to allowing on-site drainage or disposal for wastewater, stormwater runoff, or swimming pool/spa water.

Policy NS-2-d: Bluff Preservation Overlay Zone. Maintain the requirements of the Bluff Preservation Overlay Zone District, which will include provisions to:

- Require proposed development within 300 feet of the toe of the San Joaquin River bluffs to undertake an engineering soils investigation and evaluation report that demonstrates that the site is sufficiently stable to support the proposed development, or provide mitigations to provide sufficient stability; and
- Establish a minimum setback of 30 feet from the San Joaquin River bluff edge for all future structures and rear yards.

The implementation of the above objective and implementing policies would reduce impacts from mudflows to less than significant.

Cumulative Impact Analysis

Future development in areas outside of the Planning Area would not create a potential for inundation of the Planning Area by seiche, tsunami or mudflow. Since no impacts from seiche and tsunami hazards would occur and less than significant mudflow impacts would occur with the implementation of the proposed project, the project's contribution to cumulative impacts would not be considerable. Therefore, no cumulative seiche or tsunami impacts would occur and less than significant cumulative mudflow impacts would occur with the project.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.10 - Land Use and Planning

5.10.1 - Introduction

This section describes the environmental setting of the use of land for various activities such as residential, commercial, office, public facilities, mixed use, industrial, open space, agriculture, and other uses. The land use patterns influence the interactions of land uses. In addition, this section discusses the applicable plans and policies. The potential impacts from the implementation of the project are described, and mitigation measures are provided, if required.

5.10.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding land use and planning is the City of Fresno Planning Area because potential development under the City of Fresno General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative land use and planning impacts is the City of Fresno Planning Area, the unincorporated areas of the County of Fresno and County of Madera located immediately adjacent to the Planning Area, and the areas within the City of Clovis located immediately adjacent to the Planning Area.

The Planning Area

The City of Fresno Planning Area encompasses the City of Fresno incorporated area (approximately 113 square miles) and unincorporated areas located in Fresno County (approximately 53 square miles). The incorporated area of the City is primarily contiguous except for approximately 5.1 square miles that contains the Fresno-Clovis Regional Wastewater Reclamation Facility located southwest of the City's contiguous area.

Table 5.10-1 identifies the existing land uses within the Planning Area as of 2010.

Table 5.10-1: Existing Land Uses within the City of Fresno Planning Area

Land Use	Existing Development du/msf (acres)[1]	Percent of Planning Area
Single-Family Residential	118,897 (26,147)	24.7
Multiple-Family Residential	67,943 (3,496)	3.3
Commercial/Office/Public Facility	66.4 (14,804)	14.0
Mixed Use	0.1 (10)	0.0
Industrial	72.8 (6,765)	6.4
Open Space	(12,288)	11.6

Land Use	Existing Development du/msf (acres)[1]	Percent of Planning Area
Agriculture	(11,714)	11.0
Vacant	(12,522)	11.8
Other	(18,281)	17.2
TOTAL	(106,027)	100

du – dwelling units are used for the residential uses
msf – million square feet is used for non-residential uses
[1] Information obtained from Table 3-3 in Section 3.2.3 of this Master EIR.
Source: FirstCarbon Solutions 2014

Brief discussions of the primary categories of existing land uses within the Planning Area are provided below.

Residential Land Uses

Residential land uses encompass approximately 28 percent of the Planning Area and are the predominant land use in the City. The total housing units within the Planning Area is approximately 186,840 dwelling units (approximately 64 percent are single family and 36 percent are multiple family units). Single family development is distributed fairly evenly throughout the incorporated area of the City. Multiple family units are concentrated in areas around Fresno State, Southwest Fresno, and north of Shaw, Woodward Park, River Park, Dominion Areas, the Internal Revenue Service, the Saint Agnes Medical Center, the Freeway 41 Corridor, and the Fig Garden Loop neighborhood (City of Fresno. 2011. Working Paper 2: Urban Form and Land Use).

Commercial/Office/Public Facility Land Uses

Commercial/Office/Public Facility Land Uses comprise approximately 14 percent of the Planning Area and mainly located within the incorporated area of the City of Fresno. Commercial land uses within the Planning Area include a wide range of retail and service establishments intended to serve local and regional needs. The Office land uses include administrative, financial, business, professional, medical, and public offices. Office uses are generally compatible with existing residential neighborhoods given the smaller level of noise and traffic generation than commercial uses. Retail uses include business services, food services and convenience goods for those who work in the area. Public Facility land uses include those uses owned by public entities, including City Hall and other City buildings, county buildings, schools, the municipal airports and hospitals. They also include public facilities such as fire and police stations, City-operated recycling centers and sewage treatment. In addition, public facilities include neighborhood, community and regional parks, recreational centers, and golf courses as well as regional and neighborhood multi-purpose trails.

Mixed Use Land Uses

The existing mixed use development in the Planning Area is located within the Cultural Arts Districts in the Downtown. This mixed use includes residential and commercial uses.

Industrial Land Uses

Industrial land uses comprise approximately 6.4 percent of the Planning Area. These uses include light and heavy industrial and manufacturing uses. The majority of industrial land is located south of Downtown, along State Route 99 and near the Fresno Yosemite International Airport. Additionally, some heavy industrial uses are currently located adjacent to residential areas.

Open Space

The Open Space uses within the Planning Area include ponding basins, recreational use, clear zone, flood control, golf course, canals, parks (neighborhood, community and regional), recharge basins, and open space. Open Space encompasses approximately 11.6 percent of the Planning Area.

The City's park system provides a wide-range of recreational opportunities. The park system contains several classes of park space, including: trails, regional parks, neighborhood parks, community parks, pocket parks, etc. The Planning Area currently includes 12,288 acres of Open Space. The Open Space acreage includes 7,742 acres of Open Space plus, 4,546 acres within the Open Space/Agriculture category for a total of 12,288 acres of existing open space. The Open Space under existing development is characterized as ponding basins, recreational use, clear zone, flood control, golf course, canals, parks, recharge basins, and open space.

Agriculture

Although agricultural uses continue to dominate much of the regional landscape, there is only 11 percent of the Planning Area that contain agriculture. The majority of the existing agriculture within the Planning Area is located in the southeast.

Vacant

Vacant land includes areas with no development and encompasses approximately 11.8 percent of the Planning Area.

Other

This category includes roads, water transport canals, trails, and railroad lines. Fresno has an elaborate canal system that was developed to transport water for agricultural uses. Fresno is served by two major railroad transportation companies: (1) Burlington Northern Santa Fe (BNSF) and (2) Union Pacific (UP). Each railroad has lines traversing the city and freight yards. Additionally, there are several spur lines that serve industrial areas within the Planning Area. This category encompasses approximately 17.2 percent of the Planning Area.

5.10.3 - Regulatory Setting

Existing Policies Applying to the Planning Area

Below are summaries of the major federal, state, and local plans and policies that are applicable to the Planning Area regarding land use planning.

Federal Policies/Regulations

Federal Aviation Administration – Federal Aviation Regulation Part 77

The three existing airports located within the Planning Area are required to be consistent with Part 77 of the Federal Aviation Regulation (FAR) that defines airspace around civil airport. The airspace shall be free of obstructions to air navigation during critical flight phases. No obstructions shall penetrate the "imaginary surfaces" surrounding an airfield as defined in FAR Part 77. The "imaginary surfaces" are determined by runway length and type of navigational approach instrumentation available. The "imaginary surfaces" include the Runway Protection Zone, also known as the Primary Zone and Clear Zone, the Inner (Approach/Departure) Safety Zone, the Inner Turning Zone, the Outer (Approach/Departure) Safety Zone, the Sideline Safety Zone (Area parallel to the runways and extending to the end of the Runway Protection Zone), and the Traffic Pattern Zone.

The Fresno Yosemite International Airport (FYI) has more extensive "imaginary surfaces" than the Fresno-Chandler Downtown Airport (FCH) and Sierra Sky Park Airport because FYI is operated with precision instrument runways while the FCH and Sierra Sky Park Airport is classified as utility and visual runways.

The "imaginary surfaces" at the FYI rise from 200 feet beyond the ends of the runway surface and extend outward for a linear distance of 10,000 feet at a slope ratio of 50 horizontal feet to 1 vertical foot (50:1). This area includes the Runway Protection Zone and Inner Safety Zone. A linear distance of 10,000 feet surrounding the airport is the horizontal distance. Additional imaginary surfaces include an elevation of 150 feet above ground level within the 10,000 linear foot horizontal area and outside of the approach zones, the 4,000 linear feet of conical surface with a slope ratio of 20:1 extending beyond the horizontal surface, the 40,000 linear feet of outer approach zone that extends beyond the inner approach zone at a slope ratio of 40:1, and the transitional surfaces that extend on the sides of the primary surface and from the sides of the approach surfaces at a ratio of 7:1.

For the Fresno-Chandler Downtown Airport (FCH) and Sierra Sky Park Airport, the "imaginary surfaces" rise from 200 feet beyond the ends of the runway surface and extends outward for a linear distance of 5,000 feet at a slope ratio of 20:1. This area includes the Runway Protection Zone, the Inner Safety Zone, and the Outer Safety Zone. Additional imaginary surfaces include an elevation of 150 feet above ground level within the 5,000 linear foot horizontal area and outside of the approach zones, and the transitional surfaces that extend on the sides of the primary surface and from the sides of the approach surfaces at a ratio of 7:1.

State Policies

The Cortese-Knox-Herztberg Local Government Reorganization Act

The Cortese-Knox-Herztberg Local Government Reorganization Act of 2000 (Government Code Section 56300 et seq.) governs the establishment and revision of local government boundaries. The Act was a comprehensive revision of the Cortese-Knox-Herztberg Local Government Reorganization Act of 1985. The Act is a policy of the state to encourage orderly growth and development that are essential to the social, fiscal, and economic well-being of the state. The intent of the Act is promote orderly development while balancing competing state interests of discouraging urban sprawl, preserving open space and prime agricultural lands, and efficiently extending government services.

The Act had previously established the County Local Agency Formation Commission (LAFCO), which gave it authority to consider and approve city and special district annexation, dissolution, and formation.

California Land Conservation Act

The California Land Conservation Act, better known as the Williamson Act, was enacted by the State Legislature in 1965 to encourage the preservation of agricultural lands. Under the provisions of the act, landowners agreeing to keep their lands under agricultural production for a minimum of ten years receive property tax adjustments. Williamson Contracts limit the use of the properties to agricultural, open space, and other compatible use, Williamson Act lands are assessed based on their agricultural value, rather than their potential market value under nonagricultural uses. A discussion of potential Impacts related to the Williamson Act is provided in Section 5.2, Agricultural Resources, Impact AG-2.

Regional Land Use Policies

Fresno County Local Agency Formation Commission

Local Area Formation Commissions (LAFCOs) review proposals for the formation of new local governmental agencies and for changes in the organization of existing agencies. The objectives of the Fresno County LAFCO are to: encourage orderly formation of local governmental agencies, preserve agricultural land resources and to discourage urban sprawl. The Fresno County LAFCO assists in balancing the competing needs in the region for efficient services, affordable housing, economic opportunity, and conservation of natural resources. In addition, the Fresno County LAFCO considers effects that development may have on existing agricultural land and in doing so guides development toward vacant urban land and away from agricultural preserves. The Fresno County LAFCO also discourages urban sprawl (i.e. irregular and disorganized growth occurring without apparent design or plan). (Fresno County Local Area Formation Commission, 2012)

Local Land Use Plans and Policies

Airport Land Use Compatibility Plans

Per Public Utilities Code sections 21670–21679.5, Airport Land Use Commissions (ALUCs) have the authority to regulate land use decisions in the vicinity of airports to "protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to the extent that these areas are not already devoted to incompatible uses." ALUCs protect public health, safety and welfare by ensuring that orderly development, and prevention of excessive noise and safety hazards near public use airports is followed in accordance with both state and local laws. ALUCs prepare Compatibility Land Use Plans (also referred to as Airport Land Use Compatibility Plans) to ensure that county and city plans are consistent. In addition, ALUCs establish land use policies for areas near airports to ensure that land uses are compatible with airport operations. Additionally, ALUC's review individual development projects to ensure they are within the noise and safety standards in accordance with state laws (Fresno ALUC, 2012). The Fresno County ALUC has adopted airport land-use compatibility plans for the three airports located within the Planning Area.

The compatibility of the land uses in proximity to the two public airports (Fresno-Yosemite International Airport and the Fresno-Chandler Downtown Airport) and the privately owned, public use general aviation airport (Sierra Sky Park) are discussed and evaluated in Section 5.8, Hazards and Hazardous Materials in Impacts HAZ-5 and HAZ-6 in this Program EIR.

City of Fresno 2025 General Plan Land Use Element

C-1 Objective: Establish a comprehensive planning strategy to achieve the efficient and equitable use of resources; to provide for the optimum level of public facilities and services; and to realize an attractive and desirable living environment within the City of Fresno's moderately expanded sphere of influence and planned urban boundary.

C-1-a Policy: Support and pursue all reasonable efforts to include within the City of Fresno's incorporated boundaries the entire area contained within its present urban boundary and ultimately within the expanded urban boundary.

- Advocate appropriate Local Agency Formation Commission (LAFCO) policy changes and state legislative measures to facilitate the processing and successful completion of inhabited annexations.
- Advocate appropriate LAFCO policy changes to facilitate annexation of uninhabited areas within the City of Fresno's urban sphere, prior to the submission of development entitlement applications, in order to ensure the implementation of the city's general plan strategies in a comprehensive and consistent manner, and to permit the development of industrial parks that are supported by developed infrastructure and readily available for the development timelines of new businesses.

C-1-b Policy: Ensure that all portions of the metropolitan area receive a consistent and comparable level of public services and facilities; participate equitably in the cost of providing public services and facilities; and have equal access to the decision making processes that govern the quality of services and facilities enjoyed by the community.

- Insist that all new development (any permit for a new dwelling or commercial/industrial structure) within any unincorporated portion of the urban boundary be required to comply with all City of Fresno's development standards and policies.
- Insist that the County of Fresno adopt planning policies and development procedures that support the effort of the general plan update to efficiently use land and resources by prohibiting inconsistent or substandard development of property within the city's sphere of influence.

C-2-l Policy: Manage urban development to enhance the vitality, appeal, and value of the entire metropolitan area. The Council will evaluate and implement appropriate funding mechanisms and programs that will contribute to the construction of appropriate urban infrastructure improvements within the established urban core communities.

C-4-b Policy: Activity centers should include commercial areas, employment centers, schools, higher-density residential development, churches, parks, and other gathering points where residents may interact, work, and obtain goods and services in the same place.

C-4-c Policy: Place emphasis on pedestrian activities and linkages, and provide for priority transit routes and facilities to serve the activity centers.

C-8 Objective: Facilitate the development of mixed uses to blend residential, commercial and public land uses on one site.

C-8-d Policy: Ensure land use compatibility between mixed-use districts in activity centers and the surrounding residential neighborhoods.

C-10 Objective: Promote the development of more compact pedestrian friendly, single-family residential projects to aid in the conservation of resources such as land, energy, and materials.

C-13-e Policy: Gradually phase out incompatible uses from areas planned for heavy industrial activity.

City of Fresno Community Plans

The City of Fresno is divided into nine Community Plan areas that were updated during the adoption of the 2025 Fresno General Plan. The plans are tailored to the specialized needs and concerns of the identifiable Community Plan areas and provide and discuss existing conditions (i.e. trends planning issues, etc.), while also providing recommendations and/or guidelines that act as blueprints for the relative plan area.

City of Fresno Specific Plans

Unlike the General Plan or Community Plans that act as blueprints for relatively large geographic areas, Specific Plans focus on neighborhoods that contain certain characteristics that are deemed desirable or reflect a certain planning trend. It should be noted that only a small portion of the city is located within a Specific Plan area, although all areas are within a Community Plan. In addition, several of the Specific Plans have Plan Advisory Committees that review entitlements within the plan area.

City of Fresno Neighborhood Plans

The City of Fresno includes two neighborhood plans that address specific concerns expressed by residents. The plans focus on improvements to the neighborhoods based on a unified vision. These improvements include modifications to circulation, structures, utilities, public services, and aesthetics.

County of Fresno 2000 General Plan - Land Use Element

Policy LU-C.6: The County may allow the extraction of rock, sand, and gravel resources along the San Joaquin River consistent with the Minerals Resources section policies of the Open Space and Conservation Element.

Policy LU-C.7: The County, in approving recreational facilities in the San Joaquin River Parkway adjacent to residential uses, shall require a buffer of at least 150 feet and screening vegetation as necessary to address land use compatibility issues.

Policy LU-G.1: The County acknowledges that the cities have primary responsibility for planning within their LAFCO-adopted spheres of influence and are responsible for urban development and the provision of urban services within their spheres of influence.

Policy LU-G.2: Fresno County shall work cooperatively with all cities of the county to encourage each city to adopt and maintain its respective plan consistent with the Fresno County General Plan. The County shall adopt complementary planning policies through a cooperative planning process to be determined by the respective legislative bodies.

Policy LU-G.4: The County shall encourage orderly outward expansion of urban development by supporting only those city sphere of influence expansion proposals where the city has demonstrated a need for additional territory after documenting a good faith effort to implement an infill development program and minimize conversion of productive agricultural lands.

Policy LU-G.6: The County shall encourage cities to incorporate in their general plans land use policies that minimize potential land use conflicts with agriculturally-related industrial operations and other agricultural activities at the urban interface through the provision of appropriate buffers or other measures.

Policy LU-G.7: Within the spheres of influence and two (2) miles beyond, the County shall promote consultation between the cities and the County at the staff level in the early stages of preparing general plan amendments and other policy changes that may impact growth or the provision of urban services. Staff consultations, particularly concerning community plans, shall provide for meaningful participation in the policy formulation process and shall seek resolution of issues prior to presentation to the decision-making bodies.

Policy LU-G.10: The County shall minimize potential land use conflicts at the interface between urban development and existing developed rural-residential areas. Provision for a graduated transition in density/lot size from higher to lower density between the two respective areas shall generally be required unless significant buffers or other measures are determined adequate to protect established rural residential developments. The County, while recognizing the cities' need to optimize use of land within their sphere boundaries, shall encourage cities to require buffering measures when urban development is proposed adjacent to existing developed rural-residential areas within their spheres-of-influence.

Policy LU-G.11: The County shall promote consultation between the cities and the County at the staff level when cities are developing proposed annexation boundaries or proposed sphere of influence expansions.

San Joaquin River Parkway Master Plan

Policy MRP1: In public Parkway areas that have significant sand and gravel reserves that may be needed for the San Joaquin River Restoration Program or other habitat and floodplain restoration needs, site significant permanent structures where they will not preclude or interfere with future extraction of those resources.

Policy RP3: Minimize potential impacts to sensitive natural resources by grouping facilities and intensive uses or siting facilities and intensive uses in areas that are already disturbed or developed where feasible.

Policy RO1: Locate relatively intensive recreational activity sites away from natural resources that may be sensitive to those uses (such as rookeries, spawning beds, etc.) and private residences (see Buffers).

Policy CP1: Permit commercial activities needed to serve Parkway visitors, such as sales of food and beverages, camper's grocery items, and books, guides, and educational materials, under special use permits and consistent with other Parkway goals, objectives and policies.

Policy NP8.1: Provide a buffer zone of a width appropriate to the intensity of the planned land use or planned Parkway improvement as depicted in Figure 2.

Policy BZ4: During project-specific environmental review for Parkway improvements, delineate appropriate buffer zones based on site-specific investigations.

Policy BZ2: Provide native vegetation for screening wildlife from human activity as necessary to accommodate less width for a buffer zone.

Policy BZ9: Encourage local land use agencies to require where feasible buffer zones for the protection of wildlife habitat in natural reserves and wildlife/riparian corridors. From the river wildlife corridor encourage 100 foot buffers from agriculture/pasture; 150 foot buffers from low density housing (less than .05 unit per acre); 300 foot buffers from medium density housing (.05 units per acre to less than 1 unit per acre); and 600 foot buffers from business/industry or high density housing (more than 1 unit per acre, and 700 foot buffers for any development from sensitive habitat. (Sensitive habitat includes areas of special biological significance that provide habitat for locally unique biotic species/communities; that are adjacent to essential habitats of rare, endangered or threatened species; most wetland and riparian areas; or any natural community vulnerable to environmental effects of projects) See Figure 1.

5.10.4 - Thresholds of Significance

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to hazards and hazardous materials are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, land use and planning impacts resulting from the proposed project are considered significant if the project would:

a) Physically divide an established community? (Analysis provided in Impact LUP-1, below.)

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? (Analysis provided in Impact LUP-2, below.)

c) Conflict with any applicable habitat conservation plan or natural communities conservation plan? (Analysis provided in Impact LUP-3, below.)

5.10.5 – Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Divide Established Community

Impact LUP-1 **The project would not physically divide an established community.**

Project Specific Impact Analysis

Development in accordance with the General Plan and Development Code Update would result in a substantial amount of additional development throughout the Planning Area. This development would include infill and underutilized development within the existing City limit, revitalization of existing neighborhoods, new activity centers with mixed uses and neighborhoods, and development within rural/agriculture areas located outside the City and within the Planning Area.

As shown in Table 3-3 in Section 3, Project Description, buildout of the General Plan Update would result in the incremental increase of 60,626 single-family residences, 84,538 multiple-family residences, 63.3 million square feet of commercial/office/public facility, 20.8 million square feet of mixed uses, and 40.5 million square feet of industrial uses. Full buildout would result in development throughout the Planning Area.

The City of Fresno currently has nine community plans that had been previously established to provide more detailed planning to address specific concerns of the individual communities. The boundaries separating each of the communities range from various roadway widths, railroad, and freeways. Future development within the Planning Area could divide established communities. This division could result from corridors that are planned for higher intensities of uses compared to existing uses. The corridors that could divide existing established communities include Ventura-Kings Canyon Road, Clovis Avenue, and California Avenue. Development along the Blackstone, Shaw, and Herndon corridors would not divide an established community because these roadways currently form a physical boundary that separate communities.

In addition, future development could create divide established communities within rural communities that are located in the outer areas of the Planning Area. Irregular rural patterns have constrained efficient development in the Planning Area and has created lifestyle conflicts between the existing rural residents and the newly developed suburban communities. It is anticipated that as future development in accordance with the General Plan Update expands within the rural areas,

there could be continuing conflicts between existing and new land uses and could create a division of existing rural established communities.

The General Plan Update includes objectives and policies to reduce these land use conflicts and provide for future orderly development to reduce the potential to divide established communities.

Policy UF-8: Develop each of Downtown's neighborhoods and districts, according to its unique character.

Policy UF-12-a: BRT Corridors. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.

Policy UF-12-b: Activity Centers. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.

Policy UF-12-d: Appropriate Mixed-Use. Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one or adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.

Policy UF-12-g: Impacts on Surrounding Uses. Establish design standards and buffering requirements for high-intensity Activity Centers to protect surrounding residential uses from increased impacts from traffic noise and vehicle emissions, visual intrusion, interruption of view and air movement, and encroachment upon solar access.

Policy LU-1-b: Land Use Definition and Compatibility. Include zoning districts and standards in the Development Code that provide for the General Plan land use designations and create appropriate transitions or buffers between new development with existing uses, taking into consideration the health and safety of the community.

Policy LU-1-c: Provision of Public Facilities and Services. Promote orderly land use development in pace with public facilities and services needed to serve development.

Policy LU-1-d: Orderly Transition of Existing Uses. Consider updates to the Fresno Municipal Code to provide for the orderly transition of existing, legal non-conforming uses on the BRT Corridors to conforming uses by 2035.

Policy LU-1-e: Annexation Requirements. Consider implementing policies and requirements that achieve annexations to the City that conform to the General Plan Land Use Designations and open space and park system, and are revenue neutral and cover all costs for public infrastructure, public facilities, and public services on an ongoing basis.

LU-1-f: Coordination with Fresno County Land Use Planning. Seek a Memorandum of Understanding (MOU) with the County of Fresno to prohibit development inconsistent with this General Plan on unincorporated land within the City's (SOI).

Objective LU-2: Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residents.

Policy LU-2-a: Infill Development and Redevelopment. Promote development of vacant, underdeveloped, and redevelopable land within the City Limits where urban services are available by considering the establishment and implementation of supportive regulations and programs.

Policy LU-2-e: Neighborhood Preservation. Incorporate standards in the Development Code to preserve the existing small-scale residential quality of older neighborhoods.

Objective LU-4: Enhance existing residential neighborhoods through regulations, code enforcement, and compatible infill development.

Policy LU-5-a: Low Density Residential Uses. Promote low-density residential uses only where there are established neighborhoods with semi-rural or estate characteristics.

Policy LU-5-b: Medium-Low Density Residential Uses. Promote medium-low density residential uses to preserve existing uses of that nature or provide a transition between low and medium density residential areas.

Policy LU-5-c: Medium Density Residential Uses. Promote medium density residential uses to maximize efficient use and affordability of residential property through a wide range of densities.

Policy LU-5-g: Scale and Character of New Development. Allow new development in or adjacent to established neighborhoods that is compatible in scale and character with the surrounding area by promoting a transition in scale and architecture character between new buildings and established neighborhoods, as well as integrating pedestrian circulation and vehicular routes.

Policy LU-6-a: Design of Commercial Development. Foster high quality design, diversity, and a mix of amenities in new development with uses through the consideration of guidelines, regulations and design review procedures.

Policy LU-6-c: Appropriate Office Development. Promote the establishment of development standards for new offices, addressing location, size, and intensity necessary to meet the City's needs. Integrate and support employment in adjacent and proximate neighborhoods.

- Locate office projects to provide a transition between more intensive commercial uses and residential areas.
- Facilitate office uses in conjunction with, and adjacent to, institutions and employment centers.

- Avoid over concentrating office uses in any one part of Fresno when new office developments would create excessive vacancy rates in other established office areas.

Policy LU-6-f: Auto-Oriented Commercial Uses. Direct highway-oriented and auto-serving commercial uses to locations that are compatible with the Urban Form policies of the General Plan. Ensure adequate buffering measures for adjacent residential uses noise, glare, odors, and dust.

Policy LU-8-a: Civic and Institutional Use Compatibility. Protect civic and institutional areas from incompatible uses that could affect their vitality and contributions to the city.

Policy D-1-j: Lighting Standards. Update lighting standards to reflect best practices and protect adjoining uses from glare and spillover light.

Objective D-4: Preserve and strengthen Fresno's overall image through design review and create a safe, walkable and attractive urban environment for the current and future generations of residents.

Policy D-4-f: Design Compatibility with Residential Uses. Strive to ensure that all new non-residential land uses are developed and maintained in a manner complementary to and compatible with adjacent residential land uses, to minimize interface problems with the surrounding environment and to be compatible with public facilities and services.

Objective D-5: Maintain and improve community appearance through programs that prevent and abate blighting influences.

Policy D-5-a: Code Enforcement. Continue enforcement of the Fresno Municipal Code to remove or abate public nuisances in a timely manner.

Objective D-7: Continue applying local urban form, land use, and design policies to specific neighborhoods and locations.

The objectives and policies provided above would reduce the potential to physically divide an established community to less than significant.

Cumulative Impact Analysis

Development of cumulative projects would occur primarily outside of the Planning Area. The High Speed Rail project is a cumulative project that will be extended along the existing railroad tracks that currently separate communities within the Planning Area. The implementation of cumulative projects would not separate established communities within the Planning Area. As identified above, the implementation of the proposed General Plan and Development Code Update would result in a less than significant impact on the division of established communities with the implementation of the objectives and the policies within the General Plan Update. Therefore, the project's contribution to cumulative impacts associated with dividing established communities is less than cumulatively considerable, and thus less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Conflict with Applicable Plans, Policies, or Regulations

Impact LUP-2	**The project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.**

Project Specific Impact Analysis

Development in accordance with the General Plan and Development Code Update would require consistency with various federal, state, and local plans, policies, and regulations. Many of the plans, policies, and regulations are addressed in various locations within Section 5 of this Master EIR. Below is a discussion of certain land use plans, policies, and regulations that are applicable to the future development in accordance with the General Plan and Development Code Update.

Federal Aviation Administration – Federal Aviation Regulation Part 77

Section 5.8, Hazards and Hazardous Materials, within this Master EIR evaluated safety impacts based on land use type within safety zones adjacent to the three existing airports located within the Planning Area. No land use conflicts with the proposed land uses were identified adjacent to the Fresno-Yosemite International Airport and Sierra Sky Park Airport; however, there are potential land use conflicts adjacent to the southeast runway at the Fresno Chandler Downtown Airport. Although there is currently a land use inconsistency, future development in this area would be required to comply with Part 77 of the Federal Aviation Regulation (FAR) that defines airspace around civil airport. Similar to any development within airport safety zones, an evaluation of the proposed structures in relation to the "imaginary surfaces" would be required and reviewed by the Airport Land Use Commission. Compliance with this current requirement would reduce potential impacts to less than significant.

The Cortese-Knox-Herztberg Local Government Reorganization Act

The proposed General Plan and Development Code includes various objectives and policies to provide for the future orderly growth and development of the Planning Area. The project includes

retaining the sphere-of-influence boundary at its current location to prevent urban sprawl and impacting prime agricultural lands beyond the Planning Area. Since the Cortese-Knox-Herztberg Local Government Reorganization Act of 2000 governs the establishment and revision of local government boundaries, the implementation of the project would provide for orderly growth to ensure that adequate services are available to serve the new development. The following policies within the General Plan Update would ensure consistency with the Act.

Policies LU-1-c, LU-1-e, and LU-1-f as described above. In addition, the following policy would prevent urban sprawl.

Policy LU-1-g: SOI Expansion. Maintain the City's current SOI boundaries without additional expansion, except to allow for the siting of a maintenance yard for the California High Speed Train project and related industrial and employment priority areas proximate to and south of the SOI boundary between State Route 41 and State Route 99. Prohibit residential uses in the expansion area.

The implementation of the above policies as development occurs would result in consistency with the Cortese-Knox-Herztberg Local Government Reorganization Act of 2000.

California Land Conservation Act

As stated above, potential impacts associated with the Williamson Act is provided in Section 5.2, Agricultural Resources Impact AG-2.

Fresno County Local Agency Formation Commission

As identified above, the proposed General Plan and Development Code includes policies to provide for the future orderly growth and development of the Planning Area. This orderly growth would be consistent with LAFCO's objectives to encourage orderly formation of local governmental agencies, preserve agricultural land resources and to discourage urban sprawl. The following policies within the proposed General Plan Update would result in consistency with LAFCO's general policies.

Policy LU-1-a: Promote Development within the Existing City Limits as of December 31, 2012. Promote new development, infill, and rehabilitation of existing building stock in the Downtown Planning Area, along BRT corridors, in established neighborhoods generally south of Herndon Avenue, and on other infill sites and vacant land within the City.

Policy LU-1-c: Provision of Public Facilities and Services. Promote orderly land use development in pace with public facilities and services needed to serve development.

Policy LU-1-e: Annexation Requirements. Consider implementing policies and requirements that achieve annexations to the City that conform to the General Plan Land Use Designations and open space and park system, and are revenue neutral and cover all costs for public infrastructure, public facilities, and public services on an ongoing basis.

Policy LU-1-g: SOI Expansion. Maintain the City's current SOI boundaries without additional expansion, except to allow for the siting of a maintenance yard for the California High Speed Train

project and related industrial and employment priority areas proximate to and south of the SOI boundary between State Route 41 and State Route 99. Prohibit residential uses in the expansion area.

Airport Land Use Compatibility Plans

The compatibility of the land uses in proximity to the two public airports (Fresno-Yosemite International Airport and the Fresno-Chandler Downtown Airport) and the privately owned, public use general aviation airport (Sierra Sky Park) are discussed and evaluated in Section 5.8, Hazards and Hazardous Materials in Impacts HAZ-5 and HAZ-6 in this Program EIR.

City of Fresno 2025 General Plan Land Use Element

Implementation of the General Plan Update would replace the existing goals, objectives and policies within the 2025 General Plan, including the Land Use Element. Since the existing goals, objectives and policies would be replaced, the implementation of the project would not be inconsistent with the 2025 General Plan, including the Land Use Element, and potential impact would be less than significant.

City of Fresno Community Plans, Specific Plans, and Other Plans

The proposed project includes amendment of the following Plans:

- Bullard Community Plan (this will be renamed to the Pinedale Neighborhood Plan)
- Sierra Sky Park Land Use Policy Plan (formatting revisions for consistency with the ALUC's Sierra Sky Park Plan)
- Tower District Specific Plan
- Butler-Willow Specific Plan
- North Avenue Industrial Plan
- Sun Garden Acres Specific Plan
- Hoover Community Plan (this will be renamed the El Dorado Park Neighborhood Plan)

Additionally, the proposed project includes repeal of the following Plans:

- West Area Community Plan
- Roosevelt Community Plan
- Fulton/Lowell Specific Plan
- Woodward Park Community Plan
- Central Area Community Plan
- McLane Community Plan
- Fresno-High Roeding Plan
- Yosemite School Area Specific Plan
- Dakota-First Street Specific Plan
- Edison Community Plan
- Civic Center Master Plan
- Highway City Specific Plan

The General Plan Update serves as a consolidated location for many current Community, Specific and other Plan types, and is consistent with the intent of the underlying purpose of the goals, policies and objectives of the portions of the Plans designed to avoid or mitigate environmental effects. While in a different format, the underlying goals, objectives and policies serving as mitigation for applicable environmental effects have been carried forward, incorporated or otherwise addressed in the General Plan Update. As such, implementation of the project would not be inconsistent with these Plans, and potential impacts would be less than significant.

County of Fresno Land Use Element

The policies within the County of Fresno Land Use Element were reviewed to determine the consistency of the proposed project with the existing policies. As identified in Section 5.10.3 above, the County includes policies regarding development within the San Joaquin River corridor and ensuring adequate buffers are provided. Additional policies relate to planning and development within existing spheres-of-influence, orderly outward expansion of land uses, and minimization of potential land use conflicts. Furthermore, the County has policies related to cooperative planning between the City and the County. Based on a review of the County policies, the following policies within the proposed General Plan Update would be consistent with the existing County policies and less than significant impacts would occur.

San Joaquin River Corridor

The County includes policies regarding development within the San Joaquin River corridor. These policies include LU-C.6., LU-C.7. The implementation of the following policies from the proposed General Plan Update would result in land use consistency with the County's policies.

Policy RC-10-b: Zoning in San Joaquin Riverbottom. Maintain zoning consistent with on-going mineral extraction in the San Joaquin Riverbottom that also allows multiple open space uses in conformance with State law, and the City's Surface Mining Ordinance.

Policy LU-1-b. Land Use Definition and Compatibility. Include zoning districts and standards in the Development Code that provide for the General Plan land use designations and create appropriate transitions or buffers between new development with existing uses, taking into consideration the health and safety of the community.

Planning and Development

The County includes policies regarding planning and development within unincorporated areas. These policies include LU-G.1., LU-G.2., LU-G.7, and LU-G.11. The implementation of the following policies from the proposed General Plan Update would result in land use consistency with the County's policies.

Policy LU-1-c: Provision of Public Facilities and Services. Promote orderly land use development in pace with public facilities and services needed to serve development.

Policy LU-1-e. Annexation Requirements. Consider implementing policies and requirements that achieve annexations to the City that conform to the General Plan Land Use Designations and open

space and park system, and are revenue neutral and cover all costs for public infrastructure, public facilities, and public services on an ongoing basis.

Policy LU-1-f. Coordination with Fresno County Land Use Planning. Seek a Memorandum of Understanding (MOU) with the County of Fresno to prohibit development inconsistent with this General Plan on unincorporated land within the City's (SOI).

Policy LU-11-c: General Plan Consistency. Pursue coordinated planning and development project reviews with relevant federal, State, and local public agencies to ensure consistency with this General Plan.

Orderly Outward Expansion

The County includes a policy regarding orderly outward expansion from City limits to within unincorporated areas. This policy is LU-G.4. The implementation of the following policies from the proposed General Plan Update would result in land use consistency with the County's policies.

Policy LU-1-a: Promote Development within the Existing City Limits as of December 31, 2012. Promote new development, infill, and rehabilitation of existing building stock in the Downtown Planning Area, along BRT corridors, in established neighborhoods generally south of Herndon Avenue, and on other infill sites and vacant land within the City.

Policy LU-1-c: Provision of Public Facilities and Services. Promote orderly land use development in pace with public facilities and services needed to serve development.

Policy LU-1-g: SOI Expansion. Maintain the City's current SOI boundaries without additional expansion, except to allow for the siting of a maintenance yard for the California High Speed Train project and related industrial and employment priority areas proximate to and south of the SOI boundary between State Route 41 and State Route 99. Prohibit residential uses in the expansion area.

Minimization of Land Use Conflicts

The County includes policies regarding minimizing land use conflicts as development occurs. These policies include LU-G.6 and LU-G.10. The implementation of the following policy from the proposed General Plan Update would result in land use consistency with the County's policies, and potential impacts would be less than significant.

Policy LU-1-b: Land Use Definition and Compatibility. Include zoning districts and standards in the Development Code that provide for the General Plan land use designations and create appropriate transitions or buffers between new development with existing uses, taking into consideration the health and safety of the community.

San Joaquin River Parkway Master Plan

The policies within the San Joaquin River Parkway Master Plan were reviewed to determine the consistency of the proposed project with the existing policies. As identified in Section 5.10.3 above, the Master Plan includes policies regarding development within the parkway and providing buffers.

Based on a review of the Master Plan policies, the following policies within the proposed General Plan Update would be consistent with the existing Master Plan policies, and potential impacts would be less than significant.

Development within the Parkway

Policy RC-10-b: Zoning in San Joaquin Riverbottom. Maintain zoning consistent with on-going mineral extraction in the San Joaquin Riverbottom that also allows multiple open space uses in conformance with State law and the City's Surface Mining Ordinance.

Policy POSS-5-c: Buffers for Natural Areas. Require development projects, where appropriate and warranted, to incorporate natural features (such as ponds, hedgerows, and wooded strips) to serve as buffers for adjacent natural areas with high ecological value.

Policy POSS-6-a: San Joaquin River Parkway Master Plan. Support the San Joaquin River Conservancy in its efforts to update the San Joaquin River Parkway Master Plan by working with the other jurisdictions and the River Conservancy to create a comprehensive and feasible plan for preservation, conservation, and development.

Policy POSS-7-d. Buffer Zones near Intensive Uses. Protect natural reserve areas and wildlife corridor areas in the San Joaquin River corridor whenever more intensive human uses exist or are proposed on adjacent lands. Use buffer zones to allow multiple uses on parts of the parkway while still protecting wildlife and native plants.

- Require studies of appropriate buffer widths to be approved by State and federal wildlife agencies before variances from standard buffer zone widths are granted.
- Maintain natural riparian buffer zones with appropriate native plants (seed material and cuttings locally derived).
- Incorporate open space uses such as pasture, low-intensity agricultural activities, and the "rough" or marginal areas of golf courses, into buffer zones when they constitute an improvement in habitat over a previous use or degraded area. Evaluate and address the potential impacts of construction, cultural, and operational practices (such as grading, number of livestock per acre, lighting, and use of pesticides, herbicides, and fertilizers) before these uses are be approved for buffering.
- For nearby areas of the San Joaquin River corridor outside of the exclusive jurisdiction of the City, support efforts to work with other jurisdictions to achieve this policy.

Provide Buffers

Policy POSS-5-c: Buffers for Natural Areas. Require development projects, where appropriate and warranted, to incorporate natural features (such as ponds, hedgerows, and wooded strips) to serve as buffers for adjacent natural areas with high ecological value.

Policy POSS-7-d: Buffer Zones near Intensive Uses. Protect natural reserve areas and wildlife corridor areas in the San Joaquin River corridor whenever more intensive human uses exist or are

proposed on adjacent lands. Use buffer zones to allow multiple uses on parts of the parkway while still protecting wildlife and native plants.

- Require studies of appropriate buffer widths to be approved by State and federal wildlife agencies before variances from standard buffer zone widths are granted.
- Maintain natural riparian buffer zones with appropriate native plants (seed material and cuttings locally derived).
- Incorporate open space uses such as pasture, low-intensity agricultural activities, and the "rough" or marginal areas of golf courses, into buffer zones when they constitute an improvement in habitat over a previous use or degraded area. Evaluate and address the potential impacts of construction, cultural, and operational practices (such as grading, number of livestock per acre, lighting, and use of pesticides, herbicides, and fertilizers) before these uses are be approved for buffering.
- For nearby areas of the San Joaquin River corridor outside of the exclusive jurisdiction of the City, support efforts to work with other jurisdictions to achieve this policy.

Policy LU-1-b: Land Use Definition and Compatibility. Include zoning districts and standards in the Development Code that provide for the General Plan land use designations and create appropriate transitions or buffers between new development with existing uses, taking into consideration the health and safety of the community.

Cumulative Impact Analysis

Development of cumulative projects in the vicinity of the Planning Area could have the potential to result in inconsistencies within the jurisdictions of the cumulative projects such as the County of Fresno, County of Madera, and City of Clovis. These potential inconsistencies resulting from cumulative projects could result in significant cumulative impacts on plans and policies within the jurisdictions of the proposed cumulative project as discussed above, the implementation of the proposed General Plan would be consistent with federal, state, regional, and local plans. Since the proposed General Plan would be consistent with these plans, the potential environmental impacts associated with these plans from buildout of the proposed General Plan would be less than significant. Therefore, the project's contribution to potential cumulative impacts on these plans would be less than cumulatively considerable. Thus, the project would result in a less than significant cumulative impact.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Conflict with Conservation Plans

Impact LUP-3	**The project would not conflict with any applicable habitat conservation plan or natural communities conservation plan.**

Project Specific Impact Analysis

The City of Fresno Planning Area does not occur within the boundaries of any approved or draft Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP) or other adopted local, regional or state HCP. Therefore, development within the Planning Area will not result in any impacts to an adopted HCP or NCCP.

Cumulative Impact Analysis

Although outside the cumulative impact study area for land use and planning, the nearest NCCP is the Metropolitan Bakersfield Habitat Conservation Plan (MBHCP). No City of Fresno development activities are proposed that would conflict with either the goals of the MBHCP or any HCP/NCCP in the study area. No HCPs or NCCPs occur within the ccumulative impact study area. In addition, cumulative development within the ccumulative impact study area would not result in an impact to any HCP/NCCP. Therefore, the proposed project and cumulative projects would result in no cumulative impacts on any HCP/NCCP.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

No impact.

Cumulative

No impact.

5.11 - Noise

5.11.1 - Introduction

Noise can be defined as a sound or series of sounds that are intrusive, irritating, objectionable, or disruptive to daily life. Excessive noise may also cause actual physical harm and have adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum - they are adjusted to reflect only those frequencies that are audible to the human ear. Typically, a 10-dBA increase is perceived as a doubling of the sound, while a 3-dBA increase is not noticeable to the human ear.

For comparison, Table 5.11-1 provides noise levels typical of the urban environment.

Table 5.11-1: Representative Environmental Noise Levels

Noise from Common Outdoor Activities at a Given Distance	A-Weighted Sound Level in Decibels (dBA)	Noise from Common Indoor Activities at a Given Distance	Subjective Impression
Jet Takeoff (200 feet)	—120—		Pain Threshold
	—110—	Rock Music Concert	
Jet Fly-over at 100 feet			
Ambulance Siren (100 feet)	—100—		Very Loud
Gas Lawnmower at 3 feet			
	—90—	Boiler room	
		Food Blender at 3 feet	
Diesel Truck going 50 mph at 50 feet Freight Cars at 50 feet Pneumatic Drill at 50 feet	—80—	Garbage Disposal at 3 feet	
Noisy Urban Area during Daytime			
Gas Lawnmower at 100 feet Freeway at 100 feet	—70—	Vacuum Cleaner at 10 feet	Moderately Loud
Commercial Area		Normal Speech at 3 feet	
Heavy Traffic at 300 feet	—60—		
		Large Business Office	

Noise from Common Outdoor Activities at a Given Distance	A-Weighted Sound Level in Decibels (dBA)	Noise from Common Indoor Activities at a Given Distance	Subjective Impression
Light Traffic (100 feet) Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room	
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)	Quiet
Quiet Suburban Area during Nighttime			
	—30—	Library Soft Whisper (5 feet)	
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)	
	—20—		
		Broadcast/Recording Studio	
	—10—		Threshold of Hearing
	—0—		Lowest Threshold of Human Hearing
Source: California Department of Transportation, 1998.			

Noise Descriptors

Noise equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in dBA. The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour L_{eq} is the noise metric used by the California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Sound Level (L_{dn}) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. The Community Noise Equivalent Level (CNEL) is similar to the L_{dn}, except that it has another addition of 4.77 dB to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these times because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient or background noise levels, which creates an increased sensitivity to sounds. These weighted averages attempt to model real-world conditions. Noises during the day are generally expected, whereas in the evening or at night when people typically are sleeping, noises are more bothersome. For this reason, the sound is perceived to be louder in the evening and nighttime hours and is weighted accordingly. Many jurisdictions rely on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

Another noise descriptor that is used primarily for the assessment of aircraft noise impacts is the Sound Exposure Level, which is also called the Single Event Level (SEL). The SEL descriptor represents the acoustic energy of a single event (i.e., an aircraft overflight) normalized to one-second event duration. This is useful for comparing the acoustical energy of different events involving different durations of the noise sources. The SEL is based on an integration of the noise during the period when the noise first rises within 10 dBA of its maximum value and last falls below 10 dBA of its maximum value. The SEL is often 10 dBA greater, or more, than the L_{MAX}, since the SEL logarithmetically adds the L_{eq} for each second of the duration of the noise.

Tone Noise

A pure tone noise is a noise produced at a single frequency. Laboratory tests have shown the humans are more perceptible to changes in noise levels of a pure tone (Caltrans 1998). For a noise source to contain a "pure tone," there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to "stand out" against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contagious one-third octave bands by: 5 dB for center frequencies of 500 Hertz (Hz) and above; by 8 dB for center frequencies between 160 and 400 Hz; and by 15 dB for center frequencies of 125 Hz or less.

Noise Propagation

From the noise source to the noise receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source, as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models: (1) soft-site and (2) hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone, and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions, compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. To be conservative, hard-site conditions are generally used in noise analysis.

Noise Attenuation

Noise-related land use issues are typically composed of three basic elements: (1) the noise source, (2) a transmission path, and (3) a receiver. The appropriate acoustical treatment for a given project should consider the nature of the noise source and the sensitivity of the receiver. When the potential for a noise-related problem is present, either avoidance of the noise-related problem or noise control techniques should be selected to provide an acceptable noise environment for the receiver while remaining consistent with local aesthetic standards and practical structural and economic limits. Fundamental noise control options are described below.

Noise Barriers

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. For a noise barrier to work, it must be high enough and long enough to block the view of a road. A noise barrier is most effective when placed close to the noise source or receiver. A noise barrier can achieve a 5-dBA noise level reduction when it is tall enough to not allow a line-of-sight view of the road. When the noise barrier is an earthen berm instead of a wall, the noise attenuation can be increased by another 3 dBA.

Setbacks

Noise exposure may be reduced by increasing the setback distance between the noise source and the receiving use. Setback areas can take the form of open space, frontage roads, recreational areas, and storage yards. The available noise attenuation from this technique is limited by the characteristics of the noise source, but generally ranges between 4 and 6 dBA.

Site Design

Buildings can be placed on a property to shield other structures or areas affected by noise, and to prevent an increase in noise levels caused by reflections. The use of one building to shield another can significantly reduce overall noise control costs, particularly if the shielding structure is insensitive to noise. An example would be placing a detached garage nearest the noise source to shield the house or backyard.

Site design should guard against creating reflecting surfaces that may increase onsite noise levels. For example, two buildings placed at an angle facing a noise source may cause noise levels within that angle to increase by up to 3 dBA. The open end of U-shaped buildings should point away from noise sources for the same reason. Landscaping walls or noise barriers located within a development may inadvertently reflect noise back to a noise-sensitive area unless carefully located.

Building Facades

When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through acoustical design of building facades. Standard construction practices provide a noise reduction of 10–15 dBA for building facades with open windows, and a noise reduction of approximately 25 dBA when windows are closed (Table 5.11-2). An exterior-to-interior noise reduction of 25 dBA can be obtained by requiring that building design include adequate ventilation

systems, which allows windows facing a noise source to remain closed, even during periods of excessively warm weather.

Table 5.11-2: Noise Reduction Afforded by Common Building Construction

Construction Type	Typical Occupancy	General Description	Range of Noise Reduction (dB)[1]
1	Residential, Commercial, Schools	Wood frame, stucco or wood sheathing exterior. Interior drywall or plaster. Sliding glass windows, with windows partially open.	15 to 20
2	Same as 1 above	Same as 1 above, but with windows closed.	25 to 30
3	Commercial, Schools	Same as 1 above, but with fixed 0.25-inch plate glass windows.	30 to 35
4	Commercial, Industrial	Steel or concrete frame, curtain wall, or masonry exterior wall. Fixed 0.25-inch plate glass windows.	30 to 40

Notes:
[1] Range depends on the amount windows are open, degree of window seal, and glass area of windows.
Source: Caltrans 2002: 7-37.

Where greater noise reduction is required, acoustical treatment of the building facade may be necessary. Reducing relative window area is the most effective control technique, followed by providing acoustical glazing (e.g., thicker glass or increased air space between panes) within frames with low air infiltration rates, using fixed (i.e., non-movable) acoustical glazing, or eliminating windows altogether. Noise transmitted through walls can be reduced by increasing wall mass (e.g., using stucco or brick in lieu of wood siding), or isolating wall members by using double or staggered stud walls, while noise transmitted through doorways can be lessened by reducing door area, using solid-core doors, or sealing door perimeters with suitable gaskets. Noise-reducing roof treatments include using plywood sheathing under roofing materials.

Landscaping

While the use of trees and other vegetation is often thought to provide significant noise attenuation, approximately 100 feet of dense foliage – with no visual path extending through the foliage – is required to achieve a 5-dBA attenuation of traffic noise. Thus, the use of vegetation as a noise barrier is not considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.

Vegetation can be used, however, to acoustically "soften" intervening ground between a noise source and a receiver, increasing ground absorption of sound, and thus, increasing the attenuation of sound with distance. Planting trees and shrubs also offers aesthetic and psychological value, and it may reduce adverse public reaction to a noise source by removing the source from view, even though noise levels would be largely unaffected.

Groundborne Vibration Fundamentals

Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Groundborne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may consist of the rattling of windows or dishes on shelves.

Vibration Descriptors

Several different methods are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (RMS) amplitude of the vibration velocity. Because of the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels, it is denoted as LV, and is based on the RMS velocity amplitude. A commonly used abbreviation is VdB, which in this text, is when vibration level (L_V) is based on the reference quantity of 1 micro inch per second.

Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Offsite sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads. Smooth, well-maintained roads rarely produce perceptible groundborne noise or vibration. Acceptable vibration levels for an office environment would be 84 VdB, while acceptable levels for residential uses would be 78 VdB (Federal Transportation Administration 2006). Caltrans guidelines recommend a standard of 0.3 in/sec PPV not be exceeded for the protection of "normal" residential buildings and 0.1 in/sec PPV not be exceeded for the protection of old or historically significant structures (Caltrans 2004).

Vibration Propagation

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform median, while groundborne vibrations travel through the earth, which may contain significant geological differences. There are three main types of vibration propagation: (1) surface, (2) compression, (3) and shear waves. Surface waves, or Rayleigh waves, travel along the ground surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a body of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration

source. As stated above, this drop-off rate can vary greatly depending on the particular soil conditions, but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

Construction-Related Vibration Level Prediction

There are no federal, State, or local regulatory standards for ground-borne vibration. However, various criteria has been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Caltrans criteria for the evaluation of ground-borne vibration levels, with regard to structural damage and human annoyance, are provided in Table 5.11-3 and Table 5.11-4, respectively. The criteria differentiate between transient and continuous/frequent sources. Transient sources of ground-borne vibration include intermittent events, such as blasting. Continuous and frequent events include the operations of equipment, including construction equipment, and vehicle traffic on roadways.

Table 5.11-3: Damage Potential to Buildings at Various Groundborne Vibration Levels

Structure and Condition	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.2	0.1
Historic and Some Old Buildings	0.5	0.25
Older Residential Structures	0.5	0.3
New Residential Structures	1.0	0.5
Modern Industrial/Commercial Buildings	2.0	0.5
Note: Transient sources create a single isolated vibration event, such as blasting. Intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, and vibratory compaction equipment. Source: Caltrans 2004		

Table 5.11-4: Annoyance Potential to People at Various Groundborne Vibration Levels

Human Response	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.10

Human Response	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Severe	2.0	0.4

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, and vibratory compaction equipment.
Source: Caltrans 2004

The ground-borne vibration criteria recommended by Caltrans for evaluation of potential structural damage is based on building classifications, which take into account the age and condition of the building. For residential structures and newer buildings, Caltrans considers a peak-particle velocity (ppv) threshold of 0.5 inches per second (in/sec) for transient sources and 0.3 in/sec for continuous/frequent sources to be sufficient to protect against building damage. Continuous ground-borne vibration levels below approximately 0.08 in/sec ppv are unlikely to cause damage to any structure.

In terms of human annoyance, continuous vibrations in excess of 0.04 in/sec ppv and transient sources in excess of 0.25 in/sec ppv are identified by Caltrans as the minimum perceptible level for ground vibration. Short periods of ground vibration in excess of 2.0 in/sec ppv, or continuous / frequent vibrations in excess of 0.4 in/sec ppv, can be expected to result in severe annoyance to people. .

5.11.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding noise is the City of Fresno Planning Area and the immediate surrounding areas including the County of Fresno, County of Madera, and City of Clovis because potential development under the proposed project could affect areas inside and outside the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative noise impacts is similar to the study area for project impacts. The study area for cumulative noise impacts is the City of Fresno Planning Area and the immediate surrounding County of Fresno, County of Madera, and City of Clovis areas because cumulative development in the areas immediately surrounding the City of Fresno Planning Area could combine with development under the proposed project and result in cumulative noise impacts.

Existing Noise Levels

Generally, the three primary sources of substantial noise that affect the City of Fresno and its residents are all transportation-related and consist of local streets and regional highways; airport

operations at the Fresno Yosemite International, the Fresno-Chandler Downtown, and the Sierra Sky Park Airports; and railroad operations along the BNSF Railway and the Union Pacific Railroad lines.

The existing noise conditions in the General Plan Update Planning Area were measured at nine locations from May 30 to June 1, 2012. Noise monitoring sites were selected to be representative of typical residential, commercial, and industrial sites within the Planning Area, as well as arterial roadways, elevated and below-grade freeways, and railroad crossings with and without train horn soundings. At each of the nine long-term 24-hour noise monitoring sites, day-night statistical noise level trends were recorded to develop DNL values. Descriptions of each location and the measured noise levels are provided in Table 5.11-5.

Table 5.11-5: Measured Existing Noise Levels from General Plan Update

Location	Distance from Noise Source Centerline (feet)	Measured Noise Level (dBA L_{dn})
Railroad crossing at Shields Avenue	100	84
Along Railroad near W Barstow Avenue	100	74
SR 41 between W Barstow Avenue and W Shaw Avenue	100	76
SR 180 near N Peach Avenue	100	76
E Shaw Avenue near N Cedar Avenue	100	72
N Blackstone Avenue near E Ashlan Avenue	100	70
S Elm Avenue near E Jensen Avenue	100	68
N Valentine Avenue between W Ashlan Avenue and W Holland Avenue	100	67
S Fruit Avenue north of Church Avenue	100	65
Source: City of Fresno General Plan 2014.		

In addition to the above noise measurements, First Carbon Solutions took noise measurements at 27 locations throughout the City and the results are shown below in Table 5.11-6.

Table 5.11-6: Additional Measured Existing Noise Levels

Location	Distance from Noise Source (feet)	Measured Noise Level (dBA L_{eq})
Shaw Avenue (Polk Avenue to SR-99)	25	66.5
Grantland Avenue (W Ashland Avenue to E Shields Avenue)	20	64.8
Golden State Boulevard (W Shaw Avenue to W Santa Ana Avenue)	25	72.2
N Brawley Avenue (W Clinton Avenue to McKinley Avenue)	20	65.5

Location	Distance from Noise Source (feet)	Measured Noise Level (dBA L_{eq})
W Belmont Avenue (Marks Avenue to Hughes Avenue)	20	65.9
E McKinley Avenue (West Avenue to N Fruit Avenue)	25	64.2
W Kearney Boulevard (West Avenue to S Fruit Avenue)	20	63.3
Jensen Avenue (Fruit Avenue to Walnut Avenue)	20	71.0
N Friant Road (E Audubon Avenue to Blackstone Avenue)	20	73.3
E Herndon Avenue (SR-41 NB Off Ramp to N Fresno Street)	30	57.0
W Ashlan Avenue (N Fruit Avenue to N Palm Avenue)	20	70.4
W Bullard Avenue (West Avenue to N Palm Avenue)	20	68.7
Fresno Street (B Street to A Street)	20	69.7
Ventura Avenue (M Street to O Street)	20	67.4
Divisadero Street (Van Ness Avenue to San Pablo Avenue)	20	64.5
Blackstone Avenue (Belmont Avenue to Divisadero Street)	20	65.5
P Street (Divisadero Street to Tuolumne Street)	25	62.3
Tulare Street (U Street to SR-41)	20	78.3
First Street (Belmont Avenue to SR-180)	25	66.1
S Peach Avenue (E Kings Canyon Road to Lane Avenue)	20	61.7
E Jensen Avenue (S Clovis Avenue to S Peach Avenue)	25	70.8
S Temperance Avenue (E Butler Avenue to E Kings Canyon Road)	20	64.9
N Clovis Avenue (E Olive Avenue to E McKinley Avenue)	20	66.3
E McKinley Avenue (SR-168 to N Maple Avenue)	25	71.2
E Shaw Avenue (SR-168 to N Chestnut Avenue)	20	67.6
Willow Avenue (E Bullard Avenue to E Barstow Avenue)	20	70.5
Source: City of Fresno General Plan 2014.		

Roadways

Those areas in the City that experience sound levels greater than 60 dBA L_{dn} are typically near major vehicular traffic corridors. Highway traffic noise levels typically depend on three factors: (1) the volume of traffic, (2) the average speed of traffic, and (3) the vehicle mix (i.e., the percentage of trucks versus automobiles in the traffic flow). Vehicle noise includes noises produced by the engine, exhaust, tires, and wind generated by taller vehicles. Other factors that affect the perception of traffic noise include the distance from the highway, terrain, vegetation, and natural and structural obstacles. While tire noise from automobiles is generally located at ground level, truck noise sources

can be located as high as 10 to 15 feet above the roadbed due to tall exhaust stacks and higher engines.

Freeway traffic is the dominant noise source in Fresno. The freeways in Fresno consist of State Route 41 (SR-41), which has up to 76,800 vehicles per day, State Route 99 (SR-99), which has up to 58,100 vehicles per day, and State Route 180 (SR-180), which has up to 68,740 vehicles per day. Although most noise sensitive land uses adjacent to these freeways are mitigated by existing sound walls, topography or buildings, there are still some noise sensitive land uses that currently exceed the City's 60 dBA L_{dn} noise standard. In addition to the freeways, there are places throughout the City where traffic volumes on every roadway classification are high enough to create noise levels that currently exceed the City's 60 dBA L_{dn} noise standard at the nearby sensitive land uses.

Airport Operations

There are currently three airports located within the City of Fresno and consist of Fresno Yosemite International Airport, Fresno-Chandler Downtown Airport (also known as the "Fresno-Chandler Executive Airport"), and Sierra Sky Park Airport. CNEL Noise contours have been developed and are provided in the Land Use Policy Plan prepared for each airport (refer to the heading "Airport Land Use Commission of Fresno County" under Section 5.11.3, Regulatory setting, below). Each of the Environs Plans includes CNEL noise contours based on projected airport and aircraft operations. These noise contours are used to determine land use compatibility and locations for noise mitigation measures.

Commercial jet aircraft operations are limited to the Fresno Yosemite International Airport. The Air National Guard is also stationed there and operates military jets and other aircraft. Private and commercial operations with smaller aircraft use the Fresno Chandler Downtown Airport, while only small private aircraft use the Sierra Sky Park Airport.

Railroad Operations

The two major rail lines that traverse the City are the Union Pacific Railroad line, which is generally located along SR-99, and the BNSF Railway, which diverges from SR-99 in the southwest and travels through the downtown (behind City Hall) to the northwest. The Union Pacific line is generally located within a heavy commercial and industrial corridor, although residential uses occur in the vicinity of the line north of Shaw Avenue. The Union Pacific line limits its use to only freight traffic.

South of the Central Area, the BNSF Railway is bound by industrial uses, while north of the Central Area the line is generally located within a residential area. The BNSF Railway carries both freight and passenger traffic (Amtrak).

Stationary Noise Sources

Stationary noise sources can also have an effect on the population, and unlike mobile, transportation-related noise sources, these sources generally have a more permanent and consistent impact on people. These stationary noise sources involve a wide spectrum of uses and activities, including various industrial uses, commercial operations, agricultural production, school

playgrounds, high school football games, HVAC units, generators, lawn maintenance equipment, and swimming pool pumps.

Even with incorporation of the best available noise control technology, noise emanating from industrial uses can be substantial and exceed local noise standards. These noise sources can be continuous and may contain tonal components that may be annoying to nearby receptors. Although industrial uses in the City of Fresno are typically located in industrial districts near freeways and commercial uses, and away from residences and other sensitive noise receptors, noise sources associated with commercial uses such as automotive repair facilities, recycling centers, and loading docks may occur in the vicinity of residential uses.

5.11.3 - Regulatory Setting

The General Plan Update Planning Area encompasses the City of Fresno and its SOI. Noise regulations are addressed through the efforts of various federal, State, and local government agencies. The agencies responsible for regulating noise are discussed below.

Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency limits noise exposure of workers to 90 dB L_{eq} or less for 8 continuous hours, or 105 dB L_{eq} or less for 1 continuous hour. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately, that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, local jurisdictions are limited to regulating the noise

generated by the transportation system through nuisance abatement ordinances and land use planning.

State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model, which is shown in Exhibit 5.11-1, the "Land Use Compatibility for Community Noise Environments Matrix," which allows a local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new transient (e.g., hotels, motels) and multi-family dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dB CNEL. When such structures are located within a 60 dB CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45 dB CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Local

The General Plan Update Planning Area encompassed the City of Fresno and its SOI. The existing City of Fresno regulations regarding noise and vibration are presented below.

City of Fresno General Plan

The City of Fresno 2025 General Plan contains goals, objectives, and policies that address noise. The following General Plan goals, objectives, and policies are applicable to the proposed project:

Goal 1. Enhance the quality of life for the citizens of Fresno and plan for the projected population within the moderately expanded Fresno urban boundary in a manner which will respect physical, environmental, fiscal, economic, and social issues.

Goal 14. Protect and improve public health and safety.

Noise Element

H-1. OBJECTIVE. Protect the citizens of the city from the harmful and annoying effects of exposure to excessive noise.

H-1-a. Policy. Noise-sensitive land uses impacted by existing or projected future transportation noise sources shall include mitigation measures so that resulting noise levels do not exceed the standards shown in Table 8 [Table 5.11-7 of this section] below:

Table 5.11-7: Maximum Allowable Noise Exposure for Noise-Sensitive Land Uses

Land Use[1]	Outdoor Activity Areas[2] L_{dn} dB	Interior Spaces	
		L_{dn} dB	L_{dn} dB[3]
Residential	60[4]	45	—
Transient Lodging	60[4]	45	—
Hospitals, Nursing Homes	60[4]	45	—
Theaters, Auditoriums, Music Halls	—	—	35
Churches, Meeting Halls	60[4]	—	45
Office Buildings	—	—	45
Schools, Libraries, Museums	—	—	45

Notes:
1 The Planning and Development Director, on a case-by-case basis, may designate land uses other than those shown in this table to be noise-sensitive, and may require appropriate noise mitigation measures.
2 Where the location of the outdoor activity area is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.
3 As determined for a typical worst-case hour during periods of use.
4 Noise levels up to 65 dB Ldn adjacent to the Burlington Northern Santa Fe and Union Pacific mainline tracks may be allowed by the project approving authority when it is determined that it is not possible to achieve 60 dB Ldn in outdoor activity areas using a practical application of the best-available noise reduction technology, and when all feasible exterior noise reduction measures have been proposed.
Source: 2025 Fresno General Plan, Noise Element, February 2002, p. 163.

H-1-b. Policy. For purposes of city analyses of noise impacts, and for determining appropriate noise mitigation, a significant increase in ambient noise levels is assumed if the project causes ambient noise levels to exceed the following:

- The ambient noise level is less than 60 dB Ldn and the project increase noise levels by 5 dB or more.
- The ambient noise level is 60-65 dB Ldn and the project increases noise levels by 3 dB or more.
- The ambient noise level is greater than 65 dB Ldn and the project increases noise levels by 1.5 dB or more.

H-1-c. Policy. The city shall review new public and private development proposals to determine conformance with the policies of this Noise Element.

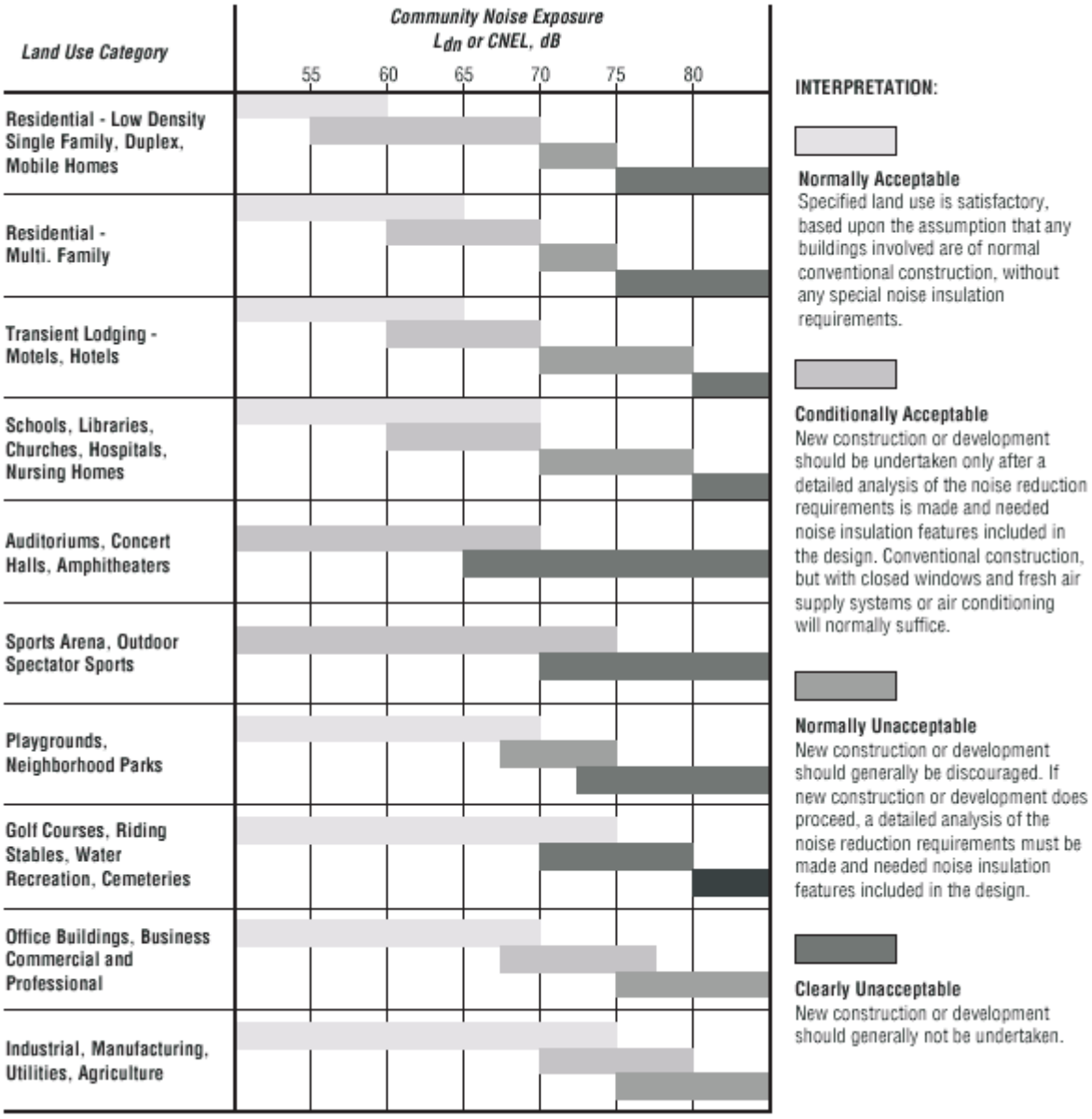


Exhibit 5.11-1
Land Use Compatibility for Community Noise Environments Matrix

H-1-d. Policy. The city shall require an acoustical analysis in those cases where a project potentially threatens to expose existing or proposed noise-sensitive land uses to excessive noise levels. The presumption of potentially excessive noise levels shall be based on the location of new noise-sensitive uses to known noise sources or staff's professional judgment that a potential for adverse noise impacts exists. Acoustical analyses shall be required early in the review process so that noise mitigation may be included in the project design. For development not subject to environmental review, the requirements for an acoustical analysis shall be implemented prior to the issuance of building permits. The requirements for the content of an acoustical analysis are established by the Planning and Development Department in conjunction with environmental health agencies.

H-1-e. Policy. The city shall develop and employ procedures to ensure that noise mitigation measures required pursuant to an acoustical analysis are implemented in the development review and building permit processes.

H-1-f. Policy. The city shall develop and employ procedures to monitor compliance with the policies of the Noise Element after completion of projects where noise mitigation measures have been required.

H-1-g. Policy. The city shall enforce the State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Unicom Building Code (UBC) concerning interior noise exposure for multi-family housing, hotels and motels.

H-1-h. Policy. The city shall request the California Highway Patrol, the Sheriff's and Police Department to actively enforce the California Vehicle Code sections relating to adequate vehicle mufflers and modified exhaust systems, and sound systems in vehicles.

H-1-i. Policy. The city shall review and update the Noise Element and the Noise Ordinance to ensure that noise exposure information and specific policies and ordinances are consistent with changing conditions with the city and with noise control regulations or policies enacted after the adoption of this element.

H-1-j. Policy. Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so that resulting noise levels do not exceed the adopted standards at noise-sensitive land uses.

H-1-k. Policy. Noise-sensitive land uses impacted by stationary noise sources shall include mitigation measures so that resulting noise levels do not exceed the standards shown in Table 9 [Table 5.11-8 of this section] as follows:

Table 5.11-8: Maximum Allowable Noise Exposure-Stationary Noise Sources

	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Equivalent Sound Level (L_{eq}), dB	50	45
Maximum Sound Level (L_{max}), dB	70	65
Notes: Noise sources were determined at the outdoor activity areas. Where the location of outdoor activity area is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus five (5) dB. Source: 2025 Fresno General Plan Noise Element, February 2002, p. 165.		

H-1-l. Policy. Noise created by new proposed stationary noise sources or existing stationary noise sources which undergo modifications that may increase noise levels shall be mitigated so as not to exceed the noise level standards of Table 9 [Table 5.11-8 of this section] at noise-sensitive land uses.

H-1-m. Policy. As a guideline, noise barrier (wall, earth berms, or berm/wall combinations) shall not exceed 15 feet in height as measured from the elevation of the nearest building pad. The Planning Department Director, on a case-by-case basis, may allow noise barrier heights differing from this guideline. However, resulting noise levels must satisfy the maximum allowable noise exposure standards.

City of Fresno Municipal Code

Chapter 10e, Article 1 (Noise Regulations), of the Fresno Municipal Code establishes excessive noise guidelines and exemptions. The following portions of the Municipal Code are applicable to the proposed project:

SEC. 10-102. Definitions.

(b) Ambient Noise. "Ambient noise" is the all-encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far. For the purpose of this ordinance, ambient noise level is the level obtained when the noise level is averaged over a period of fifteen minutes, without inclusion of the offending noise, at the location and time of day at which a comparison with the offending noise is to be made. Where the ambient noise level is less than that designated in this section, however, the noise level specified herein shall be deemed to be the ambient noise level for that location.

District	Time	Sound Level Decibels
Residential	10 pm to 7 am	50
Residential	7 pm to 10 pm	55
Residential	7 am to 7 pm	60
Commercial	10 pm to 7 am	60

District	Time	Sound Level Decibels
Commercial	7 am to 10 pm	65
Industrial	anytime	70

SEC. 10-105. Excessive Noise Prohibited. No person shall make, cause, or suffer or permit to be made or caused upon any premises or upon any public street, alley, or place within the city, any sound or noise which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing or working in the area, unless such noise or sound is specifically authorized by or in accordance with this article. The provisions of this section shall apply to, but shall be limited to, the control, use, and operation of the following noise sources:

(a) Radios, musical instruments, phonographs, television sets, or other machines or devices used for the amplification, production, or reproduction of sound or the human voice.

(b) Animals or fowl creating, generating, or emitting any cry or behavioral sound.

(c) Machinery or equipment, such as fans, pumps, air conditioning units, engines, turbines, compressors, generators, motors or similar devices, equipment, or apparatus.

(d) Construction equipment or work, including the operation, use or employment of pile drivers, hammers, saws, drills, derricks, hoists, or similar construction equipment or tools.

SEC. 10-107. School, Hospitals, and Churches. No person shall create any noise on any street, sidewalk, or public place adjacent to any school, institution of learning, or church while the same is in use, or adjacent to any hospital, which noise unreasonably interferes with the workings of such institution or which disturbs or unduly annoys patients in the hospital, provided conspicuous signs are displayed in such street, sidewalk, or public place indicating the presence of a school, church, or hospital.

SEC. 10-109. Exceptions. The provisions of this article shall not apply to:

(a) Construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the city or other governmental agency, or to site preparation and grading, provided such work takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday.

(b) Emergency work.

(c) Any act or acts which are prohibited by any law of the State of California or the United States.

Airport Land Use Commission of Fresno County

The Fresno Yosemite International Airport Land Use Compatibility Plan (ALUCP), the Fresno-Chandler Downtown Airport ALUCP, and the Sierra Sky Park ALUCP include policies designed to regulate the compatibility of land uses surrounding the airport and associated operations. The following ALUCP policies are applicable to the proposed project:

Fresno Yosemite International Airport Compatibility Land Use Plan

Chapter 3: Compatibility Policies and Criteria

3.1 Noise. The purpose of noise compatibility policies is to avoid establishment of new noise-sensitive land uses and exposure of the users to levels of aircraft noise that can disrupt activities involved. The noise contours established for the purpose of evaluating noise compatibility of land use are depicted on Figure 4.1. The state law (Public Utilities Code Section 21675(a)) requires that noise contours reflect the anticipated growth of the airport during at least the next 20 years. The AMP, 2011 EA/EIR, and 2012 EA/MND provided the activity forecast used in the contour calculations.

(2) The maximum noise exposure which shall be considered normally acceptable for residential areas is 65 dBA CNEL. The residential area criterion establishes the baseline from which noise compatibility for other land uses shall be evaluated.

(3) The relative acceptability or unacceptability of particular land uses with respect to the noise levels to which they would be exposed is indicated in the "Airport/Land Use Noise Compatibility Criteria" matrix, Table E l. These criteria shall be the principal determinants of whether a proposed land use is compatible with the noise impact from the FYI [Fresno Yosemite International Airport]. Special circumstances which would affect the specific proposal's noise sensitivity (e. g., the extent or lack of outdoor activity) also shall be taken into account.

(4) As determined by the ALUC, a condition for approval of a proposed land use which is shown on Table 1 identified as "Conditional" for a given noise environment shall be that the building intended for habitation or occupation provide a satisfactory degree of noise attenuation. Table 2 sets forth the permitted interior noise levels, the use may be deemed compatible.

(5) New residential development and new schools shall be prohibited within the adopted 65 [dBA] CNEL contour of FYI [the Fresno Yosemite International Airport] unless it is determined that there is no feasible alternative to such development of the subject property and provided that the following conditions are met:

(a) The record property owner grants an aviation easement to the City of Fresno.

(b) The record property owner executes an agreement in favor of the City of Fresno, whereby the property owner shall indemnify, hold harmless and defend the City and the ALUC, and every officer and employee thereof from any and all loss, liability, damages, costs, suits or claims arising out of the location of the development within the 65 [dBA] CNEL contour.

(c) New residential structures shall incorporate noise insulation in compliance with Title 24 of the California Code of Regulations such that interior noise levels are reduced to no more than 45 dB CNEL.

(6) An acoustical analysis shall be required prior to the approval of a special permit (site plan or conditional use permit) for any new residential use, transient lodging, school, library,

hospital, nursing home, day nursery, church, auditorium or a concert hall located within a 65 or greater CNEL contour. For single family residential proposals, an acoustical analysis shall be required as a condition of subdivision map approval, said analysis to be submitted prior to the issuance of building permits. The acoustical analysis shall be completed in a manner consistent with Title 24 of the California Code of Regulations. A special permit for the uses listed above shall not be approved unless the acoustical analysis demonstrates that interior noise levels attributable to exterior sources does not exceed 45 db CNEL in any habitable room with windows and doors closed. In quantifying aircraft noise exposure of the project site, the acoustical analysis shall include consideration of engine run up noise where applicable. A single report may suffice for all similar proposals within the same CNEL contour.

(7) Within the 70 dBA CNEL contour, new or redeveloped schools, hospitals, nursing homes, libraries, day nurseries, churches, auditoriums, and amphitheaters shall be prohibited. New residential uses (excluding transient lodging) shall be prohibited, except as provided for in Policy No. (8), below.

(8) Existing residential uses lying within the 70 dBA CNEL contour, that conform to the land use designations of this plan, may be remodeled in such a way that does not increase the floor space of the residence, or rebuilt if destroyed by fire, explosion or other catastrophic means, consistent with regulations adopted by the local jurisdiction. consistent with regulations adopted by the local jurisdiction.

Fresno-Chandler Downtown Airport Land Use Policy Plan

Policy A.1. Airport and use noise compatibility shall be evaluated in terms of the Community Noise Equivalent Level (CNEL), as defined in Title 21, Subchapter 6, of the California Code of Regulations (noise standards). Wherever used in this plan, the term CNEL shall be assumed to be an annual average.

Policy A.2. The maximum noise exposure, which shall be considered acceptable for residential areas in the immediate area of FCH, is 60 CNEL, as shown in the Environs Plan Map (Figure D-I). This contour matches the moderate forecast for the year 2018, as described in the City of Fresno's Fresno-Chandler Downtown Airport Master Plan Report (1998). The residential area criterion establishes the baseline from which noise compatibility for other land uses shall be evaluated.

Policy A.3. The relative acceptability or unacceptability of particular land uses with respect to the noise levels to which they would be exposed is indicated in the "Noise Compatibility Criterion matrix (Table C-I). These criteria shall be the principal determinants of whether a proposed land use is compatible with the noise impact from the airport. Special circumstances, which would affect the specific proposal's noise sensitivity (e.g., the extent or lack of outdoor activity) shall also be taken into account.

Policy A.4. Any new residential use, transient lodging, school, library, hospital, nursing home, day nursery, church, auditorium or concert hall which requires a special permit (site plan or conditional use permit) and is located within a 60 or greater CNEL contour shall be constructed to comply with

Title 24 of the California Code of Regulations such that interior noise levels will measure no more than 45 CNEL. Mitigation measures must be done to achieve compliance with Title 24 requirements as recommended by a certified noise consultant. Any building opening shall be acoustically treated.

Policy A.5. New residential development and new schools shall be prohibited within the adopted 60 CNEL contour of FCH unless the ALUC makes specific findings that there is no feasible alternative to such development of the subject property and provided that the following conditions are met:

a) The property owner of record grants an avigation easement.

b) The record property owner executes an agreement whereby the property owner shall indemnify, hold harmless and defend the City of Fresno and every officer and employee thereof from any and all loss, liability, damages, costs, suits or claims arising out of the location of the development within the 60 CNEL contour.

c) New residential structures shall incorporate noise insulation in compliance with Title 24 of the California Code of Regulations such that interior noise levels are reduced to no more than 45 CNEL.

Policy A.6. Within the 65 CNEL contour, new or redeveloped schools, hospitals, nursing homes, libraries, day nurseries, churches, auditoriums, and amphitheaters shall be prohibited. New residential uses shall be prohibited, except as provided for in policy number 7 below.

Policy A.7. Existing residential uses lying within the 65 CNEL contour, that conform to the land use designations of this plan, may be remodeled in such a way that does not increase the floor space of the residence, or rebuilt if destroyed by fire, explosion or other catastrophic means, if the ALUC makes a specific finding that there is no feasible alternative to such development of the subject property, and if the remodled residence conforms to the conditions of Policy No. F, above. A use is considered to be destroyed if the cost of reconstruction, repairing or rebuilding would exceed fifty percent of the reasonable replacement value of the building immediately prior to the destruction.

Sierra Sky Park Land Use Policy Plan

Policy 1. The airport/aircraft noise exposure which shall be considered normally acceptable for residential areas is 65 dB CNEL as defined by Title 21, Subchapter 6 of the California Administrative Code (Noise Standards).

Policy 2. The relative acceptability or unacceptability of a particular land use with respect to the noise levels to which it would be exposed is indicated in the "Airport Noise Compatibility Criteria" matrix, Table 1. These criteria shall be the principal determinants of whether a proposed land use is compatible with a given airport/aircraft noise exposure. Special circumstances which could affect a specific proposal's noise sensitivity (e.g., the extent or lack of outdoor activity) shall also be taken into account.

Policy 3. The interior noise level attributable to airport-aircraft noise sources shall not exceed 45 dB CNEL with windows and doors closed in any habitable room or a residential dwelling.

Policy 4. An acoustical analysis shall be required for proposed projects involving land uses which are "conditionally acceptable" within a noise environment exceeding 65 dB CNEL, when such projects are proposed for areas within the 65 dB CNEL contour of the airport unless otherwise required by California Administrative Code (CAC) Title 24 (California Noise Insulation Standards). The acoustical analysis shall be completed in a manner which is consistent with the requirements of CAC Title 24. In quantifying aircraft noise exposure on site, the acoustical analysis shall include consideration of engine run-up noise where applicable.

Policy 5. When applying the noise compatibility criteria listed in Table 1to a given location, the basis for evaluation shall be the CNEL contours shown in the Policy Plan Map (Year 2000 forecast, projected future conditions - 76,320 annual operations). If the noise analysis, which may include noise monitoring, indicates that project noise exposure may be higher or lower than indicated by the Policy Map Plan due to site-specific conditions or changes in airport/aircraft operations, the noise exposure used for project evaluation may be adjusted based upon the best available information at the discretion of the Airport Land Use Commission.

5.11.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impacts on the environment. The criteria used to determine the significance of an impact to noise are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, noise impacts resulting from the proposed project are considered significant if the project would:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? (See Noise Levels in Excess of Standards, Impact NOI-1)

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? (See Excessive Groundborne Vibration, Impact NOI-2)

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? (See Permanent Increase in Ambient Noise Levels, Impact NOI-3)

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? (See Temporary or Periodic Increase in Ambient Noise Levels, Impact NOI-4)

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? (See Airport Noise Levels, Impact NOI-5)

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? (See Private Airstrip Noise Levels, Impact NOI-6)

5.11.5 - Project Impacts and Mitigation Measures

Noise Levels in Excess of Standards

Impact NOI-1	**The project would result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.**

Project Specific Impact Analysis

Short-Term Construction Impacts

Construction noise generated from development activities associated with buildout of the General Plan Update would typically occur intermittently and vary depending upon the nature or phase (e.g., demolition, land clearing, grading, excavation, erection) of construction. Noise produced by construction equipment such as earthmovers, material handlers, and portable generators can reach high levels. Generally, the grading phase of construction involves the most equipment and generates the highest noise levels, although noise ranges are usually similar across all construction phases. Typical construction equipment noise levels are provided in Table 5.11-9. As shown, noise levels generated by individual pieces of construction equipment generally range from approximately 77 dBA to 90 dBA L_{max} at 50 feet. Typical operating cycles vary by equipment type and specific activity, although cycles generally involve two minutes of full power, followed by three to four minutes at lower settings. Depending on the equipment required and duration of use, average-hourly noise levels associated with construction activity typically ranges from roughly 65 to 90 dBA L_{eq} at 50 feet. The highest noise levels are generally associated with grading and excavation phases (FHWA 2006).

Table 5.11-9: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA L_{max}) 50 feet from Source
Backhoe/Front-End Loader	80
Compactor	80
Concrete Mixer Truck	85
Dozer	85
Grader	85
Excavator/Scraper	85
Air Compressor	80
Gradall	85
Crane, Mobile	85
Generator	82
Truck (Dump/Flat Bed)	84
Jack Hammer	85
Paver	85
Pneumatic Tool	85
Pump	77

Equipment	Typical Noise Level (dBA L_{max}) 50 feet from Source
Roller	85
Concrete Saw	90
Sources: FHWA 2006, Roadway Construction Noise Model User's Guide	

Implementation of the project would include the demolition and construction of various uses throughout the Planning Area, including single- and multi-family residential, commercial, industrial, mixed use, and public facilities, as well as ancillary infrastructural improvements such as roadways and water delivery and wastewater conveyance pipelines.

As set forth by Chapter 10, Article 1, Section 10-109 – Exemptions, the provisions of Article 1 – Noise Regulations of the Fresno Municipal Code shall not apply to:

> Construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the city or other governmental agency, or to site preparation and grading, provided such work takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday.

Thus, although development activities associated with buildout of the Planning Area could potentially result in a temporary or periodic increase in ambient noise levels in the project vicinity (as addressed below in Impact NOI-4), construction activity would be exempt from City of Fresno noise regulations, as long as such activity is conducted pursuant to an applicable construction permit and occurs between 7:00 a.m. and 10:00 p.m., excluding Sunday. Therefore, short-term construction impacts associated with the exposure of persons to or the generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies would be less than significant.

Long-Term Project Impacts

Based on existing noise measurements taken in the City (Table 5.11-5 and Table 5.11-6), as well as on existing and future noise modeling (Figure NS-2 and NS-3 of the GP Update), noise levels in excess of existing standards set forth by the City of Fresno currently occur and would continue to occur throughout the City, potentially affecting residential and other noise-sensitive uses.

As shown in Figure NS-3 of the GP Update, future noise levels along many major roadway segments would exceed the City's existing 60 dBA L_{dn} standard for adjacent residential uses, and in certain instances, future noise levels along some major roadway segments may even exceed the City's current 65 dBA L_{dn} and 70 dBA L_{dn} for commercial and industrial uses, respectively. Future development activities within the City would result in higher land use densities, which would result in increased traffic volumes and increases in commercial and industrial uses that would incrementally increase noise levels in some areas. Substantial noise level exposures can also be expected from aircraft and trains.

Roadways

Future noise exposure contours for each of the City of Fresno's roadway classifications were modeled by applying the Federal Highway Administration's (FHWA) noise modeling procedure, using roadway, speed, and traffic mix data from the City of Fresno, and projected traffic volumes based on existing, existing with project, cumulative with project and other anticipated traffic volume levels that were calculated by the transportation planning and engineering firm of Fehr & Peers. The existing, existing with project and cumulative with project traffic volumes are based on the maximum traffic volumes anticipated to be experienced for each roadway classification.

In order to quantify the traffic noise impacts along the analyzed roadways, the roadway noise contours were calculated. Noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway. For analysis comparison purposes, the noise levels are calculated at the right-of-way of each roadway type, which is the nearest location where development may occur to each roadway. In establishing noise contours for land use planning, it is customary to ignore noise attenuation afforded by buildings, roadway elevations, and depressions, and to minimize the barrier effect of natural terrain features. The result is a worst-case estimate of the existing and future noise environment. The developed noise contours for the City of Fresno are conservative, meaning that the contours are modeled with minimal noise attenuation by natural barriers and buildings, with the exception of significantly depressed sections of highways.

Table 5.11-10 shows the anticipated noise levels for each roadway type for existing, existing with project, cumulative with project, and other representative traffic volume levels at the right-of-way. The distance from the centerline to the 55-, 60-, 65-, and 70-dBA noise levels have been calculated and are also shown in Table 5.11-10 with the noise calculation spreadsheets provided in Appendix C.

Table 5.11-10: Traffic Noise Contours prior to Mitigation

Roadway	Scenario	dBA CNEL at Right-of-Way	Distance to Contour (feet)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
2-Lane Collector	Existing	66	36	79	169	365
2-Lane Collector	Existing Plus Project	66	39	84	182	391
2-Lane Collector	Cumulative Plus Project	66	41	89	191	412
4-Lane Collector	Existing	61	RW	51	109	235
4-Lane Collector	Existing Plus Project	62	RW	55	119	257
4-Lane Collector	Cumulative Plus Project	62	RW	56	120	258
3-Lane Arterial	Existing	65	RW	72	155	335
3-Lane Arterial	Existing Plus Project	63	RW	71	153	329
3-Lane Arterial	Cumulative Plus Project	63	RW	72	154	332
4-Lane Arterial	Existing	67	62	133	287	619
4-Lane Arterial	Existing Plus Project	68	78	169	363	782

Roadway	Scenario	dBA CNEL at Right-of-Way	Distance to Contour (feet)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
4-Lane Arterial	Cumulative Plus Project	69	81	175	376	811
4-Lane Super Arterial	Existing	66	64	137	295	636
4-Lane Super Arterial	Existing Plus Project	68	96	208	448	965
4-Lane Super Arterial	Cumulative Plus Project	68	97	209	450	970
6-Lane Arterial	Existing	68	89	192	414	893
6-Lane Arterial	Existing Plus Project	69	101	217	468	1,009
6-Lane Arterial	Cumulative Plus Project	69	106	229	494	1,063
Scenic Arterial	Existing	61	RW	70	151	326
Scenic Arterial	Existing Plus Project	63	RW	95	204	439
Scenic Arterial	Cumulative Plus Project	63	RW	96	207	446
6-Lane Expressway	Existing	70	119	256	551	1,188
6-Lane Expressway	Existing Plus Project	71	138	296	639	1,376
6-Lane Expressway	Cumulative Plus Project	72	141	304	655	1,410
Scenic Expressway	Existing	68	97	208	448	966
Scenic Expressway	Existing Plus Project	69	122	262	565	1,218
Scenic Expressway	Cumulative Plus Project	70	132	284	613	1,320
SR-41 Freeway	Existing	73	251	540	1,164	2,508
SR-41 Freeway	Existing Plus Project	75	308	663	1,427	3,075
SR-41 Freeway	Cumulative Plus Project	75	316	680	1,465	3,155
SR-180 Freeway	Existing	72	263	566	1,220	2,628
SR-180 Freeway	Existing Plus Project	74	332	716	1,542	3,322
SR-180 Freeway	Cumulative Plus Project	74	337	725	1,563	3,367
SR-99 Freeway	Existing	73	202	435	937	2,019
SR-99 Freeway	Existing Plus Project	76	287	619	1,334	2,875
SR-99 Freeway	Cumulative Plus Project	76	298	642	1,383	2,979
SR-168 Freeway	Existing	71	194	418	901	1,941
SR-168 Freeway	Existing Plus Project	72	235	505	1,089	2,345
SR-168 Freeway	Cumulative Plus Project	73	257	554	1,195	2,574

Notes:
RW = Noise contour is located within right-of-way of roadway.
Source: FirstCarbon Solutions, 2014.

Table 5.11-10 shows that all roadway classification scenarios would exceed the City's 60 dBA CNEL standard for sensitive land uses at the right-of-way. This would be considered a significant impact.

Implementation of proposed General Plan Policy NS-1-a would increase the City's noise standard for sensitive land uses to 65 dB L_{dn} or CNEL from transportation sources and through implementation of proposed General Plan Policy NS-1-g, which requires the implementation of noise reduction performance standards for new noise sensitive uses that requires consideration of the following noise reduction measures:

- Construct façades with substantial weight and insulation;
- Use sound-rated windows for primary sleeping and activity areas;
- Use sound-rated doors for all exterior entries at primary sleeping and activity areas;
- Use minimum setbacks and exterior barriers;
- Use acoustic baffling of vents for chimneys, attic and gable ends;
- Install a mechanical ventilation system that provides fresh air under closed window conditions.

Many of the noise reduction features provided in Policy NS-1-g are dependent of the project design and are not feasible to quantify on a generic level, however the use of exterior barriers is quantifiable and would provide similar noise reduction levels throughout the City. Table 5.11-11 shows the noise levels for each roadway classification, the required sound wall or noise attenuation feature height to meet the proposed 65 dBA CNEL standard and the resultant noise levels with implementation of the proposed sound walls.

Table 5.11-11: Mitigated Traffic Noise Contours

Roadway	Scenario	Unmitigated dBA CNEL at Right-of-Way	Wall Height (feet)	Mitigated dBA CNEL at Right-of-Way
2-Lane Collector	Existing	66	3.0	64
2-Lane Collector	Existing Plus Project	66	3.0	65
2-Lane Collector	Cumulative Plus Project	66	3.0	65
4-Lane Collector	Existing	61	0.0	61
4-Lane Collector	Existing Plus Project	62	0.0	62
4-Lane Collector	Cumulative Plus Project	62	0.0	62
3-Lane Arterial	Existing	65	0.0	64
3-Lane Arterial	Existing Plus Project	63	0.0	63
3-Lane Arterial	Cumulative Plus Project	63	0.0	63
4-Lane Arterial	Existing	67	4.0	62

Roadway	Scenario	Unmitigated dBA CNEL at Right-of-Way	Wall Height (feet)	Mitigated dBA CNEL at Right-of-Way
4-Lane Arterial	Existing Plus Project	68	4.0	64
4-Lane Arterial	Cumulative Plus Project	69	5.0	63
4-Lane Super Arterial	Existing	66	3.0	65
4-Lane Super Arterial	Existing Plus Project	68	4.0	64
4-Lane Super Arterial	Cumulative Plus Project	68	4.0	64
6-Lane Arterial	Existing	68	4.0	63
6-Lane Arterial	Existing Plus Project	69	5.0	64
6-Lane Arterial	Cumulative Plus Project	69	5.0	64
Scenic Arterial	Existing	61	0.0	61
Scenic Arterial	Existing Plus Project	63	0.0	63
Scenic Arterial	Cumulative Plus Project	63	0.0	63
6-Lane Expressway	Existing	70	6.0	64
6-Lane Expressway	Existing Plus Project	71	6.0	65
6-Lane Expressway	Cumulative Plus Project	72	6.0	65
Scenic Expressway	Existing	68	4.0	64
Scenic Expressway	Existing Plus Project	69	5.0	64
Scenic Expressway	Cumulative Plus Project	70	6.0	63
SR-41 Freeway	Existing	73	7.0	61
SR-41 Freeway	Existing Plus Project	75	8.0	64
SR-41 Freeway	Cumulative Plus Project	75	8.0	64
SR-180 Freeway	Existing	72	7.0	64
SR-180 Freeway	Existing Plus Project	74	7.0	65
SR-180 Freeway	Cumulative Plus Project	74	7.0	65
SR-99 Freeway	Existing	73	7.0	64
SR-99 Freeway	Existing Plus Project	76	7.0	64
SR-99 Freeway	Cumulative Plus Project	76	7.0	64
SR-168 Freeway	Existing	71	6.0	65
SR-168 Freeway	Existing Plus Project	72	7.0	64
SR-168 Freeway	Cumulative Plus Project	73	7.0	64
Source: FirstCarbon Solutions, 2014.				

Table 5.11-11 shows that through implementation of the increase in noise standards as detailed in General Plan Policy NS-1-a and through implementation of sound walls as detailed as a possible noise reduction measure detailed in General Plan Policy NS-1-g the roadway noise levels would be reduced to within the City's proposed noise standard of 65 dBA CNEL for noise sensitive land uses. Table 5.11-11 shows that up to 8-foot high sound walls would be required to reduce roadway noise impacts to less than significant levels. However, Section 12-306 of the Municipal Code limits walls heights to a maximum of 7 feet high. Furthermore, while the suggested wall heights may be implemented on new development projects, there is a possibility that there is existing development in the City where adequate sound walls were not constructed that would allow roadway noise to exceed the proposed 65 dBA CNEL noise standard for noise sensitive land uses. Therefore, roadway noise impacts would result in a significant unavoidable impact.

Stationary Noise Sources

Stationary noise sources can also have an effect on the population, and unlike mobile, transportation-related noise sources, these sources generally have a more permanent and consistent impact on people. These stationary noise sources involve a wide spectrum of uses and activities, including various industrial uses, commercial operations, agricultural production, school playgrounds, high school football games and marching bands, HVAC units, generators, lawn maintenance equipment, and swimming pool pumps.

Even with incorporation of the best available noise control technology, noise emanating from industrial uses can be substantial and exceed local noise standards. These noise sources can be continuous and may contain tonal components that may be annoying to nearby receptors. Although industrial uses in the City of Fresno are typically located in industrial districts near freeways and commercial uses and away from residences and other sensitive noise receptors, noise sources associated with commercial uses such as automotive repair facilities, recycling centers, and loading docks may occur in the vicinity of residential uses.

In an effort to address noise impacts in the City, the General Plan Update includes the following policies designed to reduce noise impacts from all noise sources:

Policy NS-1-a. Desirable and Generally Acceptable Exterior Noise Environment. Establish 60 dB LDN or CNEL as the standard for the desirable maximum average exterior noise levels for defined usable exterior areas of residential and noise-sensitive uses for noise, but accept 65 dB LDN or CNEL for noise generated by transportation sources.

Policy NS-1-e. Update Noise Ordinance. Update the Noise Ordinance to ensure that noise exposure information and specific standards for both exterior and interior noise and measurement criteria are consistent with this General Plan and changing conditions within the city and with noise control regulations or policies enacted after the adoption of this element.

Policy NS-1-f. Performance Standards. Implement performance standards for noise reduction for new residential and noise sensitive uses exposed to exterior community noise levels from transportation sources above 65 dB DNL or CNEL, as shown on Figure NS-3: Future Noise Contours,

or as identified by a project-specific acoustic study based on the target acceptable noise levels set in Tables 9-2 and 9-3 and Policies NS-1-a through NS-1-c.

Policy NS-1-g Noise mitigation measures which help achieve these noise level targets may include, without limitation, the following:

- Construct façades with substantial weight and insulation;
- Use sound-rated windows for primary sleeping and activity areas;
- Use sound-rated doors for all exterior entries at primary sleeping and activity areas;
- Use minimum setbacks and exterior barriers;
- Use acoustic baffling of vents for chimneys, attic and gable ends;
- Install a mechanical ventilation system that provides fresh air under closed window conditions.

Alternative acoustical designs that achieve the prescribed noise level standards may be approved by the City, provided that a qualified Acoustical Consultant submits information demonstrating that the alternative designs will achieve and maintain the specific targets for outdoor activity areas and interior spaces.

Policy NS-1-h. Interior Noise Level Requirement. Comply with the State Code requirement that any new multifamily residential, hotel, or dorm building exposed to exterior noise levels above 60 decibels CNEL must be designed to incorporate noise reduction measures to meet the 45 dB LDN interior noise criterion, and apply this standard as well to all new single-family residential and noise sensitive issues.

Policy NS-1-i. Mitigation by New Development. Require a noise study where new development of industrial, commercial or other noise generating land uses (including transportation facilities such as roadways, railroads, and airports) may result in noise levels that exceed the noise level exposure criteria established by Tables 9-2 and 9-3 to determine impacts, and require developers to mitigate these impacts in conformance with Tables 9-2 and 9-3 as a condition of permit approval through appropriate means.

Noise mitigation measures may include, but are not limited to:

- Screen and control noise sources, such as parking and loading facilities, outdoor activities, and mechanical equipment;
- Increase setbacks for noise sources from adjacent dwellings;
- Retain fences, walls, and landscaping that serve as noise buffers;
- Use soundproofing materials and double-glazed windows;

- Use open space, building orientation and design, landscaping and running water to mask sounds; and
- Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.

Alternative acoustical designs that achieve the prescribed noise level reduction may be approved by the City, provided a qualified Acoustical Consultant submits information demonstrating that the alternative designs will achieve and maintain the specific targets for outdoor activity areas and interior spaces. As a last resort, developers may propose to construct noise walls along state routes (freeways and expressways), super arterials, and arterials when compatible with aesthetic concerns and neighborhood character. This would be a developer responsibility, with no City funding.

Policy NS-1-j. Significance Threshold. Establish, as a threshold of significance for the City's environmental review process, that a significant increase in ambient noise levels is assumed if the project would increase noise levels in the immediate vicinity by 5 dB LDN or CNEL or more.

Policy Guidance. When an increase in noise would result in a "significant" impact to residents or businesses, then mitigation is required to reduce noise exposure. If the increase is five dBA or more, the change in noise is discretional. If the increase in noise is four dBA or less, then the noise impact is considered insignificant and no mitigation is needed.

Policy NS-1-k. Proposal Review. Review all new public and private development proposals that may potentially be affected by or cause a significant increase in noise levels, per Policy NS-1-i, to determine conformance with the policies of this Noise Element. Require developers to reduce the noise impacts of new development on adjacent properties through appropriate means.

Policy NS-1-l. Enforcement. Continue to enforce applicable State Noise Insulation Standards and Uniform Building Code noise requirements, as adopted by the City.

Policy NS-1-m. Transportation Projects. For projects subject to City approval, require that the project sponsor mitigate noise created by new transportation and transportation-related stationary noise sources, including roadway improvement projects, so that resulting noise levels do not exceed the City's adopted standards for noise-sensitive land uses.

Policy NS-1-n. Best Available Technology. Require new noise sources to use best available control technology to minimize noise emissions.

Policy NS-1-n. Sound Wall Guidelines. Develop, distribute, and implement standard guidelines on heights, materials, and aesthetic design for sound walls and other noise barriers, within two years of General Plan adoption. Include aesthetic considerations in the guidelines, such as variable noise barrier heights, a combination of a landscaped berm with wall, and reduced barrier height in combination with increased distance or elevation differences between noise source and noise receptor, with a maximum allowable height of 15 feet.

In unison with Policy NS-1-a, which would update the City's Noise Ordinance to set noise levels from 65 dB to 70 dB as the "conditionally unacceptable" range for residential uses, and those greater than 70 dB as "generally unacceptable", the maximum allowable noise exposure for noise-sensitive land uses such as residential, transient lodging, hospitals/nursing homes, and churches/meeting halls would be set at 65 dB from 60 dB. Increasing this noise level threshold of noise-sensitive land uses would be consistent with the intensification of land uses in the City under the General Plan Update, as noise control would be an increasing consideration for infrastructure and new development, particularly for infill residential projects. Major cities in California typically consider maximum noise levels of 65 dB to be considered "normally acceptable" for unshielded residential development, including outdoor space in an urban environment. Suburban communities, by contrast, prefer a 60 dB threshold. As a result of the continuing urbanization of the City and the future development of the General Plan Update Planning Area, a 65 dB threshold for noise-sensitive land uses would be appropriate based on the changing character of the City.

Coupled with this revised noise level threshold, implementation of the Policy NS-1-a through Policy NS-1-p, which includes several structural design measures proven to reduce the effects of noise, would in most instances, reduce noise impacts to less than significant levels. However, these proposed policies and the measures that they would implement are ultimately limited, as even advanced policies and measures are limited in what they can do to remediate or reduce the magnitude of noise effects on many existing noise-sensitive land uses in areas with current high noise exposures or where substantial noise increases are expected. Thus, the continuing exposure of existing noise-sensitive land uses to noise levels in excess of standards established by the City, or to substantial noise increases as a result of future growth according to the General Plan Update, and consistent with the community and specific plans as amended or repealed, would be considered a potentially significant impact. Therefore, long-term project impacts associated with the exposure of persons to or the generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies would be potentially significant.

Cumulative Impact Analysis

Short-Term Construction Impacts

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would introduce construction activities to the Planning Area that could potentially result in temporary or periodic increases in ambient noise levels. Construction activities would typically occur intermittently and vary depending upon the nature or phase of construction, although noise ranges are usually similar across all construction phases. Depending on the equipment required and duration of use, average-hourly noise levels associated with construction activities typically ranges from roughly 65 to 90 dBA Leq at 50 feet.

As previously addressed, site preparation, grading, and other construction activity conducted pursuant to a building or other construction permit issued by the City of Fresno or other governmental agency would be exempt for the provisions of Chapter 10, Article 1 – Noise Regulations, of the Fresno Municipal Code, provided such work occurs between 7:00 a.m. and 10:00 p.m., excluding Sunday. Additionally, the counties of Fresno and Madera and the City of Clovis have established similar provisions that exempt construction noise within their jurisdictions from their

respective noise ordinances during daytime hours. As a result, construction noise generated along the Planning Area boundary but emanating into neighboring jurisdictions, and vice versa, should be excluded from both the noise provisions set forth by the City of Fresno and the surrounding jurisdictions, granted construction activities occur within specific parameters of each particular exception. Therefore, the proposed project contributions to cumulative construction noise would be less than cumulatively considerable and thus would result in a less than significant cumulative impact.

Long-Term Project Impacts

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would result in increased traffic volumes, thus incrementally increasing noise levels in some areas. Future noise levels along existing roadways and highways are projected to increase by approximately 2 to 10 dB, as shown on Table 5.11-12. New roadways, significantly expanded roadways, or sparsely populated areas where significant new development is expected to occur may see noise levels increase by more than 10 dB. Substantial noise level exposures can also be expected from aircraft, trains, and stationary sources.

In most instances, when coupled with the revised 65 dB noise level threshold, implementation of General Plan Update Policy NS-1-a through Policy NS-1-k, as provided above, would reduce noise impacts to less than significant levels. However, these proposed policies and the measures that they would implement are ultimately limited, as even advanced policies and measures are limited in what they can do to remediate or reduce the magnitude of noise effects on many existing noise-sensitive land uses in areas with current high noise exposures or where substantial noise increases are expected. Thus, the continuing exposure of existing noise-sensitive land uses to noise levels in excess of standards established by the City, or to substantial noise increases as a result of future growth according to the General Plan Update, would be considered a potentially significant impact. As a result, cumulative impacts associated with the long-term exceedance of standards established in the local general plan or noise ordinance or applicable standards of other agencies would potentially occur in the Planning Area vicinity, and therefore, implementation of the General Plan Update is deemed cumulatively considerable.

Mitigation Measures

Project Specific

No feasible mitigation measures are available.

Cumulative

No feasible mitigation measures are available.

Level of Significance After Mitigation

Project Specific

Potentially significant impact.

Cumulative

Potentially significant impact.

Excessive Groundborne Vibration

Impact NOI-2 **The project would not result in expose persons to or generation of excessive groundborne vibration or groundborne noise levels.**

Project Specific Impact Analysis

Ground vibration generated by construction equipment and transportation sources spreads through the ground and diminishes in strength with distance. The effects of ground vibration can vary from no perceptible effects at the lowest levels, low rumbling sounds and detectable vibrations at moderate levels, and slight damage to nearby structures at the highest levels. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in structural damage.

For transient sources of vibrations such as a single isolated vibration event (e.g., blasting), a peak particle velocity (ppv) threshold of 0.5 inches per second (in/sec) is sufficient to avoid structure damage for most buildings, including modern industrial/commercial buildings, new residential structures, and older residential structures, as well as many historic and some old buildings (refer to Table 5.11-3). For the protection of "fragile" structures, a more conservative threshold for transient sources of 0.2 in/sec ppv is typically recommended. This threshold roughly represents the level at which vibrations would be "distinctly perceptible" to humans (refer to Table 5.11-4). The standards for continuous and frequently intermittent sources, including impact pile drivers, pogo-stick compactors, crack-and-seat equipment, and vibratory compaction equipment are lower. For instance, a ppv threshold of 0.5 in/sec ppv is recommended to avoid structure damage for modern industrial/commercial buildings and new residential structures, while a threshold of 0.3 ppv is recommended for older residential structures. For the protection of fragile structures, a more conservative threshold of 0.1 in/sec ppv is typically recommended.

Based on these aforementioned standards, long-term project activities associated with buildout of the Planning Area would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. Increases in ground-borne vibration levels attributable to the project would be primarily associated with short-term construction activities. Ground-borne vibration levels associated with typical construction equipment is provided in Table 5.11-12.

Table 5.11-12: Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet (in/sec)
Hoe Ram	0.089
Large Tractors	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035

Equipment	Peak Particle Velocity at 25 Feet (in/sec)
Small Tractors	0.003
Source: FTA 2006	

Construction activities associated with buildout of the Planning Area would likely require the use of various tractors, trucks, and jackhammers. Based on the vibration levels provided in Table 5.11-12, ground vibration generated by common construction equipment would be less than 0.09 inches per second ppv at 25 feet. Given that much of the construction activities would occur on vacant parcels in sparsely to moderately developed areas, the nearest offsite structures to a particular project site would likely be located in excess of 25 feet from construction activities. As a result, predicted vibration levels at the nearest offsite structures would not exceed even the conservative threshold for "fragile" buildings of 0.2 in/sec ppv for transient sources of vibrations, or the conservative threshold of 0.1 in/sec ppv for continuous/frequently intermittent sources. Additionally, the project would allow for infill development in more densely developed areas where offsite structures would be more prevalent. Even during these occurrences, the mandatory buffers set forth by the City of Fresno Development Code (e.g., setbacks, easements, right-of-ways) would ensure that in most cases onsite and offsite structures would be separated by at least 25 feet, and thus construction activities would be buffered by at least 25 feet from existing offsite structures. Therefore, short-term construction and long-term project impacts associated with groundborne vibration would be less than significant.

Cumulative Impact Analysis

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would use construction equipment such as tractors, trucks, and jackhammers. Based on the vibration levels provided in Table 5.11-12, ground vibration generated by these pieces of equipment would be less than 0.09 inches per second ppv at 25 feet, which is below the conservative threshold for "fragile" buildings of 0.2 in/sec ppv for transient sources of vibrations, and the conservative threshold of 0.1 in/sec ppv for continuous/frequently intermittent sources.

Hypothetically, if several different projects were constructed simultaneously upon the same construction site within 25 feet of an existing structure, there would be potential for cumulative ground vibration effects. However, this scenario is highly unlikely. A more reasonable assumption is that future construction activities would occur at different locations throughout the Planning Area and the Planning Area vicinity. Although scheduling of some of these construction activities would likely overlap, projects would not be constructed simultaneously, but instead would occur over a number of years. As a result, no cumulative impacts associated with ground vibration would occur in the Planning Area vicinity, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Permanent Increase in Ambient Noise Levels

Impact NOI-3	**The project would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.**

Project Specific Impact Analysis

As addressed in Impact NOI-1, future development activities within the Planning Area would result in increased traffic volumes, thus incrementally increasing noise levels in some areas. Future noise levels along existing roadways and highways are projected to increase by 2 to 10 dB. New roadways, significantly expanded roadways, or sparsely populated areas where significant new development is expected to occur may see noise levels increase by more than ten dB. Such increases in noise level can subsequently increase annoyance to populations and communities adjacent to the roadways. Future noise contours for vehicles are provided in Figure NS-3 of the General Plan.

Intervening structures or other noise-attenuating obstacles between a roadway and a receptor may reduce roadway noise levels at the receptor, but such potential reductions cannot be assumed in the noise contouring modeling. In order to determine the proposed project's contribution to roadway noise, each of the City of Fresno's roadway classifications were modeled by applying the Federal Highway Administration's (FHWA) noise modeling procedure, using roadway, speed, and traffic mix data from the City of Fresno, and the greatest project increase anticipated for each roadway type, which have been based on traffic volume levels provided by the engineering firm of Fehr & Peers. The proposed project's incremental increase to existing conditions is shown in Table 5.11-13.

Table 5.11-13: Project Traffic Noise Contributions

Roadway	dBA CNEL at Nearest Right-of-Way			Potential Significant Impact?
	Existing	Existing Plus Project	Project Contribution	
6-Lane Expressway	63	71	8	Yes
6-Lane Super Arterial	64	69	5	Yes

Roadway	dBA CNEL at Nearest Right-of-Way			Potential Significant Impact?
	Existing	Existing Plus Project	Project Contribution	
3-Lane Arterial	59	63	4	No
4-Lane Arterial	50	68	18	Yes
6-Lane Arterial	67	69	2	Yes
2-Lane Collector	59	66	7	Yes
4-Lane Collector	52	62	10	Yes
Freeway	66	76	10	Yes
Scenic Arterial	61	63	2	No
Scenic Expressway	68	69	1	No
4-Lane Super Arterial	65	68	3	Yes
Connector	42	62	20	Yes
Source: FirstCarbon Solutions, 2014.				

Table 5.11-13 shows that the for the existing conditions that the proposed project would increase roadway noise by as much as 20 dBA CNEL. The project contributions to roadway noise for the existing scenario would exceed the noise increase thresholds provided in existing General Plan Policy H-1-b. This would be considered a significant impact. Substantial noise level exposures could also be expected from aircraft, trains, and stationary sources.

In an effort to address noise impacts in the General Plan Update Planning Area, the General Plan Update includes Policy NS-1-a through NS-1-p, which are designed to reduce noise impacts. In conjunction with Policy NS-1-a, which would update the City's Noise Ordinance to set noise levels from 65 dB to 70 dB as the "conditionally unacceptable" range for residential uses, and those above 70 dB as "generally unacceptable", the maximum allowable noise exposure for noise-sensitive land uses such as residential, transient lodging, hospitals/nursing homes, and churches/meeting halls would be set at 65 dB from 60 dB. Increasing this noise level threshold of noise-sensitive land uses would be consistent with the intensification of land uses in the City under the General Plan Update, as noise control would be an increasing consideration for infrastructure and new development, particularly for infill residential projects. As a result of the continuing urbanization of the City and the future development of the General Plan Update Planning Area, a 65 dB threshold for noise-sensitive land uses would be appropriate based on the changing character of the City.

Coupled with this revised noise level threshold, implementation of the Policy NS-1-a through Policy NS-1-p, which includes several structural design measures proven to reduce the effects of noise, would in most instances, reduce noise impacts to less than significant levels. However, these proposed policies and the measures that they would implement are ultimately limited, as even advanced policies and measures are limited in what they can do to remediate or reduce the magnitude of noise effects on many existing noise-sensitive land uses in areas with current high

noise exposures or where substantial noise increases are expected. Thus, the continuing exposure of existing noise-sensitive land uses to noise levels in excess of standards established by the City, or to substantial noise increases as a result of future growth according to the General Plan Update, would result in a significant unavoidable permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Cumulative Impact Analysis

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would result in increased traffic volumes, thus incrementally increasing noise levels in some areas. Future noise levels along existing roadways and highways are projected to increase by one to five decibels. New roadways, significantly expanded roadways, or sparsely populated areas where significant new development is expected to occur may see noise levels increase by more than five decibels. Substantial noise level exposures can also be expected from aircraft, trains, and stationary sources.

The proposed project's incremental increase to cumulative conditions is shown in Table 5.11-14.

Table 5.11-14: Cumulative Plus Project Traffic Noise Contributions

Roadway	dBA CNEL at Nearest Right-of-Way			Potential Significant Impact?
	Existing	Cumulative Plus Project	Project Contribution	
6-Lane Expressway	62	72	10	Yes
6-Lane Super Arterial	64	68	4	Yes
3-Lane Arterial	58	63	5	Yes
4-Lane Arterial	58	69	11	Yes
6-Lane Arterial	66	69	3	Yes
2-Lane Collector	58	66	8	Yes
4-Lane Collector	52	62	10	Yes
Freeway	65	76	11	Yes
Scenic Arterial	60	63	3	No
Scenic Expressway	67	70	3	Yes
4-Lane Super Arterial	64	68	4	Yes
Connector	41	62	21	Yes
Source: FirstCarbon Solutions, 2014.				

Table 5.11-14 shows that the proposed project would increase roadway noise by as much as 21 dBA CNEL for the cumulative conditions. The project contributions to roadway noise for the cumulative scenario would exceed the noise increase thresholds provided in existing General Plan Policy H-1-b.

This would be considered a significant impact. Substantial cumulative noise level exposures could also be expected from aircraft, trains, and stationary sources.

In most instances, when coupled with the revised 65 dB noise level threshold, implementation of General Plan Update Policy NS-1-a through Policy NS-1-p, as provided above, would reduce noise impacts to less than significant levels. However, these proposed policies and the measures that they would implement are ultimately limited, as even advanced policies and measures are limited in what they can do to remediate or reduce the magnitude of noise effects on many existing noise-sensitive land uses in areas with current high noise exposures or where substantial noise increases are expected. Thus, the continuing exposure of existing noise-sensitive land uses to noise levels in excess of standards established by the City, or to substantial noise increases as a result of future growth according to the General Plan Update, would be considered a potentially significant impact. As a result, cumulative impacts associated with a permanent increase in ambient noise levels would occur in the Planning Area vicinity, and therefore, implementation of the General Plan Update is deemed cumulatively considerable.

Mitigation Measures

Project Specific

No feasible mitigation measures are available.

Cumulative

No feasible mitigation measures are available.

Level of Significance After Mitigation

Project Specific

Potentially significant impact.

Cumulative

Potentially significant impact.

Temporary or Periodic Increase in Ambient Noise Levels

Impact NOI-4	**The project would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.**

Project Specific Impact Analysis

Construction noise generated from development activities associated with buildout of the Planning Area would typically occur intermittently and vary depending upon the nature or phase (e.g., demolition, land clearing, grading, excavation, erection) of construction. Noise produced by construction equipment such as earthmovers, material handlers, and portable generators can reach high levels. Generally, the grading phase of construction involves the most equipment and generates the highest noise levels, although noise ranges are usually similar across all construction phases. Typical construction equipment noise levels are provided in Table 5.11-9. As shown, noise levels generated by individual pieces of construction equipment generally range from approximately 77

dBA to 90 dBA L_{max} at 50 feet. Typical operating cycles vary by equipment type and specific activity, although cycles generally involve two minutes of full power, followed by three to four minutes at lower settings. Depending on the equipment required and duration of use, average-hourly noise levels associated with construction activity typically ranges from roughly 65 to 90 dBA Leq at 50 feet. The highest noise levels are generally associated with grading and excavation phases (FHWA 2006).

Implementation of the project would include the demolition and construction of various divergent uses throughout the City of Fresno Planning Area, including single- and multi-family residential, commercial, industrial, mixed use, and public facilities, as well as ancillary infrastructural improvements such as roadways and water delivery and wastewater conveyance pipelines.

As addressed in Impact NOI-1, site preparation, grading, and other construction activity conducted pursuant to a building or other construction permit issued by the City of Fresno or other governmental agency would be exempt for the provisions of Chapter 10, Article 1 – Noise Regulations, of the Fresno Municipal Code, provided such work occurs between 7:00 a.m. and 10:00 p.m., excluding Sunday. However, although exempt, construction noise can still result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project to the extent that there is potential for physical harm to surrounding noise-sensitive receptors. Because of the nature of the project, which would include construction activity within and adjacent to previously developed areas within the City, including densely populated residential areas, there would be potential for a temporary or periodic increase in ambient noise levels in the Planning Area and subsequent harm to noise-sensitive receptors.

The Occupational Safety and Health Administration (OSHA) has adopted noise exposure thresholds, which establish the highest permissible exposure limit based on periods of exposure. The permissible noise exposure limit increases with shorter periods of exposure. OSHA allows a noise exposure level of 90 dB over an eight-hour exposure period. The highest permissible noise exposure limit increases to 92 dB for a six-hour exposure period, 95 dB for four hours of exposure, 97 dB for a three-hour period, and 105 dB for one hour of exposure. The highest permissible noise exposure level for periods of 15 minutes or less is 115 dB. Exposure to impulsive or impact noise cannot exceed 140 dB peak sound pressure level. It is important to note that these noise exposure limits apply only to employees in the workplace, but are useful in understanding noise exposure levels with regard to potential hearing loss and physiological damage.

As provided in Table 5.11-9, average-hourly noise levels associated with construction activity typically ranges from roughly 65 to 90 dBA L_{eq} at 50 feet, and can potentially reach levels of 90 dBA when concrete saw or similar equipment is used. These average-hourly noise levels would conform with the noise thresholds adopted by OSHA for exposure periods ranging from 115 dBA over 15 minutes to 90 dBA over eight hours (i.e., a full construction workday). As such, the various construction activity associated with buildout of the Planning Area would not exceed noise levels recognized as causing harm to nearby receptors. Therefore, impacts associated with a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project would be less than significant.

Cumulative Impact Analysis

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would introduce construction activity to the Planning Area that could potentially result in temporary or periodic increases in ambient noise levels. Construction activities would typically occur intermittently and vary depending upon the nature or phase of construction, although noise ranges are usually similar across all construction phases. Depending on the equipment required and duration of use, average-hourly noise levels associated with construction activities typically ranges from roughly 65 to 90 dBA Leq at 50 feet.

Hypothetically, if several different projects were constructed simultaneously within the same immediate vicinity, there would be potential for cumulative temporary noise effects, since construction noise from individual projects could compound. However, this scenario is highly unlikely. A more reasonable assumption is that future construction activities would occur at different locations throughout the Planning Area and the Planning Area vicinity. Although scheduling of some of construction activities would likely overlap, projects would not be constructed simultaneously, but instead would occur over a number of years. This distribution of individual projects would reduce the potential for compounding of construction noise.

As previously addressed, typical construction noise levels would fall within those noise exposure limits established by OSHA. As a result, considering that buildout of the Planning Area and construction of related projects would occur at different locations and over several years, temporary noise levels would not exceed those limits recognized as causing harm to nearby receptors. As a result, no cumulative impacts associated with a temporary or periodic increase in ambient noise levels would occur in the Planning Area vicinity, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Airport Noise Levels

Impact NOI-5	**The project is located within an airport land use plan and within two miles of a public airport or public use airport, but the project would not expose people residing or working in the project area to excessive noise levels.**

Project Specific Impact Analysis

One public commercial airport, Fresno Yosemite International Airport, and two public general aviation airports, Fresno-Chandler Downtown Airport, and Sierra Sky Park Airport, are located in the General Plan Update Planning Area. As required by the Caltrans Division of Aeronautics, the Fresno County Airport Land Use Commission (ALUC) must prepare an ALUCP (refer to the heading "Airport Land Use Commission of Fresno County" under Section 5.11.3, Regulatory setting, above) for each public and public use airport within its jurisdiction. An ALUCP guides local jurisdictions in determining appropriate compatible land uses with detailed findings and policies. The City of Fresno General Plan, other City land use plans, and all City land use decisions must be compatible with the adopted ALUCP. Each ALUCP includes CNEL noise contours based on projected airport and aircraft operations. The purpose of these noise contours are to minimize the effect of airport and aircraft noise on the adjacent community by determining land use compatibility and locations for noise mitigation measures during the planning, design, and development process.

The Fresno Yosemite International Airport Land Use Compatibility Plan ALUCP, the Fresno-Chandler Downtown Airport ALUCP, and the Sierra Sky Park ALUCP establish land uses that are either acceptable or unacceptable within each CNEL noise contour based on the noise sensitivity of the particular use. Noise-sensitive land uses such as residential uses are typically only acceptable within area between the 60 and 65 dB CNEL noise contours. It is within these areas that the Fresno County ALUC has determined that residential uses can occur while still minimizing the effects of adjacent and overhead aircraft noise on noise-sensitive receptors. Any land use decision made within the jurisdictional boundary of an applicable ALUCP, and based upon policies set forth by the General Plan Update, must be consistent with the ALUCP, including the land use compatibility policies based on CNEL noise contours, as required by law. Additionally, in an effort to address aircraft noise impacts in the General Plan Update Planning Area, the General Plan Update includes the following policies designed to reduce aircraft noise impacts:

Additionally, in an effort to address aircraft noise impacts in the General Plan Update Planning Area, the General Plan Update includes the following policies designed to reduce aircraft noise impacts:

> **NS-1-p.** Airport Noise Compatibility. Implement the land use and noise exposure compatibility provisions of the adopted Fresno Yosemite International Airport Land Use Compatibility Plan, the Fresno-Chandler Downtown Airport Master and Environs Specific Plan and the Sierra Skypark Land Use Policy Plan to assess noise compatibility of proposed uses and improvements within airport influence and environs areas.

To address aircraft noise impacts, Policy NS-1-p would require that the City approve only noise-compatible land uses and limit noise-sensitive land use, including residential uses, as defined by the applicable ALUCPs. In the event that residential uses or similar noise-sensitive land use are proposed

for areas susceptible to aircraft noise levels exceeding those levels that are typically considered acceptable, Policy NS-1-p would conditionally allow development of such uses following preparation of a noise study and implementation of mitigation measures.

Along with compliance with the applicable ALUCPs and the land use compatibility policies contained within, Policy NS-1-p would reduce impacts from adjacent and overhead aircraft noise on noise-sensitive land uses to acceptable levels. Therefore, impacts associated with noise produced by public and public use airports in the Planning Area vicinity would be less than significant.

Cumulative Impact Analysis

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would introduce noise-sensitive land uses such as residential uses to areas potentially affected by public or public use airport and aircraft noise. However, all development occurring within the Planning Area would be subject to the land use compatibility polices of the applicable ALUCPs. Each ALUCP includes CNEL noise contours based on projected airport and aircraft operations. The purpose of these noise contours are to minimize the effect of airport and aircraft noise on the adjacent community by determining land use compatibility and locations for noise mitigation measures during the planning, design, and development process. Any land use decision made within the jurisdictional boundary of an applicable ALUCP (regardless of whether within or outside the Planning Area) and based upon policies set forth by the General Plan Update must be consistent with the ALUCP, including the land use compatibility policies based on CNEL noise contours, as required by law. Additionally, incorporation of General Plan Update Policy NS-1-p, as previously provided, would further reduce airport-related noise effects within the Planning Area and reduce any potential contribution to cumulative airport noise effects. As a result, no cumulative impacts associated with airport and aircraft noise would occur in the Planning Area vicinity, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Private Airstrip Noise Levels

Impact NOI-6	**The project is within the vicinity of a private airstrip, but the project would not expose people residing or working in the project area to excessive noise levels.**

Project Specific Impact Analysis

Currently, there are no private airstrips operating within the General Plan Update Planning Area. A few private airstrips potentially occur outside of the Planning Area boundary, although the operational status of these airstrips is presently undetermined. These dirt-surfaced airstrips are associated with agricultural operations in the Planning Area vicinity and were/are likely used by smaller aircraft to apply pesticides to fields. If still in use, these airstrips would not support more than a few smaller aircraft operating intermittently throughout the growing season. Conversely, due to infrastructural limitations, these airstrips are not physically capable of supporting large-scale flight operations, larger aircraft fleets, or consistent aircraft flights that would result in generation of substantial noise effects on the adjacent and surrounding areas. As a result, any noise potentially produced by these airstrips would not constitute a substantial increase in noise levels within the Planning Area.

Additionally, in an effort to address aircraft noise impacts in the General Plan Update Planning Area, the General Plan Update includes the following policies designed to reduce aircraft noise impacts:

> **NS-1-p.** Airport Noise Compatibility. Implement the land use and noise exposure compatibility provisions of the adopted Fresno Yosemite International Airport Land Use Compatibility Plan, the Fresno-Chandler Downtown Airport Master and Environs Specific Plan and the Sierra Skypark Land Use Policy Plan to assess noise compatibility of proposed uses and improvements within airport influence and environs areas.

To address aircraft noise impacts, Policy NS-1-p would require that the City approve only noise-compatible land uses and limit noise-sensitive land use, including residential uses, as defined by the applicable ALUCPs. In the event that residential uses or similar noise-sensitive land use are proposed for areas susceptible to aircraft noise levels exceeding those levels that are typically considered acceptable, Policy NS-1-p would conditionally allow development of such uses following preparation of a noise study and implementation of mitigation measures.

Along with compliance with the applicable ALUCPs and the land use compatibility policies contained within, Policy NS-1-p would reduce impacts from adjacent and overhead aircraft noise on noise-sensitive land uses to acceptable levels. Therefore, impacts associated with noise produced by private airstrips in the Planning Area vicinity would be less than significant.

Cumulative Impact Analysis

Buildout of the General Plan Update Planning Area, along with construction of related projects in the Planning Area vicinity, would introduce noise-sensitive land uses such as residential uses to areas potentially affected by private airstrip noise. However, because of infrastructural limitations, all of the private airstrips in the Planning Area vicinity are not physically capable of supporting large-scale flight operations, larger aircraft fleets, or consistent aircraft flights that would result in generation of

substantial noise effects on the adjacent and surrounding areas. As such, any noise potentially produced by these airstrips would not constitute a substantial increase in noise levels within the Planning Area and beyond. As a result, no cumulative impacts associated with airstrip noise would occur in the Planning Area vicinity, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.12 - Population and Housing

5.12.1 - Introduction

This section of the EIR evaluates the potential environmental effects related to population and housing associated with implementation of the proposed General Plan Update. The analysis includes a review of population, employment, employees, and housing.

5.12.2 - Existing Conditions

Study Area for Project Impacts

The study area for project impacts regarding population and housing is the Planning Area because potential development under the General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative population and housing impacts is the area surrounding the Planning Area including land under the jurisdiction of the County of Fresno, City of Clovis, and County of Madera.

Population Trends

Fresno was incorporated in 1885 and had a population of 10,000 by 1890. Fresno is now the fifth largest city in the state of California. Centrally located, Fresno is the financial, industrial, trade, and commercial capital in the Central San Joaquin Valley.

Population projections for Fresno County were identified in the San Joaquin Valley Demographic Forecasts 2010 to 2050. These projections were prepared for the Fresno Council of Governments in 2012. The population estimates for the County are provided in Table 5.12-1. The San Joaquin Valley Demographic Forecasts 2010 to 2050 only forecasted population to 2050, but based on the growth forecasted for the previous five years (i.e., between 2040 and 2045), a similar growth rate was used to forecast growth between 2050 and 2055. In addition, as similar growth rate was used to project the population for one additional year to 2056.

Based on the County's population forecast, the forecast for the City of Fresno Planning Area was derived. The Planning Area population estimate for the year 2010 was obtained from the Fresno Council of Governments in a correspondence provided to the City from Kathy Chung on July 19, 2011 and provided as Appendix A in the Map Atlas, Existing Conditions Report prepared for the General Plan & Code Update in August 2011. The 2010 population estimate for the Planning Area was 545,000. Given that the City of Fresno population from the 2010 U.S. Census was approximately 495,000, the remaining area within the Planning Area (unincorporated areas) contained approximately 50,000 persons.

Historically, the population within the City of Fresno Planning Area has been approximately 60 percent of the population within the County of Fresno. This population percentage of 60 percent

was used to forecast the population within the Planning Area after 2010. Table 5.12-1 provides a population forecast for the Planning Area. Based on the Planning Area's population representing approximately 60 percent of the County's forecast population and the City's projected population at full buildout of the General Plan Update (970,000), buildout of the Planning Area was determined to occur in the year 2056 as shown in Table 5.12-1.

Table 5.12-1: Population Estimate for the County of Fresno and the City of Fresno Planning Area

Year	Population Estimate	
	County of Fresno	City of Fresno Planning Area
2010	930,000[1]	545,000[2]
2015	1,010,000[3]	606,000[4]
2020	1,082,000[1]	649,200[4]
2025	1,155,000[3]	693,000[4]
2030	1,228,000[1]	736,800[4]
2035	1,301,000[3]	780,600[4]
2040	1,374,000[1]	824,400[4]
2045	1,447,000[3]	868,200[4]
2050	1,521,000[1]	912,600[4]
2055	1,600,000[5]	960,000[4]
2056	1,616,667[6]	970,000[4]

[1] San Joaquin Valley Demographics Forecasts 2010 to 2050, Fresno Council of Governments, page 18.
[2] 2010 base is 58.6 percent of the total County of Fresno population. The population for 2010 was estimated by City of Fresno staff.
[3] Estimates based on 50 percent of the ten years of growth during the decade.
[4] Planning Area population estimate is 60 percent of the County's population
[5] Estimated County Population in 2055 based upon previous 5 year growth increments of 5.1% to 5.2%
[6] One year growth increment for 2056 was based upon previous 5-year growth increments of approximately 5.1% to 5.2%.
Source: FirstCarbon Solutions 2014

Employees to Housing

An important indicator of providing adequate housing and employment within a community is to determine the number of employees who currently reside in the County of Fresno. Based on a review of 2000-2010 Fresno County data from the U. S. Census Bureau, as shown in Table 5.12-2 below, the employees to occupied housing ratio for 2010 has increased since the year 2000 from 1.19 to 1.28. This data shows that the number of employees residing within each occupied housing unit has increased in Fresno County.

Table 5.12-2: Employees per Occupied Housing Unit in Fresno County

Year	Number of Employees who live in Fresno County1	Number of Occupied Housing Units in Fresno County2	Employees per Occupied Housing Unit Ratio
2000	301,306[1]	252,940[5]	1.19
2005	355,812[2]	274,129[6]	1.30
2008	381,368[3]	278,964[7]	1.37
2010	363,891[4]	284,690[8]	1.28

Sources:
1 U.S. Census Bureau. 2000.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF3_DP3&prodType=table
2 U.S. Census Bureau. 2005
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_05_EST_DP3&prodType=table
3 U.S. Census Bureau. 2008.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_08_1YR_DP3&prodType=table
4 U.S. Census Bureau. 2010.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_DP03&prodType=table
5 U.S. Census Bureau. 2000.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF1_QTH1&prodType=table
6 U.S. Census Bureau. 2005.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_05_EST_DP3&prodType=table
7 U.S. Census Bureau. 2008.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_08_1YR_DP4&prodType=table
8 U.S. Census Bureau. 2010.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_DP03&prodType=table
Source: FirstCarbon Solutions 2014.

Jobs to Housing

An additional employment indicator for Fresno County is to determine the number of jobs within the County compared to the number of housing units within the County. As shown in Table 5.12-3 below, the number of jobs increased between the year 2000 to 2008 and then decrease between 2008 and 2010 due to the economic recession. Also shown in Table 5.12-3, the number of housing units within the County has increase between the year 2000 and 2010. Furthermore, the jobs to housing ratio began at 1.14 in 2000 and dropped to 1.01 in the year 2010 which shows that there were fewer jobs per housing unit.

When comparing the number of employees and jobs in Table 5.12-2 and Table 5.12-3, the data shows that after the year 2000, there were a greater number of employees who lived in Fresno County compared to the number of jobs that were available in Fresno County. Therefore, employees who lived in Fresno County travelled outside the County to their place of employment.

Table 5.12-3: Number of Jobs per Housing Unit in Fresno County

Year	Number of Jobs in Fresno County[1]	Number Housing Units in Fresno County	Jobs per Housing Unit Ratio
2000	309,400	270,767[2]	1.14
2005	326,600	292,733[3]	1.12
2008	344,200	308,459[4]	1.12
2010	319,600	315,531[5]	1.01

Sources:
[1] State of California Economic Development Department. http://www.labormarketinfo.edd.ca.gov/county/fresno.html#IND
[2] U.S. Census. 2000. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF1_QTH1&prodType=table
[3] U.S. Census. 2005. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_05_EST_DP4&prodType=table
[4] U.S. Census. 2008. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_05_EST_DP4&prodType=table
[5] U.S. Census. 2010. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_DP03&prodType=table
Source: FirstCarbon Solutions 2014.

Based on jobs and housing data obtained from the traffic model developed for the General Plan Update, the jobs to housing ratio for the City of Fresno Planning Area was 1.12 in the year 2010 as shown in Table Table 5.12-4 shown below.

Table 5.12-4: Number of Jobs per Housing Unit in the City of Fresno Planning Area in 2010

Jobs	Housing Units	Jobs-Housing Ratio
209,261[1]	186,840[2]	1.12

[1] Obtained from the traffic model for the Fresno General Plan Update which was derived from the Fresno Council of Governments Traffic Model.
[2] Obtained from Table 3-3 in Section 3, Project Description.
Source: FirstCarbon Solutions 2014.

5.12.3 - Regulatory Setting

City of Fresno General Plan

The applicable regulations within the Planning Area are provided within the City of Fresno Urban Form Element and Housing Element. These applicable goals, policies and program are provided below.

Urban Form Element

C-9 Objective. Plan for the diversity and quality of residential housing, at locations necessary to provide for adequate and affordable housing opportunities. Housing patterns should support balanced urban growth, and should make efficient use of resources and public facilities.

C-10 Objective. Promote the development of more compact pedestrian friendly, single-family residential projects to aid in the conservation of resources such as land, energy, and materials.

C-11 Objective. The city will employ multi-family residential densities to meet housing needs in an affordable, balanced fashion.

Housing Element

Goal 2 – New Construction of Affordable Housing

Policy 2.1 – New Construction. The City's RHNA number for new construction for this planning period consists of the following income categories:

Extremely Low:	2,977
Very Low:	2,202
Low:	3,355
Moderate:	3,312
Above Moderate:	9,121

Note: Based on 2007 Fresno County RHNA Plan, Approved November 29, 2007. The above numbers may not add up to 20,967 due to rounding.

Program 2.1.1 - Land Demand

The City shall annually monitor the supply of vacant zoned and residential planned land. The City shall also ensure that there is at least a continual 10-year supply of planned residential land and at least a 5-year supply of zoned land to meet the needs of all economic sectors of the community. Where supplies drop below the adopted thresholds, the City shall immediately initiate a General Plan amendment, proactive annexations, rezonings, or zoning actions to ensure an adequate supply and shall explore the possibility of "prezoning" to reduce processing times and costs to potential housing projects. If necessary, to assure affordability, additional environmental documentation shall be prepared.

Program 2.1.2 - Reduction in Density

The City shall comply with density reductions of the State law.

Program 2.1.3 - Central Community Plan Area Housing

The City shall ensure that priority and expedited processing is extended for the construction of new housing in the Central Community Plan (generally bound by State Routes 41, 99, and 180) area by processing completed (after Development Partnership Center acceptance) plan consistent rezoning, and Site Plan Review and Conditional Use Permit applications for permitting within an average of 75 working days.

Program 2.1.4 - Inner City Residential Development

The City Planning and Development Department shall continue to provide reduced application fees and priority processing for single- and multi-family projects within the Inner City Fee Program area, as referenced in the Municipal Code, to create approximately 700 housing units. The Inner City

Development Policy permits residential projects in the eligible areas to be given processing priority and reduced processing fees from 10 to 50 percent.

Program 2.1.5 – Other Infill Housing

The City Housing and Community Development Division and the RDA shall acquire sites to accommodate up to 300 units to be constructed as low-income affordable housing, utilizing non-and for-profit builders, and housing agencies. Funding for these projects shall come from available HUD, State, and other applicable funding sources. Funding available through HUD will be analyzed every spring along with the release of the federal Super NOFA (Notice of Funding Available), and every January with the release of HOME Program entitlement allocation to the City. The State of California has several over-the-counter housing programs and several additional programs that have varying due dates. The City will review each state-issued NOFA for applicability to infill housing goals.

Program 2.1.6 – Multi-family Land Supply

The City will amend the Zoning Ordinance to establish a site plan review procedure for multifamily uses in multifamily zones on lots greater than 2 acres.

Program 2.1.6A – Facilitate the Development of Multifamily Housing Affordable to Lower Income Households

The City will identify and rezone approximately 500 acres of vacant land to the R-2 or R-3 zoning district, allowing exclusively residential uses by right without a CUP or other discretionary action and a minimum of 20 units per acre. Rezoned sites will be selected from sites identified in the parcel listing (Rezone 20 upa), will be suitable, and will be available for development in the planning period where water and sewer can be provided.

Additionally, the City will identify and rezone approximately 200 acres of vacant land to the R-3 or R-4 zoning district, allowing exclusively residential uses by right without a conditional use permit or other discretionary action and a minimum of 38 units per acre. Rezoned sites will be selected from sites identified in the attached parcel listing (Rezone 38 upa), will be suitable, and will be available for development in the planning period where water and sewer can be provided.

It should be noted that a portion of the properties to be rezoned will also require plan land use amendments, however since the specific properties to be rezoned from the attached listings have not yet been determined, it is not possible to identify the specific sites requiring plan amendments at this time.

Program 2.1.7 - Increase Housing Yields

The City shall annually review applicable State legislation to ensure that its plans and Zoning Ordinance are consistent with State law.

Program 2.1.7A – Maximum Density

Whenever possible, density shall be increased, conserving land, services, and costs. The City Planning and Development Department shall review its development standards such as street width, setback, coverage, heights, parking and lot size requirements and amend zoning and development standards as necessary to ensure the ability to achieve minimum density, particularly in the R-3 and

R-4 zoning districts, and facilitate maximum densities. Further, the City will develop a maximum density matrix to help developers facilitate higher density residential developments.

Program 2.1.8 – Mixed-Use Zoning

The City shall continue to encourage mixed-use developments through its Activity Center Study, which is analyzing the activity centers proposed in Exhibit 6 of the 2025 General Plan an density and design recommendations for these mixed-use nodes. In addition, the City is Form Based Zoning Code, which will provide design standards for the City's activity cent transit corridors.

This program was not completed. From what I know, HCD was ok given that we committed to addressing the Code update, correct?

Program 2.1.14 – Single Room Occupancy Housing

Single Room Occupants are defined in the City as Boarding or Rooming Houses and are building containing a single dwelling unit with provisions for five, but not more than fift where lodging is provided with or without meals, for compensation, but not to include, motel, emergency residential shelter, group housing facility or rest group. The City will amend the Zoning Ordinance, within one year of submission of the Housing Element, to comply with the State law on single room occupants to permit development, by right, in appropriate zone districts.

Program 2.1.15 - Very-Low Income Large Family Single- and Multi-Family Housing

Are there programs that replaced the RDA in re: to affordable housing?

The City Housing and Community Development Division, RDA and Housing Autho investigate funding sources, develop partnerships and apply for available local, S funds to assist in the production of 400 large family units. Funding for these proj available HUD, State, and other applicable funding sources. Funding available th analyzed every spring along with the release of the federal Super NOFA (Notice of Funding Available), and every January with the release of HOME Program entitlement allocation to the City. The State of California has several over-the-counter housing programs and several additional programs that have varying due dates. The City will review each state-issued NOFA for applicability to meeting very low-income large family housing needs. A "large family" household is defined as those containing five or more persons.

Program 2.1.16 - Extremely Low-, Very Low-, and Low-Income Senior Housing

The City Housing and Community Development Division, RDA and Housing Authority, shall seek and apply to funding sources and partner with local and statewide non-profits and for-profits in applying for funds and encouraging the construction of at least 400 units for extremely low-, very low-, and low-income income seniors (typically age 65 years and over; may vary by funding source or program).

Program 2.1.17 - Other Extremely Low- and Very Low-Income Housing

The City Housing and Community Development Division, RDA, and Housing Authority in conjunction with non- and for-profit developers, shall provide financial assistance to develop, at least 1,000 units for other extremely-low and very-low income households. Additionally, staff will partner with the 10 x 10 Affordable Housing subcommittee for Expanding Affordable Housing Resources and New Financing to continue to seek and support additional housing resources, develop guidelines for the

implementation of a local and regional housing trust fund and identify funding priorities for the City's set aside housing trust fund.

Program 2.1.20 – Strengthening Partnerships with Affordable Housing Developers

The City Housing and Community Development Division and Redevelopment Agency shall continue the on-going efforts to strengthen partnerships and relationships with affordable housing developers by encouraging funding applications to applicable funding sources, providing staff expertise, encouraging local capacity building and attracting large investors to facilitate the construction of new affordable housing units and incentivize self-help type single family housing construction for extremely low-income households.

Goal 3 – Housing Rehabilitation, Acquisition and Neighborhood Improvements

Policy 3.1 - Neighborhood Revitalization. The City of Fresno, RDA, and City of Fresno Housing Authority, in conjunction with private businesses and developers, and community-based non-profit organizations, shall collectively increase neighborhood revitalization activities and pledge to allocate funds to preserve existing neighborhoods.

Program 3.1.1 - Comprehensive Code Enforcement

The City Code Enforcement Division shall set a goal of assertively conducting targeted neighborhood inspections of 35,000 housing units for potential health and safety issues and advise on available financial assistance. The 10 x 10 Affordable Housing subcommittee on Innovative Government (Code Enforcement group) will work in partnership with City staff to ensure City resources are targeted at high need areas to encourage blight removal, repair of substandard housing units and incentivize needed repairs of both owner-occupied and tenant- occupied housing by identifying rehabilitation and relocation funds and making the information readily available to households whose homes are in need of major renovations. Additionally, the Code Enforcement Division's Safe Housing and Vacant Structure Team, and all Area Teams as needed, will continue to improve neighborhoods throughout nd increase livability by creating safe and healthy conditions, removing blight, educating promoting pride of ownership and building collaborative relationships with the community.

Still exist? Was this replaced?

Still exist? Was this replaced?

Program 3.1.2 - Neighborhood Infrastructure

The City Public Works Department shall commit its best efforts to provide services, within budgetary allocations, for neighborhood infrastructure such as curbs, gutters, sidewalks, streets, ramps, driveway approaches, curb cuts, wheelchair ramps, and street lights necessary to accommodate existing units and facilitate development of undeveloped or underdeveloped properties, to assist at least 2,500 households. This goal can be met through the No Neighborhood Left Behind (NNLB), Community Development Block Grant and Americans with Disability Act (ADA) improvement activities. The NNLB Program has identified 71 neighborhood areas most needing infrastructure repairs and is funded through a local bond program. Over 40 areas have been repaired; the remaining areas will be repaired by 2010. The City's ADA Advisory Council currently receives citizen suggestions on needed ADA improvements and implements the most needed projects on a priority basis. During the 2008-2013 planning period, the City's Public Works Department will identify and prioritize neighborhood infrastructure deficiencies and needs to develop an infrastructure repair plan for the City of Fresno, and specifically CDBG eligible areas.

still exist?

Still exist? Was this replaced?

Policy 4.2- Relocation f Residents

Program 4.2.1 – Provide Relocation Services as Needed

The City Housing and Community Development Division and the RDA shall be legally responsible for the relocation of individuals and families displaced due to redevelopment activities. The City shall provide relocation assistance as prescribed by law.

Policy 4.3 – Accountability

Program 4.3.1 – Required Reporting by Regional Housing Need Allocation Income Category

To ensure standardized and categorized reporting in the Housing Element annual update to the California Department of Housing and Community Development on the targeted income and special groups, all parties reporting accomplishment data to the City shall track housing program accomplishments by the following area median income levels: Extremely low-income (30%), very low-income (50%), low-income (80%), and moderate-income (100%). Other housing development agencies shall also provide similar reports. Detailed reports will ensure the City is working toward meeting the housing need of each income category as provided for the RHNA number for the City of Fresno as follows:

Extremely low-income	2,977
Very low-income	2,202
Low-income	3,355
Moderate-income	3,312
Above moderate income	9,121

5.12.4 - Thresholds of Significance

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impacts on the environment. The criteria used to determine the significance of an impact to population and housing are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, population and housing impacts resulting from the proposed project are considered significant if the project would:

a) Induce substantial population growth in an area, either directly or indirectly? (See Induce Population Growth , Impact PH-1)

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? (See Displacement of Housing, Impact PH-2)

c) Displace substantial numbers of people necessitating the construction of replacement housing elsewhere? (See Displacement of People, Impact PH-3)

5.12.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Induce Population Growth

Impact PH-1 **The project would not induce substantial population growth in an area, either directly or indirectly.**

Project Specific Impact Analysis

Population in the Planning Area would increase due to the proposed new development under the proposed General Plan Update. The proposed General Plan Update is anticipated to accommodate up to approximately 425,000 additional persons for a total of 970,000 persons within the Planning Area by the buildout year of 2056. In addition, the project is projected to accommodate approximately 145,000 additional housing units for a total of approximately 332,000 units by the buildout year of 2056.

New jobs in the Planning Area would be created by development of commercial, industrial and other employment generating uses. Based on data from the traffic model prepared for the General Plan Update, there are approximately 393,200 jobs that are projected to occur within the Planning Area by the buildout year of 2056 as shown in Table 5.12-5. The jobs to housing ratios for 2010 and 2056 shows that more jobs are projected to be available for each housing unit in 2056 compared to 2010. There are approximately 1.18 jobs for every housing unit in the buildout year of 2056.

Table 5.12-5: Projected Jobs to Housing Ratio for the City of Fresno Planning Area

2010 Jobs to Housing Ratio for the Planning Area			Projected (2056) Jobs to Housing Ratio for the Planning Area		
Housing Units	Jobs	Job to Housing Ratio	Housing Units at Buildout	Jobs at Buildout	Job to Housing Ratio
186,840[1]	209,260[2]	1.12	332,004[1]	393,200[2]	1.18

[1] The total housing units for the years 2010 and 2056 are provided in Table 3-3 in the Project Description.
[2] The total jobs for 2010 is provided in Table 5.12-4 above and the total jobs for 2056 within the Planning Area was obtained from the traffic model for the Fresno General Plan Update which was derived from the Fresno Council of Governments Traffic Model.
Source: FirstCarbon Solutions 2014.

An additional indicator of whether a community provides a balance of jobs and housing is to determine the number of employees that live in an area compared to the number of occupied housing units. As shown in Table 5.12-6, the County of Fresno employees to housing ratio for the year 2010 was assumed to be constant in the future years. This ratio was approximately 1.28 employees for each housing unit within the County in 2010 as shown in Table 5.12-2. It is assumed that this employee to housing ratio was similar to the ratio for the Planning Area in 2010. Furthermore, the employee to housing ratio of 1.28 is assumed to be constant in the future years until buildout of the General Plan Update.

The projected occupied housing is based on an average occupancy of total units throughout the County between the year 2000 and 2010. The average occupancy was approximately 95 percent and approximately 5 percent vacancy. The projected occupied housing within the County after 2010 was based on using the average occupancy of 95 percent and the total number of units provided in the San Joaquin Valley Demographic Forecasts 2010 to 2050 prepared in 2012. The 2010 estimate of occupied units for the Planning Area was based on a 95 percent occupancy of the total units within the Planning Area.

As shown in Table 5.12-6, the total employees who are projected to reside in the County in 2056 is 632,508 and the total employees who are projected to reside in the Planning Area is 403,717.

Table 5.12-6: Projected Occupied Housing Units and Employees Residing in Fresno County and the City of Fresno Planning Area

Year	Employees Who Reside in Area		Occupied Housing		Employees to Housing Ratio	
	County	Planning Area	County	Planning Area	County	Planning Area
2010	363,891[1]	227,197[2]	284,690[1]	177,498[3]	1.28[4]	1.28[5]
2020	427,729[6]	257,441[6]	334,163[7]	201,126[8]	1.28[9]	1.28[5]
2030	476,829[6]	291,713[6]	372,523[7]	227,901[8]	1.28[9]	1.28[5]
2040	531,566[6]	330,546[6]	415,286[7]	258,239[8]	1.28[9]	1.28[5]
2050	592,585[6]	374,548[6]	462,957[7]	292,616[8]	1.28[9]	1.28[5]
2055	625,672[6]	398,701[6]	488,806[7]	311,485[8]	1.28[9]	1.28[5]
2056	632,508[6]	403,717[6]	494,147[7]	315,404[8]	1.28[9]	1.28[5]

[1] Obtained from Table 5.12-2.
[2] Derived from the projected occupied housing and multiplying the projected employees to housing ratio of 1.28.
[3] Assumes a 95 percent occupancy of the 186,840 total housing units obtained from Table 5.15-5.
[4] Obtained from Table 5.12-2.
[5] Assumes the same employees to housing ratio within the Planning Area as the employee to housing ratio within the County of Fresno.
[6] Derived by multiplying the total occupied housing units by the employee to housing ratio.
[7] Based on a total housing unit growth of 171,785 units from 2010 to 2050 obtained from the San Joaquin Valley Demographic Forecast for 2010 to 2050, a 2010 total housing units within the County of 315,531 units, an annual housing unit growth rate of 1.010926 between 2010 and 2050, and an occupancy rate of 95 percent of the total housing units.
[8] Based on a total housing unit growth of 145,164 (332,004 units in 2056 minus 186,840 units in 2010), an annual housing unit growth rate of 1.012576, and an occupancy rate of 95 percent of the total housing units.
[9] Assumes a constant employees to housing ratio between 2010 and 2056.

Source: FirstCarbon Solutions 2014

Based on the information in Table 5.12-5 and Table 5.12-6, there are a greater number of employees who reside in the Planning Area in 2010 and 2056 compared to the number of jobs that are provided in 2010 and 2056. In 2010, approximately 17,937 employees who reside in the Planning Area

(227,197 employees minus 209,260 jobs) leave the Planning Area for employment. In 2056, approximately 10,517 employees who are projected to reside in the Planning Area (403,717 employees minus 393,200 jobs) leave the Planning Area for employment. Given that the number of employees who are projected to leave the Planning Area for employment reduces from 2010 to 2056, the implementation of the General Plan Update would improve the employees to jobs ratio. A balanced ratio is 1.0 which means each employee who resides in an area has an opportunity to obtain a job in the same area. Under the proposed project, the jobs to employees ratio for the Planning Area improves from 0.92 in 2010 to 0.97 in 2056. This improvement provides a closer balance of the number of jobs provided in the Planning Area compared to the number of employees who reside within the Planning Area. Since there is an improvement, the proposed project would provide a beneficial effect on the jobs to employees ratio and would not result in a significant inducement of additional employment growth to accommodate future employees who will reside in the Planning Area.

In addition, with a constant housing growth to accommodate future employees as well as their families, the implementation of the General Plan Update would provide adequate housing for projected employees and would result in a less than significant inducement of housing after the implementation of the project (i.e., buildout of the Planning Area in accordance with the General Plan Update).

Therefore, the implementation of the proposed project would result in a less than significant inducement of population growth because the project would result in a less than significant inducement of housing and employment.

Cumulative Impact Analysis

Cumulative development within the County of Fresno is projected to increase employees who reside in the County as shown in Table 5.12-6 and will increase the amount of employment. In 2010, there were approximately 319,600 jobs in the County as shown in Table 5.12-3 and approximately 363,891 employees as shown in Table 5.12-6. When comparing the jobs to employees in the County, the ratio is 0.88. Based on information from the Fresno Council of Governments, the total projected jobs in 2020 and 2040 are 363,581 and 449,111, respectively. When comparing these employment figures in 2020 and 2040 to the number of employees projected in Table 5.12-6, the jobs to employees ratio is 85.0 in 2020 and improves to 84.5 in 2040. As shown, the jobs to employees are declining through 2040. There is an increase in the total number of employees who reside in the County that are leaving the County for employment. The specific location of the employment is not known but could include the counties of Madera, Tulare, Kings, and Merced as well as other counties. This trend could result in the inducement of growth under cumulative conditions. However, as stated above, the implementation of the proposed project would improve the jobs to employees ratio and reduce the total number of employees leaving the Planning Area (i.e., from 17,937 employees in 2010 to 10,517 employees in 2056). Therefore, the project's contribution to the potential inducement of growth would not be cumulatively considerable, and thus the project would result in a less than significant cumulative inducement impact.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Displacement of Housing

Impact PH-2	**The project would not displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.**

Project Specific Impact Analysis

The proposed project includes development on vacant land in accordance with the General Plan Update. Development could also occur within areas that would be redeveloped. Implementation of the proposed project could potentially result in removal of existing residential units. However, the proposed project includes a substantial number of new housing units. Therefore, implementation of the project would result in an increase in housing units available for those residences that would be removed during future development under the proposed project. Prior to any displacement, a relocation analysis must be prepared in accordance with federal and/or state law. Implementation of the proposed project would not necessitate construction of replacement housing in addition to the housing that is planned under the proposed General Plan Update.

Additionally, the Fresno General Plan 2008 Housing Element includes the following policies to reduce housing impacts:

Policy 1.1: Continue the Housing Support Activities of the City and Redevelopment Agency
Policy 2.1: New Construction
Policy 3.1: Neighborhood and Revitalization
Policy 3.2: Housing Rehabilitation, Replacement and Home Buyer Assistance
Policy 4.1: Preservation of Affordability of At-Risk Housing
Policy 4.2: Relocation of Residents
Policy 4.3: Accountability

Implementation of the General Plan policies would further reduce potential housing impacts to less than significant.

Cumulative Impact Analysis

Cumulative development within the County of Fresno is projected to occur on vacant land and in areas that would be redeveloped. Based on housing projections, the County is anticipated to substantially increase housing. Therefore, cumulative development may result in less than significant impacts on the displacement of existing housing that would necessitate the development of more housing than projected for Fresno County. As described above, the implementation of the proposed project would result in a less than significant housing impact because future development under the General Plan Update is projected to provide adequate housing for future employees and their families within the Planning Area. Therefore, the project contribution to potential cumulative housing impacts within the County would not be considerable, and thus would be less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Displacement of People

Impact PH-3	**The project would not displace substantial numbers of people necessitating the construction of replacement housing elsewhere.**

Project Specific Impact Analysis

As described in Impact PH-2 above, implementation of the proposed General Plan Update could potentially result in removal of existing residential units. However, the General Plan Update includes a substantial number of new housing. Therefore, implementation of the project would result in an increase in housing units available for residences that would be removed. Prior to any displacement, a relocation analysis must be prepared in accordance with federal and/or state law. Implementation of the proposed project would not displace a substantial number of people, necessitating the construction of replacement housing in addition to the housing that is planned under the proposed General Plan Update.

Additionally, the Fresno General Plan 2008 Housing Element includes the following policies to reduce housing impacts:

Policy 1.1: Continue the Housing Support Activities of the City and Redevelopment Agency
Policy 2.1: New Construction
Policy 3.1: Neighborhood and Revitalization
Policy 3.2: Housing Rehabilitation, Replacement and Home Buyer Assistance
Policy 4.1: Preservation of Affordability of At-Risk Housing
Policy 4.2: Relocation of Residents
Policy 4.3: Accountability

Implementation of the General Plan policies would further reduce the potential displacement of substantial numbers of people, necessitating housing and result in a less than significant impact.

Cumulative Impact Analysis

Cumulative development within the County of Fresno is projected to occur on vacant land and in areas that would be redeveloped. Based on housing projections, the County is anticipated to substantially increase housing. Therefore, cumulative development may result in less than significant impacts on the displacement of substantial numbers of people, necessitating housing within the County. As described above, the implementation of the proposed project would also result in less than significant impacts on the displacement of a substantial number of people, necessitating housing. Therefore, the project contribution to potential cumulative displacement of people, necessitating housing within the County, would not be considerable, and thus would be less than significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.13 - Public Services

5.13.1 - Introduction

This section addresses potential impacts to public services such as police protection, fire protection, schools, parks/recreation, courts, libraries, and hospitals resulting from implementation of the proposed General Plan and Development Code Update. Information obtained from the various service providers has been used to determine the existing public services setting within the Planning Area.

5.13.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding public services is the City of Fresno Planning Area because potential development under the City of Fresno General Plan and Development Code Update is limited to areas within the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative public services impacts is the area served by the service provider. Some of the service such as police protection and parks/recreation are provided within the Planning Area. In addition, there are some service providers that provide services beyond the Planning Area. These include fire protection, schools, and other public facilities such as courts, libraries, and hospitals.

Police Protection

Within the Planning Area, there are numerous agencies that provide police protection services. These agencies include the City of Fresno Police Department, the Fresno County Sheriff's Department, the California Highway Patrol, Fresno State Police Department, and Fresno City College Police Department.

City of Fresno Police Department

City of Fresno Police Department provides police protection services. The City of Fresno Police Departments provide a full range of police services, including: uniformed patrol response to calls for service, crime prevention, tactical crime enforcement (such as gang/violent crime suppression), as well as traffic enforcement/accident prevention. The Department also contains the Investigative Services Division, which investigates crimes against persons/property, collects intelligence information, and deals with vice/narcotics control and enforcement. Patrol services are divided into four policing districts. The Southwest Policing District is located south of McKinley Avenue and west of East Avenue and SR 99. The Northwest Policing District is located north of McKinley Avenue to the San Joaquin River and west of Blackstone Avenue to the western City limits. The Southeast Policing District is located south of Ashland Avenue (east of Clovis Avenue), south of McKinley Avenue between East Avenue and Clovis Avenue, east of SR 99 south of Church Avenue to the

southern City limits. The Northeast Policing District is north of McKinley Avenue to the San Joaquin River and east of Blackstone Avenue to the City of Clovis.

The Fresno Police Department (FPD) operates five police stations within the City, listed below:

- Headquarters: 2323 Mariposa Mall, Fresno CA 93721
- Southwest: 1211 Fresno Street, Fresno, CA 93706
- Southeast: 1617 S. Cedar Ave., Fresno, CA 93702
- Northeast: 1450 E. Teague, Fresno, CA 93720
- Northwest: 3781 N. Hughes Ave., Fresno, CA 93705

The Fresno Police Department also operates Specialized Units and Services that support the Department. These units and services include Traffic, Skywatch (aerial support), Mounted Patrol, K-9 Units, Explosive Ordinance Disposal (EOD) and Specialized Weapons and Tactics (SWAT); and are maintained within the Patrol, Support and Investigations Divisions.

Fresno County Sheriff's Department

The Fresno County Sheriff's Department provides law enforcement/crime prevention to the unincorporated portions of the metropolitan area and Fresno County. These unincorporated communities include Calwa, Malaga, Mayfair, Sunnyside, Fig Garden, and Tarpey. The Planning Area is located within Patrol Area 2 of the County of Fresno Sherriff's Department. Area 2 extends from the San Joaquin River south to American Avenue and from McCall Avenue west to Chateau Fresno which is immediately west of the Planning Area. The Area 2 Sheriff's Department office is located at 5717 E. Shields Avenue, which is located in the southeast portion of the Planning Area.

Other Law Enforcement Agencies

Other law enforcement services that are provided within the Planning Area include the California Highway Patrol, Fresno State Police Department, and Fresno City College Police Department. The California Highway Patrol (CHP) provides law enforcement services with relation to the State highway system and assists the City of Fresno by providing enforcement within the City under special programs. The CHP offices that serve the Planning Area include the CHP Central Division office located at 5179 North Gates Avenue, which is located in the northwest portion of the Planning Area and the CHP Area office located at 1382 West Olive Avenue, which is also located in the northwest portion of the Planning Area. The Division office oversees the Area offices that are located throughout the San Joaquin Valley. The Fresno State Police Department provides safety and security for students, staff, faculty, and visitors of the campus community 24 hours a day and 7 days a week and their authority extends one mile beyond the University's boundary. The campus of the California State University at Fresno is located in the northeast portion of the Planning Area. The Fresno City College Police Department serves the school campus community that is located north of Downtown Fresno. They provide a full range of police-related services including immediate response to all medical and fire emergencies.

Fire Protection

City of Fresno Fire Department

The City of Fresno Fire Department offers the following services within the City of Fresno's city limits: fire prevention, fire suppression, hazardous material mitigation, rescue, and emergency medical services. The City has instant aid agreements with surrounding agencies and districts within Fresno County whereby the nearest fire station responds to an emergency regardless of the jurisdiction within which it is located. These agreements, in addition to the City of Fresno's own resources, provide a high quality of fire suppression and emergency medical care services. Emergency medical service is provided to all city residents by the Fire Department, however, emergency transport is provided by private carriers (such as private ambulance companies).

The City of Fresno Fire Department employs 304 uniformed firefighters and serves a population of more than 550,000 in the City of Fresno, the North Central Fire Protection District and the Fig Garden Fire Protection District (over 325 square miles) with 24 fire stations, including the Airport Rescue Fire Fighting (ARFF) station (19 of which are located in the City of Fresno). The companies are divided into three battalions: two for the City and one for the North Central Fire Protection District, each supervised by a battalion chief. Daily staffing consists of 66 firefighters and one 24-hour arson investigator.

The Fire Department recently merged operational services with two other county departments and now has 19 fires stations within the City that serve a 336 square mile area. The Fire Department also has hazardous materials, swift water rescue, and heavy rescue apparatus. The Department's target response time is four minutes from the time the station receives notification of an emergency. In 2010, the City of Fresno had a staffing level of 0.6 firefighters per 1,000 people and the state average was 0.81. In addition to responding to calls, the Fire Department reviews building permits and subdivision maps to ensure proper location and access to fire suppression equipment. Additionally, the Department conducts annual business safety inspections. The City requires that all new residential development be within a 3-mile "running distance" of a fire station. Table 5.13-1 provides Fire Department statistics from 1980 to 2011.

Table 5.13-1: City of Fresno Fire Department Statistics 1980-2011

Year	1980	1990	2000	2009	2010	2011
Firefighters	273	221	243	323	282	260
Calls for Service	15,887	28,780	23,792	41,034	30,001	NA
Fire Fighters per 1,000 Residents	1.3	0.71	0.6	0.68	0.6	0.54
Minimum Daily Staffing	88	NA	NA	85	66	66
Engines	12	14	16	19	16	15
Trucks	5	4	5	6	4	4

NA – Information not available
Source: City of Fresno General Plan Map Atlas, 2011.

City of Fresno Fire Hazards

Although the City of Fresno is proximate to high and very high fire hazard designated areas, the City itself is largely categorized as little or no threat or moderate fire hazard, which is largely attributed to paved areas. Some small areas along the San Joaquin River Bluff in the northern portion of the City of Fresno are prone to wildfire due to the relatively steep terrain and vegetation and are classified as having a high fire hazard.

North Central and Fresno County Fire Protection Districts

The North Central Fire Protection District serves approximately 240 square miles and includes several fire stations, none of which are located within the Planning Area. There are three fire stations (Station No. 21, 22, and 23) that were part of a merger between the City of Fresno Fire Department and the North Central Fire Protection District. These stations are located west of the Planning Area. The Fresno County Fire Protection District encompasses approximately 3,800 square miles and contains 19-staffed stations. There is one station (Station 87) located in the southern portion of the Planning Area. An additional station (Station 89) is located south of the Planning Area and is currently providing service to residents and businesses within the unincorporated areas in the southern portion of the Planning Area. The Fig Garden Fire Protection District is a division of the Fresno County Fire Protection District. Station 20 was part of a merger between the City of Fresno Fire Department and the Fig Garden Fire Protection District. This station is located within the unincorporated area of Fig Garden within the Planning Area.

Table 5.13-2 shows the 24 fire stations operated by the Fresno Fire Department. There are 21 fire stations (not including Fire Stations 21, 22, and 23) that are located within the Planning Area.

Table 5.13-2: Existing City of Fresno Fire Stations

Station No.	Address (Fresno)	Equipment/Personnel
1	1264 North Jackson	Engine No. 1 - The engine is operated by a crew of three. Truck No. 1 - The truck is operated by a crew of four. Hazmat No. 1 - Staffed by a member of Truck No. 1's crew. Battalion No. 1 - 1998 Ford Expedition command vehicle.
2	7114 North West	Engine No. 2 - The engine is operated by a crew of three. Water Tender No. 2- The water tender holds 2,000 gallons of water and is staffed by a crewmember from engine 2.
3	1406 Fresno Street	The block occupied by Station No. 3 is also home to the Fresno Fire Department's Training Section and Drill Tower, as well as the Repair and Maintenance section that are responsible for maintaining fire department apparatus. Engine No. 3 - The engine is operated by a crew of four. Truck No. 3 - The truck is operated by a crew of four Water Tender No. 3 - The water tender holds 3,000 gallons of water and is staffed by a firefighter from Station 3.
4	3065 East Iowa	Engine No. 4 - The engine is operated by a crew of four.
5	3131 North Fresno	Engine No. 5 - The engine is operated by a crew of four

Station No.	Address (Fresno)	Equipment/Personnel
	Street	
6	4343 East Gettysburg	Engine No. 6 - The engine is operated by a crew of three.
7	2571 South Cherry	Engine No. 7 - The engine is operated by a crew of three.
8	1428 South Cedar	Engine No. 8 - The engine is operated by a crew of four. Brush Rig No.8- Staffed by the crew of engine 8.
9	2340 North Vagedes	Engine No. 9 - The engine is operated by a crew of three. Truck No. 9 - The engine is operated by a crew of three. Battalion 2- 2001 Ford.
10	5545 Air Terminal	Engine No. 10 - The engine is operated by a crew of three.
11	5544 North Fresno	Engine No. 11 - The engine is operated by a crew of three. Truck No. 11 - The engine is operated by a crew of four. Rescue No. 211- The rescue truck is staffed by a firefighter engineer from the truck crew.
12	2874 West Acacia	Engine No. 12 - The engine is operated by a crew of four.
13	815 East Nees	Engine No. 13 - The engine is operated by a crew of three
14	6239 North Polk	Engine No. 14 - The engine is operated by a crew of three. Truck No. 14 - The engine is operated by a crew of three. Brush rig No. 14- The brush rig is operated by the truck crew.
15	5630 E Park Circle	Engine No. 15 – The engine is operated by a crew of three. OES No. 314- This engine is used for "The Office of Emergency Services" or as a reserve engine when needed.
16	4170 N. Brix	Engine No. 16 - The engine is operated by a crew of three.
17	10512 N Maple	Engine No. 17 – 2005 Smeal, which pumps 1,500 gallons of water per minute, and is equipped with a 730-gallon water tank. The engine is operated by a crew of three. Patrol Rig No. 17- Used for vegetation fires and is staffed by the engine crew.
18	5938 N La Ventana	Engine No. 18 – The engine is operated by a crew of three.
19	3175 W. Belmont	Engine No. 19 – The engine is operated by a crew of three.
20	4537 N. Wishon **(Fig Garden Fire Protection District)**	Engine No. 20 – The engine is operated by a crew of three. Battalion No.3- 2006 Chevrolet.
21	15850 W. Kearney Blvd. **(North Central Fire Protection District)**	Engine No. 21- Staffed by a crew of three. Truck No. 21- Staffed by a crew of three Water Tender No. 21- The water tender holds 3,000 gallons of water and is staffed by a firefighter from station 21.
22	806 S. Garfield **(North Central Fire Protection District)**	Engine No. 22- Staffed by a crew of three.
23	4555 N. Biola Ave **(North Central Fire**	Engine No. 23- Staffed by a crew of three Water Tender No. 23- The water tender holds 3,000 gallons of water

Station No.	Address (Fresno)	Equipment/Personnel
	Protection District)	and is staffed by a firefighter from the engine.
24	Airport Rescue Fire Fighting (ARFF) station (location: City of Fresno Yosemite International Airport)	The ARFF Team consists of 19 Fire Control 5 certified team members. Services provided include, but not limited to: ARFF response, Hazardous Materials incidents, first responder calls, and all structure fires within the airport boundaries.[1] The department maintains a minimum daily staffing of two ARFF members assigned to the ARFF Station.[1]

Note:
[1] http://www.fresno.gov/Government/DepartmentDirectory/Fire/FireSuppression/Aircraft+Rescue+and+Fire+Fighting.htm
Source: City of Fresno Fire Department Station Locations, 2012.
Website
http://www.fresno.gov/Government/DepartmentDirectory/Fire/AboutFresnoFire/StationLocations/default.htm

Schools

The Planning Area includes various schools that provide primary, secondary, and post-secondary education.

Primary and Secondary Schools (Kindergarten through Twelfth Grades)

The Planning Area is served by a number of school districts that provide kindergarten through twelfth grade classes because school boundaries do not mirror the City of Fresno Planning Area. The table below shows the current enrollment capacities of each school district, including enrollment for private and charter schools. As shown in the Table 5.13-3 below, combined, the school districts can serve up to 163,325 school aged children in kindergarten through twelfth grades.

Table 5.13-3: Capacity and Enrollment Figures for K-12 School in the City of Fresno Planning Area

Grade Level	Elementary School		Middle School		High School		Various Grades		Total	
School District [1]	Max	Current	Max	Current	Max	Current	Max	Current	Max	Current
Fresno Unified	41,210	38,406	11,271	9,860	20,807	20,759	5,360	3,332	78,648	72,357
Fresno Unified (Charter)	(all grades and school districts combined)						2,247	2, 981	2,247	2,981
Clovis Unified	23,015	20,160	7,700	6,084	15,200	11,298	N/A	N/A	45,915	37,542
Central Unified	10,736	8,060	2,670	2,277	5,198	4,269	N/A	N/A	18,604	14,606
Sanger Unified	5,519	5,670	1,755	1,684	2,673	3,109	N/A	N/A	9,947	10,463
West Fresno Elementary School District [2]	744	765	350	300	1,063	1,063	430	313	2,587	2,441
Private	(all grades and school districts combined)						4,244	N/A	4,244	0
Other Charter	(all grades and school districts combined)						2,196	N/A	2,196	0

Grade Level	Elementary School		Middle School		High School		Various Grades		Total	
(Eastern Sierra; Mendota USD; Parlier USD; Sierra USD; West Fresno Charter)										
Total	81,224	73,061	23,746	20,205	44,941	40,498	14,477	6,626	164,388	140,390

Notes:
[1] Given that school boundaries do not mirror city boundaries, students may attend schools outside of the city while students that live outside of the city may attend schools within the city. Enrollment figures are as of 2011.
[2] In July 2011, West Fresno Elementary School District and Washington Unified School Unified merged. Enrollment figures for the Washington Union High School and American Union (grades K-8) were obtained from the 2010-2011 School Accountability Report Cards located at website: http://www.wusd.ws/pages/Washington_Unified_School_Dist/Files_Manager/Files /School_Accountability_Report_C/School_Sites. The maximum capacity at the high school is not known and therefore was assumed to be the same as the current enrollment.
Source: City of Fresno, 2011; General Plan Map Atlas and updated by FirstCarbon Solutions, 2014.

Each of the school districts is described below. The Fresno Unified School District (FUSD) is a consolidated district that contains seven sub-districts. FUSD is the fourth largest school district in California and has an enrollment of 72,357 students dispersed among 95 existing schools. A District Master Plan was recently completed which will aid in alleviating overcrowding in the schools. The Master Plan calls for a new high school in the southern edge of the City of Fresno, which would accommodate new growth and lessen overcrowding at existing high schools in the City.

Clovis Unified School District (CUSD) serves northeast and north-central Fresno and is the city's second largest school district (with a maximum capacity of 49,915 students). Approximately 40 percent of students in CUSD are residents of Fresno. This school district predominantly serves Fresno's new growth areas. The District is in the early planning stages of its newest educational complex in the northern portion of South East Growth Area.

Central Unified School District (Central USD) serves the northwestern and west area (i.e., west of State Route 99) as well as a large rural area west of the City. Over the past decade, this school district has had to construct new schools due to the population increase in the district's service area.

Sanger Unified School District (Sanger USD) serves the southeast portion of the city. High school students living in Fresno and within the Sanger USD currently attend Sanger High School, which is located several miles east of Fresno. The southwest portion of the city was served by the West Fresno School District, which contains an elementary school and a middle school, however in July 2011, West Fresno USD merged into and became a part of the Washington Unified School District.

Post-Secondary Schools

Post-secondary schools are those schools that provide education after twelfth grade. This education is also referred to as higher education. The schools that provide higher education within the Planning Area include California State University, Fresno (Fresno State University), Fresno Pacific

University, Fresno City College, Willow International Community College Center, and a wide variety of vocational and technical schools that prepare students for the workplace.

Fresno State University is part of the California State University system and enrolled more than 21,500 students in the 2011-2012 academic year. The school offers a wide range of advanced undergraduate and graduate degrees at its 388-acre main campus and its 1,011-acre University Farm are located at the northeast edge of the City.

Fresno Pacific University is a private college offering both undergraduate and graduate degrees. The Main Fresno campus had an enrollment of 3,603 students in the fall of 2011.

Fresno City College is a comprehensive learning institution providing a curriculum ranging from general education coursework for students intending to transfer to an undergraduate university to vocational programs. Current enrollment at Fresno City College is approximately 23,900 students.

Willow International Community College Center is part of the State Center Community College District. It offers programs in general education to student who intend to transfer to a four-year institution or obtain a Certificate or Associates Degree. Willow International is one of three State Center Community College District educational centers, and all three combined enroll approximately 8,300 students.

Parks/Recreation

The city's park system contains several classes of park space, including trails, regional parks, neighborhood parks, educational facilities, dual-use ponding basins, etc. The City of Fresno has 4,019 acres of existing open space. Over half of the existing open space (including private golf courses and parks in gated communities) is not accessible to the general public, although it fulfills recreational needs for those who have access. The City contains over 4,000 acres of open space and maintains approximately 1,617 acres of open space and nearly 230,000 square feet of building space dedicated to recreational/educational purposes. Additionally, the City maintains 9 community pools, 4 splash parks, 518 picnic tables, 153 barbeque grills, 3 amphitheaters, 54 baseball/softball fields, 53 football/soccer fields, 40 basketball courts, 11 volleyball courts, 40 tennis courts, 7 skate parks, and 5 dog parks.

Table 5.13-4 below identifies the various parks and community facilities that are maintained by the City of Fresno. As shown in Table 5.13-4, regional parks comprise a majority of the City's parkland, followed by neighborhood parks.

Table 5.13-4: City of Fresno Maintained Parks and Community Facilities

Facility	Acreage	Number of Sites
Dual Use Ponding Basin (maintenance only)	128	16
Community center	31	6
City owned golf course	206	2

Facility	Acreage	Number of Sites
Neighborhood center	71	12
Neighborhood park	307	32
Community park	20	1
Pocket park	27	21
Regional park	725	3
Paths and Trails	115	11
Future parks	70	6
Total	**1,698**	**110**
Source: City of Fresno, 2011. General Plan Map Atlas, and Development and Resource Management Department, 2014.		

The park system also provides 34 acres off-road trails for pedestrians and cyclists. Schools augment the City's park system because they provide additional opportunities through joint use agreements. However, not all schools are open during non-school hours, which limit their ability to be used for recreational purposes. Table 5.13-5 below shows the acreage of all open space in the City. As depicted in this table, ponding basins comprise a majority of the open space in the City, followed by parks. Ponding basins account for 1,273 acres within the City and are owned by the Fresno Metropolitan Flood Control District (FMFCD). All basins serve as ponding basins for storm drainage, while some also are utilized as year-round groundwater recharge basins. Whenever feasible, FMFCD and the City partner to develop parks at basins with play equipment and sports fields.

Table 5.13-5: City of Fresno Existing Open Space

Facility	Acreage
Multi-use	887
Recreational	23
Ponding Basins	1,273
Airport Approach/Clear Zone	17
Educational Open Space	29
Golf Courses	692
Parks	967
Canals	44
Lake/Water feature	86
Total	4,019
Source: City of Fresno, 2011- General Plan Map Atlas	

In addition to the open space within the City of Fresno, there are various types of open space within the unincorporated areas of the Planning Area. The Planning Area includes 7,742 acres of existing open space as depicted in Table 5.13-6. As shown, the majority of the open space is for multiple uses followed by ponding basins, golf courses, and parks.

Table 5.13-6: City of Fresno Planning Area Existing Open Space

Facility	Acreage
Multi-use	3,601
Recreational	23
Ponding Basins	1,544
Airport Approach/Clear Zone	17
Educational Open Space	29
Golf Courses	1,122
Parks	1,625[1]
Canals/Open Space	134
Lake/Water feature	86
Open Space/Gravel Mining	106
Total	7,742

Source: City of Fresno, DARM, April 2014
[1]Includes 541 acres of ponding basins developed as park space maintained by the City. Total acreage does not include the double-counting.

Currently, the Planning Area includes approximately 545,000 people. Based on the existing City of Fresno parks standard that includes 3 acres of parkland to be provided per 1,000 residents, approximately 1,635 acres of parkland would need to be provided to currently meet this standard. As shown above, there are currently 1,625 acres of parkland within the Planning Area. Based on the current population within the Planning Area, approximately 3.28 acres of parkland is provided per 1,000 residents, which is just over the City's current park standard. This includes ponding basins with park space maintained by the City of Fresno

Courts

State and federal courts are provided in the City of Fresno Planning Area. The State courts include the Fresno County Superior Court (trial court) and the Appellate Court. The federal court is the U.S. District Court for the Eastern District of California, Eastern Division.

State Courts

Fresno County Superior Court

There are three Superior Court locations within the Planning Area and one additional court located immediately south of the Planning Area (City of Fresno, 2014). The locations as well as the types of cases heard at each facility are provided below.

The Fresno Superior Courthouse Downtown Location is at 1100 Van Ness Avenue. The types of cases heard at the Fresno Downtown Courthouse are Criminal (Felony, Infractions, Misdemeanor); Domestic Violence; Drug Court; Juvenile Dependency Division (Juvenile Dependency Hearings) and Traffic: (Infractions and Misdemeanors).

The B. F. Sisk Courthouse is located at 1130 O Street. The B.F. Sisk Courthouse primarily is used for non-criminal cases such as civil cases, conservatorship, family court services, family law, probate, restraining orders, small claims, and unlawful detainer cases.

The "M" Street Courthouse is located at 2317 Tuolumne Street. The types of cases heard at the "M" Street Courthouse include Criminal Infractions and Traffic Infractions.

In addition to the three courthouses identified above, there is a Juvenile Delinquency Court immediately south of the Planning Area. This court is located at 333 East American Avenue. The types of cases heard at this facility include misdemeanor criminal, felony criminal, drugs, traffic, and school attendance.

5th District Court of Appeals

The State of California 5th District Court of Appeals is located in the City of Fresno at 2424 Ventura Street. The Fifth Appellate District covers nine counties located in central California: Fresno, Kern, Kings, Madera, Mariposa, Merced, Stanislaus, Tulare, and Tuolumne. Except for death penalty cases, the Courts of Appeal have appellate jurisdiction when trial courts have original jurisdiction and in other causes prescribed by statute. An appeal is filed in the trial court and reviewed in the appellate district where the trial court is located.

Federal Court System

The U.S. District Court is located in the City of Fresno at 2500 Tulare Street. This District Court is the Fresno Division of the Eastern District of California. The Fresno Division hears civil, criminal, and miscellaneous actions arising in the counties of Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Stanislaus, Tulare, and Tuolumne. The Fresno Divisional Office is currently staffed with two district court judges, two senior district court judges, and three magistrate judges (United States District Court, 2014).

Libraries

The Fresno County Public Library provides collections and services through its Central Resource Library and 34 branches. The County Library is part of the San Joaquin Valley Library System, which is a cooperative network of ten public library jurisdictions in the counties of Fresno, Kern, Kings, Madera, Mariposa, Merced, and Tulare. County of Fresno library system has the Central Library,

three regional libraries, six branch libraries, and two other libraries as shown in Table 5.13-7 within the City of Fresno Planning Area.

Table 5.13-7: Libraries Currently in the Planning Area

Library Name	Address
Woodward Park Regional Library	944 East Perrin Avenue, Fresno, CA 93720
Pinedale Branch Library	7170 North San Pablo Avenue, Pinedale, CA 93650
Fig Garden Regional Library	3071 West Bullard Avenue, Fresno, CA 93711
Politi Branch Library	5771 North First Street, Fresno, CA 93710
Gillis Branch Library	629 West Dakota Avenue Fresno, CA 93705
Cedar-Clinton Branch Library	4150 East Clinton Avenue Fresno, CA 93703
Talking Book Library For The Blind	Ted C. Wills Community Center 770 N San Pablo Avenue, Fresno CA 93728
Central Library	2420 Mariposa Street Fresno, CA 93721
Sunnyside Regional Library	5566 East Kings Canyon Road Fresno, CA 93727
Mosqueda Branch Library	4670 East Butler Avenue Fresno, CA 93702
West Fresno Branch Library	188 E. California Ave Fresno, CA 93706
Senior Resource Center Library	2025 E. Dakota Fresno, CA 93726
Source: http://www.fresnolibrary.org/branch/metro.html, Accessed April 24, 2012	

Hospitals

There are nine hospitals that are located within the City of Fresno Planning Area. These hospitals provide a variety of services. There are four hospitals that provide emergency services and one hospital that provides trauma service. The location, services offered, and capacity of each of the hospitals are provided in Table 5.13-8.

Table 5.13-8: Hospitals in the City of Fresno Planning Area

Hospital Name	Location	Services Offered	Capacity
Fresno Surgical Hospital[1]	6125 North Fresno Street	Inpatient and Outpatient Surgery	31 Beds
Fresno Heart and Surgical Hospital[2]	15 East Audubon Drive	Acute Care, Emergency Services	57 Beds
St. Agnes Medical Center[3]	1303 Herndon Avenue	Acute Care, Emergency Services, Eye Center, Cancer Center	436 Beds
Kaiser Foundation Hospital – Fresno[4]	7300 North Fresno Street	Emergency Services, ICU Medical/Surgical	145 Beds
Community Regional Medical Center[5]	2823 Fresno Street	Trauma Center, Emergency Services, Burn Center, Neuroscience Institute	677 Beds (44 Beds – Psychiatric Unit) (24 Beds – Rehabilitation Unit)
Community Behavioral Health Center[6]	7171 N. Cedar Avenue	Inpatient and Outpatient Services	61 Beds
Community Subacute and Transitional Care Center[7]	3003 N. Mariposa Street	Chronic Subacute Conditions	106 Beds
Crestwood Psychiatric Health Facility[8]	153 N. U Street	Psychiatric Health	12 Beds
San Joaquin Valley Rehabilitation Hospital[9]	7173 N. Sharon Avenue	Rehabilitation	40 Beds

Notes:
[1] Data obtained from http://gis.oshpd.ca.gov/atlas/places/facility/106104047. Accessed January 12, 2014.
[2] Data obtained from http://gis.oshpd.ca.gov/atlas/places/facility/106105029. Accessed January 12, 2014.
[3] Data obtained from http://www.samc.com/see-our-facilities. Accessed January 12, 2014.
[4] Data obtained from http://www.hospital-data.com/hospitals/KAISER-FOUNDATION-HOSPITAL---FRESNO-207.html. Accessed January 12, 2014.
[5] Data obtained from http://www.hospital-data.com/hospitals/COMMUNITY-MEDICAL-CENTER-FRESNO-FRES300.html. Accessed January 12, 2014.
[6] Data obtained from http://gis.oshpd.ca.gov/atlas/places/facility/106104008. Accessed January 12, 2014.
[7] Data obtained from http://gis.oshpd.ca.gov/atlas/places/facility/206100718. Accessed January 12, 2014.
[8] Data obtained from http://gis.oshpd.ca.gov/atlas/places/facility/106344170. Accessed January 12, 2014.
[9] Data obtained from http://health.usnews.com/best-hospitals/area/ca/san-joaquin-valley-rehabilitation-hospital-6930055. Accessed January 12, 2014.
Source: FirstCarbon Solutions 2014

As shown above, the hospital with the greatest number of beds is the Community Regional Medical Center that is located in Downtown Fresno. The total number of beds provided within the Planning Area is approximately 1,565.

5.13.3 - Regulatory Setting

Following are the public services regulations that are applicable to the Planning Area.

Police Protection

City of Fresno

The City of Fresno includes various police protection policies as part of the 2025 Fresno General Plan.

E-24 OBJECTIVE: Provide the level of law enforcement and crime prevention services necessary to maintain a safe, secure, and stable urban living environment through a police department that is dedicated to providing professional, ethical, efficient and innovative service with integrity, consistency and pride.

E-24-c: Policy: Continue to identify and apply appropriate safety design and operational measures as conditions of development entitlement approval including but not limited to access control measures, lighting and visibility of access points and common areas, functional and secure on-site recreational and open space improvements within residential developments, and utilization of private "certified" security services.

E-24-d: Policy: Maximize communication and cooperative efforts with residents and businesses in order to identify crime problems and to optimize the effectiveness of crime prevention measures and law enforcement programs.

E-24-e: Policy: Maximize coordination between the Police Department and the Sheriff's Department to address crime problems in neighborhoods divided by the City's incorporated boundary and continue to explore opportunities for combining and consolidating services when it provides a means to improve the level of law enforcement provided to the community.

E-24-f: Policy: Identify and pursue measures and methods to improve law enforcement services.

- Implement a process which provides for Police Department review and approval of major events including concerts, sports contests, community celebrations, exhibitions and other events generating large attendances which will ensure that adequate event staffing is provided to maintain crowd control, traffic safety and to meet law enforcement needs on and off-site.
- Establish at least one Problem Oriented Policing (POP)/TAC office in each policing area.
- Consider utilization of alternative means of patrol and apprehension such as air support (helicopter or other aircraft), foot patrol or bicycle and horse mounted patrol.
- Maintain a long-range law enforcement budget planning program to identify revenue and expenditure trends and establish funding mechanisms (including but not limited to the consideration of assessment districts) to address revenue deficiencies.

County of Fresno 2000 General Plan

Goal PF-G: To protect life and prosperity by deterring crime and ensuring the prompt and efficient provision of law enforcement service and facility needs to meet the growing demand for police services associated with an increasing population.

Policy PF-G.1: The County shall ensure the provision of effective law enforcement services to unincorporated areas in the county.

Policy PF-G.2: The County shall strive to maintain a staffing ratio of two (2) sworn officers serving unincorporated residents per 1,000 residents served. (This count of officers includes all ranks of deputy sheriff personnel an excludes all support positions and all sworn officers serving county wide population interests such as bailiffs, and sworn officers serving contract cities and grant-specific populations).

Policy PF-G.3: The County shall identify and establish funds for acquisition of adequate sheriff facility sites in unincorporated locations of the county.

Policy PF-G.4: The County shall require development to pay its fair share of the costs for providing law enforcement facilities and equipment to maintain service standards.

Policy PF-G.5: The County shall provide law enforcement support to adequately maintain its service standards, within the County's budgetary constraints.

Policy PF-G.6: Safe Design Features. The County shall promote the incorporation of safe design features (e.g. lighting, adequate view from streets into parks) into new development by providing Sheriff Department review of development proposals.

Fire Protection

City of Fresno

The City of Fresno includes various fire protection policies as part of the 2025 Fresno General Plan.

E-25 OBJECTIVE: Ensure that fire protection, emergency medical and all emergency services are provided in an adequate, efficient and cost effective manner.

E-26 OBJECTIVE: Ensure that the Fire Department's staffing and equipment resources are sufficient to implement all requests for fire and emergency service from the citizens of Fresno.

E-26-a. Policy: Use adopted general and specific plans, the city's GIS database, and the fire station location program to achieve optimum siting of future fire stations. For those station sites identified by the 2025 General Plan Land Use and Circulation Map (Exhibit 4) but not yet acquired by the city, the underlying alternative land uses shown on Table 5 shall be applied.

The siting of any additional new station locations to serve future development such as the North and Southeast Growth Areas shall occur through the applicable community or specific plan adoption/amendment process.

E-26-b: Policy. Provide for an average response time of not more than five minutes for all emergency requests for service within the metropolitan area.

E-27-c: Policy. Continue Fire Department review of all development proposals in order to ensure the inclusion of adequate on-site and off-site fire protection provisions.

E-27-e: Policy. Continue to ensure that adequate water supplies and hydrants are available for fire suppression within all existing urban areas as well as newly developing areas.

E-27-f: Policy: Investigate and implement methods to generate fees to off-set the ongoing personnel and maintenance costs of providing fire protection.

County of Fresno 2000 General Plan

Goal PF-H: To ensure the prompt and efficient provision of fire and emergency medical facility and service needs, to protect residents of and visitors to Fresno County from injury and loss of life, and to protect property from fire.

Policy PF-H.1: The County shall work cooperatively with local fire protection districts to ensure the provision of effective fire and emergency medical services to unincorporated areas within the county.

Policy PF-H.2: Prior to the approval of a development project, the County shall determine the need for fire protection services. New development in unincorporated areas of the county shall not be approved unless adequate fire protection facilities are provided.

Policy PF-H.3: The County shall require that new fire stations be located to achieve and maintain a service level capability consistent with services for existing land uses.

Policy PF-H.4: The County shall reserve adequate sites for fire and emergency medical facilities in unincorporated locations in the county.

Policy PF-H.5: The County shall require that new development be designed to maximize safety and minimize fire hazard risks to life and property.

Policy PF-H.6: The County shall limit development to very low densities in areas where emergency response times will be more than 20 minutes.

Policy PF-H.8: The County shall encourage local fire protection agencies in the county to maintain the following as minimum standards for average first alarm response times to emergency calls:

a) 5 minutes in urban areas;

b) 15 minutes in suburban areas; and

c) 20 minutes in rural areas.

Schools

The City and the County have the following general plan land use policies that are applicable to schools within the Planning Area.

City of Fresno

E-28 OBJECTIVE: Cooperate with and encourage all school districts within the metropolitan area to provide the educational facilities and programs necessary to meet the needs of the area's student population.

E-28-c: Policy. The implementation of strategies by school districts to provide and efficiently utilize facilities is to be considered an important factor by the City of Fresno when contributing its resources or utilizing its legislative authority to require school fees. The city cannot impose any school impact fee (other than those mandated by law), unless the school districts clearly demonstrate an efficient utilization of facilities including, but not limited to, the following considerations:

- Construction of new or expanded permanent school site facilities.
- Interim measures such as year-round schedules.
- Use of portable classroom structures, transporting students to campuses with available student capacity and double or evening sessions.

E-28-d. Policy: The acquisition of school sites and construction of school facilities that are equal to, or greater than, the state standards for school enrollment and school site size by all school districts serving the metropolitan area is a high priority of the City of Fresno.

E-28-e. Policy: Support measures to acquire planned school sites and construct school facilities, including the assessment of additional school fees on new development, consistent with applicable state and federal laws and the following:

- development fees are determined necessary to ensure that new development contributes its equitable share of the full cost of constructing new schools.
- these development fees are uniformly applied within a school district's boundaries.
- all reasonable and diligent efforts have been made to utilize other potentially available sources of funds.

E-29. OBJECTIVE: Plan for the location and design of schools to ensure their physical and functional compatibility with surrounding urban development and improvements, and to promote their role as the focal point of neighborhood and community activity.

County of Fresno 2000 General Plan

Policy PF-I.2: The County shall encourage school facility siting that establishes schools as focal points within the neighborhoods and community in areas with safe pedestrian and bicycle access.

Policy PF-I.4: The County shall work cooperatively with school districts in monitoring housing, population, and school enrollment trends and in planning for future school facility needs and shall assist school districts in locating appropriate sites for new schools.

Policy PF-I.6: The County strongly discourages the siting of schools in agricultural areas due to the growth-inducing potential of schools and conflicts with farming practices such as pesticide application.

Policy PF-I.8: The County and school districts should work closely to secure adequate funding for new school facilities. The County shall support the school districts' efforts to obtain appropriate funding methods such as school impact fees.

Parks and Recreational Facilities

The City and the County have the following general plan land use policies that are applicable to parks and recreational facilities within the Planning Area.

City of Fresno

F-1. OBJECTIVE: This general plan constitutes an update of the Master Parks Plan and will be used as a programmatic framework by the City of Fresno in order to ensure sufficient park facilities and to maintain a variety of meaningful and balanced recreational programs for residents for the upcoming 20-plus year planning horizon. This Master Parks Plan incorporates objectives, policies, open space land use designations, and trail alignments adopted in the land use and transportation topics of this general plan and in community and specific plans, ordinances, and resolutions of the City of Fresno.

F-1-a. Policy: The Master Parks Plan (and any subsequent implementation plan for parks and recreation) should have the following characteristics:

- it should meet the needs of the people of Fresno and make recreation more accessible to the public.
- it will be consistent with, and integrated into, regional, community, and specific plans.
- it should be simple to apply and attainable in the planning period with existing or projected funds.
- it should ensure that the city's parks and recreation is coordinated with other recreational opportunities, other recreation providers, and other public services (such as education and transportation).
- it should be amenable to revision as circumstances change

F-1-b. Policy: Ensure that park and recreation planning is a continuous process, with a full review and evaluation of this master plan at least every ten years in order to consider changing priorities and conditions applicable to park acquisition, development, and operation.

F-1-d. Policy: Provide for the continuing development of a public system to meet the community's needs for both active and passive recreation with an adequate supply of recreational space, an appropriate mix of park types, and an equitable distribution of these facilities.

F-1-e. Policy: Public park types are classified as follows and are to be developed according to the standards specified.

Mini-Parks ("Pocket Parks"). Small parks, generally less than two acres, located near higher-density development. These parks fill a void when larger parks are not feasible and when adequate open space and recreational opportunities within nearby residential development projects are not provided. As a general rule, these small parks are best suited to providing landscaped, shaded areas for non-programmed passive enjoyment. However, flexibility should be allowed in planning mini-park facilities, to meet specialized and changing needs of neighborhoods (for instance, predominantly senior citizen neighborhoods may desire meeting places or gardening areas; other neighborhoods may need tot lots, or surface courts for teenagers to play ball). While mini-parks may serve smaller neighborhoods, their size makes them inefficient and more costly to maintain (per person served). While they provide some open space in urban areas, mini-parks cannot replace the larger neighborhood parks in providing a wide range of recreation activities.

Neighborhood Parks. Semi-active parks of five to ten acres, designed to serve residents living within a one-mile radius of the site, or to serve between 10,000 and 15,000 residents. In addition to irrigated landscaping, typical improvements for neighborhood parks include softball/soccer fields, lighted tennis courts, lighted multi-purpose courts, tot lots, picnic areas, restrooms, equipment checkout rooms, and parking lots. Whenever possible, neighborhood parks are to be located adjacent to elementary schools, to facilitate cooperative arrangements. When sited next to schools, a minimum size of five acres is indicated for neighborhood parks. When not adjacent to school sites, neighborhood parks are developed as a "stand along" park: a minimum site size of 7.5 acres is indicated, and "stand alone" parks should also include a multi-purpose room approximately 2,000 square feet in size.

Community Parks. These parks are ideally twenty acres in size. They are intended to serve residents living within a two to four mile radius, or to serve a population of between 50,000 and 80,000 residents. Community parks may have lighted sports fields and specialized equipment not found in neighborhood parks. The community park is the nucleus of the park system, where members of the community can congregate for area-wide functions or programs. At the heart of the park is the community center building of 25,000 to 30,000 square feet, which may provide at least the following facilities and services:

- gymnasium (with showers and lockers)
- multi-purpose room
- meeting rooms
- senior activity center
- administrative offices
- snack bar and kitchen facilities

Regional Parks. These parks are generally 100 or more acres in extent. They are developed to serve residents living within each quadrant of the city. This type of park serves a population of approximately 100,000 residents with active and passive recreational opportunities. In addition to facilities for various outdoor sports, regional park improvements may include picnic shelters, hiking trails, lakes, streams, public gardens, and other amenities not normally located in an urban setting. These parks are the only city recreational sites large enough to set aside wildlife habitat and offer non-programmed, nature-oriented recreational opportunities.

The San Joaquin River Parkway. This area is being developed into a "super-regional" park, serving not only the City, but also residents of Fresno and Madera counties. Its unique recreational opportunities and ecological features also draw visitors from throughout the state. The parkway plan, discussed in detail in the Open Space/Recreation Element, encompasses developed recreational sites, interpretive and educational sites, and natural habitat areas. Intercalated with the public portions of the parkway is private land used for recreation, agriculture, surface mining (and processing of extracted minerals), and other approved existing uses.

School Grounds/Playfields. School sites comprise a large inventory of recreational open space areas, which can provide recreational space for organized activities such as soccer, youth baseball, tennis, and other exercise, and gym uses. The playfield program operates through joint use agreements between the city and school districts, which own the sites. The program currently offers programmed and non-programmed activities, primarily serving elementary school-aged children living within a one-half mile radius of the school.

Ponding Basins. Whenever feasible, Fresno Metropolitan Flood Control District (FMFCD) provides opportunities for recreational open space through public use of storm drainage/groundwater recharge basins (see Table 7). Some basins are developed as park sites with play equipment, others have play fields, and still others are maintained as open turfed areas.

F-1-f. Policy. The City of Fresno will continue to pursue implementation of an open space standard of 3.0 acres of public parkland for every 1,000 persons residing in the city's planning area and will ensure the development of sufficient park land in areas designated for higher density. This park acreage standard includes the following components:

Neighborhood Parks	0.75 acres/1,000
Community Parks	0.25 acres/1,000
Regional Parks	2.00 acres/1,000
TOTAL	3.00 acres/1,000

F-1-g. Policy. The City will achieve its park space acreage standards by using the following matrix for allocating park space when land use plans are formulated:

PARK TYPE	SIZE RANGE (ACREAGE)	POPULATION SERVED	SERVICE AREA RADIUS
Schoolground/playfield	1-2.5	3,000-5,000	¼ to ½ mile
Neighborhood	5-10	10,000-15,000	½ to 1 mile
Community	15-20	50,000-80,000	2 to 4 miles
Regional	100+	100,000	30 minute drive

F-2. OBJECTIVE: Ensure that adequate land, in appropriate locations, is designated and acquired for park and recreation uses prior to urban development.

F-5. OBJECTIVE: The city will continue to coordinate with other agencies and organizations providing recreation facilities and services.

F-5-a. Policy: The city will coordinate the planning, acquisition, and development of recreational facilities in order to achieve the greatest public benefit from multiple use at the least cost.

F-5-e. Policy: In order to maximize the area's supply of recreation activities and facilities, the city should explore cooperative agreements with the recreational sites and programs of non-profit organizations such as athletic leagues, churches, parochial and private schools, the Calwa Park District, the Clovis Memorial District, and other public agencies.

County of Fresno 2000 General Plan

Policy OS-H.2: The County shall strive to maintain a standard of five (5) to eight (8) acres of County-owned improved parkland per one thousand (1,000) residents in the unincorporated areas.

Policy OS-H.4: The County shall require the dedication of land and/or payment of fee, in accordance with local authority and State law (e.g., Quimby Act), to ensure funding for the acquisition and development of public recreation facilities. The fees are to be set and adjusted, as necessary, to provide for a level of funding that meets the actual cost to provide for all the public parkland and park development needs generated by new development.

Policy OS-H.5: The County shall encourage Federal, State, and local agencies currently providing recreational facilities to maintain, at a minimum, and improve, if possible, their current levels of service.

Policy OS-H.15: The County shall utilize retention-recharge basins as open space areas for parks and recreation purposes.

Courts

The City and the County do not have land use policies regarding courts.

Library

City of Fresno

The City of Fresno does not currently have policies within the 2025 General Plan regarding library services.

County of Fresno 2000 General Plan

Policy PF-I.9: The County shall promote provision of library services throughout the county and create new facilities as appropriate or expand existing facilities to meet additional demand from new growth.

Hospital

The City and the County do not have land use policies regarding hospitals.

5.13.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to public services are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines as identified below. Accordingly, public services impacts resulting from the proposed project are considered significant if the project would:

> Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
>
> a) Fire protection? (See Fire Protection, Impact PS-1)
>
> b) Police protection? (See Police Protection, Impact PS-2)
>
> c) Schools? (See Schools, Impact PS-3)
>
> d) Parks? (See Parks, Impact PS-4)
>
> e) Other public facilities? (See Other Public Facilities, Impact PS-5)
>
> The other public facilities include courts, libraries, and hospitals.

5.13.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Fire Protection

Impact PS-1	**The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered fire protection facilities to maintain acceptable service ratios, response times or other performance objectives for fire protection, and the construction of which could cause significant environmental impacts.**

Project Specific Impact Analysis

The City of Fresno Fire Department currently does not meet target response times due to cuts in the number of units available to respond. The City is currently rated by the Insurance Services Office (ISO) as a Public Protection Class 3. Staffing reductions and other cuts since 2009 has resulted in the City's level of service to be below average compared to similar sized metropolitan cities. The expected level of service based on nationally recognized best practice for fire prevention services in a city the size of Fresno is the ability to provide annual fire and life safety inspections if all commercial, industrial, institutional, and multi-family building and to provide proactive fire safety public education programs. Due to current budget issues, many low and moderate fire and life safety hazard buildings are not being inspected and public education outreach has ceased.

Implementation of the proposed General Plan would result in an increased demand for fire protection. Additional staff, equipment, and facilities would be required to ensure adequate levels of service and exceed current response times. Additional personnel may require additional facilities; therefore, there could be adverse physical impacts associated with the provision of new or physically altered governmental facilities. Typical impacts associated with fire stations include: noise, traffic, and lighting.

Development Impact Fees are currently collected for the provision of capital facilities for fire facilities that will provide for future facilities as the City's population increases.

Recognizing that there would be an increased demand for fire and emergency medical response, the General Plan Update includes several policies to support the activities of the Fresno Fire Department. The policies and objectives listed below from the proposed General Plan Update will ensure that the proposed project does not significantly affect fire protection.

PU-2: Ensure that the Fire Department's staffing and equipment resources are sufficient to meet all fire and emergency service level objectives and are provided in an efficient and cost effective manner.

PU-2-a: Unity Fire Protection: Pursue long-range transfer of fire protection service agreements with adjacent fire districts that, in concert with existing automatic aid agreements, will lead to the eventual unification of fire protections services in the greater Fresno area.

PU-2-b: Maintain Ability: Strive to continually maintain the Fire Department's ability to provide staffing and equipment resources to effectively prevent and mitigate emergencies in existing and new high-rise buildings and in other high-density residential and commercial development throughout the city.

PU-2-c: Rescue Standards: Develop appropriate standards, as necessary, for rescue operations, including, but not limited to, confined space, high angle, swift water rescues, and the unique challenges of a high speed rail corridor.

PU-2-d: Station Siting: Use the General Plan, community plans, Specific Plans, neighborhood plans, and Concept Plans, the City's Geographic Information Systems (GIS) database, and a fire station location program to achieve optimum siting of future fire stations.

PU-2-e: Service Standards: Strive to achieve a community wide risk management plan that includes the following service level objectives 90 percent of the time:

- *First Unit on Scene* – First fire unit arriving with minimum of three firefighters and ability to apply suppressing agent within 6 minutes and 20 seconds from emergency call (7 minutes and 30 seconds with 9-11 processing time).
- *Effective Response Force* – Provide sufficient number of firefighters on scene of an emergency (17 for low risk, 23 for high risk) within nine minutes and 20 seconds from time to alert to arrival.

PU-3: Enhance the level of fire protection to meet the increasing demand for services from an increasing population.

PU-3-a: Fire Prevention Inspections: Develop strategies to enable the performance of annual fire and life safety inspection of all industrial, commercial, institutional, and multi-family residential buildings, in accordance with nationally recognized standards for the level of service necessary for a large Metropolitan Area, including self-certification program.

PU-3-b: Reduction Strategies: Develop community risk reduction strategies that target high service demand areas, vulnerable populations (e.g. young children, older adults, non-English speaking residents, persons with disabilities, etc.) and high life hazards occupancies.

PU-3-c: Public Education Strategies. Develop strategies to re-establish and enhance routine public education outreach to all sectors of the community.

PU-3-d: Review All Development Applications: Continue Fire Department review of all development applications, provide comments and recommend conditions of approval that will ensure adequate on-site and off-site fire protection systems and features are provided.

PU-3-e: Building Codes. Adopt and enforce amendments to construction and fire codes, as determined appropriate, to systematically reduce the level of risk to life and property from fire, commensurate with the City's fire suppression capabilities.

PU-3-f: Adequate Infrastructure. Continue to pursue the provision of adequate water supplies, hydrants, and appropriate property access to allow for adequate fire suppression throughout the City.

PU-3-g: Cost Recovery. Continue to evaluate appropriate codes, policies, and methods to generate fees or other sources of revenue to offset the ongoing personnel and maintenance costs of providing fire prevention and response services.

In addition to the above policies and objectives, the following regulation within the City of Fresno Municipal Code would reduce potential fire service impacts.

Section 12-4.901 of the Fresno Municipal Code. In order to implement the goals and objectives of the City's general plan, and to mitigate the impacts caused by future development in the city, certain fire department facilities must be constructed. The City Council has determined that a Fire Facilities Fee is needed in order to pay for (a) land acquisition for, and design, engineering, and construction of the public facilities designated in the Council resolution and reasonable costs of outside consultant studies related thereto; (b) to reimburse the city for designated public facilities construction by the city with funds (other than gifts or grants) from other sources together with accrued interest; (c) to reimburse developers who have designed and constructed designated public facilities which are oversized and supplemental size, length, or capacity; and/or (d) to pay for and/or reimburse costs of program development and ongoing administration of the Fire Facilities Fee program.

As growth occurs within the Planning Area, the Fire Department may require additional personnel and additional facilities to provide adequate fire protection services. The provision of new or physically altered fire facilities could result in adverse environmental impacts. Typical impacts associated with new or altered fire facilities, such as stations, include: noise, traffic, and lighting. These typical impacts could remain significant after the implementation of the above-mentioned proposed policies as well as the Municipal Code regulation.

Cumulative Impact Analysis

Future growth would result in increased demand for fire services and facilities throughout the Planning Area as well as areas that are outside the Planning Area. As cumulative development increases the demand for additional fire services and facilities, potential significant cumulative impacts could occur. To reduce the potential impacts, the General Plan Update includes objective and policies and the Municipal Code includes regulations. The implementation of General Plan Update Objectives PU-2 and PU-3 and Policies PU-2-a through PU-2-e and PU-3-a through PU-3-g and Section 12-4.901 of the Municipal Code would reduce the potential impacts. Although the potential impacts could be reduced, there could still be potential significant cumulative environmental impacts as future fire facilities are constructed to improve fire protection within the

City's service area. The implementation of the proposed project would contribute to the potential significant cumulative impact as future fire facilities are constructed. This project contribution is considered cumulatively considerable.

Mitigation Measures

Project Specific

MM PS-1: As future fire facilities are planned, the fire department shall evaluate if specific environmental effects would occur. Typical impacts from fire facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:

- **Noise:** Barriers and setbacks on the fire department sites.
- **Traffic:** Traffic devices for circulation and a "keep clear zone" during emergency responses.
- **Lighting:** Provision of hoods and deflectors on lighting fixtures on the fire department sites.

Cumulative

Implementation of Mitigation Measure PS-1 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Police Protection

Impact PS-2	**The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered police protection facilities to maintain acceptable service ratios, response times or other performance objectives for police protection, and the construction of which could cause significant environmental impacts.**

Project Specific Impact Analysis

Growth under the General Plan Update would result in a potential population increase of approximately 425,000 additional residents within the Planning Area by buildout. Full buildout is projected to occur in approximately the year 2056. Therefore, implementation of the proposed General Plan Update would result in an increased need for law enforcement staffing and police protection. Based on the Fresno Police Department's goal of 1.5 officers per 1,000 residents, approximately 638 new officers would be required. Additional equipment and facilities would also be required to accommodate the additional personnel and ensure adequate levels of service and response times throughout the Planning Area. Additional new or physically altered facilities could

result in adverse environmental impacts. Typical impacts associated with police stations include: noise, traffic, and lighting.

Development Impact Fees are currently collected for the provision of capital facilities for fire facilities that will provide for future facilities as the City's population increases.

Recognizing that there would be an increased demand for police services, the General Plan Update includes several policies to support the activities of the Fresno Police Department. The policies and objectives listed below from the proposed General Plan update will ensure that the proposed project does not significantly affect police protection.

PU-1: Provide the level of law enforcement and crime prevention services necessary to maintain a safe, secure, and stable urban living environment through a Police Department that is dedicated to providing professional, ethical, efficient and innovative service with integrity, consistency and pride.

Strive to increase ethnic diversity and gender representation of the law enforcement workforce to reflect the composition of the Fresno community.

Maintain active involvement in youth development and delinquency prevention activities.

Collaborate with community-based public, non-profit or private agencies to develop comprehensive narcotics and violence prevention programs designed to discourage delinquent behavior and narcotics abuse, and to encourage viable alternative behaviors.

PU-1-b: Involvement in General Plan. Facilitate Police Department participation in the implementation of General Plan policies, including citizen participation efforts and the application of crime prevention design measures to reduce the exposure of neighborhoods to crime and to promote community security.

- Facilitate Police Department communication with citizen advisory committees.
- Refer appropriate development entitlements to the Police Department for review and comment.

PU-1-c: Safety Considerations in Development Approval. Continue to identify and apply appropriate safety, design and operational measures as conditions of development approval, including, but not limited to, street access control measures, lighting and visibility of access points and common areas, functional and secure on-site recreational and open space improvements within residential developments, and use of State licensed, uniformed security.

PU-1-e: Communication with Public. Maximize communication and cooperative efforts with residents and businesses in order to identify crime problems and optimize the effectiveness of crime prevention measures and law enforcement programs.

PU-1-g: Plan for Optimum Service. Create and adopt a program to provide targeted police services and establish long-term steps for attaining and maintaining the optimum levels of service - 1.5 officers per 1,000 residents.

In addition to the above policies and objectives, the following regulation within the City of Fresno Municipal Code would reduce potential police service impacts.

Section 12-4.801 of the Municipal Code. In order to implement the goals and objectives of the City's general plan, and to mitigate the impacts caused by future development in the city, certain police facilities must be constructed. The City Council has determined that a Police Facilities Fee is needed in order to pay for (a) land acquisition for, and design, engineering, and construction of the public facilities designated in the Council resolution and reasonable costs of outside consultant studies related thereto; (b) to reimburse the city for designated public facilities construction by the city with funds (other than gifts or grants) from other sources together with accrued interest; (c) to reimburse developers who have designed and constructed designated public facilities which are oversized and supplemental size, length, or capacity; and/or (d) to pay for and/or reimburse costs of program development and ongoing administration of the Police Facilities Fee program.

As growth occurs within the Planning Area, the Police Department may require additional personnel and additional facilities to provide adequate police protection services. The provision of new or physically altered fire facilities could result in adverse environmental impacts. Typical impacts associated with new or altered police facilities, such as stations, include: noise, traffic, and lighting. These typical impacts could remain significant after the implementation of the above-mentioned proposed policies as well as the Municipal Code regulation.

Cumulative Impact Analysis

Future growth would result in increased demand for police services and facilities throughout the Planning Area and could increase mutual aid services to areas that are outside the Planning Area. As cumulative development increases the demand for additional police services and facilities, potential significant cumulative impacts could occur. The project's contribution to potential cumulative impacts on police services would be considerable. Implementation of the General Plan Update Objective PU-1 and Policies PU-1-a through PU-1-g and Section 12-4.801 of the Municipal Code would reduce the potential impacts to police services. Although the potential impacts could be reduced, there could still be potential significant cumulative environmental impacts as future police facilities are constructed to improve police protection within the City's service area. The implementation of the proposed project would contribute to the potential significant cumulative impact as future police facilities are constructed. This project contribution is considered cumulatively considerable.

Mitigation Measures

Project Specific

MM PS-2 As future police facilities are planned, the police department shall evaluate if specific environmental effects would occur. Typical impacts from police facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:

- **Noise:** Barriers and setbacks on the police department sites.
- **Traffic:** Traffic devices for circulation.
- **Lighting:** Provision of hoods and deflectors on lighting fixtures on the fire department sites.

Cumulative

Implementation of Mitigation Measure PS-2 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Schools

Impact PS-3	**The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered school facilities to maintain acceptable service ratios or other performance objectives for schools, and the construction of which could cause significant environmental impacts.**

Project Specific Impact Analysis

Impacts on schools are determined by analyzing the projected increase in demand for schools as a result of future development projected under the proposed General Plan Update. The buildout of the proposed General Plan would result in a substantial increase in residential development as well as projected student population. As identified in Section 3, Project Description, the project is anticipated to increase residential development by approximately 145,164 residential units. As shown in Table 5.13-9, the total student population is projected by identifying a student generation rate by type of school and for single family and multiple family residential units. The student generation rates were derived based on a review of the student generation rates provided by the Fresno Unified School District and the Clovis Unified School District. These two districts were reviewed since the majority of the Planning Area is served by these two districts. The rates that were used for each category of student were the highest rates between the two districts to reflect a worst-case generation of students. As shown in Table 5.13-9, the amount of students projected to be generated from the residential units that are projected to be developed within the Planning Area is approximately 65,518 students. This increase in student population will result in approximately 39,197 elementary students, 8,924 middle school students, and approximately 17,601 high school students.

Table 5.13-9: Generation of Additional Students under the City of Fresno General Plan Update

Total Residential Units and Grade Level School	Type of Residential Unit		Total Students Generated
	Single-Family	Multiple-Family	
Total Units	60,626	84,538	
Elementary School Student Generation Rate[1]	0.3587[2]	0.204[3]	
Total Students	21,747	17,246	39,197
Middle School Student Generation Rate[1]	0.097[3]	0.036[3]	
Total Students	5,881	3,043	8,924
High School Student Generation Rate[1]	0.222[3]	0.049[3]	
Total Students	13,459	4,142	17,601
Total Elementary, Middle, and High School Students	41,087	24,431	65,518

[1] The student generation rates were derived based on a review of the student generation rates provided by the Fresno Unified School District and the Clovis Unified School District. These two districts were reviewed since the majority of the Planning Area is served by these two districts. The rates that were used for each category of student were the highest rates between the two districts to reflect a worst-case generation of students.
[2] Development Fee Justification Study/School Facilities Needs Analysis, Clovis Unified School District, 2012
[3] Fresno Unified School District Facilities Master Plan, Fresno Unified School District, 2012
Source: FirstCarbon Solutions, 2014.

The projected increase in student population within the Planning Area will result in the need for substantial additional elementary, middle, and high schools to serve the future student population. The project includes areas within the Planning Area that are designated for school facilities. City staff coordinated with representatives from the various school districts that serve the students within the Planning Area. As future development occurs throughout the Planning Area, the school districts will continually monitor capacities of existing schools and forecast the timing of the construction of new schools or expansion of existing schools so that new student populations can be provided with adequate school facilities. As new schools or expansion of existing schools are proposed, there could be significant adverse environmental impacts from the construction and operation of the schools. Typical impacts associated with schools include: noise and traffic for most of the schools and potentially lighting if there are high school stadiums proposed.

Development Impact Fees in accordance with Senate Bill 50 are currently collected for the provision of school facilities that will accommodate the Planning Area's future student population.

Recognizing that there would be an increased demand for schools, the General Plan Update includes the following objective and policies to support schools.

Proposed General Plan Update Policies

The following goals and policies from the proposed General Plan Update are relevant to the provision of schools within the Planning Area.

Objective POSS-8: Work cooperatively with school districts to find appropriate locations for schools to meet the needs of students and neighborhoods.

Implementing Policies

POSS-8-a: Support School Districts' Programs. Support strategies and programs of school districts and the Fresno County Office of Education to provide access to and use of the highest quality educational programs and support services.

POSS-8-b: Appropriate School Locations. Support school locations that facilitate safe and convenient access by pedestrian and bicycle routes, are compatible with surrounding land uses, and contribute to a positive neighborhood identity and Complete Neighborhoods. Commit to the following:

- Work with representatives of public and private schools during the preparation and amendment of plans and the processing of development proposals to ensure that General Plan policies are implemented.
- Require school districts to provide necessary street improvements, pedestrian facilities, public facilities, and public services at each new school site as authorized by law.
- Continue to designate known school sites on the Land Use Diagram (Figure LU-1), community plans, Specific plans, and other plans compatible with the locational criteria of each school district, and to facilitate safe and convenient walking and biking to schools in neighborhoods.
- Meet regularly with school district staff and trustees to provide ongoing communication and coordination of plans, projects, and priorities.
- Collaborate with school districts to plan and implement new school sites in a manner that supports and reinforces objectives to develop walkable Complete Neighborhoods.

POSS-8-c: Park and School Site Coordination. Pursue the cooperative development and use of school sites with adjacent neighborhood parks for both school activities and non-school related recreational activities.

Implementation of the Fresno General Plan Update Policies POSS-8-a through POSS-8-c as well as assisting in collecting Senate Bill 50 fees from developers would assist the school districts in

providing adequate school facilities in the Planning Area. However, as the expansion of existing schools or construction of new schools is proposed, there could still be adverse environmental impacts from the construction and operation of the schools. As described above, typical impacts associated with schools include: noise and traffic for most of the schools and potentially lighting if there are high school stadiums proposed.

Cumulative Impact Analysis

Future cumulative growth within the school districts that currently serve the student population within the Planning Area would result in the need for expanded or new school facilities. These new facilities could be located within or outside of the Planning Area. Construction and operation of these facilities could result in significant cumulative adverse environmental impacts such as noise, traffic, and lighting. Since the proposed project would generate a demand for additional school facilities and these additional facilities could result in significant adverse environmental impacts, the proposed project's contribution to cumulative environmental impacts associated with the provision of schools is considered cumulatively considerable. The objective and policies identified above would reduce the potential impact; however, the project's contribution would remain cumulatively considerable. Thus, the proposed project would result in significant cumulative impacts related to the provision of schools.

Mitigation Measures

Project Specific

MM PS-3 As future school facilities are planned, the school districts shall evaluate if specific environmental effects would occur. Typical impacts from school facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:

- **Noise:** Barriers and setbacks placed on school sites.
- **Traffic:** Traffic devices for circulation.
- **Lighting:** Provision of hoods and deflectors on lighting fixtures for stadium lights

Cumulative

Implementation of Mitigation Measure PS-3 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Parks and Recreational Facilities

Impact PS-4	**The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered park and recreational facilities to maintain acceptable service ratios or other performance objectives for park and recreational, and the construction of which could cause significant environmental impacts.**

Project Specific Impact Analysis

With the buildout of the General Plan, growth would result in a potential population increase of approximately 425,000 additional residents within the Planning Area. This additional residential growth would result in an increase in the demand for parks and recreational facilities. Based on the proposed standard of 5 acres of public parkland per 1,000 residents, the buildout of the General Plan Update would require 4,850 acres of parkland and associated recreational amenities to serve all residents in the Planning Area. An additional 1,635 acres of Pocket, Neighborhood, and Community parkland and associated amenities would be required to accommodate existing residents, with 2,725 additional acres to reach the 5 acres per 1,000 residents goal. Based on the current Pocket, Neighborhood, and Community parkland of 632 acres within the Planning Area, an additional 2,278 acres, for a total of 2,910 acres, of parkland would be required to adequately accommodate future residents to meet the 3 acres per 1,000 residents for Pocket, Neighborhood, and Community Parks. The proposed General Plan Update includes the allocation of 2,100 acres of parkland in addition to existing parkland. Therefore, the proposed General Plan Update would not meet the City's goal of 5 acres of parkland per 1,000 residents for all City park space and 3 acres per 1,000 residents for Pocket, Neighborhood, and Community Park Space.

As future parklands are developed, there could be significant adverse environmental impacts from the construction and operation of the facilities. Typical impacts associated with parks include: noise, traffic, and lighting.

Recognizing that there would be an increased demand for parks and recreational facilities, the General Plan Update includes several policies to support goals and objectives regarding these facilities.

Objective POSS-1: Provide an expanded, high quality and diversified park system, allowing for varied recreational opportunities for the entire Fresno community.

Implementing Policies

POSS-1-a. Parkland standard: Implement a standard of at least three acres of public parkland per 1,000 residents for Pocket, Neighborhood, and Community Parks throughout the city, while striving for five acres per 1,000 residents for all parks throughout the city, subject to identifying additional funding for regional parks and trails.

POSS-1-b. Parks Implementation Planning: Conduct ongoing planning to implement park policies established in this General Plan and continue to strive for well-maintained and fully accessible playgrounds, with accessible amenities, throughout the city.

- Keep an up-to-date inventory of existing and planned parks, including locations mapped on the Parks and Open Space Diagram.
- Plan for acquiring new parkland designated in the General Plan, as shown in Figure POSS-1.
- Establish a standard protocol for working with new development to arrange for parkland acquisition and dedication.
- Establish a protocol for working with established neighborhoods to provide needed parks, including the fostering of neighborhood and district associations to help plan, acquire, improve and care for public parks, and coordinating new City service facilities to provide new open space.
- Establish detailed design, construction, and maintenance standards.
- Prepare an assessment of the recreation needs of existing and future residents.
- Create an action plan defining priorities, timeframes, and responsibilities.
- Adopt and implement a comprehensive financing strategy for land acquisition, park development, operations, and maintenance.
- Identify opportunities for using existing or planned park space as passive stormwater storage, treatment, and conservation areas that also provide scenic and/or recreational opportunities.
- Identify opportunities for siting and using existing or planned park space as passive "purple pipe" waste water storage, treatment, and conservation areas that also provide scenic and/or recreational opportunities.

POSS-1-c: Public Input in Park Planning. Continue to provide opportunities for public participation in the planning and development of park facilities and in creation of social, cultural, and recreational activities in the community.

POSS-1-d: Additional parkland in certain areas. Strive to obtain additional parkland of sufficient size to adequately serve underserved neighborhood areas and along BRT corridors in support of new and intense residential and mixed-use infill development.

- Identify, where appropriate, joint use opportunities in siting parks with other City service facility needs.

POSS-1-e: Criteria for Parks in Development Areas. Continue to use park size and service area criteria for siting new parks and planning for parks in Development Areas:

Park Type	Size Range (Acreage)	Population Served	Service Area Radius
Neighborhood	2.01 to 10	10,000 - 15,000	Up to 1 mile
Community	10.01 to 40	50,000 - 80,000	Up to 4 miles
Regional	More than 40	100,000	100,000 residents

POSS 1-f. Parks and Open Space Diagram. Require parks to be sited and sized as shown on the Parks and Open Space Diagram (Figure POSS-1) of the General Plan, subject to the following:

- All new park designations carry dual land use designations, so that if a park is not needed, private development consistent with zoning and development standards may be approved. (See Figure LU-2: Dual Designation Diagram in the Urban Form, Land Use, and Design Element)
- Revised and/or additional park sites will be identified through subsequent implementation and planning in established neighborhoods and Development Areas.
- Locations for future park sites as shown on Figure POSS-1 are schematic to the extent that park sites may be relocated as necessity and opportunity dictate, and a General Plan amendment is not required if the park continues to serve the target areas as determined by the Planning Director.
- A park may be located on any suitable land in the general vicinity of the sites depicted. However, the zoning of potential park sites must be made consistent with the General Plan.

Objective POSS-2: Ensure that adequate land, in appropriate locations, is designated and acquired for park and recreation uses in infill and growth areas.

Implementing Policies

POSS-2-b: Park and Recreation Priorities. Use the following priorities and guidelines in acquiring **and** developing parks and recreation facilities:

- Acquire and develop neighborhood park space in existing developed neighborhoods that are deficient of such space and in areas along BRT corridors that are designated as priorities for encouraging new mixed-use transit-oriented development.
- Provide accessible recreation facilities in established neighborhoods with emphasis on those neighborhoods currently underserved by recreation facilities.
- Improve established neighborhood parks with emphasis on those neighborhoods with the greatest need.
- Acquire and develop neighborhood and community parks in new Development Areas.
- Recognize community parks as a special need in areas that lack these facilities or are planned for transit supportive urban densities, and explore all potential sources of revenue to secure and development appropriate sites including joint use facilities.
- Develop new special purpose parks, such as outdoor gym equipment, natural resource based trail parks, equestrian centers, dog parks, and amphitheaters, as well as alternative recreation facilities, such as community recreation centers, passive wildlife observation park, cultural heritage and diversity park, military veterans memorial park, and universal access open space park.

- Acquire and develop park and open space in existing neighborhoods and Development Areas so that all residents have access to park or open space within one-half mile of their residence. Develop these facilities to be fully accessible to individuals with disabilities as required by law.

POSS-2-c: Review of Development Applications. Coordinate review of all development applications (i.e., site plans, conditional use permits, and subdivision maps) in order to implement the parks and open space standards of this Plan.

- Assure the provision of adequate active and passive open spaces and facilities as appropriate within residential subdivisions through Development Code requirements for mandatory dedication and improvement of land and/or development fees.
- Require the provision of appropriate outdoor living areas or private open space in multi-family residential developments not subject to the Subdivision Map Act.
- Request open space easements where feasible and warranted to secure appropriate public use of sensitive areas with scenic or recreation values, and for buffering space for sensitive areas.
- Require provision of appropriate open space areas in private projects, in the form of trails, enhanced landscaped setbacks, parks, and water features.
- Evaluate the merits of establishing a development bonus entitlement program in which development incentives (i.e., bonus densities, bonus floor area square footage) are provided for contributions to public recreational facilities on-site or in the vicinity of the development project.

POSS-2-d: Creation Opportunities near Freeway Corridors. Negotiate with Caltrans, other public agencies, and private property owners to develop remnant parcels along freeway corridors for appropriate recreational uses.

Objective POSS-3: Ensure that park and recreational facilities make the most efficient use of land; that they are designed and managed to provide for the entire Fresno community; and that they represent positive examples of design and energy conservation.

Implementing Policies

POSS-3-a: Centralized Park Locations. Site parks central and accessible to the population served, while preserving the integrity of the surrounding neighborhood.

POSS-3-b: Park Location and Walking Distance. Site Parks within a half-mile walking distance of new residential development.

POSS-3-c: Link Parks with Walkways. Link public open space to adjacent, schools, and residential uses and Activity Centers through a series of landscaped linear walkways and bikeways that enhance and encourage pedestrian use.

POSS-3-e: Minimum Park Size for Active Recreation. Minimize City acquisition or acceptance of dedication of park sites less than two acres in size for active recreational uses, except where maintenance costs are secured through a CFD, HOA, or other such mechanism.

POSS-3-f: Park Design Guidelines. Create, maintain, and apply park design guidelines, including provisions for:

- Minimum and maximum shade.
- Protections from shading by adjacent buildings.
- Accessibility to persons with disabilities.
- Street trees and landscaped median strips in adjacent arterial roads.
- Art and points of attraction.
- Landscape and hardscape features.
- Street furniture, signage, and lighting.
- Food sales and entertainment.
- Restroom facilities, play structures, and picnic shelters.
- Landscape design synthesis with input from civil engineers and hydrologists, educators and daycare providers, fitness trainers and coaches, police officers and experts in crime prevention through environmental design, as appropriate.
- Using topography to create interesting and visually appealing spaces and forms.
- Use of waterways as a key design influence, a focus of restoration, and an opportunity to provide for public enjoyment of views.
- Reflecting the agricultural and horticultural heritage of the site or area.
- Connecting with surrounding areas in a way that encourages expanded pedestrian activity.
- Creating individual places within a park that respond to the needs of a broad range of park users, from youth to the elderly.
- Creating places of delight that engage the senses, such as water features or moving installations.
- Creating places that engage the mind, by treating park features as opportunities for interpretation and questioning.
- Using sustainable design practices, and highlighting these as opportunities for learning.

POSS-3-g: Park Security and Design. Promote safety, attractiveness, and compatibility between parks and adjacent residential areas through design, maintenance, and enforcement of park regulations

- Require the installation of security lighting for parking, points of access, and building areas at all public recreation and park sites.
- Keep neighborhood eyes on parks to increase security.

POSS-3-h: Coordination with School Districts. Continue to coordinate with school districts for joint use of both outdoor and indoor recreation facilities, such as playgrounds, play fields, and gymnasiums, for City recreation programs.

POSS-3-i: Joint Use with Drainage Facilities. Continue to seek joint use agreements for use of FMFCD stormwater drainage facilities. **Objective POSS-4:** Pursue sufficient and dedicated funding for parks acquisition, operations, and maintenance.

Implementing Policies

POSS-4-a: Supplemental Revenue. Seek revenue sources to supplement General Fund support for basic park maintenance and basic recreational services.

POSS-4-b: Operation and Maintenance Financing. Continue to require new residential development to form lighting and landscaping maintenance districts or community facility districts or ensure other means of financing to pay for park operations and maintenance.

POSS-4-c: Improvements in Established Neighborhoods. Seek agreements with formal neighborhood associations and institutions for improvements and ongoing maintenance of parks in established neighborhoods.

Section 12-4.701 of the Municipal Code: In order to implement the goals and objectives of the City's general plan, and to mitigate the impacts caused by future development in the city, certain park facilities must be constructed. The City Council has determined that a Park Facilities Fee is needed in order to pay for (a) land acquisition for, and design, engineering, and construction of the public facilities designated in the Council resolution and reasonable costs of outside consultant studies related thereto; (b) to reimburse the city for designated public facilities construction by the city with funds (other than gifts or grants) from other sources together with accrued interest; (c) to reimburse developers who have designed and constructed designated public facilities which are oversized and supplemental size, length, or capacity; and/or (d) to pay for and/or reimburse costs of program development and ongoing administration of the Park Facilities Fee program

The implementation of the above objectives and policies as well as the Municipal Code standard would reduce potential impacts associated with parks and recreational facilities. However, the potential significant environmental impacts that could occur during construction and operation of the facilities could remain.

Cumulative Impact Analysis

Development associated with implementation of the proposed General Plan Update and related cumulative projects would result in the development of new parks and recreational facilities. Individual development projects would be required to pay the City's Park Facilities Fee. Therefore,

individual project applicants would be required to pay the fees, so that parks can be constructed at appropriate sites within the Planning Area and adequately maintained.

As future parks and recreational facilities are developed, there could be significant adverse environmental impacts from the construction and operation of the facilities. Typical cumulative impacts associated with parks include: noise, traffic, and lighting. Since the proposed project could also result in similar significant environmental impacts from construction and operation of the facilities, the proposed project's contribution to cumulative environmental impacts would be cumulatively considerable. Thus, the implementation of the proposed project would result in significant cumulative impacts.

Mitigation Measures

Project Specific

MM PS-4 As future parks and recreational facilities are planned, the City shall evaluate if specific environmental effects would occur. Typical impacts from school facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:

- **Noise:** Barriers and setbacks placed on school sites.
- **Traffic:** Traffic devices for circulation.
- **Lighting:** Provision of hoods and deflectors on lighting fixtures for stadium lights

Cumulative

Implementation of MM PS-4 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Other Public Facilities

Impact PS-5	**The project could result in substantial adverse physical impacts associated with the provision or need of new or physically altered public facilities to maintain acceptable service ratios or other performance objectives for other public facilities, and the construction of which could cause significant environmental impacts.**

Project Specific Impact Analysis

As growth occurs within the Planning Area in accordance with the proposed General Plan Update, an increase in residential population would occur. An increase in population would result in an increased demand for other public facilities such as court, libraries, and hospitals within the Planning

Area. Based on a substantial increase in population (approximately 425,000 people), a substantial increase in the need for new and expanded courts, libraries, and hospitals would be required to serve the future City residents.

As future facilities such as courts, libraries, and hospitals are developed as part of the General Plan Update, there could be significant adverse environmental impacts from the construction and operation of these facilities. Typical impacts associated with other facilities include: noise, traffic, and lighting. No specific objectives or policies are proposed to reduce potential impacts to these facilities.

There are no objectives or policies within the proposed General Plan Update to reduce the potential environmental effects associated with the expansion or development of new service facilities. Therefore, the potential significant environmental impacts would remain.

Cumulative Impact Analysis

Development associated with implementation of the proposed General Plan Update and related cumulative projects would result in the development of new court, library, and hospital facilities. As these future facilities are developed, there could be significant adverse environmental impacts from the construction and operation of the facilities. Typical cumulative impacts associated with other public facilities such as courts, libraries, and hospitals would include: noise, traffic, and lighting. Since the proposed project could also result in similar significant environmental impacts from construction and operation of the facilities, the proposed project's contribution to cumulative environmental impacts would be cumulatively considerable. Thus, the implementation of the proposed project would result in significant cumulative impacts.

Mitigation Measures

Project Specific

MM PS-5 As future court, library, and hospital facilities are planned, the appropriate agencies shall evaluate if specific environmental effects would occur. Typical impacts from court, library, and hospital facilities include noise, traffic, and lighting. Typical mitigation to reduce potential impacts includes:

- **Noise:** Barriers and setbacks placed on school sites.
- **Traffic:** Traffic devices for circulation.
- **Lighting:** Provision of hoods and deflectors on lighting fixtures for stadium lights

Cumulative

Implementation of Mitigation Measure PS-5 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.14 - Transportation and Traffic

5.14.1 - Introduction

This section describes potential impacts to the transportation system associated with adoption of the City of Fresno General Plan Update. The impact analysis examines the roadway, transit, bicycle, pedestrian, rail, and aviation components of the transportation system in the City of Fresno. To provide a context for the impact analysis, this section begins with a description of the environmental setting, which describes the existing physical and operational conditions of the transportation system. Following the environmental setting is the relevant regulatory framework, which influences the transportation system and provides the basis for impact significance thresholds that are used in the impact analysis findings and recommended mitigation measures.

5.14.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding transportation and traffic is the Planning Area and the immediate surrounding County of Fresno, City of Clovis, and surrounding Counties areas because potential development under the project could affect areas inside and outside the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative transportation and traffic impacts is similar to the study area for project impacts. The study area for cumulative transportation and traffic impacts is the Planning Area and the immediate surrounding County of Fresno, City of Clovis, and surrounding Counties areas because cumulative development in the areas immediately surrounding the Planning Area could combine with development under the proposed project and result in cumulative transportation and traffic impacts.

Setting

The City of Fresno is the fifth largest city in California with a population of about 500,100 in 2011. Fresno County has a population of 940,220 people making it the tenth largest county in the state and is expected to reach 1.1 million people by 2020 (City of Fresno 2012). Located in California's San Joaquin Valley, Fresno is equidistance from the major population centers in Northern and Southern California with easy access to the California Central Coast and Sierra Nevada.

The 2000-2001 California Household Travel Survey provides information on residents travel patterns including the purpose and method of travel in Fresno County. For convenience, travel survey responses are grouped into the following three general categories:

- **Home-Based Work:** Trips may begin or end at a residence and represent travel between a residence and place of work.
- **Home-Based Other:** Trips may begin or end at a residence and include school trips, shopping trips, or trips for recreation.

- **Non-Home-Based:** Trips do not begin or end at a residence. These trips would include a trip from work to a restaurant during lunch.

According to the 2000-2001 California Household Travel Survey, Home-Based Work trips account for 20 percent of trips. In general, Home-Based Work trips occur during the morning and evening commute periods and are predominately made by automobile. There is less flexibility in the departure and arrival time for work trips, due to traditional work schedules. Other trip purposes account for about 80 percent of travel and are more evenly distributed throughout the day.

Most residents traveled from home to work by automobile (about 98 percent) with about 15 percent of those being shared ride (i.e., carpool) trips. Shared ride, transit, walk, and bike trips were significantly higher for non-work trips (Home-Based Other and Non-Home-Based purposes).

The average weekday person trip length for Home-Based Work was about 20 minutes compared to Home-Based Other trips (15 minutes), and Non-Home-Based trips (16 minutes). On average, non-work trips are about 30 percent shorter than work trips and have a higher percentage of transit walk and bike use. This is reasonable given trip purpose, trip scheduling flexibility, and proximity of trip origin and trip destination.

The 2000-2001 California Household Travel Survey also shows that about 12 percent of Fresno County households did not have access to a vehicle and therefore are dependent on transit, walking, and bicycling for mobility.

Roadway Network

The roadway network in the City is generally a traditional grid-based network of north/south and east/west streets, except for significant portions of the Downtown Planning Area, whose grid-based network of streets are angled consistent with the northwest/southeast railroad alignment. Nearly every major street in the Fresno metropolitan area is regularly spaced at half-mile intervals. The grid system provides high levels of accessibility (i.e., travel choices) for residents. Some of the roadways in Fresno are super arterials, which are similar to expressways. Super arterials have limited access and function like expressways to move large volumes of vehicles where freeways are absent. Appendix H-1 includes an exhibit that shows the existing study roadway functional classification and the operational hierarchy of the roadway system. This roadway hierarchy is shown in Table 5.14-1. Freeways are under the jurisdiction of the State, outside the control of the City. They have been assessed for the purposes of this General Plan due to their location within the Planning Area for the General Plan.

Table 5.14-1: City of Fresno Roadway Hierarchy

Roadway Type	Number of Lanes	Bike Lanes	Pedestrian Facilities	On-Street Parking	Median
Expressway	4 to 6	No	Trail	No	Yes
Superarterial	4 to 6	Yes	Sidewalks1	No	Yes

Roadway Type	Number of Lanes	Bike Lanes	Pedestrian Facilities	On-Street Parking	Median
Arterial	4 to 6	Yes	Sidewalks1	Possible	Yes
Collector	2 to 4	Yes	Sidewalks	Yes	Possible
Connector	2 to 3	Possible (or Trail)	Sidewalks	Yes	No
Local	2 to 3	Possible (or Trail)	Sidewalks	Yes	Possible

Notes: [1]Where called for the General Plan, a trail maybe required instead of a sidewalk.
Source: Fehr & Peers. 2011.

Physical Conditions

Exhibit 5.14-1 shows the number of lanes on major city roadways (See Appendix H-2 for detail). The state highway network radiates from Downtown Fresno and serves inter-city and inter-regional travel. The grid street network provides primary local and inter-city travel.

State Facilities

The state facilities in the City of Fresno are listed below and are full access-controlled freeways, which are operated and maintained by Caltrans.

- **SR-41** serves as a principal north/south route connecting north Fresno with the Central Business District (CBD), generally paralleling the Blackstone Avenue corridor within the City. Regionally, SR-41 extends from Yosemite National Park in Madera County, through Fresno County, and to Kettleman City in Kings County near Interstate 5 (I-5). From I-5, SR-41 continues west and connects to US Highway 101 and SR-1 on the Central Coast.
- **SR-99** is a principal north/south route in Fresno County that links Bakersfield in Kern County to the Stockton and Sacramento metropolitan areas in the Northern San Joaquin and Sacramento Valleys. SR-99 is a major goods movement corridor with significant truck volumes. Within Fresno, SR-99 connects northwest Fresno with Downtown and has freeway-to-freeway interchanges with SR-180 and SR-41.
- **SR-168** connects Downtown Fresno with northeast Fresno and the City of Clovis. SR-168 begins at a freeway-to-freeway interchange with SR-180 about 1.5 miles east of SR-41. East of the City of Clovis, SR-168 transitions to a two-lane conventional highway and provides access to the Sierra Nevada.
- **SR-180** travels east/west and connects southeast and southwest Fresno with Downtown Fresno. It also has freeway-to-freeway interchanges at SR-41, SR-99, and SR-168. East of Fresno, SR-180 provides access to Kings Canyon and Sequoia National Parks. West of Fresno, SR-180 transitions to a two-lane conventional highway and connects to SR-145 in Kerman and SR-33 in Mendota.

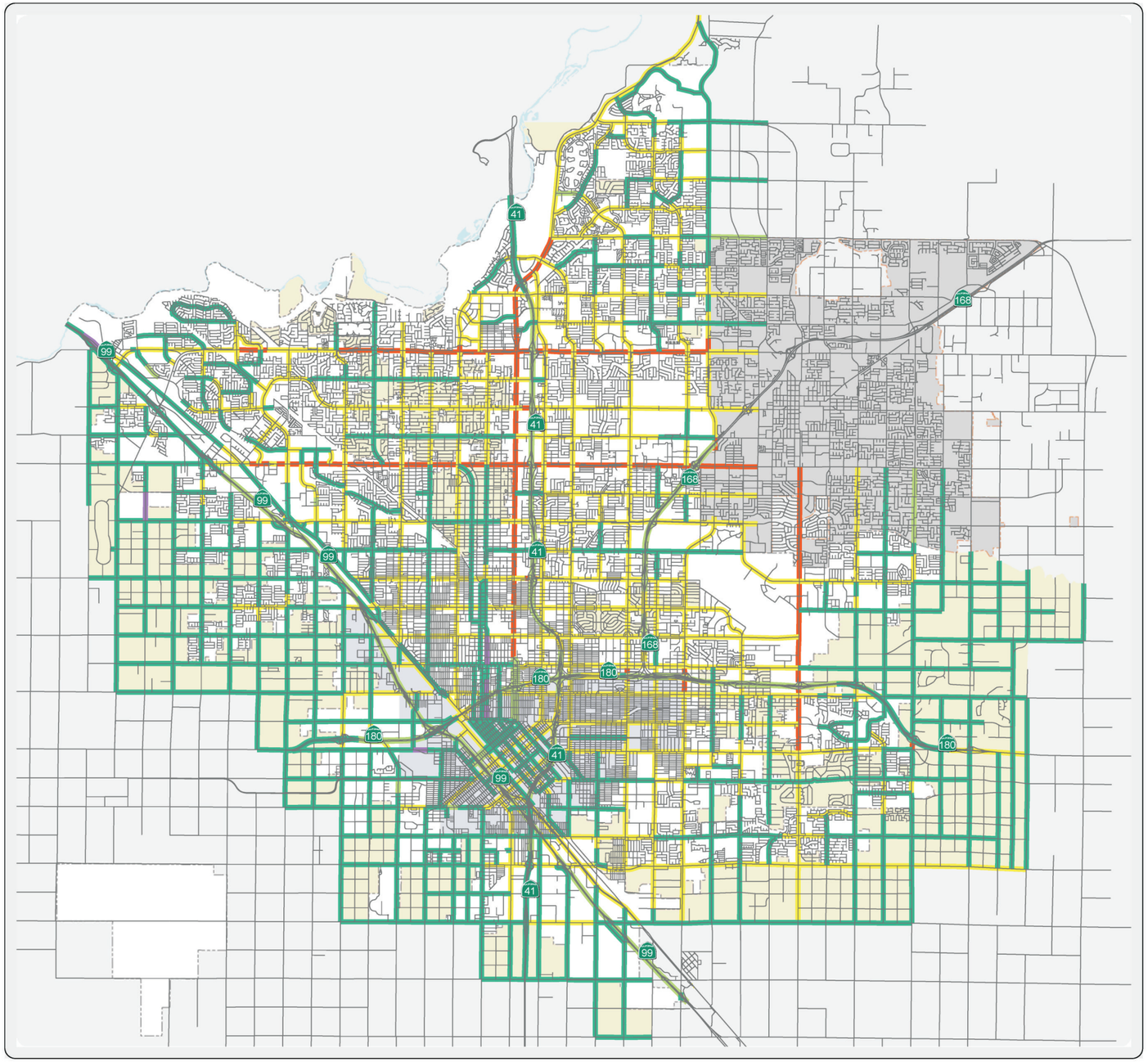
Traffic Operations

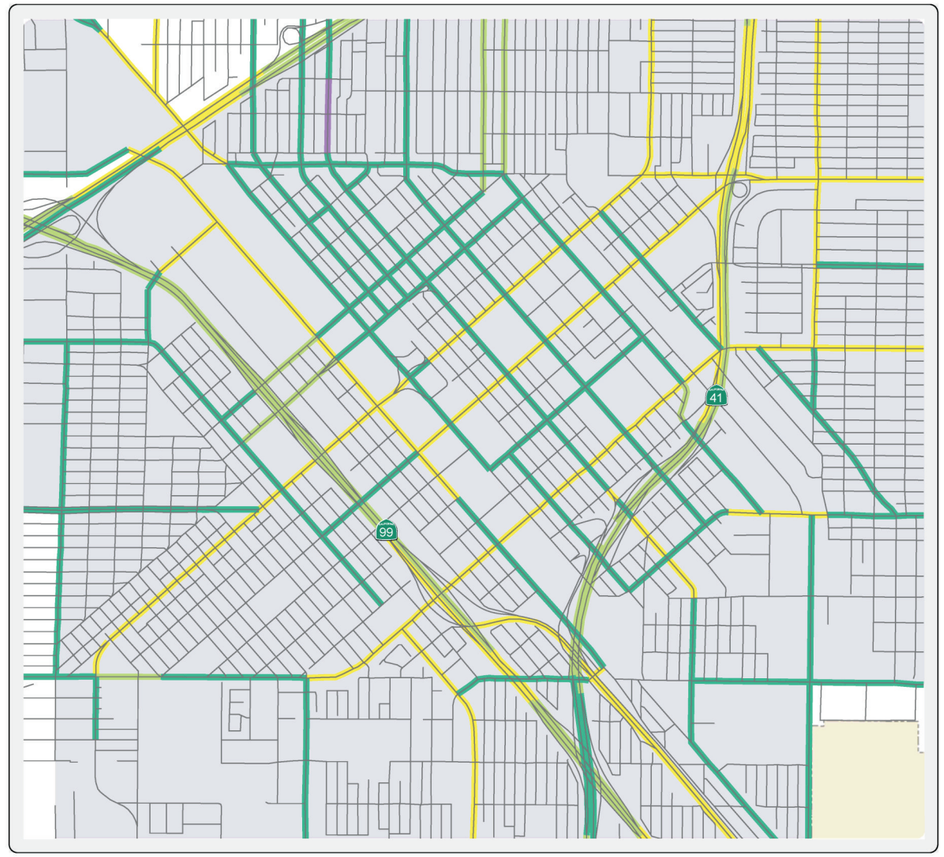
The analysis of traffic operations was conducted based on roadway segments representative of the City's overall transportation network. Traffic volumes on the selected roadway segments are used to determine the overall usage and congestion. Note that the roadway segment analysis is based on traffic counts taken at a single location or link, which was intended to be representative of the entire segment. A link connects two intersections; a segment is a series of links. The segments used in this analysis were developed based on where a series of links had common physical and traffic conditions.

Traffic operations on the study roadway segments were measured using a qualitative measure called level of service (LOS). LOS is a general measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving, as well as speed, travel time, traffic interruptions, and freedom to maneuver. The LOS grades are generally defined as follows:

- **LOS A** represents free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver.
- **LOS B** has stable operating conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience, and maneuvering freedom.
- **LOS C** has stable operating conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.
- **LOS D** represents high-density, but stable flow. Users experience severe restriction in speed and freedom to maneuver, with poor levels of comfort and convenience.
- **LOS E** represents operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions.
- **LOS F** is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion.

The LOS was calculated for each major roadway segment in the City roadway system to evaluate the quality of traffic conditions. Traffic counts used for this analysis represent year 2012 conditions. LOS was determined by comparing traffic volumes for selected roadway segments with peak hour LOS capacity thresholds. These thresholds are shown in Table 5.14-2 and were calculated based on the methodology contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000). The HCM methodology is the prevailing measurement standard used throughout the United States.





LEGEND

Existing Number of Lanes

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Downtown Neighborhoods Planning Area

City of Fresno

City of Clovis

Fresno Planning Area

N

Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon SOLUTIONS

Exhibit 5.14-1
Existing Roadway Number of Lanes

It should be noted that this traditional methodology used to analyze the roadway system does not consider the potential impact on walking, bicycling, and transit. Pedestrians, bicyclists, and transit riders are all users of the roadway system but may not be fully recognized in the traffic operations analysis and the calculation of LOS. The LOS thresholds in Table 5.14-2 are based on driver's comfort and convenience. Identifying the need for roadway improvements based on the resulting roadway LOS can have unintended impacts to other modes such as increasing the walking time for pedestrians. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users.

Table 5.14-2: Roadway Functional Class and Peak Hour Level-of-Service Thresholds

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Threshold				
			A	B	C	D	E
Freeway	N/A[1]	4	2,720	4,460	6,630	7,720	8,630
		3+Aux[2]	2,360	3,860	5,640	6,730	7,530
		3	2,000	3,270	4,660	5,740	6,430
		2+Aux	1,650	2,700	3,850	4,760	5,340
		2	1,300	2,130	3,050	3,790	4,260
State Expressway	Divided	6	2,410	3,960	5,730	7,450	8,450
		4	1,610	2,650	3,810	4,960	5,630
		2	810	1,340	1,890	2,470	2,810
City Expressway	Raised Median	6			1,860	6,170	6,520
		5			1,520	5,110	5,430
		4			1,180	4,050	4,340
		2			520	1,910	2,160
Super Arterial	Raised Median	6				4,910	6,240
		5				4,040	5,195
		4				3,170	4,150
Arterial	Raised Median	8			2,120	7,070	7,490
		6			1,560	5,270	5,610
		5			1,280	4,370	4,670
		4			1,000	3,470	3,730
		3			720	2,555	2,795
		2			440	1,640	1,860
	TWLTL[3]	4			940	3,290	3,550
		2			420	1,550	1,760

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Threshold				
			A	B	C	D	E
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
Collector	TWLTL	4			940	3,290	3,550
		2			420	1,550	1,760
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
One-Way	Undivided	3		1,960	2,240	2,430	2,610
		2		1,250	1,490	1,620	1,740
		1		550	740	800	870
Rural State Highway	Undivided	2	310	570	1,020	1,730	2,470
Rural Arterial	Divided	4			1,950	3,580	3,780
	Undivided	2			570	1,230	1,310
Rural Collector/Local	Undivided	2			700	930	1,000

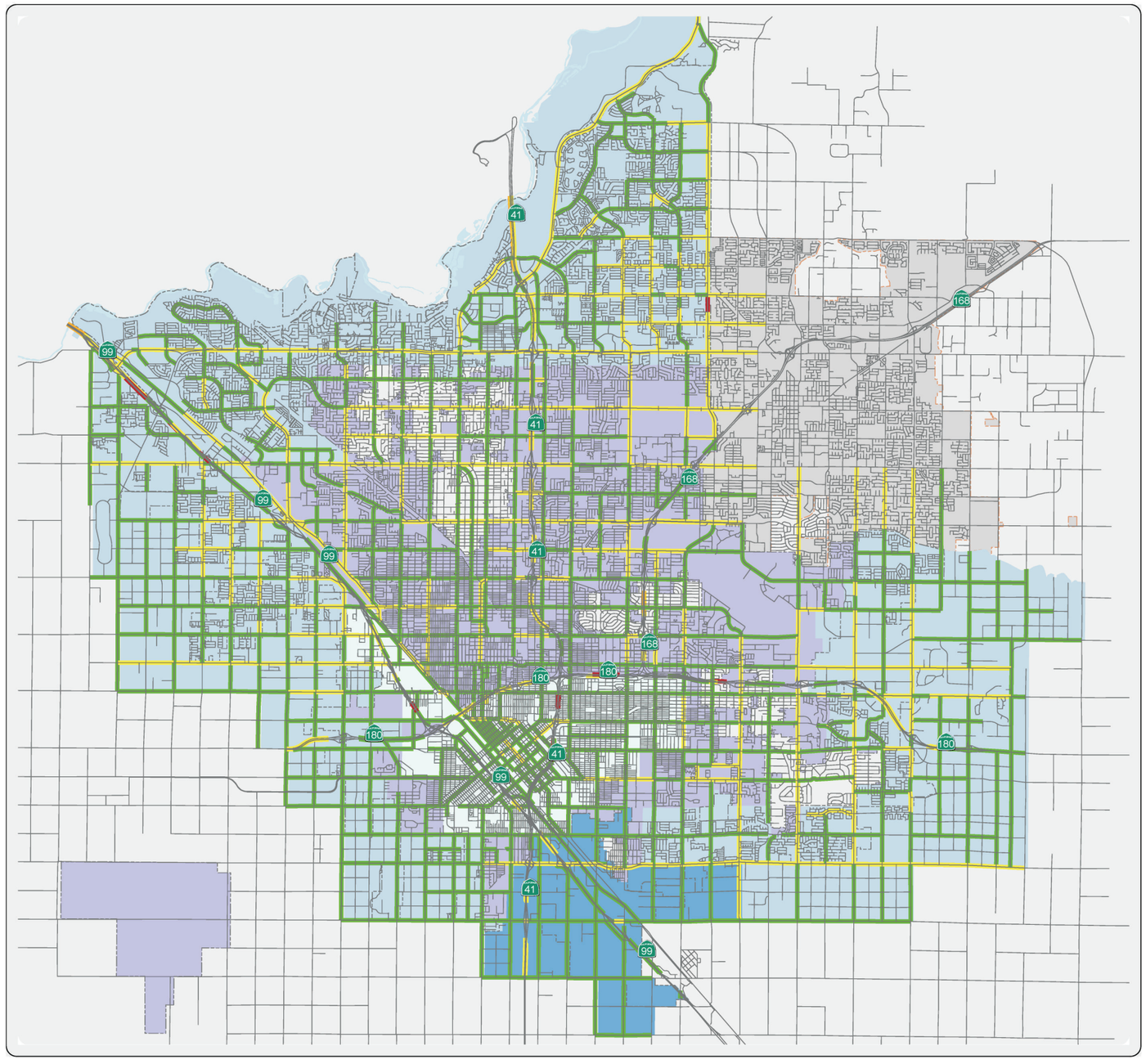
Notes:
[1] N/A - Not applicable for operational class
[2] Aux - Auxiliary Lane
[3] TWLTL – Two-way Left-turn Lane
- LOS is not achievable because of type of facility.
Source: Fehr & Peers 2012.

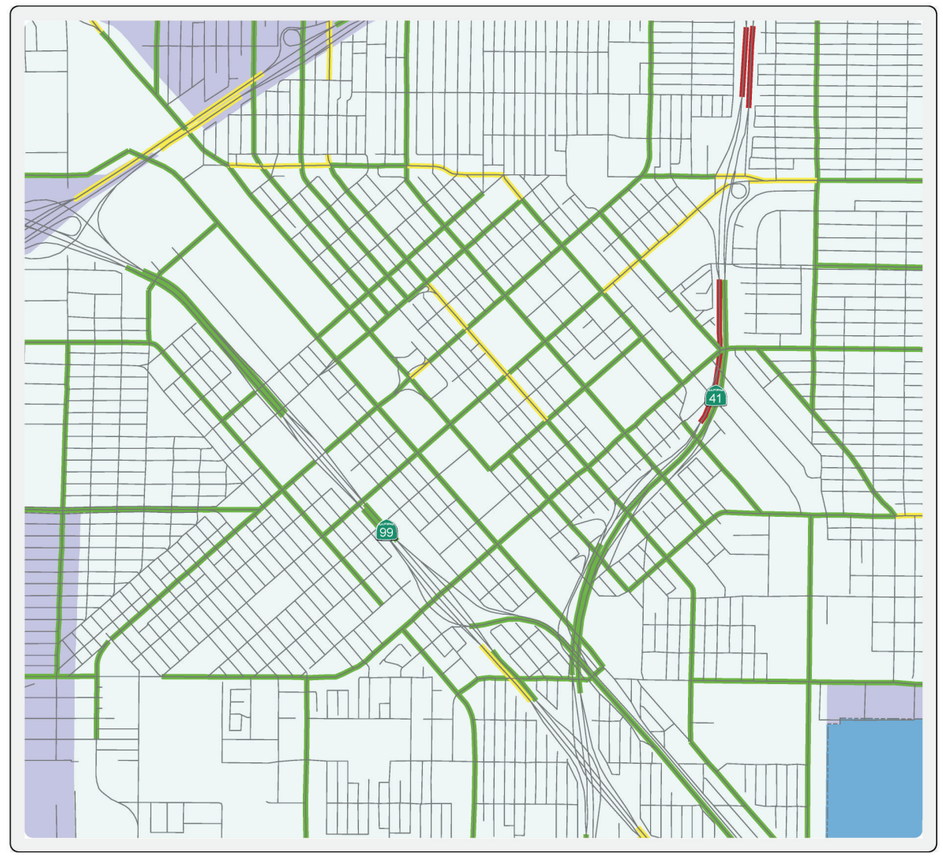
Exhibit 5.14-2 shows existing AM peak hour traffic volumes (two-way total) and LOS (See Appendix H-3 for detail) and Exhibit 5.14-3 shows existing PM peak hour traffic volumes (two-way total) and LOS (See Appendix H-4 for detail). Exhibit 5.14-4 illustrates the planned roadway number of lanes.

Most roadways operate at LOS D or better during the AM and PM peak hours, except for the following, which operate at LOS E and F:

City of Fresno

- Willow Avenue – Copper to Behymer Avenue (LOS E during the PM peak hour)
- Willow Avenue – Behymer Avenue to Shepherd Avenue (LOS F during the PM peak hour)
- Golden State Boulevard – Shaw Avenue to Swift Avenue (LOS F during the PM peak hour)
- Golden State Boulevard – Motel Drive to Ashlan Avenue (LOS E during the PM peak hour)
- Nees Avenue – Jordan Avenue to Paula Avenue (LOS E during the PM peak hour)
- Cornelia Avenue – Ashlan Avenue to Griffith Way (LOS E during the PM peak hour)
- Marks Avenue – Dakota Avenue to Weber Avenue (LOS E during the PM peak hour)
- Clinton Avenue – Valentine Avenue to Marks Avenue (LOS F during the PM peak hour)





DOWNTOWN VIEW

LEGEND

Level of Service			
A thru C	TIZ-I	City of Fresno
D	TIZ-II	Downtown Neighborhoods Planning Area
E	TIZ-III	City of Clovis
F	TIZ-IV	

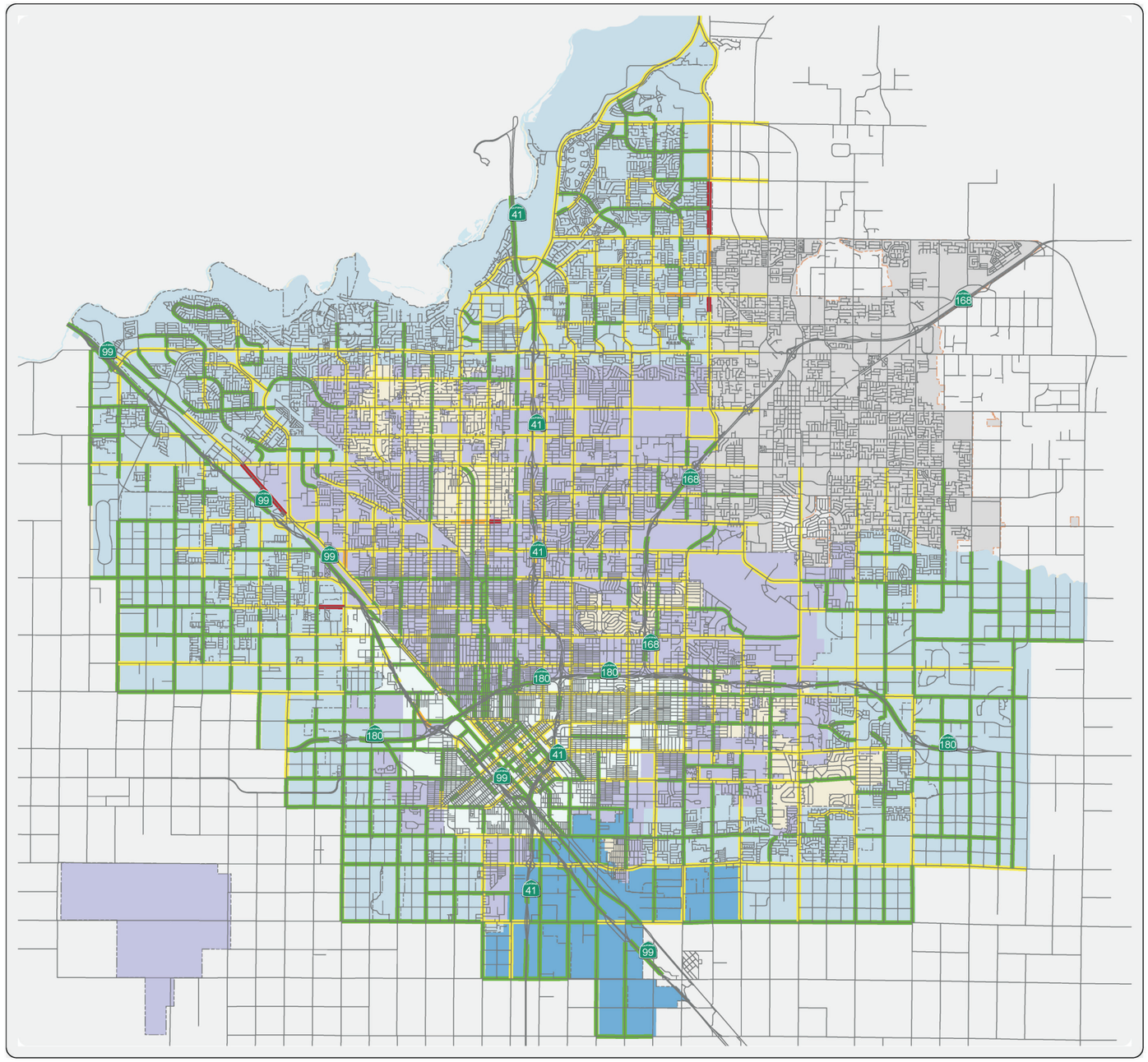
N

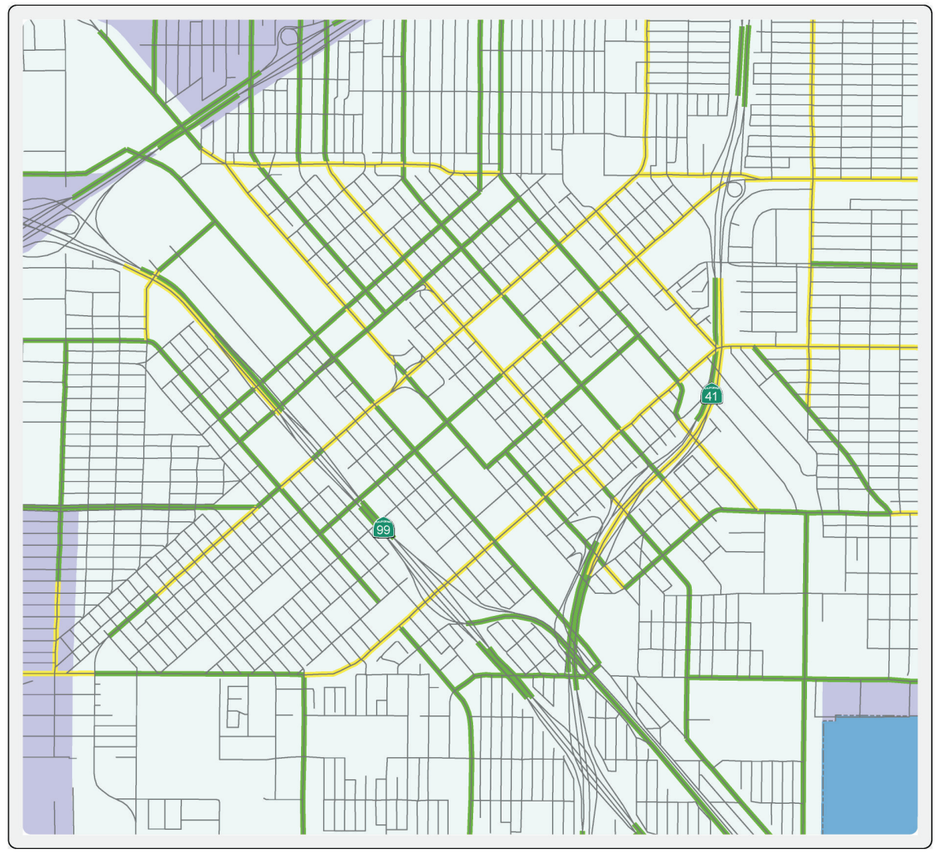
Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-2
AM Peak Hour LOS-Base Year Conditions





DOWNTOWN VIEW

LEGEND

Level of Service
- A thru C
- D
- E
- F

- TIZ-I
- TIZ-II
- TIZ-III
- TIZ-IV

- City Limits
- Downtown Neighborhoods Planning Area
- City of Clovis
- Fresno Planning Area

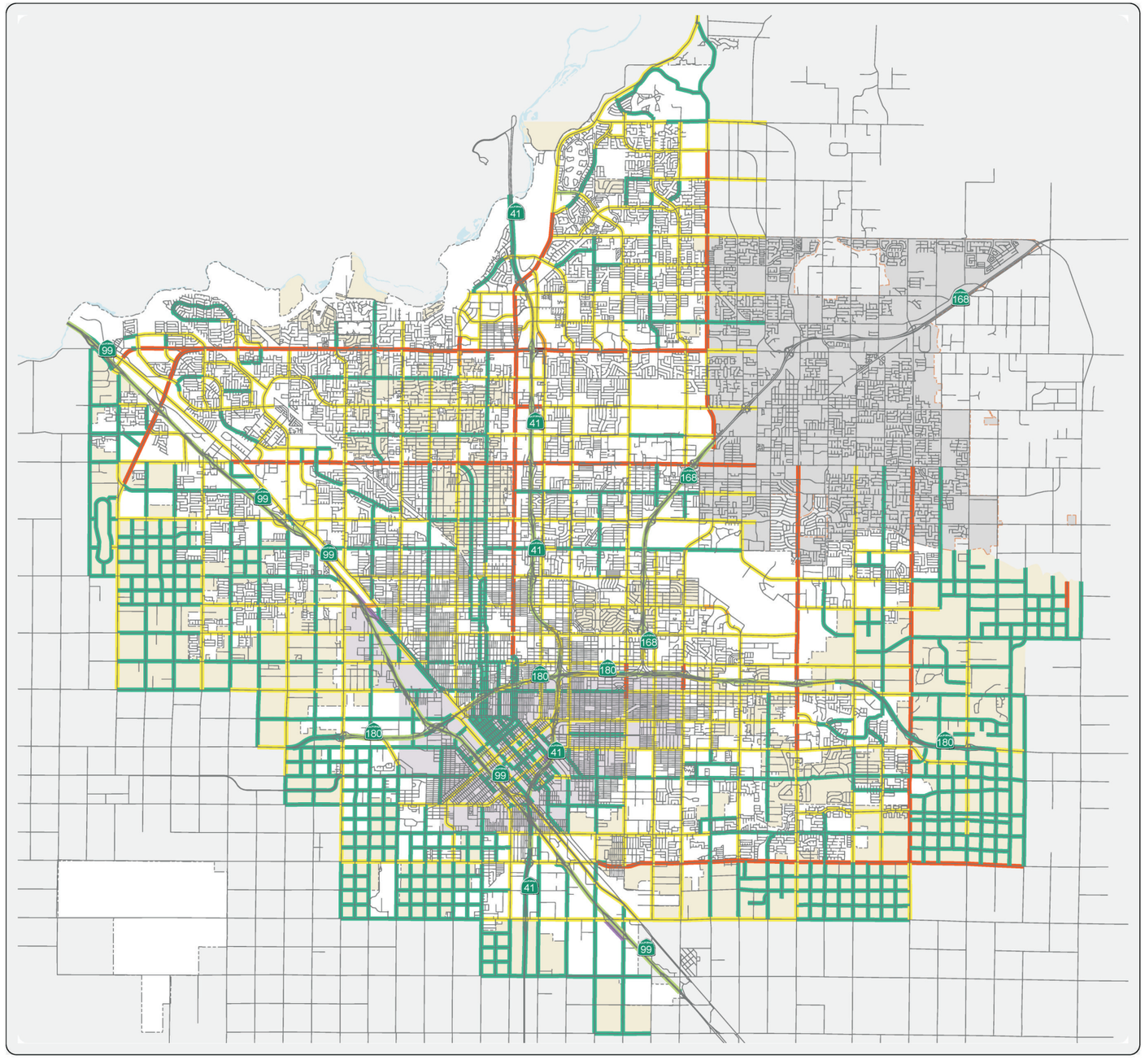
N

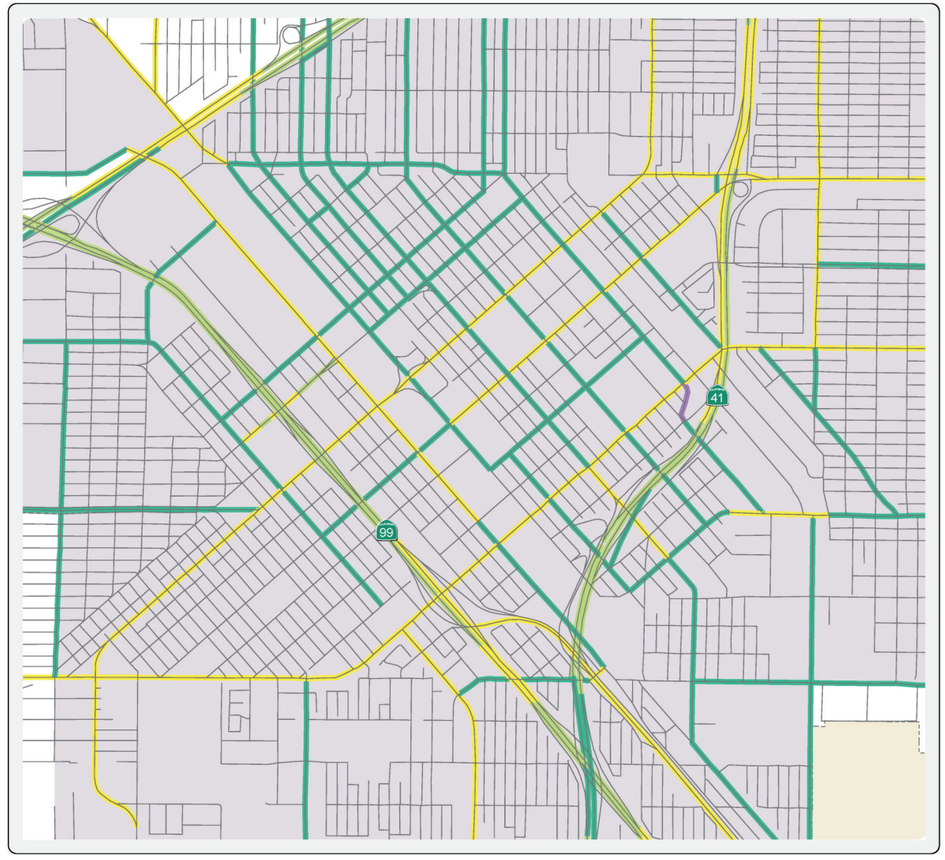
Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-3
PM Peak Hour LOS-Existing Conditions





DOWNTOWN VIEW

LEGEND

Number of Lanes

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Downtown Neighborhoods Planning Area

City of Fresno

City of Clovis

Fresno Planning Area

N

Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-4
Planned Roadway Number of Lanes

City of Fresno/Unincorporated Fresno County

- Willow Avenue – Shepherd Avenue to Teague Avenue (LOS E during the PM peak hour)
- Ashlan Avenue – Palm Avenue to Maroa Avenue (LOS E during the PM peak hour)
- Ashlan Avenue – Maroa Avenue to Del Mar Avenue (LOS F during the PM peak hour)

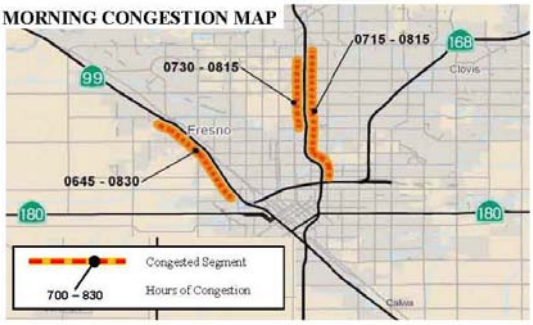
City of Fresno/City of Clovis

- Nees Avenue to Decatur Avenue (LOS F during the AM and PM peak hours)

Caltrans

- SR-41 Southbound - Bullard Avenue to Shaw Avenue (LOS E during the AM peak hour)
- SR-41 Northbound - Shaw Avenue to Ashlan Avenue (LOS E during the PM peak hour)
- SR-41 Northbound - Shields Avenue to McKinley Avenue (LOS E during the PM peak hour)

SR-99 Northbound - SR-180 to Belmont Avenue (LOS E during the PM peak hour)Congestion data presented in the 2008 State Highway Congestion Monitoring Program (HICOMP) Annual Data Compilation (September 2009) indicate recurrent congestion during the morning and evening peak hour on segments of SR-99 and SR-41 in the City. The images below show these congested locations.



The HICOMP defines recurrent congestion as a condition lasting for at least 15 minutes when travel demand exceeds freeway capacity and vehicle speeds are 35 mile per hour or less on a typical incident-free weekday. Note that an auxiliary lane was recently added to northbound SR-41 between the Bullard Avenue and Herndon Avenue interchanges to improve these conditions. These locations may not be captured by the roadway segment capacity analysis presented above, since it cannot capture the operational aspects of vehicle merging, diverging and weaving that is a key contributor to the recurrent congestion shown on the maps above. The freeway segment analysis summarized above is similar to but not as severe as the HICOMP congestion data.

Traffic Safety

Appendix H-12 includes an exhibit that shows recorded automobile collisions since 2009 based on Statewide Integrated Traffic Records System (SWITERS) data. For that period, there were about 3,100 collisions. The top ten collision locations are shown and all were on or at interchanges with SR-41 and SR-180. The highest number of reported collisions (89) occurred on SR-41 near the Sierra Avenue overcrossing and all were rear end and sideswipe, indicative of collisions due to stop-and-go conditions and on- and off-ramp merge movements. An auxiliary lane was recently added to

northbound SR-41 between the Bullard Avenue and Herndon Avenue interchanges and braided ramps were constructed between SR-41 and SR-180 to improve these conditions.

Public Transportation

- Public transportation in the City consists of the following services and facilities:
- Public bus service
- Express bus service
- Demand-response paratransit
- Passenger rail service

Fresno Area Express (FAX), a department of the City of Fresno, is the predominant transit provider in the City. FAX provides 17,600,000 annual passenger boardings, averaging 48,000 passenger trips per day. The entire FAX system runs about 1,000 bus operations per day. Ridership trends in recent years have shown an increase in the number of people using transit, which may be attributable to poor economic conditions and the rising cost of travel. Appendix H-12 provides the bus routes in the City. The routes typically follow most of the Fresno arterial street network, which are generally spaced on the mile and provide good coverage to most of the City.

Handy Ride is a demand-response service for seniors and persons with disabilities, as required by the Americans with Disabilities Act. This paratransit service serves up to 12,500 eligible individuals in the FAX service area and provided 238,707 passenger rides in fiscal year 2010.

The Fresno County Rural Transit Agency (FCRTA) and Amtrak also provide services for regional travel outside of the Fresno-Clovis Metropolitan Area. FCRTA provides service to many of the unincorporated communities in Fresno County such as Coalinga and Mendota (FCRTA 2012). The San Joaquin Line is one of Amtrak's passenger rail services with connections between the San Joaquin Valley, the Sacramento Valley, the San Francisco Bay Area, and Los Angeles. Greyhound provides similar (more frequent) bus service to these regions.

Bicycle and Pedestrian Circulation

The City is generally flat, which provides a favorable environment for bicycling and walking as a mode of transportation. The City of Fresno Bicycle, Pedestrian, and Trails Master Plan (BPTMP), which was completed in October 2010, provides guidance to expansion and maintenance of the City of Fresno bicycle and pedestrian circulation system. Although the BPTMP is a separate document not part of this Plan, the General Plan recognizes the BPTMP identifies more detailed implementation strategies with cost estimates and prospective funding sources, evaluates priorities of prospective improvements, and identifies a complete inventory of both short and long-range bicycle improvements.

Bicycling

The City of Fresno has approximately 167 miles of on-street striped bike lanes and 17 miles of trails or paths within the City limits, many of which are shown in Appendix H-12. The bicycling facilities are broken down into three classifications, which are each identified below.

- **Class I**: Bicycle or multi-use (bicycle-pedestrian) path that is completely separated from vehicle traffic and typically a 10- to 12-foot wide concrete/asphalt-concrete paved surface with two-foot wide shoulders.
- **Class II**: Designated on-street bicycle lane that is identified with painted pavement striping and singing and is typically at least five feet in width.
- **Class III**: On-street bicycle route that is designated by signs and markings and utilizes the paved surface shared with a low volume of motorized vehicles.

Since the completion of the City of Fresno Bicycle, Pedestrian, and Trails Master Plan in 2010, several facilities have been added to the network, which are identified below:

- Divisadero Street - R Street to H Street
- M Street - San Joaquin Street to Ventura Street
- P Street - Fresno Street to Divisadero Street
- H Street - Divisadero Street to Tulare Street
- Tuolumne Street - Divisadero Street to Broadway Street
- Stanislaus Street - Divisadero Street to Broadway Street

Bicycle Ridership

Data from the U.S. Census revealed a 0.9 percent bicycle mode split for the City of Fresno in 2000, slightly higher than California's statewide average of 0.8 percent. The state's goal is to have 2.8 percent of trips to work be made by bicycle. It is important to note that these numbers likely underestimate the percent of individuals who bicycle because it does not include those who bicycle to work one or two days per week, or those who bicycle for recreation or other purposes. Regardless, the City of Fresno's 0.9 percent bicycle mode share means that 2,700 people in the workforce (in the year 2000) used a bicycle as their primary mode of transportation to and from work.

Pedestrians

The street environment in the City is currently focused around the automobile with sidewalks being absent or incomplete in many areas. However, some older neighborhoods have more pleasant pedestrian environments. For years, the City of Fresno required a park strip in between sidewalks and street curbs to allow for the planting of street trees. As a result, trees were planted in many neighborhoods and are now old, mature trees providing sun relief in the hot summer months. The City began addressing this problem with the "No Neighborhood Left Behind" program in 2005, which brought sidewalks to many neighborhoods throughout Fresno. Although these projects have been completed, the City currently has a program focused on installing the missing sidewalk curb ramps on street corners where ramps are needed.

Rail/Highway Freight

The city is served by two rail corridors: the Burlington Northern Santa Fe (BNSF) rail corridor has one track and travels through northwest Fresno and the middle of Downtown while the Union Pacific

Railroad (UPRR) corridor has two tracks and generally runs parallel to SR-99. According to the 2007 City of Fresno Downtown Transportation and Infrastructure Study, about 50 freight trains pass through the two rail corridors daily as they travel through Downtown. SR-99 and the UPRR are both international trade facilities. Peak shipping months in the San Joaquin Valley are May through October. Appendix H-12 includes an exhibit that shows existing goods movement and aviation facilities.

High Speed Rail

The California High Speed Rail Authority (Authority) is proposing to construct, operate, and maintain an electric-powered high-speed train system in California. In August 2011, the Authority released the Draft Environmental Impact Report (DEIR) for the Merced to Fresno and Fresno to Bakersfield project sections. The DEIR identified several roadway network changes in the City, including road closures, new grade separations, and road realignments.

As of January 2013, the Authority had secured Federal and State funding for an initial construction section in the Fresno area, and was receiving bids from design-build contractor teams to begin construction. This initial construction segment includes the high-speed rail (HSR) trackway through the City, from Madera County through Downtown Fresno.

The Authority Board of Directors, on May 7, 2014, certified the Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Fresno to Bakersfield project section of the high-speed rail program and approved a high-speed rail alignment within the Fresno to Bakersfield project section

Aviation

The City of Fresno manages the Fresno Yosemite International Airport (FYI). The airport is located in northeast Fresno just southwest of Clovis in between Highways 168 and 180. There are two runways, each of which is 7,205 feet long and 100 feet wide. There are 174 aircraft based at FYI with an average of 371 daily aircraft operations in 2012. In 2011, the two runways served about 1.2 million passengers and airport officials expect that number to grow in the future. There are also two other general aviation airports (i.e., Chandler and Sierra Sky Park) and four heliports, including McCarthy Ranch, Community Regional Medical Center, Valley Medical Center, and PG&E Service Center in the City (AirNav 2012).

5.14.3 - Regulatory Setting

This section summarizes the transportation policies, laws, and regulations that apply to the proposed project. This information provides context for the impact discussion related to the project's consistency with applicable regulatory conditions. Further, this study identifies impacts to traffic operations by comparing roadway LOS analysis results against LOS policies set forth by the City of Fresno and Caltrans.

Federal Plans, Policies, Regulations, Laws

No federal plans, policies, regulations or laws pertaining to transportation are applicable.

State Plans, Policies, Regulations, and Laws

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) is responsible for operating and maintaining the State highway system. In the project vicinity, State Routes 41, 99, and 180, along with all the freeway ramp terminal intersections, fall under Caltrans jurisdiction. Caltrans provides administrative support for transportation programming decisions made by the California Transportation Commission (CTC) for state funding programs. The State Transportation Improvement Program (STIP) is a multi-year capital improvement program that sets priorities and funds transportation projects envisioned in long-range transportation plans.

Corridor System Management Plans (CSMP) & Transportation Concept Reports (TCR)

A Corridor System Management Plan (CSMP) is a long-range comprehensive planning document that defines the current LOS on a facility and the future LOS when considering feasible long-term projects. Similarly, a Transportation Concept Report (TCR) is a long-range system-planning document that establishes a planning concept for state facilities. Both documents identify a concept LOS, or "target" LOS, for the applicable highway facility. A deficiency or need for improvement is triggered when the actual LOS falls below the concept LOS.

In April 2009, Caltrans released the Fresno/Madera Urban Route 99 CSMP. Based on this CSMP for SR-99, the segments of this facility located within the project study area are anticipated to operate at LOS F conditions in year 2030 with the 2030 concept facility (six-lane freeway with auxiliary lanes). However, the CSMP identifies LOS D as the concept LOS.

In August 2004, Caltrans released the SR-180 Transportation Concept Report (TCR). For the study area, the SR-180 TCR identifies LOS D as the route concept LOS.

In October 2005, Caltrans released the SR-168 Transportation Concept Report (TCR). For the study area, the SR-168 TCR identifies LOS D as the route concept LOS. Based on the SR-168 TCR, the segments in the Fresno-Clovis Metropolitan Area are operating at about LOS B except at the SR-180/SR-168 interchange due to close interchange spacing.

In July 2013, Caltrans released the SR-41 Transportation Concept Report (TCR). For the study area, the SR-41 TCR identifies LOS D as the route concept LOS.

Guide for the Preparation of Traffic Impact Studies

Caltrans' "Guide for the Preparation of Traffic Impact Studies" (Caltrans 2002) provides general guidance regarding the preparation of traffic impact studies for projects that may have an impact on the State Highway System. The guidance includes when a traffic study should be prepared and the methodology to use when evaluating operating conditions on the State highway system.

The "Guide for the Preparation of Traffic Impact Studies" states, "Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on state highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS." In accordance with this

recommendation, consultation with Caltrans staff indicated that Caltrans would be willing to consider LOS D at the LOS D/E threshold when improvements become infeasible for State facilities.

The Guide for the Preparation of Traffic Impact Studies also states that where "an existing State highway facility is operating at less than the appropriate target LOS, the existing [measure of effectiveness (MOE)] should be maintained."

Deputy Directive 64-R1

The California Department of Transportation provides for the needs of travelers of all ages and abilities in all programming, planning, design, construction, operations and maintenance activities and products on the State highway system. The Department views all transportation improvements as opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycles, pedestrians, and transit modes as integral elements of the transportation system.

The department develops multi-modal projects in balance with community goals, plans, and values. Addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in all projects, regardless of funding, is implicit in these objectives. Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets" beginning early in system planning and continuing through project delivery and maintenance and operations.

California Public Utilities Commission (CPUC)

The California Public Utilities Commission (CPUC) sets guidelines for interactions between railroad facilities and ground transportation facilities. This includes location and type of crossing guards, design of railroad crossings, and other design criteria in and around railroad facilities. The guidelines come in the form of General Orders (GO).

Senate Bill 743

On September 27, 2013, Governor Brown signed Senate Bill 743 (SB 743), which made several changes to the California Environmental Quality Act (CEQA) for project located in areas served by transit. The changes direct the Governor's Office of Planning and Research (OPR) to develop a new approach for analyzing the transportation impacts under CEQA, which may eliminated vehicle delay and level of service as CEQA impacts for many parts of California. SB 743 also creates a new exemption for certain projects that are consistent with a Specific Plan and, eliminates the need to evaluate aesthetic and parking impacts of a project, in some circumstances. OPR must release new CEQA guidelines in response to SB 743 by July 2014. The guidelines will require certification and adoption by the Secretary for Resources before the go into effect.

Regional and Local Plans, Policies, Regulations, and Ordinances

Fresno Council of Governments (Fresno COG)

The Fresno Council of Governments (Fresno COG) is an association of local governments in Fresno County. Fresno COG provides transportation planning and funding for the region, and serves as a forum for the study and resolution of regional issues. In addition to preparing the region's long-range transportation plan, Fresno COG assists in planning for transit, bicycle networks, clean air, and

airport land uses. Fresno COG also develops and maintains the regional travel demand-forecasting model.

2011 Fresno COG Regional Transportation Plan (RTP)

The 2011 Fresno COG Regional Transportation Plan (RTP) (Fresno COG, 2010) is a federally mandated long-range fiscally constrained transportation plan for Fresno County. The area is designated a federal non-attainment area for ozone, indicating that the transportation system is required to meet stringent air quality emissions targets to reduce pollutant levels that contribute to ozone formation. To receive federal funding, transportation projects nominated by cities, counties, and agencies must be consistent with the RTP.

The 2011 Fresno COG RTP also includes the following relevant policies:

- Develop a regional streets and highways system that has a balanced mix of high-speed and local corridors, which are functional and flexible for intermodal use.
- Integrate transportation modes through a coordinated transportation systems management process.
- Develop bicycle and pedestrian facilities as an alternative to the automobile.
- Decisions on improvements to the transportation system shall take into account the effective use of all modes and facilities.
- Encourage jurisdictions to ensure that the needs of pedestrians, bicyclists, and individuals with disabilities are given special attention in the project review process.
- Encourage local jurisdictions to provide incentives to encourage transit, ridesharing, walking and bicycling.
- Manage the transportation system in a manner designed to increase operational efficiency, conserve energy and space, reduce air pollution and noise, and provide for effective goods movement, safety, personal mobility, and accessibility.
- Work closely with local land use agencies to ensure that land use planning is coordinated with transportation planning to fully mitigate the traffic impacts of new development to the greatest degree possible.
- Existing and future land use plans of the communities within the region shall be recognized in the formulation of transportation decisions.
- Encourage and support mixed land use developments that encourage a jobs/housing balance and that make alternative modes more effective.
- Monitor levels of service on the streets and highways network within Fresno County to ensure safe and efficient movement of people and goods.
- Consider development of a multimodal transportation terminal facility in, or in close proximity to, the Central Business District.

- Support the planning and construction of a High Speed Rail System in the San Joaquin Valley, which directly connects the major population centers within the Valley.
- Encourage projects proposing pedestrian or transit oriented designs at suitable locations.

Regional Transportation Improvement Program (RTIP)

The Regional Transportation Improvement Program (RTIP) is a list of transportation projects and programs to be funded and implemented over the next 3 years. Fresno COG submits this document to Caltrans and amends the program on a quarterly cycle.

Fresno Bus Rapid Transit (BRT) Master Plan

The Fresno COG Bus Rapid Transit (BRT) Master Plan studies the possibility of BRT service in the Fresno-Clovis Metropolitan Area. The study recommends BRT service in the Ventura Avenue/Kings Canyon Road corridor and the Blackstone Avenue/Abby Street corridor with service routed through Downtown to connect the two corridors. In addition, the Master Plan cites previous transit studies, including the Transit Master Plan (1994), the Transit Long Range Master Plan (2001), and the Downtown Transportation and Infrastructure Study (2007).

Fresno Area Express (FAX)

The Fresno Area Express (FAX) provides public transit service within the project area. FAX operates 17bus routes covering the City.

The City of Fresno's "Short-Range Transit Plan" (2011) is the short-term plan for transit service and transit capital improvements over the next five years. The "Short-Range Transit Plan" (SRTP) places significant emphasis on improved transit service throughout the region through a combination of infrastructure investments and service modifications. This includes the implementation of bus rapid transit (BRT) service in the Blackstone Avenue/Abby Street and Ventura Avenue/Kings Canyon Road corridors, purchase of new articulated buses, transit signal prioritization, a Downtown Circulator (electric bus), and enhanced passenger amenities in Downtown.

The "2001 Long-Range Transit Master Plan" (LRTMP 2002) identifies transit system improvements over a 20-year period. The LRTP recommends increases in transit service (decreased headways) on highly used routes, BRT service on Blackstone Avenue, Ventura Avenue/Kings Canyon Road, and Shaw Avenue, and relocating the existing Downtown Transfer Center at Courthouse Park.

City of Fresno

The City of Fresno generally provides infrastructure for the movement of people and goods within the City.

City of Fresno 2025 General Plan

The City of Fresno adopted the 2025 Fresno General Plan in 2002 as an update to the previous 1984 Fresno General Plan. The 2025 Fresno General Plan serves as the community's guide for the continued development, enhancement, and revitalization of the Fresno metropolitan area.

The General Plan includes the following policies related to transportation and circulation that are relevant to this analysis:

Policy E-1-f: Allow a Level of Service "D" as the acceptable level of traffic congestion on major streets. LOS "D" according to the Caltrans and COFCG accepted LOS criteria, as developed by the Florida Department of Transportation, means moderate congestion at peak traffic periods; approaching unstable flow with reduced speeds, limited maneuverability, and loss of convenience; average speeds range from 9 to 17 miles per hour on arterials with stopped delays of 40 seconds or less.

Policy E-1-j: Provide areas for pedestrian and other non-motorized travel that enhance the safety, utilization, and efficiency of the street system. Pedestrian travel should be encouraged as a viable mode of movement throughout the metropolitan area by providing safe and convenient pedestrian facilities in new and existing urban areas and particularly within the Central Area and urban core community centers.

Policy E-1-k: Pursue the funding for and development of sidewalks and bicycle lanes on all collector and arterial major streets and bike paths along all expressways.

Policy E-1-l: All commercial and office development should be linked with pedestrian, bicycle, and transit facilities.

Policy E-1-m: Achieve greater pedestrian accessibility to commercial uses from nearby neighborhoods.

Policy E-1-n: Safe access and mobility for the physically impaired must be implemented in the design of all pedestrian facilities.

Policy E-2-a: Pursue the implementation of Transportation Demand Management and Transportation System Management strategies, as identified by land use and air quality policies and actions of this plan, to reduce peak hour traffic demands and supplement the capacity of the transportation system.

Policy E-2-b: Minimize vehicular and vehicle-pedestrian conflicts on major streets and adjacent land uses through use of traffic design and control measures that reduce congestion and increase safety.

Policy E-7-d: Support the development of a multimodal transportation terminal facility in, or in close proximity to, the Central Area.

Policy E-9-j: Coordinate service to facilitate multimodal and intersystem transfer.

Policy E-9-m: Encourage mixed use intensive cluster-type development where consistent with general plan goals and policies.

Policy E-9-s: Promote the development of the Central Area as the region's principal employment center and public transportation hub.

Policy E-13-a: Provide bikeways in proximity to major traffic generators such as commercial centers, schools, recreational areas, and major public facilities.

Policy C-17-b: The City shall identify and pursue measures to lower auto-dependence and encourage public transit (including pursuit of fixed guideway systems such as monorail or people mover), bicycle use, and walking consistent with other transit-oriented development concepts and principles.

Policy C-20-d: Safe vehicular, bicycle, and pedestrian access shall be provided and maintained. Access for the disabled shall be incorporated into the project designs as required.

City of Fresno Traffic Impact Study Report Guidelines

The City of Fresno's Traffic Impact Study Report Guidelines establish general procedures and requirements for the preparation of traffic impact studies associated with development within the City. The guidelines are intended to be a checklist to ensure regular study items are not missed, but are not intended to be prescriptive to the point of eliminating professional judgment.

The guidelines include the preferred traffic analysis methodologies, significance criteria, and documentation requirements. This study is conducted using the preferred analysis methodologies and significance criteria as outlined in the guidelines.

City of Fresno Bicycle, Pedestrian, & Trails Master Plan

The City of Fresno Bicycle, Pedestrian, & Trails Master Plan (2010) is intended to guide and influence bikeway policies, programs, and development standards to encourage bicycling in the City. Although the BPTMP is a separate document not part of this Plan, the General Plan recognizes the BPTMP identifies more detailed implementation strategies with cost estimates and prospective funding sources, evaluates priorities of prospective improvements, and identifies a complete inventory of both short and long-range bicycle improvements. The BPTMP includes a variety of resources for bicycle transportation including:

- Identification of existing and planned bicycle facilities.
- Goals, objectives, and policies that expand upon objectives and policies in the 2025 Fresno General Plan.
- Encouragement, education, and enforcement programs designed to increase bicycling in Fresno.
- Implementation steps for the planned bicycle network.

Fresno Area Express (FAX)

The Fresno Area Express (FAX) provides public transit service within the project area. FAX operates 17 bus routes covering the City.

The City of Fresno's "Short-Range Transit Plan" (2011) is the short-term plan for transit service and transit capital improvements over the next five years. The "Short-Range Transit Plan" (SRTP) places significant emphasis on improved transit service throughout the region through a combination of

infrastructure investments and service modifications. This includes the implementation of bus rapid transit (BRT) service in the Blackstone Avenue/Abby Street and Ventura Avenue/Kings Canyon Road corridors, purchase of new articulated buses, transit signal prioritization, a Downtown Circulator (electric bus), and enhanced passenger amenities in Downtown.

The "2001 Long-Range Transit Master Plan" (LRTMP 2002) identifies transit system improvements over a 20-year period. The LRTP recommends increases in transit service (decreased headways) on highly used routes, BRT service on Blackstone Avenue, Ventura Avenue/Kings Canyon Road, and Shaw Avenue, and relocating the existing Downtown Transfer Center at Courthouse Park.

City of Clovis 1993 General Plan

The City of Clovis 1993 General Plan includes the following policy related to transportation and circulation that are relevant to this analysis:

Policy 1.3: Level of Service should meet the City standard on major streets and intersection within the Clovis Project Area.

Action 1.3.2: Designate Service Level "D" as defined in the Highway Capacity Manual as the minimum desirable service level at which freeways, expressways, arterial streets and collector streets should operate.

The City of Clovis is in the process of updating its General Plan. However, it has not been adopted at the time of circulation.

County of Fresno 2000 General Plan

The County of Fresno 2000 General Plan includes the following policy related to transportation and circulation that are relevant to this analysis:

Policy TR-A.2: The County shall plan and design its roadway system in a manner that strives to meet Level of Service (LOS) D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county.

The County of Fresno is in the process of updating its General Plan. However, it has not been adopted at the time of circulation.

5.14.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to transportation and traffic are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, transportation and traffic impacts resulting from the proposed project are considered significant if the project would:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? (See Traffic Increase, Impact TRANS-1)

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways? (See Congestion Management Plan, Impact TRANS-2)

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? (See Air Traffic Patterns, Impact TRANS-3)

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? (See Hazards, Impact HAZ-4)

e) Result in inadequate emergency access? (See Emergency Access, Impact HAZ-5)

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? (See Conflict with Alternative Transportation, Impact TRANS-6)

As allowed with the passage of California Assembly Bill 2419 (Bowler), the Fresno COG Policy Board rescinded the Congestion Management Program on September 25, 1997 at the request of the local member agencies. Therefore, no roadway segment in Fresno is identified in a county congestion management program. This issue will not be discussed further in this EIR.

Caltrans Thresholds

According to the Guide for the Preparation of Traffic Impact Studies (Caltrans 2002), if an existing State highway facility operates at less than the appropriate target LOS, then the existing measure of effectiveness should be maintained.

In coordination with the Guide for the Preparation of Traffic Impact Studies, the proposed project would cause a significant impact if it results in one or more of the following:

- Causes a facility operating at an acceptable LOS to operate at an unacceptable LOS (i.e., LOS E or F)
- Results in an increase of the applicable measure of effectiveness (i.e., volume-to-capacity (v/c) ratio or service volume) on a freeway facility that currently or will (under cumulative no project conditions) operate at an unacceptable LOS (LOS E or F)

City of Fresno, Clovis, Unincorporated Fresno County Thresholds

The project would cause a significant impact to the roadway system if it would result in the following conditions:

- Cause a roadway segment operating at LOS D or better to operate at LOS E or worse

Transit, Bicycle, and Pedestrian Facilities

The City of Fresno Traffic Impact Study Report Guidelines do not currently have thresholds for impacts on transit, bicycle, and pedestrian facilities.

For purposes of this study, the project would cause a significant impact to the transit system, bicycle network, and/or pedestrian facilities if it would:

- Disrupt or interfere with existing or planned public transit services or facilities
- Create an inconsistency with policies concerning transit systems set forth in the 2025 Fresno General Plan or other applicable adopted policy document
- Disrupt or interfere with existing or planned bicycle/pedestrian facilities
- Result in unsafe conditions for pedestrians, including unsafe pedestrian/bicycle or pedestrian/vehicle conflicts
- Result in unsafe conditions for bicycles, including unsafe bicycle/pedestrian or bicycle/vehicle conflicts

Create an inconsistency with policies related to bicycle or pedestrian systems set forth in the 2025 Fresno General Plan, the City of Fresno Bicycle, Pedestrian, and Trails Master Plan, or other applicable adopted policy document

5.14.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

This section describes the transportation analysis of the City of Fresno General Plan Update and identifies potential impacts and mitigation measures that would be associated with the adoption of the General Plan. A quantitative roadway impact analysis was conducted for build-out of the General Plan Update under existing and cumulative conditions. A discussion of transportation analysis methodology is included below followed by impact statements, and mitigation measures.

Transportation Analysis Methodology

The transportation analysis for the roadway system followed the methodology described below. For other components of the transportation system, the policy framework and implementation program for the City of Fresno General Plan Update were evaluated against the significance criteria.

A modified version of the Fresno COG countywide travel demand forecasting (TDF) model was used to forecast future traffic volume for the City of Fresno General Plan Update. The modifications were

specific to the City of Fresno to ensure that the model accurately estimated traffic volumes used in the analysis process to determine the number of lanes for major roadway segments based on anticipated future population and employment growth. Appendix H-5 includes documentation of the transportation modeling and analysis steps including a summary of the model validation. The following summarizes the overall process.

Land use inputs for the City of Fresno General Plan Update were developed with City of Fresno staff based on the Draft General Plan Land Use Diagram (August 8, 2013). The proposed Land Use Plan maintains the same sphere-of-influence (SOI) as the current City of Fresno 2025 Land Use Plan and will accommodate a population of 970,000, which are about 180,000 more people than the current General Plan in the same area. The General Plan Update also reduces total lane miles of expressway and arterial-level roadway by about 9 percent compared to the 2025 General Plan. The land use inputs were developed for the SOI based on typical Fresno COG input assumptions and were allocated to the traffic model traffic analysis zones (TAZs). The TAZs are geographic polygons used to organize land use input data for the TDF model. The TAZs are defined by natural borders such as roads, waterways, and topography and typically represent areas with similar travel behavior. Appendix H-12 includes exhibits that show growth in households, retail employment, and non-retail employment by TAZ for the SOI area excluding the Downtown Planning Area.

Land use growth assumptions and roadway network assumptions for the area outside the City of Fresno SOI were based on the land use and roadway network from the adopted 2011 Regional Transportation Plan (Adopted July 29, 2010) for Fresno County for existing and cumulative conditions.

The land use forecasts were input into the modified Fresno COG countywide TDF model and the model was run to generate AM and PM peak hour traffic volume forecasts. The modified Fresno COG countywide TDF model was initially run using the current City of Fresno 2025 General Plan Circulation Map. An iterative process was performed where the roadway network was modified to expand or reduce roadway network capacity in the TDF model. The goal of the interactive process was to size the roadway network to accommodate the planned population growth consistent with General Plan policy. In some cases, eliminating LOS deficiencies was not possible or desirable because the physical roadway expansion necessary to provide acceptable LOS was considered infeasible because of constraints such as terrain, sensitive habitat, cultural resources, and right-of-way. The traffic impact analysis was based on the Fresno General Plan Update.

Traffic Increase

Impact TRANS-1	**The project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.**

The City of Fresno General Plan Update will increase demand for travel. Table 5.14-3 compares vehicle miles of travel (VMT) estimates and forecasts to provide a context for potential changes in long-range travel demand. As shown in the Table 5.14-3, VMT is projected to increase from 9,395,793 to 19,883,448 per weekday with build-out of the proposed General Plan under cumulative conditions, an increase of nearly 10,487,655 over existing conditions.

Table 5.14-3: VMT Comparison - Existing Conditions and General Plan Update

Scenario	Population	Employment	Weekday VMT	VMT/ Population	VMT/ Employee	VMT/ (Population + Employee)
Existing Conditions	498,000	209,600	9,395,793	18.88	44.83	13.29
Existing Plus General Plan Buildout	970,000	393,200	18,343,614	18.91	46.65	13.46
Cumulative Plus General Plan Buildout	970,000	393,200	19,883,448	20.50	50.57	14.59
Source: Fresno COG Countywide Travel Demand Forecasting Model as modified for the City of Fresno General Plan Update.						

Traditional TDF models cannot fully capture the benefits of land use, transportation, and urban design policies that reduce VMT. Extensive research has shown that various planning techniques can reduce vehicle trip, increase non-automobile mode share, reduce trip lengths, and reduce VMT. Increases in development density and intensity are correlated with reduced vehicle trips. Mixing complementary uses in a neighborhood setting increase internal trip "capture." Many different urban design approaches are used to increase transportation connectivity and provide high-quality bicycle, pedestrian, and transit facilities. This increases the relative attractiveness of non-automobile modes of travel, and can promote travel mode shifts. The VMT comparisons shown in Table 5.14-3 may overestimate VMT and volumes along certain segments. This is because the VMT calculations were derived from the TDF model without modification. The TDF model cannot capture all VMT reductions that may be available to the City of Fresno under the proposed General Plan related to the following:

- Shifts in travel to transit, bike, and walk modes
- Mode shifts or shorter trips from improved multi-modal transportation connectivity
- Mode shifts or shorter trips related to more compact and mixed-use development patterns

As such, the VMT presented in Table 5.14-3 can be considered conservative (erring on the high side), since it does not account for localized VMT reduction benefits.

Increases in travel demand is not itself an adverse physical environmental impact, but rather causes a variety of impacts. Transportation is the largest source of greenhouse gases in California and transportation is a major source of toxic air contaminants and particulate matter. Traffic is a major source of noise in the planning area, and therefore increases in travel demand lead to noise impacts. Transportation is the largest user of energy in California, as well, and therefore impacts related to energy use relate closely to travel demand (U.S. Energy Information Administration 2010, Laurence Berkeley National Laboratory 2005). The full range of impacts related to travel demand is analyzed and reported throughout the environmental topic sections of this EIR.

The roadway traffic effects of implementing the City of Fresno General Plan Update were analyzed under existing and cumulative conditions with build-out of the proposed General Plan, using the same methodology that was used for existing conditions. Appendix H-12 and Exhibit 5.14-14 (See Appendix H-7 for detail) display the City of Fresno General Plan Update roadway functional classification and number of travel lanes, respectively.

The following exhibits display AM and/or PM roadway segment LOS for the City of Fresno General Plan Update:

- Exhibit 5.14-5- Existing Plus Project Conditions - City of Fresno General Plan Update AM Peak Hour Roadway Traffic Volumes and LOS (See Appendix H-8 for detail)
- Exhibit 5.14-6- Existing Plus Project Conditions - City of Fresno General Plan Update PM Peak Hour Roadway Traffic Volumes and LOS (See Appendix H-9 for detail)

- Exhibit 5.14-7- Cumulative Plus Project Conditions - City of Fresno General Plan Update AM Peak Hour Roadway Traffic Volumes and LOS (See Appendix H-10 for detail).
- Exhibit 5.14-8 - Cumulative Plus Project Conditions - City of Fresno General Plan Update PM Peak Hour Roadway Traffic Volumes and LOS (See Appendix H-11 for detail).

Project specific and cumulative impacts to the roadway system due to implementation of the City of Fresno General Plan Update are discussed below.

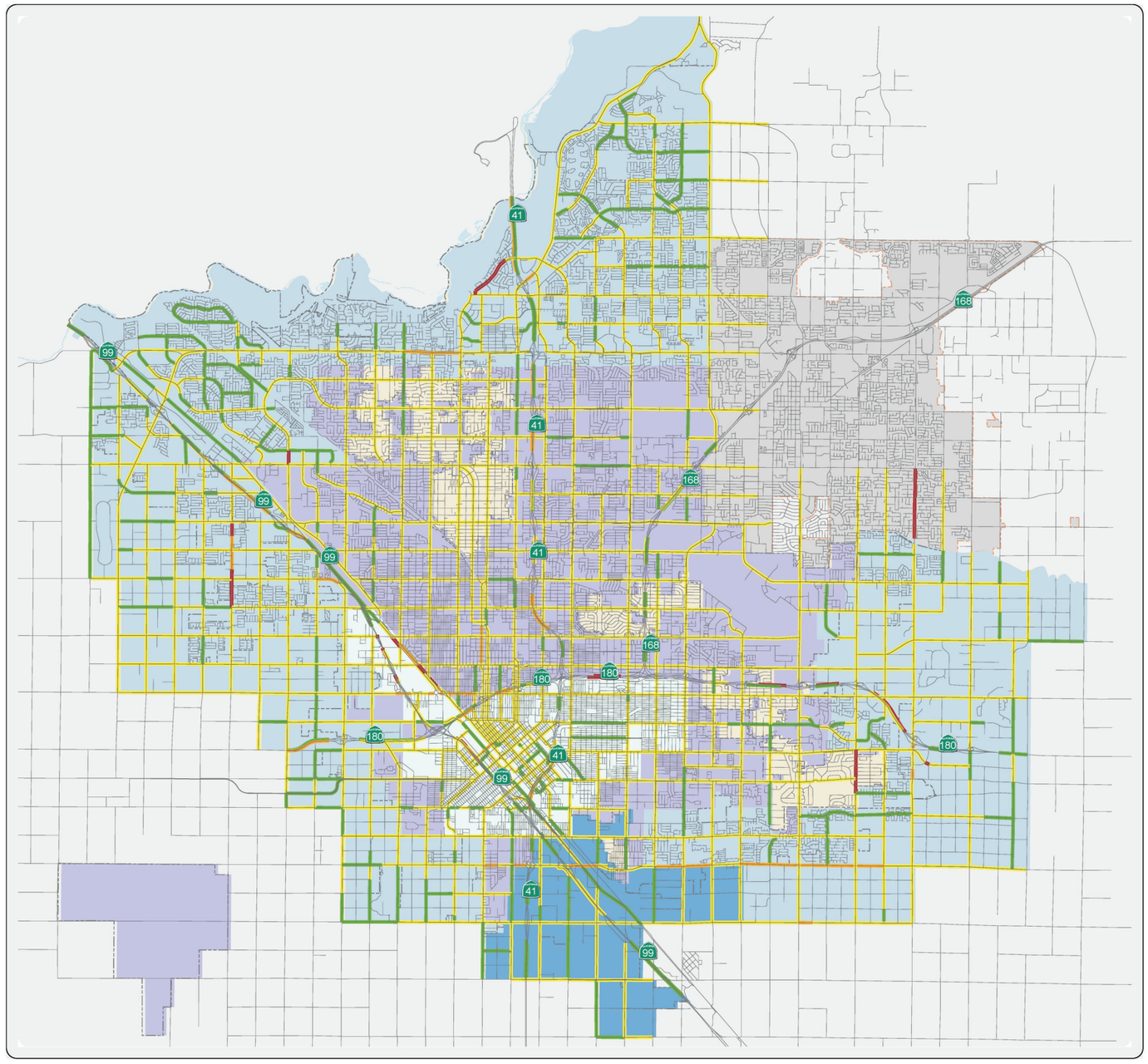
Project Specific Impact Analysis

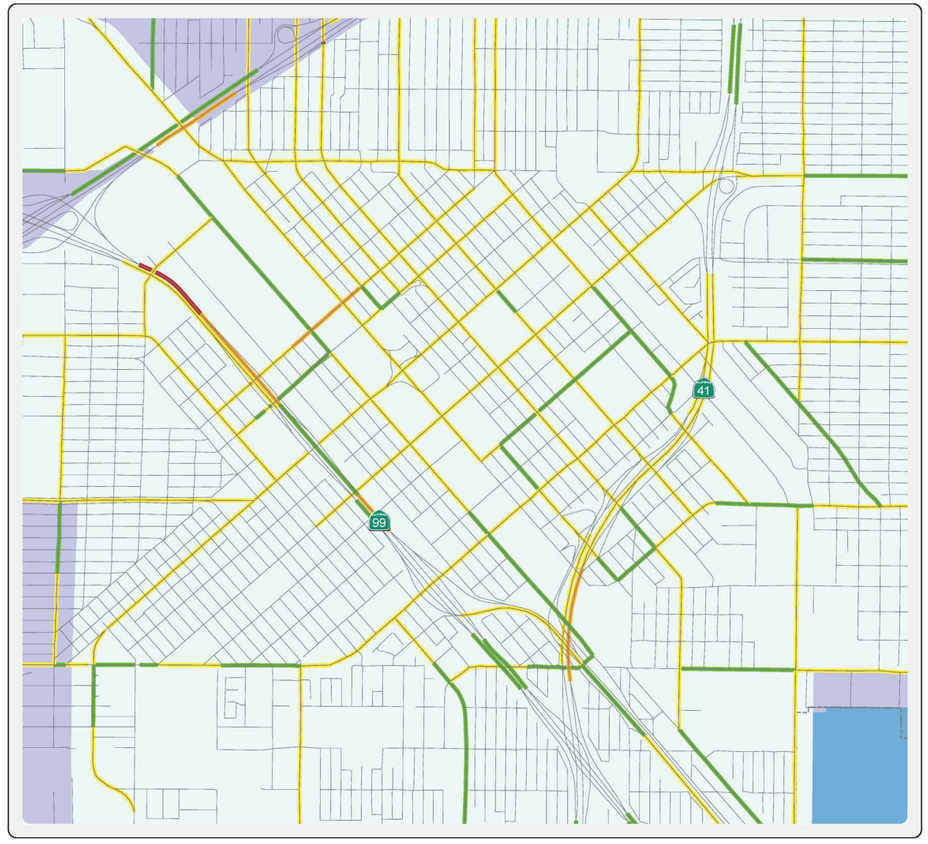
Project specific impacts identified due to increases in peak hour traffic volumes are based on build-out of the City of Fresno General Plan Update along with existing development in the remainder of Fresno County. Along with build-out of planned population and employment, the analysis assumes the transportation system displayed in Appendix H-7 and H-8. Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the adopted level of service thresholds in the City, unincorporated Fresno County, City of Clovis, and to Caltrans facilities. This is a significant impact.

City of Fresno

Buildout of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the City of Fresno 2025 General Plan LOS under existing conditions.

Policy E-1-f of the City of Fresno 2025 General Plan establishes a LOS D threshold for major roadways. Based on the LOS identified in Exhibits 5.14-5 and 5.14-6 (See Appendix H-8 and H-9, respectively, for detail), the following roadways are anticipated to operate at a lower level of service than LOS D in the City of Fresno planning area during the AM and PM peak hours assuming build-out of the City of Fresno General Plan Update under existing conditions. These roadways are summarized for each of the four traffic impact zones (TIZ) shown on Exhibits 5.14-5 and 5.14-6.





DOWNTOWN VIEW

LEGEND

Level of Service
- A - C
- D
- E
- F

- TIZ-I
- TIZ-II
- TIZ-III
- TIZ-IV

- City of Fresno
- Downtown Neighborhoods Planning Area
- City of Clovis
- Fresno Planning Area

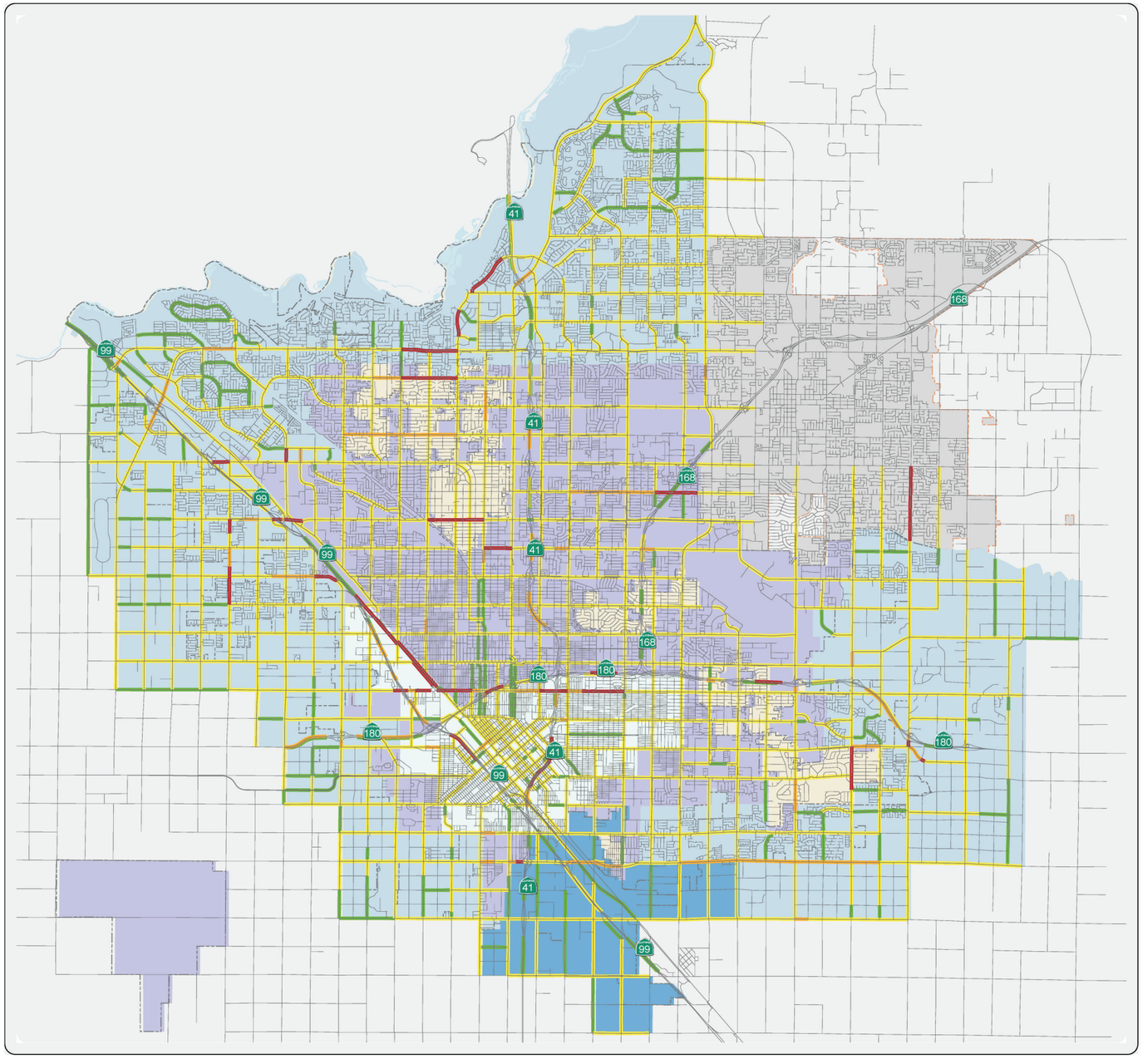
N

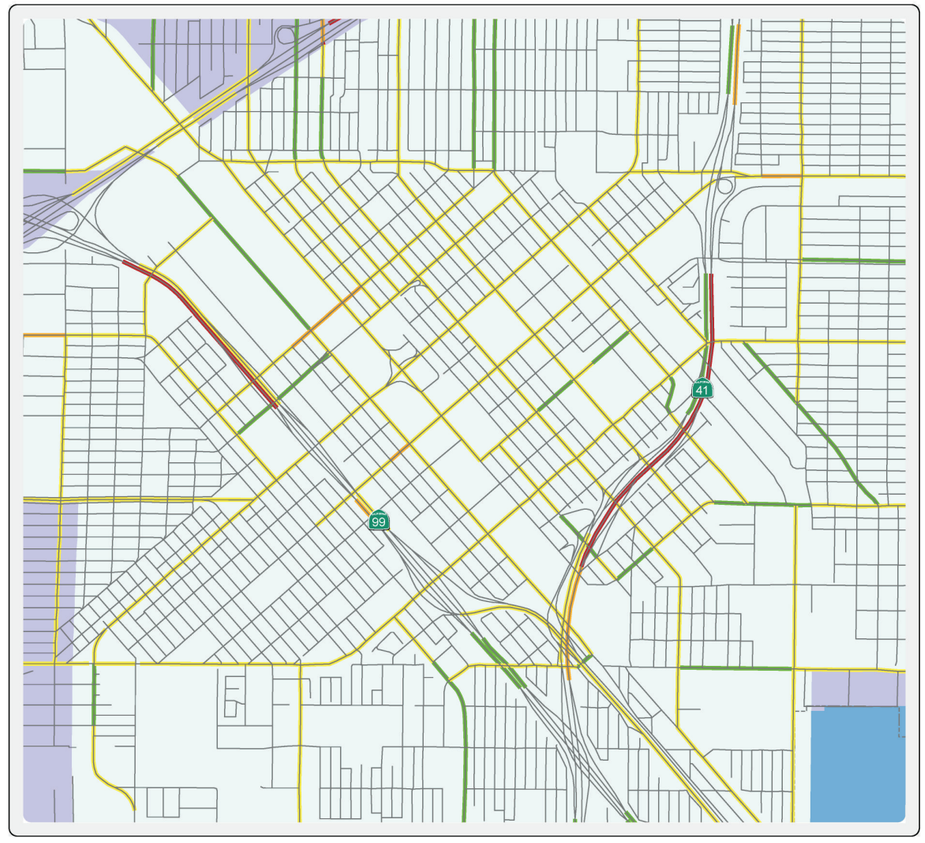
Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-5
AM Peak Hour LOS-Existing + Project Conditions





DOWNTOWN VIEW

LEGEND

Level of Service			
A thru C	TIZ-I	City of Fesno	
D	TIZ-II	Downtown Neighborhoods Planning Area	
E	TIZ-III	City of Clovis	
F	TIZ-IV	Fresno Planning Area	

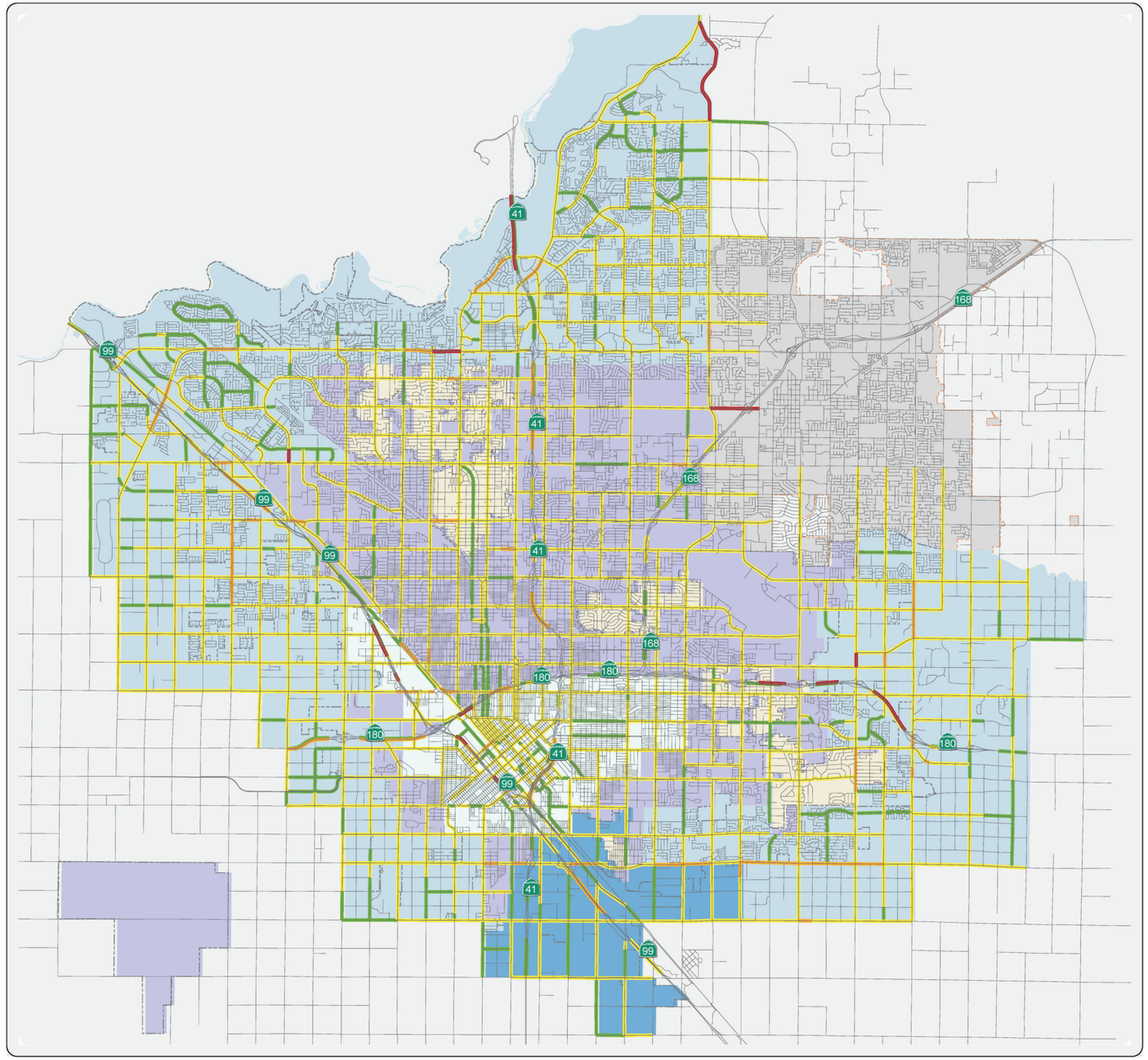
N

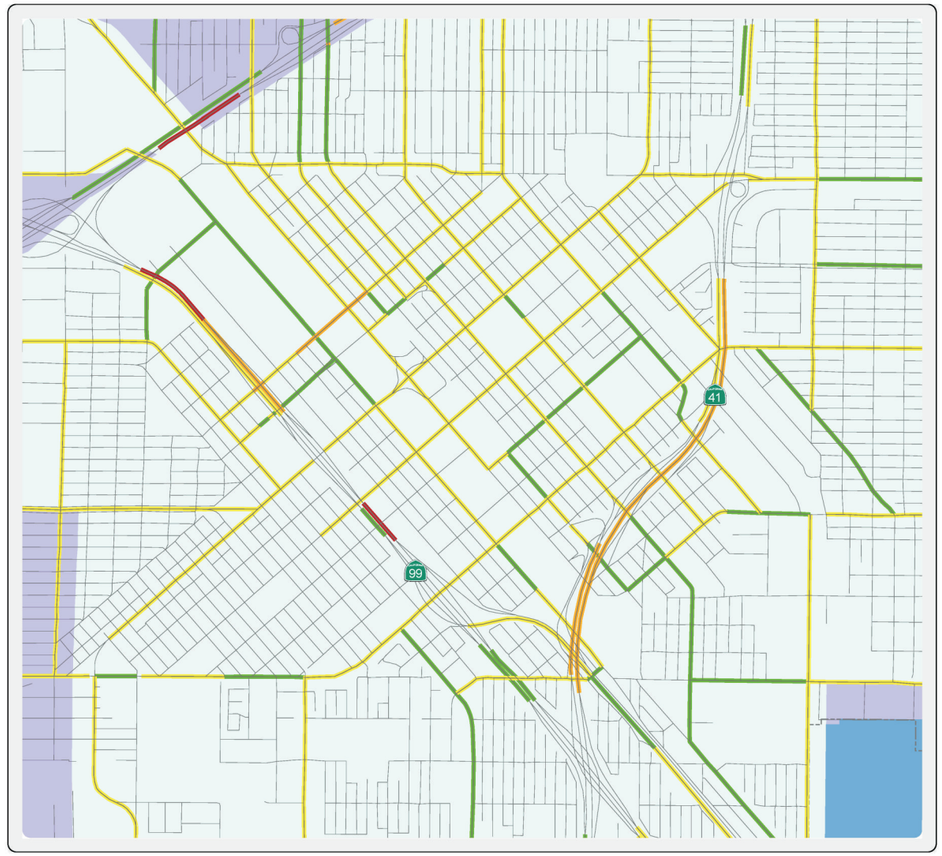
Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-6
PM Peak Hour LOS-Existing + Project Conditions





DOWNTOWN VIEW

LEGEND

Level of Service
- A - C
- D
- E
- F

- TIZ-I
- TIZ-II
- TIZ-III
- TIZ-IV

- City of Fresno
- Downtown Neighborhoods Planning Area
- City of Clovis
- Fresno Planning Area

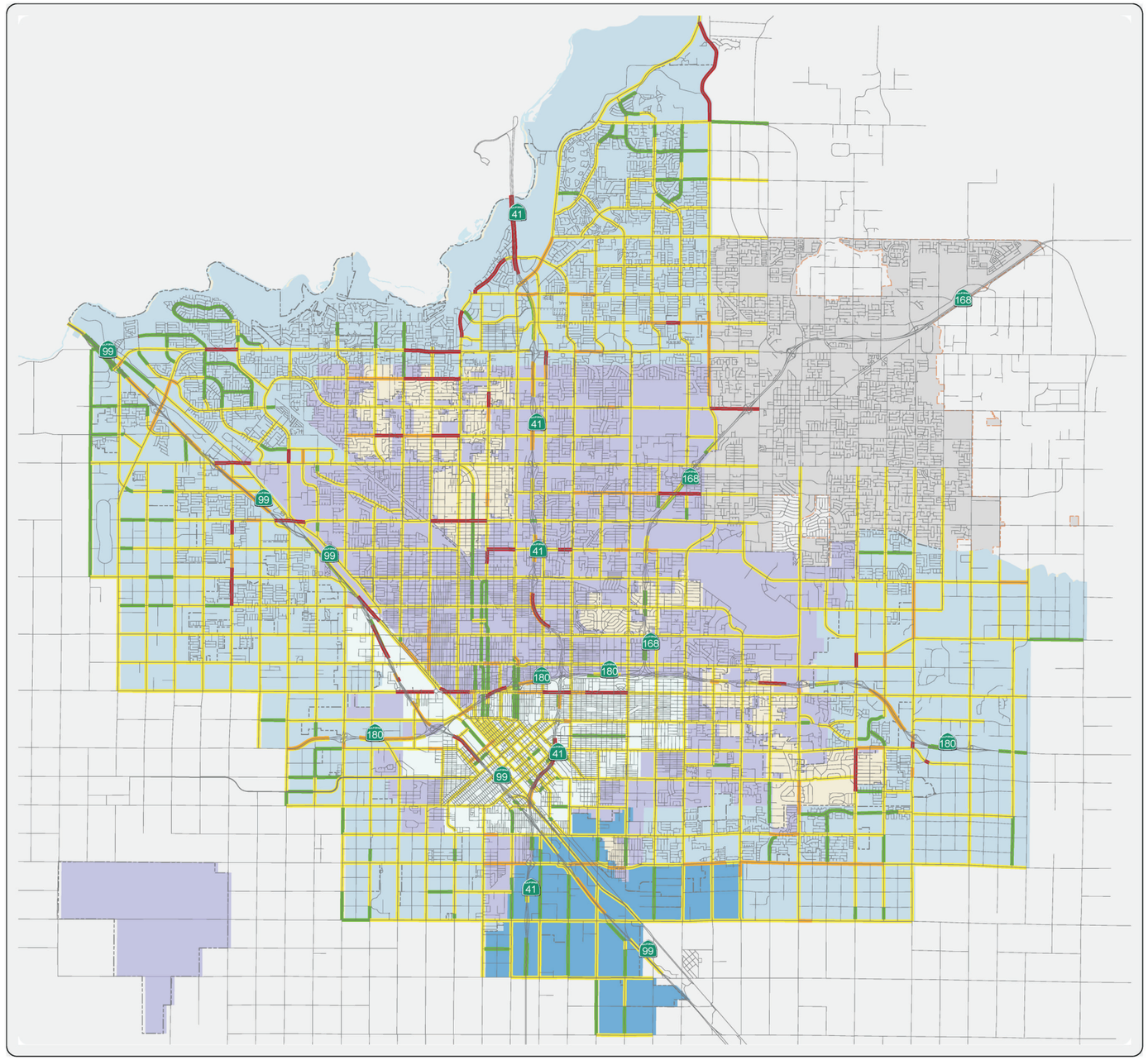
N

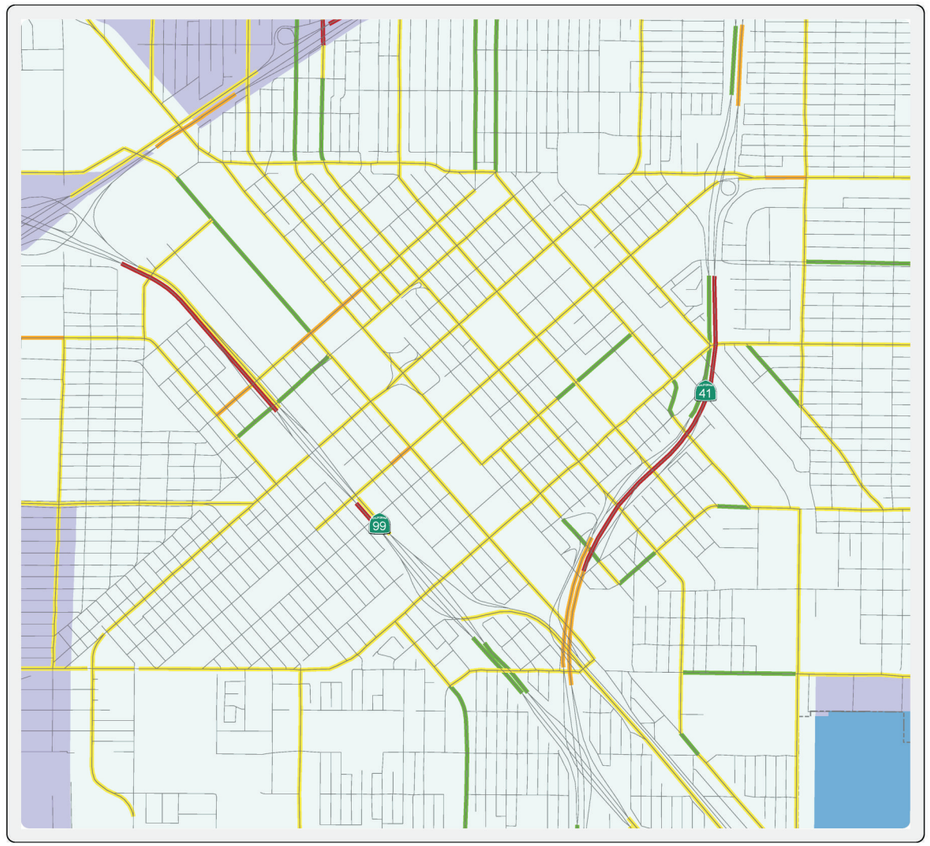
Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-7
AM Peak Hour LOS-Cumulative Conditions





DOWNTOWN VIEW

LEGEND

Level of Service
- A thru C
- D
- E
- F

- TIZ-I
- TIZ-II
- TIZ-III
- TIZ-IV

- City of Fesno
- Downtown Neighborhoods Planning Area
- City of Clovis
- Fresno Planning Area

N
Not to Scale

Source: FEHR & PEERS, 2014.

FirstCarbon® SOLUTIONS

Exhibit 5.14-8
PM Peak Hour LOS-Cumulative Conditions

TIZ I

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ I, which includes the Downtown Planning Area.

TIZ I – LOS F		
B Street	Thorne Avenue to Fruit Avenue	- LOS E during the PM peak hour
Belmont Avenue	North Parkway Drive to Weber Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Abby Street to Fresno Street	- LOS E during the PM peak hour
	Fresno Street to Cedar Avenue	- LOS E/F during the PM peak hour
Church Street	Martin Luther King Jr. Boulevard to Clara Avenue	- LOS E during the PM peak hour
Golden State Boulevard	SR 99 to McKinley Avenue	- LOS F during the AM peak hour
	McKinley Avenue to West Avenue	- LOF during the AM and PM peak hours
	Olive Avenue to Belmont Avenue	- LOS F during the PM peak hour
Stanislaus Street	F Street to Broadway Street	- LOS E during the AM and PM peak hours
Weber Avenue	West Avenue to Olive Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Olive Avenue to Thomas Avenue	- LOS F during the AM and PM peak hours
	Thomas Avenue to Belmont Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour

As summarized above, twelve roadway segments in TIZ I will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update, which is presented below, would allow LOS F in TIZ I.

MT-2-i: Transportation Impact Studies. Require a Transportation Impact Study (currently named *Traffic Impact Study*) to assess the impacts of new development projects on existing and planned streets for projects meeting one or more of the following criteria, unless it is determined by the City

Traffic Engineer that the project site and surrounding area already has appropriate multi-modal infrastructure improvements.

- When a project includes a General Plan amendment that changes the General Plan Land Use Designation.
- When the project will substantially change the off-site transportation system (auto, transit, bike or pedestrian) or connection to the system, as determined by the City Traffic Engineer.
- Transportation impact criteria are tiered based on a project's location within the City's Sphere of Influence. This is to assist with areas being incentivized for development. The four zones, as defined on Figure MT-4, are listed below. The following criteria apply, except for roadway segments identified in the traffic evaluation for the MEIR with LOS F for TIZ-II or LOS E or F for TIZ-III:
  - Traffic Impact Zone I (TIZ-I): TIZ-I represents the Downtown Planning Area. Maintain a peak hour LOS standard of F or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.
  - Traffic Impact Zone II (TIZ-II): TIZ-II generally represents areas of the City currently built up and wanting to encourage infill development. Maintain a peak hour LOS standard of E or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.
  - Traffic Impact Zone III (TIZ-III): TIZ-III generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012. Maintain a peak hour LOS standard of D or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 100 or more peak hour new vehicle trips.
  - Traffic Impact Zone IV (TIZ-IV): TIZ-IV represents the southern employment areas within and planned by the City. Maintain a peak hour LOS standard of E or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ I would be less than significant.

TIZ II

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ II, which generally represents areas of the City currently built up and wanting to encourage infill development.

TIZ II – LOS E		
Ashlan Avenue	Golden State Boulevard to Marty Avenue	- LOS E during the PM peak hour
	Fruit Avenue to Maroa Avenue	- LOS F during the PM peak hour
Barstow Avenue	Marks Avenue to Palm Avenue	- LOS E during the PM peak hour
Belmont Avenue	Weber Avenue to Broadway Street	- LOS E during the AM peak hour and LOS F during the PM Peak hour
	Broadway Street to Fulton Street	- LOS E during the PM peak hour
Clovis Avenue	SR 180 to Belmont Avenue	- LOS E during the PM peak hour
	Butler Avenue to California Avenue	- LOS E during the PM peak hour
Dakota Avenue	Angus Street to First Street	- LOS E during the PM peak hour
	Barton Avenue to Maple Avenue	- LOS E during the PM peak hour
Dakota Avenue	Maroa Avenue to Blackstone Avenue	- LOS F during the PM peak hour
Fowler Avenue	Kings Canyon Drive to Hamilton Avenue	- LOS F during the AM and PM peak hours
Fruit Avenue	Weldon Avenue to McKinley Avenue	- LOS E during the PM peak hour
Gettysburg Avenue	First Street to Maple Avenue	- LOS E during the PM peak hour
	Maple Avenue to Winery Avenue	- LOS F during the PM Peak hour
Jensen Avenue	Martin Luther King Jr. Boulevard to Clara Avenue	- LOS E during the AM and PM peak hours
Jensen Avenue	Orange Avenue to Cedar Avenue	- LOS E during the PM peak hour
Maroa Avenue	Sample Avenue to Browning Avenue	- LOS E during the PM peak

TIZ II – LOS E		
		hour
	Dakota Avenue to Fedora Avenue	- LOS E during the PM peak hour
Sierra Avenue	Van Ness Boulevard to West Avenue	- LOS E during the PM peak hour
Willow Avenue	Palo alto Avenue to Sierra Avenue	- LOS E during the PM peak hour

As summarized above, twenty roadway segments in TIZ II will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E and LOS F on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ II.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ II would be less than significant.

TIZ III

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ III, which generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012.

TIZ III – LOS D		
Ashlan Avenue	SR 99 SB Ramps to SR 99 NB Ramps	- LOS F during the PM peak hour
	SR 99 NB Ramps to Golden State Boulevard	- LOS E during the PM peak hour
Audubon Drive	Del Mar Avenue to Nees Avenue	- LOS F during the AM and PM peak hours
Brawley Avenue	San Jose Avenue to Shaw Avenue	- LOS F during the AM and PM peak hours

TIZ III – LOS D		
Cornelia Avenue	Ashlan Avenue to Griffith Way	- LOS F during the AM and PM peak hours
	Griffith Way to Dakota Avenue	- LOS E during the AM peak hour
	Dakota Avenue to Cortland Avenue	- LOS E during the AM and PM peak hours
	Cortland Avenue to Clinton Avenue	- LOS F during the AM and PM peak hours
Fowler Avenue	McKinley Avenue to Olive Avenue	- LOS E during the PM peak hour
Friant Road	SR 41 SB Off-Ramp to Fresno Street	- LOS E during the AM and PM peak hours
Herndon Avenue	SR 99 to Golden State Boulevard	- LOS E during the PM peak hour
	Palm Avenue to West Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Milburn Avenue to Polk Avenue	- LOS E during the PM peak hour
Jensen Avenue	Maple Avenue to Chestnut Avenue	- LOS E during the AM peak hour
	Chestnut Avenue to Willow Avenue	- LOS E during the AM and PM peak hours
	Willow Avenue to Peach Avenue	- LOS E during the PM peak hour
	Peach Avenue to Armstrong Avenue	- LOS E during the AM and PM peak hours
Kings Canyon Road	East of Temperance Avenue	- LOS E/F during the PM peak hour
Marty Avenue	San Jose Avenue to Shaw Avenue	- LOS E during the PM peak hour
Palm Avenue	Alluvial Avenue to Locust Avenue	- LOS F during the PM peak hour
Shaw Avenue	SR 99 NB Ramps to Cornelia Avenue	- LOS F during the PM peak hour
Shields Avenue	Burnswick Avenue to Valentine Avenue	- LOS E during the PM peak hour

TIZ III – LOS D		
	Valentine Avenue to Marks Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
Sierra Avenue	West Avenue to Palm Avenue	- LOS F during the PM peak hour
Temperance Avenue	Kings Canyon Road to SR 180 EB Ramps	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Butler Avenue to Lowe Avenue	- LOS E during the AM peak hour
Veterans Boulevard	Barstow Avenue to Bullard Avenue	- LOS E during the PM peak hour

As summarized above, twenty-seven roadway segments in TIZ III will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS D, and LOS E and LOSF on the roadway segments identified above as operating at LOS E or LOS F with the implementation of the General Plan Update in TIZ III.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ III would be less than significant.

TIZ IV

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ IV, which represents the southern employment areas within and planned by the City.

TIZ IV – LOS E		
Jensen Avenue	Elm Avenue to Holly Avenue	- LOS E during the AM and PM peak hours

TIZ IV – LOS E		
	Holly Avenue to SR 41 SB Ramps	- LOS E during the AM peak hour and LOSF during the PM peak hour
	SR 41 NB Ramps to Orange Avenue	- LOS E during the AM and PM peak hours

As summarized above, three roadway segments in TIZ IV will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E, and LOSF on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ IV.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ IV would be less than significant.

Fresno County

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the LOS thresholds of unincorporated Fresno County under existing conditions.

Impacts to roadways within Fresno County were analyzed based on the County's minimum LOS threshold established by the County of Fresno 2000 General Plan, which identifies the following Policy:

Policy TR-A.2: The County shall plan and design its roadway system in a manner that strives to meet Level of Service (LOS) D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county.

Based on Exhibit 5.14-5 and 5.14-6 (See Appendix H-8 and H-9, respectively, for detail), the following study roadway segments are anticipated to operate at a lower level of service than the established LOS thresholds in Fresno County during the AM and PM peak hour under existing conditions. These roadways are summarized for three of the four traffic impact zones (TIZ) shown on Exhibits 5.14-5 and 5.14-6.

TIZ II

The following roadway segments would exceed the LOS D threshold, established by Fresno County, in TIZ II, which generally represents areas of the City currently built up and wanting to encourage infill development.

TIZ II – Unincorporated Fresno County		
Ashlan Avenue	Fruit Avenue to Maroa Avenue	- LOS F during the PM peak hour
Barstow Avenue	Marks Avenue to Palm Avenue	- LOS E during the PM peak hour
Clovis Avenue	SR 180 EB Ramps to Belmont Avenue	- LOS E during the PM peak hour
	Butler Avenue to California Avenue	- LOS E during the PM peak hour
Fowler Avenue	Kings Canyon Drive to Hamilton Avenue	- LOS F during the AM and PM peak hours
Jensen Avenue	Orange Avenue to Cedar Avenue	- LOS E during the PM peak hour
Maroa Avenue	Sample Avenue to Browning Avenue	- LOS E during the PM peak hour
Sierra Avenue	Van Ness Boulevard to West Avenue	- LOS E during the PM peak hour
	West Avenue to Palm Avenue	- LOS F during the PM peak hour

As summarized above, nine roadway segments in TIZ II will exceed the LOS D threshold established by Fresno County.

If incorporated, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E, and LOSF on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ II.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update (and if incorporated), impacts to roadways within TIZ II would be less than significant.

If not incorporated, the City of Fresno General Plan Update includes the following policy related to transportation funding and regional-level coordination:

Policy MT-2-j Funding for Multi-Modal Transportation Systems. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development of impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-l: Region-wide Transportation Impact Fees. Continue to support the implementation of a metropolitan-wide and region-wide transportation impact fees sufficient to cover the proportional share of a development's impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (e.g., Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development.
- Regional highways, streets, trails, public transportation, goods movement system components, consistent with the General Plan, necessary to mitigate those impacts and serve projected demand.
- Projected full lifetime costs of the regional transportation system components, including construction, operations, and maintenance.
- Cost covered by established funding sources.

These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in Fresno County and could reduce these impacts, there is no guarantee that Fresno County will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

TIZ III

The following roadway segments would exceed the LOS D threshold, established by Fresno County, in TIZ III, which generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012.

TIZ III – Unincorporated Fresno County		
Cornelia Avenue	Dakota Avenue to Cortland Avenue	- LOS E during the AM and PM peak hours
	Cortland Avenue to Clinton Avenue	- LOS F during the AM and PM peak hours
Fowler Avenue	McKinley Avenue to Olive Avenue	- LOS E during the PM peak hour
Jensen Avenue	Peach Avenue to Armstrong Avenue	- LOS E during the AM and PM peak hours
Kings Canyon Road	Fowler Avenue to Armstrong	- LOS E during the PM peak hour
	East of Temperance Avenue	- LOS E/F during the PM peak hour
Temperance Avenue	Kings Canyon Road to SR 180 EB Ramps	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Butler Avenue to Lowe Avenue	- LOS E during the AM peak hour

As summarized above, eight roadway segments in TIZ III will exceed the LOS D threshold established by Fresno County.

If incorporated, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS D, and LOS E and F on the roadway segments identified above as operating at LOS E and F with the implementation of the General Plan Update in TIZ III.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update (and if incorporated), impacts to roadways within TIZ III would be less than significant.

If not incorporated, the City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in Fresno County and could reduce these impacts, there is no guarantee that Fresno County will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

TIZ IV

The following roadway segments would exceed the LOS D threshold, established by Fresno County, in TIZ IV, which represents the southern employment areas within and planned by the City.

TIZ IV – Unincorporated Fresno County		
Jensen Avenue	Maple Avenue to Chestnut Avenue	- LOS E during the AM peak hour
	Chestnut Avenue to Willow Avenue	- LOS E during the AM and PM peak hours
	Willow Avenue to Peach Avenue	- LOS E during the PM peak hour

As summarized above, eight roadway segments in TIZ IV will exceed the LOS D threshold established by Fresno County.

If incorporated, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E, and LOSF on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ IV.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update (and if incorporated), impacts to roadways within TIZ IV would be less than significant.

If not incorporated, the City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in Fresno County and could reduce these impacts, there is no guarantee that Fresno County will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

City of Clovis

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the LOS thresholds of the City of Clovis under existing conditions.

Impacts to roadways within the City of Clovis were analyzed based on the City's minimum LOS threshold established by the City of Clovis 1993 General Plan, which identifies the following Policy:

Policy 1.3: Level of Service should meet the City standard on major streets and intersection within the Clovis Project Area.

Action 1.3.2: Designate Service Level "D" as defined in the Highway Capacity Manual as the minimum desirable service level at which freeways, expressways, arterial streets and collector streets should operate.

Based on Exhibit 5.14-5 through 5.14-6 (See Appendix H-8 and H-9, respectively, for detail), the following study roadway segment is anticipated to operate at a lower level of service than the established LOS thresholds in Fresno County and the City of Clovis during the PM peak hour under existing conditions:

City of Clovis		
Temperance Avenue	Ashlan Avenue to Shields Avenue	- LOS F during the AM and PM peak hours

The resulting LOS for each of the identified roadway segments is due to a combination of traffic volumes assuming build-out of the City of Fresno General Plan Update combined with existing traffic generated outside of the City. The City of Fresno General Plan Update includes the following policy related to transportation funding and regional-level coordination:

Policy MT-2-j Funding for Multi-Modal Transportation Systems. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development of impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-l: Region-wide Transportation Impact Fees. Continue to support the implementation of a metropolitan-wide and region-wide transportation impact fees sufficient to cover the proportional share of a development's impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (e.g., Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development;
- Regional highways, streets, trails, public transportation, goods movement system components, consistent with the General Plan, necessary to mitigate those impacts and serve projected demand;
- Projected full lifetime costs of the regional transportation system components, including construction, operations, and maintenance; and
- Cost covered by established funding sources.

These policies are crafted so that new City development pays the proportional share of the developments impacts.

The City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in the City of Clovis and could reduce these impacts, there is no guarantee that the City of Clovis will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

Caltrans

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the LOS thresholds for Caltrans facilities under existing conditions.

According to the Guide for the Preparation of Traffic Impact Studies (Caltrans 2002), if an existing State highway facility operates at less than the appropriate target LOS, then the existing measure of effectiveness should be maintained.

In coordination with the Guide for the Preparation of Traffic Impact Studies, the proposed project would cause a significant impact if it results in one or more of the following:

Causes a facility operating at an acceptable LOS to operate at an unacceptable LOS (i.e., LOS E or F) Results in an increase of the applicable measure of effectiveness (i.e., v/c ratio or service volume) on a freeway facility that currently or will (under cumulative no project conditions) operate at an unacceptable LOS (LOS E or F)

Based on Exhibit 5.14-14 and 5.14-15(See Appendix H-8 and H-9, respectively, for detail), the following roadways are anticipated to operate at a lower level of service than LOS D in the City of Fresno planning area during the AM and PM peak hour assuming build-out of the City of Fresno General Plan Update under existing conditions.

Caltrans		
SR 99		
Southbound	Shaw Avenue to Ashlan Avenue	- LOS E during the AM peak hour
	Clinton Avenue to McKinley Avenue	- LOS F during the AM peak hour and LOS E during the PM peak hour
	McKinley Avenue to Olive Avenue	- LOS F during the AM peak hour and LOS E during the PM peak hour
	Olive Avenue to Belmont Avenue	- LOS F during the AM peak hour and LOS E during the PM peak hour
	SR 180 to Stanislaus Avenue	- LOS F during the PM peak hour
	Fresno Street to Ventura Avenue	- LOS E during the PM peak hour
Northbound	McKinley Avenue to Olive Avenue	- LOS E during the PM peak hour
	Olive Avenue to Belmont Avenue	- LOS E during the PM peak hour
	Belmont Avenue to SR 180	- LOS E during the PM peak hour
	SR 180 to Stanislaus Avenue	- LOS F during the AM peak hour
	Fresno Street to Ventura Avenue	- LOS E during the AM peak hour
SR 41		

Caltrans		
Southbound	North of Friant Road	- LOS E during the AM peak hour
	Herndon Avenue to Bullard Avenue	- LOS E during the AM peak hour
	Bullard Avenue to Shaw Avenue	- LOS E during the AM and PM peak hours
	Shields Avenue to McKinley Avenue	- LOS E during the AM and PM peak hours
Northbound	Bullard Avenue to Shaw Avenue	- LOS E during the AM and PM peak hours
	Shields Avenue to McKinley Avenue	- LOS E during the AM and PM peak hours
	SR 180 to Divisadero Street	- LOS E during the PM peak hour
	Divisadero Street to Van Ness Avenue	- LOS F during the PM peak hour
	Van Ness Avenue to SR 99	- LOS E during the AM and PM peak hours
SR 180		
Eastbound	Brawley Avenue to Marks Avenue	- LOS E during the AM peak hour
	SR 99 to Fulton Street	- LOS E during the AM peak hour
	Fulton Street to Abby Street	- LOS E during the AM peak hour
	SR 41 to SR 168	- LOS F during the AM peak hour
	Chestnut Avenue to Peach Avenue	- LOS E during the PM peak hour
	Fowler Avenue to Temperance Avenue	- LOS E during the PM peak hour
Westbound	Brawley Avenue to Marks Avenue	- LOS E during the PM peak hour
	Marks Avenue to SR 99	- LOS E during the PM peak hour
	Fulton Street to Abby Street	- LOS F during the PM peak hour
	SR 41 to SR 168	- LOS F during the AM and PM peak hours

Caltrans		
	Peach Avenue to Clovis Avenue	- LOS F during the AM and PM peak hours
	Clovis Avenue to Fowler Avenue	- LOS F during the AM peak hour
	Fowler Avenue to Temperance Avenue	- LOS F during the AM peak hour

The resulting LOS for each of the identified roadway segments is due to a combination of traffic volumes assuming build-out of the City of Fresno General Plan Update combined with existing traffic generated outside of the City. The City of Fresno General Plan Update includes the following policy related to transportation funding and regional-level coordination:

Policy MT-2-j Funding for Multi-Modal Transportation Systems. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development of impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-l: Region-wide Transportation Impact Fees. Continue to support the implementation of a metropolitan-wide and region-wide transportation impact fees sufficient to cover the proportional share of a development's impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (e.g., Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development;
- Regional highways, streets, trails, public transportation, goods movement system components, consistent with the General Plan, necessary to mitigate those impacts and serve projected demand;
- Projected full lifetime costs of the regional transportation system components, including construction, operations, and maintenance; and
- Cost covered by established funding sources.

These policies are crafted so that new City development pays the proportional share of the developments impacts.

The City of Fresno General Plan Update will accommodate planned population and employment growth without expanding its current SOI, accommodating 180,000 more people than the current General Plan in the same area. The intent is to accommodate anticipated growth though compact, walkable, infill, new complete neighborhoods, and mixed-use development through intensification of the downtown planning area, high capacity transit corridors, intensive urban activity centers, and

multi-modal districts. This focus will locate population and employment closer to services. As discussed under Impact TRANS-1, increased development density and intensity is correlated with reduced vehicle trips. Mixing complementary uses in a neighborhood setting increase internal trip "capture," and different urban design approaches increase transportation connectivity and provide high-quality bicycle, pedestrian, and transit facilities by increasing the relative attractiveness of non-automobile modes of travel to promote travel mode shifts. The City of Fresno General Plan Update also provides a complete streets approach, which considers all modes of transportation, in the planning, design and implementation facilities to support planned population and employment growth. Even with this focus on more compact development and complete street concepts, vehicle travel as measured in terms of VMT is forecast to increase.

The phenomenon where additional capacity leads to additional demand for travel is known as "induced travel." Induced travel occurs when the cost of travel is reduced (i.e., travel time reduction due to additional capacity) causing an increase in demand (more travelers using the improved facility). The reduction in travel time causes various responses by travelers, including diversion from other routes, changes in destinations, changes in mode, departure time shifts, and possibly the creation of new trips altogether. Expansion of the regional freeway system, consistent with the 2011 RTP, will contribute to induced travel and therefore may compete with objectives of the City of Fresno General Plan update that foster more compact multi-modal development.

The City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure funding for new development's impacts to regional facilities that would contribute to planned expansion of the freeway system. However, improvements to the freeway system are for roadways under Caltrans' jurisdiction. Therefore, the City of Fresno does not have control over their timing or implementation, and this impact would remain significant and unavoidable.

Madera, Merced, San Benito, Kings, Tulare Counties

As outlined in Table 5.14-3, build-out of the City of Fresno General Plan Update would increase vehicle travel compared to existing conditions.

As noted earlier, this study uses the most recently adopted Fresno COG TDF model released in 2010, and calibrated and validated for the project study subarea. While this makes the TDF model the most valid and capable tool for forecasting future travel in Fresno County, the TDF model does not include roadway network and traffic analysis zone detail in Madera County, Merced County, San Benito County, Kings County, and Tulare County. Therefore, detailed roadway analysis was not conducted for these counties.

However, as discussed in Section 5.12, Population and Housing, an important indicator of a community providing a balance of jobs and housing is to determine the number of employees that live in an area compared to the number of jobs provided in the same area. Tables 5.12-5 and 5.12-6 shows that approximately 227,197 employees resided within the Planning Area and there were approximately 209,260 jobs provided in the Planning Area in the year 2010. This shows that approximately 16,162 people who were employed and resided within the Planning Area travelled outside of the Planning Area in the year 2010 to their place of employment. The number of people leaving the Planning Area for work would increase with people who live outside the Planning Area travelling to the Planning Area for employment.

Jobs and housing within the Planning Area under build-out conditions were derived from the land use projections of the General Plan Update. These projections were used to determine the future jobs, employees, and occupied housing units, and total housing units that would occur within the Planning Area. Based on the information provided in Tables 5.12-5 and 5.12-6, there are 393,200 jobs projected to occur within the Planning Area and 403,717 employees who are projected to live within the Planning Area. This shows that approximately 10,517 people who are employed and live within the Planning Area are projected to travel outside of the Planning Area in the year 2056 to their place of employment. Therefore, in the year 2056, there would be fewer employed residents (16,162 minus 10,517 equals approximately 5,645) who live within the Planning Area that would be required to travel outside the Planning Area for employment compared to the year 2010. This reduction would provide a greater balance of employees and jobs within the Planning Area. Even with a greater balance of jobs and employees living in the Planning Area, the vehicle travel (measured in terms of VMT) is projected to increase with the proposed project. Exhibits 5.14-5 and 5.14-6 in Appendix H-8 and H-9, respectively, show increased travel on SR 99 and SR 41 at the Fresno County/Madera County line. Even though the project is projected to result in greater jobs to resident employees, there will still be employed residents who choose to live in the Planning Area and work outside of the Planning Area, and there will also be employed residents who live outside the Planning Area and choose to work within the Planning Area. These choices will occur due to housing and employment growth in the region and personal preferences. The magnitude of travel and potential impact to roadways in neighboring counties would not occur due to an oversupply of employment or an increase in the oversupply of housing in the Planning Area because the proposed project would provide a greater balance of housing (employees who live in the Planning Area) and jobs. By providing a greater balance, the proposed project would generally result in a less than significant impact on roadways within neighboring counties. However, since the traffic volumes are assumed to increase along SR 99 and SR 41, it is reasonable to assume that there would be increases in traffic volumes outside of the County of Fresno. The specific increases in traffic volumes beyond the County of Fresno boundary (i.e., in areas adjacent to SR 99 and SR 41) resulting from buildout of the Planning Area is speculative because future growth within areas outside of the County of Fresno is dependent on land use development approvals of other jurisdictions and timing of future development. Therefore, the project's impact on other surrounding counties is considered speculative.

Cumulative Impact Analysis

Cumulative impacts identified due to increases in peak hour traffic volumes are based on build-out of the City of Fresno General Plan Update along with cumulative development in the remainder of Fresno County. Along with build-out of planned population and employment, the analysis assumes the transportation system displayed in See Appendix H-6 and H-7. Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the adopted level of service thresholds in the City of Fresno, unincorporated Fresno County, City of Clovis, and to Caltrans facilities. This is a significant impact.

City of Fresno

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the City of Fresno 2025 General Plan LOS under cumulative conditions.

Policy E-1-f of the City of Fresno 2025 General Plan establishes a LOS D threshold for major roadways. Based on the LOS identified in Exhibit 5.14-7 and 5.14-8 (See Appendix H-10 and H-11, respectively, for detail), the following roadways are anticipated to operate at a lower level of service than LOS D in the City of Fresno planning area during the AM and PM peak hours assuming build-out of the City of Fresno General Plan Update under cumulative conditions. These roadways are summarized for each of the four traffic impact zones (TIZ) shown on Exhibits 5.14-7 and 5.14-8.

TIZ I

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ I, which includes the Downtown Planning Area.

TIZ I – LOS F		
B Street	Thorne Avenue to Fruit Avenue	- LOS E during the PM peak hour
Belmont Avenue	North Parkway Drive to North Pacific Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Pacific Avenue to Fruit Avenue	- LOS F during the PM peak hour
	Fruit Avenue to Golden State Boulevard	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Abby Street to Fresno Avenue	- LOS E during the PM peak hour
	Fresno Avenue to First Street	- LOS F during the PM peak hour
	First Street to Bond Street	- LOS E during the PM peak hour
	Bond Street to Cedar Avenue	- LOS F during the PM peak hour

TIZ I – LOS F		
Church Street	Martin Luther King Jr. Boulevard to Clara Avenue	- LOS E during the PM peak hour
Stanislaus Street	B Street to SR 99 SB Ramps	- LOS E during the PM peak hour
Stanislaus Street	F Street to Broadway Street	- LOS E during the AM and PM peak hours

As summarized above, eleven roadway segments in TIZ I will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update, which is presented below, would allow LOS F in TIZ I.

MT-2-i: Transportation Impact Studies. Require a Transportation Impact Study (currently named *Traffic Impact Study*) to assess the impacts of new development projects on existing and planned streets for projects meeting one or more of the following criteria, unless it is determined by the City Traffic Engineer that the project site and surrounding area already has appropriate multi-modal infrastructure improvements.

- When a project includes a General Plan amendment that changes the General Plan Land Use Designation.
- When the project will substantially change the off-site transportation system (auto, transit, bike or pedestrian) or connection to the system, as determined by the City Traffic Engineer.
- Transportation impact criteria are tiered based on a project's location within the City's Sphere of Influence. This is to assist with areas being incentivized for development. The four zones, as defined on Figure MT-4, are listed below. The following criteria apply, except for roadway segments identified in the traffic evaluation for the MEIR with LOS F for TIZ-II or LOS E or F for TIZ-III:
  - Traffic Impact Zone I (TIZ-I): TIZ-I represents the Downtown Planning Area. Maintain a peak hour LOS standard of F or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.
  - Traffic Impact Zone II (TIZ-II): TIZ-II generally represents areas of the City currently built up and wanting to encourage infill development. Maintain a peak hour LOS standard of E or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.
  - Traffic Impact Zone III (TIZ-III): TIZ-III generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012. Maintain a peak hour LOS standard of D or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 100 or more peak hour new vehicle trips.

- Traffic Impact Zone IV (TIZ-IV): TIZ-IV represents the southern employment areas within and planned by the City. Maintain a peak hour LOS standard of E or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ I would be less than significant.

TIZ II

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ II, which generally represents areas of the City currently built up and wanting to encourage infill development.

TIZ II – LOS E		
Abby Street	Olive Avenue to Hedges Avenue	- LOS E during the PM peak hour
Ashlan Avenue	Golden State Boulevard to Marty Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Fruit Avenue to Palm Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Palm to Maroa Avenue	- LOS F during the PM peak hour
Barstow Avenue	Marks Avenue to Van Ness Boulevard	- LOS E during the PM peak hour
	Van Ness Boulevard to West Avenue	- LOS F during the PM peak hour
	West Avenue to Fruit Avenue	- LOS E during the PM peak hour
	Fruit Avenue to Palm Avenue	- LOS F during the PM peak hour

TIZ II – LOS E		
Belmont Avenue	Weber Avenue to Palm Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Palm Avenue to Roosevelt Avenue	- LOS F during the PM peak hour
	Roosevelt Avenue to Broadway Street	- LOS E during the PM peak hour
Clovis Avenue	SR 180 EB Ramps to Belmont Avenue	- LOS E during the PM peak hour
Dakota Avenue	Maroa Avenue to Del Mar Avenue	- LOS F during the PM peak hour
	Del Mar Avenue to Blackstone Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Diana Street to Fresno Street	- LOS E during the PM peak hour
	Angus Street to First Street	- LOS F during the PM peak hour
	9th Street to Cedar Avenue	- LOS E during the PM peak hour
	Barton Avenue to Maple Avenue	- LOS E during the PM peak hour
Fowler Avenue	Kings Canyon Drive to Hamilton Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
Fresno Street	Palo Alto Avenue to Sierra Avenue	- LOS E during the PM peak hour
Fruit Avenue	Weldon Avenue to Floradora Avenue	- LOS E during the PM peak hour
	Floradora Avenue to Olive Avenue	- LOS E during the AM and PM Peak hours
	Olive Avenue to Dennett Avenue	- LOS E during the PM peak hour
Gettysburg Avenue	First Street to Maple Avenue	- LOS E during the PM peak hour
	Maple Avenue to Winery Avenue	- LOS F during the PM peak hour
Jensen Avenue	Martin Luther King Jr. Boulevard to Clara Avenue	- LOS E during the AM and PM peak hours

TIZ II – LOS E		
	Clara Avenue to Elm Avenue	- LOS E during the PM peak hour
	Pullman Street to Cedar Avenue	- LOS E during the PM peak hour
Maroa Avenue	Sample Avenue to Bullard Avenue	- LOS F during the PM peak hour
	Bullard Avenue to Browning Avenue	- LOS E during the PM peak hour
	Gettysburg Avenue to Holland Avenue	- LOS E during the PM peak hour
	Dakota Avenue to Fedora Avenue	- LOS F during the PM peak hour
Olive Avenue	Fulton Street to San Pablo Avenue	- LOS E during the PM peak hour
Sierra Avenue	Marks Avenue to West Avenue	- LOS E during the PM peak hour
	West Avenue to Thorne Avenue	- LOS F during the PM peak hour
	Thorne Avenue to Palm Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
Willow Avenue	Herndon Avenue to Escalon Avenue	- LOS E during the PM peak hour

As summarized above, twenty roadway segments in TIZ II will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E and LOS F on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ II.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ II would be less than significant.

TIZ III

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ III, which generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012.

TIZ III – LOS D		
Alluvial Avenue	Mansionette Drive to Pinedale Avenue	LOS E during the PM peak hour
	Pinedale Avenue to Chestnut Avenue	LOS F during the PM peak hour
	Chestnut Avenue to Willow Avenue	LOS E during the PM peak hour
Armstrong Avenue	McKinley Avenue to Olive Avenue	LOS E during the AM and PM peak hours
Ashlan Avenue	SR 99 SB Ramps to Golden State Boulevard	LOS F during the PM peak hour
Audubon Drive	Del Mar Avenue to Nees Avenue	LOS E during the AM peak hour and LOS F during the PM peak hour
Brawley Avenue	San Jose Avenue to Shaw Avenue	LOS F during the AM and PM peak hour
Church Avenue	Minnewawa Avenue to Clovis Avenue	LOS E during the PM peak hour
Clovis Avenue	Butler Avenue to California Avenue	LOS E during the PM peak hour
Cornelia Avenue	Ashlan Avenue to Griffith Way	LOS E during the AM peak hour and LOS F during the PM peak hour
	Griffith Way to Dakota Avenue	LOS E during the AM peak hour
	Dakota Avenue to Cortland Avenue	LOS E during the AM and PM peak hours
	Cortland Avenue to Clinton Avenue	LOS E during the AM peak hour and LOS F during the PM peak hour
Fowler Avenue	McKinley Avenue to Olive Avenue	LOS F during the AM and PM peak hours
Fresno Street	Herndon Avenue to Palo Alto Avenue	LOS F during the PM peak hour
Friant Road	SR 41 SB Off-Ramp to SR 41 NB Off-Ramp	LOS E during the PM peak hour
	SR 41 NB Off-Ramp to Audubon Drive	LOS E during the AM and PM peak hours
	Audubon Drive to Shepherd Avenue	LOS E during the PM peak hour
Herndon Avenue	First Street to Mill brook Avenue	LOS E during the PM peak hour
	Palm Avenue to Fruit Avenue	LOS F during the AM and PM peak hours

TIZ III – LOS D		
	Fruit Avenue to West Avenue	LOS E during the AM peak hour and LOS F during the PM peak hour
	Milburn Avenue to Polk Avenue	LOS E during the AM peak hour and LOS F during the PM peak hour
Jensen Avenue	Maple Avenue to Chestnut Avenue	LOS E during the AM peak hour
	Chestnut Avenue to Willow Avenue	LOS E during the AM and PM peak hours
	Willow Avenue to Helm Avenue	LOS E during the PM peak hour
	Peach Avenue to Armstrong Avenue	LOS E during the AM and PM peak hours
Kings Canyon Road	Fowler Avenue to Armstrong	LOS E during the PM peak hour
	East of Temperance Avenue	LOS F during the PM peak hour
Maroa Avenue	Gettysburg Avenue to Holland Avenue	LOS E during the PM peak hour
Marks Avenue	Whites Bridge Avenue to SR 180 EB Ramps	LOS E during the PM peak hour
Marty Avenue	San Jose Avenue to Shaw Avenue	LOS E during the PM peak hour
Nees Avenue	Blackstone Avenue to Fresno Street	LOS E during the PM peak hour
	Audubon Drive to Millbrook Avenue	LOS E during the PM peak hour
Palm Avenue	Alluvial Avenue to Locust Avenue	LOS F during the PM peak hour
Shaw Avenue	SR 99 NB Ramps to Cornelia Avenue	LOS E during the AM peak hour and LOS F during the PM peak hour
	Cornelia Avenue to Jennifer Avenue	LOS F during the PM peak hour
Temperance Avenue	Shields Avenue to McKinley Avenue	LOS E during the AM and PM peak hour
	Kings Canyon Road to SR 180 EB Ramps	LOS E during the AM peak hour and LOS F during the PM peak hour
	Butler Avenue to Lowe Avenue	LOS E during the AM and PM peak hours
Veterans Boulevard	Barstow Avenue to Bullard Avenue	LOS E during the AM and PM peak hours
Willow Avenue	Friant Road to Copper Avenue	LOS F during the AM and PM peak hours
	Decatur Avenue to Alluvial Avenue	LOS E during the PM peak hour
	Alluvial Avenue to Herndon Avenue	LOS E during the AM and PM peak hours

As summarized above, forty-three roadway segments in TIZ III will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS D, and LOS E and LOSF on the roadway segments identified above as operating at LOS E or LOS F with the implementation of the General Plan Update in TIZ III.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ III would be less than significant.

TIZ IV

The following roadway segments would exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan in TIZ IV, which represents the southern employment areas within and planned by the City.

TIZ IV – LOS E		
Jensen Avenue	Elm Avenue to SR 41 SB Ramps	- LOS E during the AM and PM peak hours
	SR 41 NB Ramps to Orange Avenue	- LOS E during the AM and PM peak hours

As summarized above, two roadway segments in TIZ IV will exceed the LOS D threshold established by Policy E-1 of the City of Fresno 2025 General Plan. However, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E, and LOS F on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ IV.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update, impacts to roadways within TIZ IV would be less than significant.

Fresno County

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the LOS thresholds of unincorporated Fresno County under cumulative conditions.

Impacts to roadways within Fresno County were analyzed based on the County's minimum LOS threshold established by the County of Fresno 2000 General Plan, which identifies the following Policy:

Policy TR-A.2: The County shall plan and design its roadway system in a manner that strives to meet Level of Service (LOS) D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county.

Based on Exhibit 5.14-7 and 5.14-8 (See Appendix H-10 and H-11, respectively, for detail), the following study roadway segments are anticipated to operate at a lower level of service than the established LOS thresholds in Fresno County during the AM and PM peak hours under cumulative conditions. These roadways are summarized for three of the four traffic impact zones (TIZ) shown on Exhibits 5.14-7 and 5.14-8.

TIZ II

The following roadway segments would exceed the LOS D threshold, established by Fresno County, in TIZ II, which generally represents areas of the City currently built up and wanting to encourage infill development.

TIZ II – Unincorporated Fresno County		
Ashlan Avenue	Fruit Avenue to Palm Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Palm to Maroa Avenue	- LOS F during the PM peak hour
Barstow Avenue	Marks Avenue to Van Ness Boulevard	- LOS E during the PM peak hour
	Van Ness Boulevard to West Avenue	- LOS F during the PM peak hour
	West Avenue to Fruit Avenue	- LOS E during the PM peak hour
	Fruit Avenue to Palm Avenue	- LOS F during the PM peak hour
Clovis Avenue	SR 180 EB Ramps to Belmont Avenue	- LOS E during the PM peak hour

TIZ II – Unincorporated Fresno County		
	Butler Avenue to California Avenue	- LOS E during the PM peak hour
Fowler Avenue	Kings Canyon Drive to Hamilton Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
Jensen Avenue	Martin Luther King Jr. Boulevard to Clara Avenue	- LOS E during the AM and PM peak hours
Maroa Avenue	Sample Avenue to Bullard Avenue	- LOS F during the PM peak hour
	Bullard Avenue to Browning Avenue	- LOS E during the PM peak hour
	Gettysburg Avenue to Holland Avenue	- LOS E during the PM peak hour
Sierra Avenue	Marks Avenue to West Avenue	- LOS E during the PM peak hour
	West Avenue to Thorne Avenue	- LOS F during the PM peak hour
	Thorne Avenue to Palm Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour

As summarized above, sixteen roadway segments in TIZ II will exceed the LOS D threshold established by Fresno County.

If incorporated, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E, and LOS F on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ II.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update (and if incorporated), impacts to roadways within TIZ II would be less than significant.

If not incorporated, the City of Fresno General Plan Update includes the following policy related to transportation funding and regional-level coordination:

Policy MT-2-j Funding for Multi-Modal Transportation Systems. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development of impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-l: Region-wide Transportation Impact Fees. Continue to support the implementation of a metropolitan-wide and region-wide transportation impact fees sufficient to cover the proportional share of a development's impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (e.g., Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development;
- Regional highways, streets, trails, public transportation, goods movement system components, consistent with the General Plan, necessary to mitigate those impacts and serve projected demand;
- Projected full lifetime costs of the regional transportation system components, including construction, operations, and maintenance; and
- Cost covered by established funding sources.

These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in Fresno County and could reduce these impacts, there is no guarantee that Fresno County will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

TIZ III

The following roadway segments would exceed the LOS D threshold, established by Fresno County, in TIZ III, which generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012.

TIZ III – Unincorporated Fresno County		
Alluvial Avenue	Pinedale Avenue to Chestnut Avenue	- LOS F during the PM peak hour

TIZ III – Unincorporated Fresno County		
	Chestnut Avenue to Willow Avenue	- LOS E during the PM peak hour
Armstrong Avenue	McKinley Avenue to Olive Avenue	- LOS E during the AM and PM peak hours
Cornelia Avenue	Ashlan Avenue to Griffith Way	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Griffith Way to Dakota Avenue	- LOS E during the AM peak hour
	Dakota Avenue to Cortland Avenue	- LOS E during the AM and PM peak hours
	Cortland Avenue to Clinton Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
Fowler Avenue	McKinley Avenue to Olive Avenue	- LOS F during the AM and PM peak hours
Jensen Avenue	Peach Avenue to Armstrong Avenue	- LOS E during the AM and PM peak hours
Kings Canyon Road	Fowler Avenue to Armstrong Avenue	- LOS E during the PM peak hour
	East of Temperance Avenue	- LOS F during the PM peak hour
Marks Avenue	Whites Bridge Avenue to SR 180 EB Ramps	- LOS E during the PM peak hour
Temperance Avenue	Shields Avenue to McKinley Avenue	- LOS E during the AM and PM peak hours
	Kings Canyon Road to SR 180 EB Ramps	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Butler Avenue to Lowe Avenue	- LOS E during the AM and PM peak hours

As summarized above, fifteen roadway segments in TIZ III will exceed the LOS D threshold established by Fresno County.

If incorporated, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS D, and LOS E and F on the roadway segments identified above as operating at LOS E and F with the implementation of the General Plan Update in TIZ III.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update (and if incorporated), impacts to roadways within TIZ III would be less than significant.

If not incorporated, the City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in Fresno County and could reduce these impacts, there is no guarantee that Fresno County will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

TIZ IV

The following roadway segments would exceed the LOS D threshold, established by Fresno County, in TIZ IV, which represents the southern employment areas within and planned by the City.

TIZ IV – Unincorporated Fresno County		
Jensen Avenue	Pullman Street to Cedar Avenue	- LOS E during the PM peak hour
	Maple Avenue to Chestnut Avenue	- LOS E during the AM peak hour
	Chestnut Avenue to Willow Avenue	- LOS E during the AM and PM peak hours
	Willow Avenue to Helm Avenue	- LOS E during the PM peak hour

As summarized above, four roadway segments in TIZ IV will exceed the LOS D threshold established by Fresno County.

If incorporated, Policy MT-2-i of the proposed City of Fresno General Plan Update would allow LOS E, and LOSF on the roadway segments identified above as operating at LOS F with the implementation of the General Plan Update in TIZ IV.

The General Plan Update accepts lower LOS values. This reflects a change in policy for the City of Fresno to acknowledge that transportation planning based solely on roadway LOS, which considers only driver comfort and convenience, is not desirable since it fails to acknowledge other users of the circulation system and other community values. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. In addition, roadway LOS is directly linked to roadway infrastructure costs. A higher LOS results in greater expenditure of infrastructure for wider roadways that do not necessarily serve all users of the circulation system and may compete with other policies of the General Plan Update.

With the General Plan Update (and if incorporated), impacts to roadways within TIZ IV would be less than significant.

If not incorporated, the City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure fair-share funding toward roadway impacts in Fresno County and could reduce these impacts, there is no guarantee that Fresno County will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

City of Clovis

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the LOS thresholds of the City of Clovis under cumulative conditions. Impacts to roadways within the City of Clovis were analyzed based on the City's minimum LOS threshold established by the City of Clovis 1993 General Plan, which identifies the following Policy:

Policy 1.3: Level of Service should meet the City standard on major streets and intersection within the Clovis Project Area.

Action 1.3.2: Designate Service Level "D" as defined in the Highway Capacity Manual as the minimum desirable service level at which freeways, expressways, arterial streets and collector streets should operate.

Based on Exhibit 5.14-7 and 5.14-8 (See Appendix H-10 and H-11, respectively, for detail), the following study roadway segment is anticipated to operate at a lower level of service than the

established LOS thresholds in Fresno County and the City of Clovis during the AM and PM peak hours under cumulative conditions:

City of Clovis		
Bullard Avenue	East of Willow Avenue	- LOS F during the AM and PM peak hours

The resulting LOS for each of the identified roadway segments is due to a combination of traffic volumes assuming build-out of the City of Fresno General Plan Update combined with existing traffic generated outside of the City. The City of Fresno General Plan Update includes the following policy related to transportation funding and regional-level coordination:

Policy MT-2-j Funding for Multi-Modal Transportation Systems. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development of impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-l: Region-wide Transportation Impact Fees. Continue to support the implementation of a metropolitan-wide and region-wide transportation impact fees sufficient to cover the proportional share of a development's impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (e.g., Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development;
- Regional highways, streets, trails, public transportation, goods movement system components, consistent with the General Plan, necessary to mitigate those impacts and serve projected demand;
- Projected full lifetime costs of the regional transportation system components, including construction, operations, and maintenance; and
- Cost covered by established funding sources.

These policies are crafted so that new city development pays the proportional share of the developments impacts.

The City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to

ensure fair-share funding toward roadway impacts in the City of Clovis and could reduce these impacts, there is no guarantee that the City of Clovis will agree to new funding mechanisms or construct roadway capacity expansion projects to reduce the identified impacts if desired. Therefore, this would remain significant and unavoidable.

Caltrans

Build-out of the City of Fresno General Plan Update would add vehicle trips to roadways that would result in operations below the LOS thresholds for Caltrans facilities under cumulative conditions.

According to the Guide for the Preparation of Traffic Impact Studies (Caltrans 2002), if an existing State highway facility operates at less than the appropriate target LOS, then the existing measure of effectiveness should be maintained.

In coordination with the Guide for the Preparation of Traffic Impact Studies, the proposed project would cause a significant impact if it results in one or more of the following:

Causes a facility operating at an acceptable LOS to operate at an unacceptable LOS (i.e., LOS E or F)
Results in an increase of the applicable measure of effectiveness (i.e., v/c ratio or service volume) on a freeway facility that currently or will (under cumulative no project conditions) operate at an unacceptable LOS (LOS E or F)

Based on Exhibit 5.14-7 and 5.14-8 (See Appendix H-10 and H-11, respectively, for detail), the following roadways are anticipated to operate at a lower level of service than LOS D in the City of Fresno planning area during the AM and PM peak hour assuming build-out of the City of Fresno General Plan Update under cumulative conditions.

SR 99		
Southbound	Shaw Avenue to Ashlan Avenue	- LOS E during the AM and PM peak hours
	Clinton Avenue to McKinley Avenue	- LOS F during the AM and PM peak hours
	McKinley Avenue to Olive Avenue	- LOS F during the AM and PM peak hours
	Olive Avenue to Belmont Avenue	- LOS E during the PM peak hour
	SR 180 to Stanislaus Avenue	- LOS F during the PM peak hour
	Fresno Street to Ventura Avenue	- LOS F during the PM peak hour
	Jensen Avenue to North Avenue	- LOS E during the AM peak hour

Northbound	Herndon Avenue to Veterans Boulevard	- LOS E during the PM peak hour
	Veterans Boulevard to Shaw Avenue	- LOS E during the PM peak hour
	Shaw Avenue to Ashlan Avenue	- LOS E during the PM peak hour
	Olive Avenue to Belmont Avenue	- LOS E during the PM peak hour
	Belmont Avenue to SR 180	- LOS E during the PM peak hour
	SR 180 to Stanislaus Avenue	- LOS F during the AM peak hour
	Fresno Street to Ventura Avenue	- LOS F during the AM peak hour
	Jensen Avenue to North Avenue	- LOS E during the AM and PM peak hours
SR 41		
Southbound	North of Friant Road	- LOS F during the AM and PM peak hours
	Herndon Avenue to Bullard Avenue	- LOS E during the AM and PM peak hours
	Bullard Avenue to Shaw Avenue	- LOS E during the AM and PM peak hours
	Shields Avenue to McKinley Avenue	- LOS E during the AM and PM peak hours
Northbound	North of Friant Road	- LOS F during the PM peak hour
	Bullard Avenue to Shaw Avenue	- LOS E during the AM and PM peak hours
	Shields Avenue to McKinley Avenue	- LOS E during the AM peak hour and LOS F during the PM peak hour
	SR 180 to Divisadero Street	- LOS E during AM peak hour and LOS F during the PM peak hour
	Divisadero Street to Van Ness Avenue	- LOS E during AM peak hour and LOS F during the PM peak hour
	Van Ness Avenue to SR 99	- LOS E during the AM and PM peak hours

SR 180		
Eastbound	Brawley Avenue to Marks Avenue	- LOS E during the AM peak hour
	Marks Avenue to SR 99	- LOS E during the AM peak hour
	SR 99 to Fulton Street	- LOS F during the AM peak hour and LOS E during the PM peak hour
	Fulton Street to Abby Street	- LOS E during the AM peak hour
	Fowler Avenue to Temperance Avenue	- LOS E during the PM peak hour
Westbound	Brawley Avenue to Marks Avenue	- LOS E during the PM peak hour
	Marks Avenue to SR 99	- LOS E during the PM peak hour
	Fulton Street to Abby Street	- LOS E during the AM peak hour and LOS F during the PM peak hour
	Chestnut Avenue to Peach Avenue	- LOS F during the AM and PM peak hours
	Peach Avenue to Clovis Avenue	- LOS F during the AM and PM peak hour
	Clovis Avenue to Fowler Avenue	- LOS F during the AM peak hour
	Fowler Avenue to Temperance Avenue	- LOS F during the AM peak hour and LOS E during the PM peak hour

The resulting LOS for each of the identified roadway segments is due to a combination of traffic volumes assuming build-out of the City of Fresno General Plan Update combined with existing traffic generated outside of the City. The City of Fresno General Plan Update includes the following policy related to transportation funding and regional-level coordination:

Policy MT-2-j Funding for Multi-Modal Transportation Systems. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development of impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-l: Region-wide Transportation Impact Fees. Continue to support the implementation of a metropolitan-wide and region-wide transportation impact fees sufficient to cover the proportional

share of a development's impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (e.g., Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development;
- Regional highways, streets, trails, public transportation, goods movement system components, consistent with the General Plan, necessary to mitigate those impacts and serve projected demand;
- Projected full lifetime costs of the regional transportation system components, including construction, operations, and maintenance;
- Cost covered by established funding sources.

These policies are crafted so that new City development pays the proportional share of the developments impacts.

The City of Fresno General Plan Update will accommodate planned population and employment growth without expanding its current SOI, accommodating 180,000 more people than the current General Plan in the same area. The intent is to accommodate anticipated growth though compact, walkable, infill, new complete neighborhoods, and mixed-use development through intensification of the downtown planning area, high capacity transit corridors, intensive urban activity centers, and multi-modal districts. This focus will locate population and employment closer to services. As discussed under Impact TRANS-1, increased development density and intensity is correlated with reduced vehicle trips. Mixing complementary uses in a neighborhood setting increase internal trip "capture," and different urban design approaches increase transportation connectivity and provide high-quality bicycle, pedestrian, and transit facilities by increasing the relative attractiveness of non-automobile modes of travel to promote travel mode shifts. The City of Fresno General Plan Update also provides a complete streets approach, which considers all modes of transportation, in the planning, design and implementation facilities to support planned population and employment growth. Even with this focus on more compact development and complete street concepts, vehicle travel as measured in terms of VMT is forecast to increase.

The phenomenon where additional capacity leads to additional demand for travel is known as "induced travel." Induced travel occurs when the cost of travel is reduced (i.e., travel time reduction due to additional capacity) causing an increase in demand (more travelers using the improved facility). The reduction in travel time causes various responses by travelers, including diversion from other routes, changes in destinations, changes in mode, departure time shifts, and possibly the creation of new trips altogether. Expansion of the regional freeway system, consistent with the 2011 RTP, will contribute to induced travel and therefore may compete with objectives of the City of Fresno General Plan update that foster more compact multi-modal development.

The City of Fresno General Plan Update includes Policy MT-2-j and MT-2-I (included above) related to transportation funding and regional-level coordination. These policies are crafted so that new City

development pays the proportional share of the developments impacts. These policies identify continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover the proportional share of the developments impacts and need for a comprehensive multi-modal transportation system that are not funded by other sources. While implementation of the policies included in the City of Fresno General Plan Update would work to ensure funding for new development's impacts to regional facilities that would contribute to planned expansion of the freeway system. However, improvements to the freeway system are for roadways under Caltrans' jurisdiction. Therefore, the City of Fresno does not have control over their timing or implementation, and this impact would remain significant and unavoidable.

Madera, Merced, San Benito, Kings, Tulare Counties

Cumulative development within Fresno County would increase vehicle travel compared to existing conditions. As noted earlier, this study uses the most recently adopted Fresno COG TDF model released in 2010, and calibrated and validated for the project study subarea. While this makes the TDF model the most valid and capable tool for forecasting future travel in Fresno County, the TDF model does not include roadway network and traffic analysis zone detail in Madera County, Merced County, San Benito County, Kings County, and Tulare County. Therefore, detailed roadway analysis was not conducted for these counties.

As outlined in Table 5.14-3, build-out of the City of Fresno General Plan Update would increase vehicle travel compared to existing conditions. Furthermore, Exhibit 5.14-7 and 5.14-8 in Appendix H-10 and H-11, respectively, show increased travel on SR 99 and SR 41 at the Fresno County/Madera County line under a cumulative development scenario.

The City of Fresno General Plan Update will accommodate planned population and employment growth without expanding its current SOI, accommodating 180,000 more people than the current General Plan in the same area. Based on U.S. Census Bureau data as provided in Section 5.12 of this Master EIR (Population and Housing), Fresno County supported approximately 1.28 employees per occupied housing unit. The Fresno General Plan Update is projected to maintain this employee to occupied housing unit ratio.

The intent is to accommodate anticipated growth though compact, walkable, infill, new complete neighborhoods, and mixed-use development through intensification of the downtown area, high capacity transit corridors, intensive urban activity centers, and multi-modal districts. This focus will locate population and employment closer to services. As discussed under Impact TRANS-1, increased development density and intensity is correlated with reduced vehicle trips. Mixing complementary uses in a neighborhood setting increases internal trip "capture," and different urban design approaches increase transportation connectivity and provide high-quality bicycle, pedestrian, and transit facilities by increasing the relative attractiveness of non-automobile modes of travel to promote travel mode shifts. The City of Fresno General Plan Update also provides a complete streets approach, which considers all modes of transportation, in the planning, design and implementation facilities to support planned population and employment growth. Even with this focus on more compact development and complete street concepts, vehicle travel, as measured in terms of VMT, is forecasted to increase.

The City of Fresno General Plan Update includes Policy MT-2-l that identifies continued support for the implementation of metropolitan-wide and region-wide transportation impact fees to cover fair share proportion of a developments' impacts to and need for a comprehensive multi-modal transportation system that is not funded by other sources.

Policy MT-2-l Region-wide Transportation Impact Fees. Continue to support the implementation of metropolitan-wide and region-wide transportation impact fees sufficient to cover the fair share proportion of a developments' impact to and need for a comprehensive multi-modal transportation system that is not funded by other sources. Work with the Council of Fresno County Governments, transportation agencies (Caltrans, Federal Transportation Agency) and other jurisdictions in the region to develop a method for determining:

- Regional transportation impacts of new development;
- Regional highways, streets, trails public transportation, goods movement system components necessary to mitigate those impacts and serve projected demands;
- Projected full lifetime costs of the regional transportation system components, including construction, operation, and maintenance; and
- Costs covered by established funding sources.

The City of Fresno General Plan Update includes a policy that would work to ensure funding for new development's impacts to regional facilities. Even with Policy MT-2-l, cumulative volumes along SR 99 and SR 41 are projected to substantially increase. Since the traffic volumes are projected to increase along SR 99 and SR 41, it is reasonable to assume that there would be increases in traffic volumes outside of the County of Fresno. The specific increases in cumulative traffic volumes beyond the County of Fresno boundary (i.e., in areas adjacent to SR 99 and SR 41) resulting from buildout of the Planning Area is speculative because future growth within areas outside of the County of Fresno is dependent on land use development approvals of other jurisdictions and timing of future development. There is not a regional integrated transportation model to understand specific future impacts on roadways within Fresno County and its surrounding counties. Therefore, the project's contribution to cumulative traffic impacts on other surrounding counties is considered speculative. Thus, the project's cumulative impact on facilities within neighboring counties is speculative.

Level of Significance After Mitigation

Project Specific

City of Fresno – Less than significant with the General Plan Update. No mitigation required.

Fresno County – Significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policy, Policy MT-2-j and MT-2-I.

City of Clovis – Significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policy, Policy MT-2-j and MT-2-I.

Caltrans – Significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policy, Policy MT-2-j and MT-2-I.

Madera, Merced, San Benito, Kings, Tulare Counties – Speculative. No mitigation required.

Cumulative

City of Fresno – Less than significant with the General Plan Update. No mitigation required.

Fresno County – Significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policy, Policy MT-2-j and MT-2-I.

City of Clovis – Significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policy, Policy MT-2-j and MT-2-I.

Caltrans – Significant and unavoidable. No feasible mitigation measures beyond implementation of General Plan Update Policy, Policy MT-2-j and MT-2-I.

Madera, Merced, San Benito, Kings, Tulare Counties – Speculative. No mitigation required.

Congestion Management Program

Impact TRANS-2	**The project would not conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.**

Policies or Ordinances Related to Congestion Management Programs

The passage of California Assembly Bill 2419 in 1996 allowed counties to "opt out" of the California Congestion Management Program, reference above, if a majority of local governments elected to exempt themselves from California's congestion management plans. On September 25, 1997, the Fresno COG Policy Board rescinded the Fresno County Congestion Management Program at the request of the local member agencies. Therefore, this impact criteria is not applicable and this impact is less than significant.

Air Traffic Patterns

Impact TRANS-3	**The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.**

Policies or Ordinances Related To Air Traffic Patterns

A review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or discrepancies with other adopted plans or programs supporting the provision of aviation facilities or services in the City of Fresno. In addition, demand for aviation facilities or services, which may increase with population and employment growth in the City of Fresno in not expected to result in a change to air traffic patterns, a change to the location of airports, or result in a substantial safety risks.

The City of Fresno General Plan Update includes the following objectives and policies to support civic and institutional land use compatibility, public safety, service expansion, and funding for capital improvements of Fresno Chandler Executive Airport and Fresno Yosemite International Airport. These policies encourage improvements to the airport facilities and air carrier and air cargo service.

Policy LU-8-a. Civic and Institutional Use Compatibility. Protect civic and institutional areas from incompatible uses that could affect their vitality and contributions to the City.

Objective MT-12. Operate the City's municipal airport facilities to meet present and anticipated demands in a manner that maintains compliance with federal regulations, enhances safety to the public, minimizes the adverse effects of aircraft operations on people, and promotes the economic health of the community.

Policy MT-12-a. Funding for Airport Capital Improvements. Pursue appropriate funding sources and capital improvement budget enhancements that will:

- Provide a modern, safe, and efficient municipal airport terminal facility including the Federal Inspection Station, and airfield.
- Maintain airfield compliance with FAA Part 139 operating requirements.
- Maintain financial self-sufficiency and long-term sustainability.
- Continue to implement the master plans for FYI Airport and Fresno Chandler Executive Airport to meet projected air passenger travel, air cargo transportation and general aviation demands.

Policy MT-12-b. Airport Ground Movement Improvements. Obtain and install a FAA-approved Surface Movement Guidance and Control System to allow for ground movement on the airfield in lower visibility conditions.

Policy MT-12-c. Airport Management and Viability. Pursue management policies to keep Fresno Yosemite International Airport and Fresno Chandler Executive Airport self-sustaining and financially viable in compliance with FAA grant assurances.

- Implement aircraft rescue and firefighting transition plan.
- Implement the policy transition plan.
- Seek alternate ways to improve the financial viability of the airports.
- Seek non-reimbursable Port of Entry status with the United States Department of Homeland Security.

Policy MT-13-c. Expanding Service. Continually solicit new airlines and seek expanded service from incumbent air carriers for both domestic and international flights. Provide incentives as market conditions dictate.

As a result, implementation of the City of Fresno General Plan Update would result in a less-than-significant impact related to aviation policy conflicts and would not result in substantial safety risks.

Hazards

Impact TRANS-4	**The project would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).**

Policies or Ordinances Related to Hazards

A review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or discrepancies related to hazards associated with design features and incompatible uses. Implementation of the City of Fresno General Plan Update would increase the amount of vehicle traffic, which would require the improvement and expansion of the City of Fresno's roadway system. The proposed General Plan update identifies a roadway system, bikeway and trail connections, and transit system that will be constructed to facilitate transportation in the City. However, new transportation facilities will be designed according to applicable federal, state, and local design appropriate standards, which will minimize traffic hazards.

The City of Fresno General Plan Update includes the following objectives and policies related to the implementation of the land use and transportation system. These policies are related to the implementation of complete streets, the design of transportation facilities consistent with community character, and design of facilities to support economic development, including railroad, truck route design and safety.

Policy MT-1-h. Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specifications reflect the Complete Streets concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.

Policy MT-1-j. Prioritize transportation improvements that are consistent with the character of surrounding neighborhoods and supportive of safe, functional and Complete Neighborhoods; minimize negative impacts upon sensitive land uses such as residences, hospitals, schools, natural habitats, open space areas, and historic and cultural resources. Design improvement to:

- Facilitate provision of multi-modal transportation opportunities;
- Provide added safety, including appropriate traffic calming measures;
- Promote achievement of air quality standards;
- Provide capacity in a cost effective manner; and
- Create improved and equitable access with increased efficiency and connectivity.

Policy MT-5-d. Minimize vehicular and pedestrian conflicts on both major and non-roadways through implementation of traffic access design and control standards addressing street

intersections, median island openings and access driveways to facilitate accessibility while reducing congestion and increasing safety. Increase safety and accessibility for pedestrians with vision disabilities through the installation of Accessible Pedestrian Signals at signalized intersections.

Objective MT-11. Achieve necessary capacity increasing and inter-modal connectivity enhancing improvements to the goods movement transportation system to support the growth in critical farm product and value added industries.

Policy MT-11-b. Continue to participate in and advocate for collaborative efforts to improve railroad transportation facilities and reduce conflicts with the street system, including relocation and/or consolidation of the BNSF and UP mainline railroad track facilities.

Policy MT-11-d. Appropriate Truck Route Roadway Design. Incorporate provisions for trucks in design of routes designated for truck movement. Ensure that truck routes meet federal standards for intersections, pavement, and turning movements.

Policy MT-11-e. Railroad Crossing Improvements. Continue to improve and maintain the condition and safety of existing railroad crossings by upgrading surface conditions and installing signs and signals where warranted.

Implementation of the City of Fresno General Plan Update would increase the amount of vehicle traffic, which will require improvement and expansion of the City's transportation system. However, new and upgraded roadways will be designed according to applicable federal, state, and local design standards. In addition, the selected policy outlined above from the City of Fresno General Plan Update support development of the transportation system based on complete street concepts that accommodate mobility of all system users and trip purposes. As a result, implementation of the City of Fresno General Plan Update would result in a less-than-significant impact related to hazards due to roadway design features or incompatible uses.

Emergency Access

Impact TRANS-5 The project would not result in inadequate emergency access

Policies or Ordinances Related to Emergency Access

A review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or discrepancies related to emergency access. Implementation of the City of Fresno General Plan Update would increase the amount of vehicle traffic, which would require the improvement and expansion of the City of Fresno's roadway system, consistent with functional classifications exhibit provided in Appendix H-12, to accommodate forecasts travel demand as well as maintaining acceptable traffic operations (LOS) in the City (see Impact Trans-1). An enhanced roadway network that accommodates forecasted travel demand would also provide adequate emergency access. In addition, the City of Fresno General Plan Update will accommodate planned population and employment growth without expanding its current SOI. This will be achieved through intensification of the downtown planning area, high capacity transit corridors, intensive urban activity centers, and multi-modal districts, which will help to locate population and

employment closer to services, serving to minimize the need to expand emergency response service areas (i.e., compared to conditions with an expanding SOI).

The City of Fresno General Plan Update includes the following objectives and policies that will support its implementation and provide adequate emergency access.

Policy LU-1-a. Promote Development within the Existing City Limits as of December 31, 2012. Promote new development, infill, and rehabilitation of existing building stock in Downtown Planning Area, along BRT corridors, in established neighborhoods generally south of Herndon Avenue, and on other infill sites and vacant land within the City.

Policy LU-1-c. Provision of Public Facilities and Services. Promote orderly land use development in pace with public facilities and services needed to serve development.

Policy LU-1-g. SOI Expansion. Maintain the City's current SOI boundaries without additional expansion, except to allow for the siting of a maintenance yard for the California High Speed Train project and related industrial and employment priority areas proximate to and south of the SOI boundary between State Route 41 and State Route 99. Prohibit residential uses in the expansion area.

Objective MT-1. Create and maintain a transportation system that is safe, efficient, provides access in an equitable manner, and optimizes travel by all modes.

Policy MT-1-k. Multi-Modal Level of Service Standards. Develop and use a tiered system of flexible, multi-modal Level of Service standards for streets designated by the Circulation Diagram (Figure MT-1). Strive to accommodate a peak hour vehicle LOS of D or better on street segments and at intersections, except where Policies MT-1-m through MT-1-p provide greater specificity. Establish minimum acceptable service levels for other modes and use them in the development and environmental review process.

Objective MT-2. Make efficient use of the City's existing and proposed transportation system and strive to ensure the planning and provision of adequate resources to operate and maintain it.

Policy MT-2-f. Optimization of Roadway Operations. Optimize roadway operations by continuing to expand the use of techniques such as the City's intelligent transportation system (ITS) to manage traffic signal timing coordination in order to improve traffic operations and increase traffic-carrying capacity, while reducing unnecessary congestion and decreasing air pollution emissions.

Policy MT-2-j. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such measures as development impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-6-n. Emergency Vehicle Access along Paths and Trails. Provide points of emergency vehicle access within the path and trail corridors, via parking areas, service roads, emergency access gates in fencing, and firebreaks.

As a result of the City of Fresno General Plan Update policy, implementation of the General Plan would result in a less-than-significant impact related to emergency access.

Conflict with Alternative Transportation

Impact TRANS-6	**The project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.**

Project Specific Impact Analysis

A review of the City of Fresno General Plan Update revealed no potential internal policy inconsistencies or conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities or the performance or safety of those facilities. Implementation of the City of Fresno General Plan Update would increase demand for public transit, bicycle, and pedestrian facilities, which would require the improvement and expansion.

The City of Fresno General Plan Update will accommodate planned population and employment growth without expanding its current SOI, accommodating 180,000 more people than the current General Plan in the same area. The intent is to accommodate anticipated growth through compact, walkable, infill, new complete neighborhoods, and mixed-use development through intensification of the downtown planning area, high capacity transit corridors, intensive urban activity centers, and multi-modal districts. This focus will locate population and employment closer to services. As discussed under Impact TRANS-1, increased development density and intensity is correlated with reduced vehicle trips. Mixing complementary uses in a neighborhood setting increases internal trip "capture," and different urban design approaches increase transportation connectivity and provide high-quality bicycle, pedestrian, and transit facilities by increasing the relative attractiveness of non-automobile modes of travel to promote travel mode shifts. The City of Fresno General Plan Update also provides a complete streets approach, which considers all modes of transportation, in the planning, design and implementation of facilities to support planned population and employment growth.

The City of Fresno General Plan Update includes the following objectives and policies that address public transit, bicycle, and pedestrian facilities.

Policy LU-1-a. Promote Development within the Existing City Limits as of December 31, 2012. Promote new development, infill, and rehabilitation of existing building stock in Downtown Planning Area, along BRT corridors, in established neighborhoods generally south of Herndon Avenue, and on other infill sites and vacant land within the City.

Policy LU-1-c. Provision of Public Facilities and Services. Promote orderly land use development in pace with public facilities and services needed to serve development.

Objective MT-1. Create and maintain a transportation system that is safe, efficient, provides access in an equitable manner, and optimizes travel by all modes.

Policy MT-1-g. "Complete Streets" Concept Implementation. Provide transportation facilities based upon a Complete Streets concept that facilitates the balanced use of all viable travel modes (pedestrians, bicyclists, motorists, and transit users), meeting the transportation needs of all ages and abilities and providing mobility for a variety of trip purposes, while also supporting other City goals. Implementation actions will include:

- Meeting the needs of all users within the street system as a whole; each individual street does not need to provide all modes of travel, but travel by all modes must be accommodated throughout the Planning Area;
- Continuing to adopt refined street cross-section standards as appropriate in response to needs identified;
- Encourage conversion of one-way streets to two-way streets to improve location circulation, access, and safety;
- Considering the impact of streets on public health by addressing storm water runoff quality, air quality, and water conservation among other factors; and
- Adhering to the water efficient landscape standards adopted by the City for median and streetscape plantings and irrigation methods.

Policy MT-1-h. Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specifications reflect the Complete Streets concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.

Policy MT-1-k. Multi-Modal Level of Service Standards. Develop and use a tiered system of flexible, multi-modal Level of Service standards for streets designated by the Circulation Diagram (Figure MT-1). Strive to accommodate a peak hour vehicle LOS of D or better on street segments and at intersections, except where Policies MT-1-m through MT-1-p provide greater specificity. Establish minimum acceptable service levels for other modes and use them in the development and environmental review process.

Policy MT-1-o. LOS Deviations Outside of Activity Centers and Areas Designated for Mixed-Use. Accept vehicle LOS E or F conditions outside of identified multi-modal districts only if provisions commensurate with the level of impact and approved by the City Traffic Engineer are made to sufficiently improve the overall transportation system and/or promote non-vehicular transportation as part of a development project or City-initiated project.

Policy MT-2-j. Funding for Multi-Modal Transportation system. Continue to seek and secure adequate financing to construct and maintain a complete multi-modal system through such

measures as development impact fees, local sales tax measures, special tax measures, assessment/improvement districts, and regional, state and federal transportation funds and grants.

Policy MT-2-k. Funding of Complete Streets Retrofits. Continue to participate in a comprehensive analysis of transportation needs and the funding of transportation improvements, including State and federal grant funding to support Complete Street retrofit improvements, within the Fresno-Clovis Metropolitan Area.

Objective MT-4. Establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.

Policy MT-4-a. Bicycle, Pedestrian and Trails Master Plan. To the extent consistent with this General Plan, continue to implement and periodically update the Bicycle, Pedestrian, and Trails Master Plan to meet State standards and requirements for recommended improvements and funding proposals as determined appropriate and feasible.

Policy MT-4-i. Bicycling and Public Transportation. Promote the integration of bicycling with other forms of transportation, including public transit. Continue to provide bike racks or space for bicycles on FAX buses.

Objective MT-5. Establish a well-integrated network of pedestrian facilities to accommodate safe, convenient, practical, and inviting travel by walking, including for those with physical mobility and vision impairments.

Policy MT-5-f. Modifications to Street Standards. Continue to evaluate and adopt modifications to City street standards to achieve overall objectives of providing good access and travel opportunities while calming traffic, promoting pedestrian and other transportation options, and reducing the amount of land devoted to streets.

Objective MT-6. Establish a network of multi-purpose pedestrian and bicycle paths, as well as limited access trails, to link residential areas to local and regional open spaces and recreation areas and urban Activity Centers in order to enhance Fresno's recreational amenities and alternative transportation options.

Policy MT-6-b. Multi-Agency Planning for Paths and Trail System. Continue to participate in multi-agency planning and implementation partnerships for the coordinated development of the Fresno-Clovis Metropolitan Area planned path and trail system and with Madera County for the San Joaquin River Parkway trail system.

Policy MT-6-f. Path and Trail Designation Process. Develop a network of multi-purpose path and trail corridors by using the Official Plan Line process or other processes as provided by the Development Code to obtain appropriate linear rights-of-way along riparian corridors, drainage and irrigation easements, utility easements, abandoned railroad rights of way, and major street corridors.

Objective MT-7. Pursue a variety of funding sources to maximize implementation and development of the City's path and trail system.

Objective MT-8. Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize environmental impacts.

Policy MT-8-e. Regional Coordination. Continue to work with local and regional governmental institutions to promote efficient transportation policies and coordinated programs.

Objective MT-9. Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, frequent, reliable, cost- effective, and financially feasible.

Policy MT-9-b. Transit Service Productivity Evaluation. Continue evaluation of transit service productivity and cost efficiency indicators, through a Short-Range Transit Plan established in accordance with mandated federal transportation requirements, and make necessary and appropriate service adjustments when operationally and financially feasible.

Policy MT-9-c. Addressing Unmet Transit Needs. Continue to participate in the Council of Fresno County Governments' annual unmet transit needs evaluation process, particularly with respect to identifying need for access to medical and educational services; perform market analysis to identify potential transit choice riders; and pursue public education and information programs to identify changes in demand characteristics and opportunities to increase ridership.

As a result of the City of Fresno General Plan Update policy, implementation of the General Plan would result in a less-than-significant impact related to adopted policies, plans, or programs regarding public transit, bicycle, and pedestrian facilities.

5.15 - Utilities and Service Systems

5.15.1 - Introduction

This section addresses the existing conditions related to utilities and service systems. The topics of water, wastewater, drainage/flood control, solid/hazardous waste are discussed in detail in this section. Primary information for the utilities and services systems was obtained from various sources. Wastewater information was obtained from the 2006 Wastewater Master Plan prepared by Brown and Caldwell in 2006 and the Wastewater Technical Report prepared for the General Plan Update by Blair, Church & Flynn in 2013 (see Appendix J-1). Water facility information was obtained from the 2012 City of Fresno Metropolitan Water Resources Management Plan prepared by West Yost Associates in 2011. Water supply information was obtained from both the 2008 Urban Water Management Plan prepared by West Yost Associates in 2008 as well as the 2010 Urban Water Management Plan prepared by West Yost Associates in 2012. Storm drainage information was obtained from the 2004 District (Fresno Metropolitan Flood Control District) Services Plan Master EIR prepared by EIP Associates in 2006 (Draft MEIR) and 2007 (Final MEIR) and the Storm Drainage Technical Report prepared for the General Plan Update by Blair, Church & Flynn in 2013 (see Appendix G-1).

5.15.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding utilities and service systems is the City of Fresno Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of utilities and service systems cumulative impacts varies depending on the utility and service system being analyzed as described below:

Stormwater Drainage - The study area for cumulative impacts regarding stormwater drainage is the Fresno-Clovis Metropolitan Area because the Fresno Metropolitan Flood Control District (District) includes an area of approximately 400 square miles and covers almost the entire portion of the Fresno-Clovis Metropolitan Area.

Water Supply - The study area for cumulative impacts regarding water supply is the City of Fresno Planning Area and the groundwater basins from which the Planning Area derives water.

Wastewater - The study area for cumulative impacts regarding wastewater is the City of Fresno Planning Area and the City of Clovis because the City of Fresno acts as the Regional Sewering Agency and is responsible for operating the Fresno/Clovis Regional Wastewater Reclamation Facility.

Solid Waste - The study area for cumulative impacts regarding solid waste is the entire County of Fresno because waste from throughout the County could be accommodated at primarily three landfills within the County including the American Avenue Landfill in Kerman, Clovis Landfill in Clovis, and the Coalinga Landfill in Coalinga.

Water Supply

The water supply section discusses the existing condition of the City's water supply and treatment and distribution systems.

Key planning documents for City of Fresno water resources include the 2012 Fresno Metropolitan Water Resources Management Plan (2012 Metro Plan) and the 2010 Urban Water Management Plan (UWMP).

The City of Fresno Department of Public Utilities (DPU) provides potable water to the majority of the City, and some users within the portion of the Planning Area outside of the City limits. Fresno's primary source of potable water is groundwater stored in an aquifer. However, in 2004 the City's first surface water treatment facility (Northeast Surface Water Treatment Facility [NESWTF]) came on line and began delivering approximately 4,060 acre-feet in 2004 to residents in northeast Fresno. By 2010, the NESWTF delivered approximately 18,474 acre-feet of treated surface water (2010 Urban Water Management Plan, 2012).

The 2010 UWMP was adopted by the City Council in November 2012. It describes the current and planned water conservation programs, provides a water shortage contingency plan should it need to be implemented in the event of a severe water shortage or water supply emergency and a future water supply plan for a variety of water sources including treated surface water, groundwater and recycled water. Also included in this 2010 UWMP is an aggressive water conservation plan to reduce demand throughout the City's service area. The 2010 UWMP is in accordance with the Urban Water Management Planning Act that stipulates that every urban water supplier in California supplying water directly or indirectly to 3,000 or more customers or supplying more than 3,000 AF of water annually shall adopt and submit an Urban Water Management Plan to the California Department of Water Resources. Failure to submit a plan, as required, could result in ineligibility to receive certain grants or receive drought assistance from the State.

Groundwater Supply

The City lies within the Kings Sub-basin, which is part of the larger San Joaquin Valley Groundwater Basin, and extracts a majority of water to meet its demands from this underground aquifer. Historically, the groundwater levels in the Fresno area have declined by an average of 1.5 feet per year since 1990 (Urban Water Management Plan, 2008). In the past 80 years, the water level has decreased from 30 feet below ground surface to more than 128 feet below ground surface, according to 2009 data provided by the City. According to Figures 4.4 and 4.5 provided in the previous Urban Water Management Plan adopted in 2008, there was a cone of depression from Herndon Avenue in the north to Jensen Avenue in the south and from Maple Avenue to Brawley Avenue in the east-west direction in both the lower and upper aquifer zones. A groundwater mound is located near the Fresno-Clovis Regional Wastewater Reclamation Facility (Regional Facility) as a result of the disposal of treated effluent at the Regional Facility percolation basins.

Groundwater used by the City to meet its demands is replenished by three different methods:

- Natural recharge
- Subsurface inflow
- Intentional recharge

Natural recharge occurs through rainfall, irrigation, canal and stream flows that seep into the soil and replenish the aquifer below. Based on City data, the natural recharge was approximately 24,400 AF in 2010. According to the Metropolitan Water Resources Management Plan (Metro Plan Update) prepared in 2011, the average annual natural recharge is 37,000 AF within the Planning Area. As additional development occurs throughout the Planning Area, there will be less pervious surfaces to allow natural recharge to occur. However, as the City annexes portions of the Planning Area, the amount of natural recharge allocated to the City will increase. At buildout, the natural recharge is estimated to be approximately 27,000 AFY.

Subsurface recharge occurs from the movement of groundwater from external sources such as the Sierra Nevada moving into the local aquifer. Since the groundwater table surrounding the City's Planning Area is higher than inside the Planning Area, subsurface water tends to flow from surrounding areas with a higher groundwater table into the aquifer within the Planning Area that has a lower groundwater table. Based on City data, the annual subsurface inflow to the City is approximately 22,500 AF in 2010. By the year 2025, the City anticipates that groundwater operations (i.e., subsurface inflows and outflows) would be balanced and subsurface flows will not be directed to the Planning Area. Therefore, during and after the year 2025, subsurface water flows will not be a water supply source for the City.

Intentional recharge is provided by directing surface water into the underground aquifer by means of groundwater recharge basins located throughout the Planning Area. Currently, the City's primary recharge facility is Leaky Acres, located just northwest of Fresno-Yosemite International Airport. Other recharge facilities include Fresno Metropolitan Flood Control District (FMFCD) storm drainage basins and the Alluvial Groundwater Recharge System (AGRS) owned and operated by the City of Clovis. Based on the 2008 UWMP, the average intentional recharge between 1985 and 2007 was approximately 44,200 AF/year. The maximum intentional recharge was approximately 62,000 AF/year in 2003. Based on information provided by City staff, the intentional recharge quantity in 2009 was approximately 54,600 AF and in 2010, the intentional recharge was approximately 53,100 AF.

Based on the natural groundwater recharge (24,400 AF), subsurface inflow (22,500 AF), and intentional recharge (53,100 AF) that occurred in 2010, the total groundwater recharge during normal year supply is approximately 100,000 AF. At buildout, the City anticipates that the natural groundwater recharge will increase to 27,000 AFY, subsurface inflow will be 0 AFY, and intentional groundwater recharge will increase to 75,100 AFY due to an increase in the capacity of surface water treatment. The total groundwater recharge at buildout will be approximately 102,100 AFY.

The City currently has approximately 272 active wells that pump an average of 146 million gallons of water per day (MGD) (approximately 448 acre-feet per day). Groundwater pumping data provided by the City indicates that approximately 128,578 AF was pumped in 2010. Between 2006 and 2010, the City pumped an average of approximately 139,207 AFY. This average groundwater pumping has exceeded the current estimated groundwater safe yield of approximately 100,000 AFY.

In 2004, the NESWTF located at Chestnut and Behymer Avenues began operation. The NESWTF has reduced the dependence on groundwater pumping by the City that was needed to meet water demand. Prior to NESWTF operation, 100 percent of the City's water demand was met through groundwater pumping. The addition of the NESWTF has reduced the percentage of total water demand provided by groundwater from 100 percent prior to 2004 to approximately 87 percent in 2010.

In the near future, groundwater will continue to be an important part of the City's supply but is not planned to be relied upon as heavily as has historically been the case. The 2010 UWMP projects that groundwater pumped by the City will decrease from approximately 128,578 AF/year in 2010 to approximately 85,000 AF/year buildout of the General Plan Update. This would represent a decrease in the groundwater percentage of total water supply from 87 percent to 36 percent. This reduction in groundwater pumping will recharge the aquifer by approximately 15,000 acre-feet per year because the safe yield is approximately 100,000 acre-feet per year. In order to meet the projected decrease, the City is planning to rely on expanding their delivery and treatment of surface water supplies and groundwater recharge activities.

Surface Water Supply

The City entered into a contract with the Fresno Irrigation District (FID) in 1976 that granted to the City a percentage share of FID's water entitlements from the Kings River. The contract pertained only to natural flows in the Kings River. It excluded Class 2 entitlement water provided to FID by the United States Bureau of Reclamation (USBR) and any water stored in Pine Flat Reservoir. The percentage share of water available to the City is based on the ratio of the total area annexed by the City to the total area within the FID water service area. Therefore, water available to the City will increase over time as the City annexes additional lands within the FID service area.

The percent allocation of FID's rights to normal year natural flows in the Kings River to the City of Fresno was 23.6 percent in 2005. The percent allocation of FID's rights to the natural flows in the Kings River to the City is projected to increase to approximately 32.4 percent by buildout of the General Plan Update. This represents an increase from 92,200 AF/year in 2005 to 126,500 AF/year at buildout of the General Plan Update during normal conditions.

In addition to the Kings River water contract with FID, the City has another agreement with FID to exchange treated wastewater effluent for additional river water from FID's water entitlement from the Kings River or their USBR Class 2 water from the San Joaquin River. In exchange for 30,000 AF/year of treated effluent, FID will provide the City with 13,800 AF/year (46 percent of the 30,000 AF/year). Information included in the 2010 UWMP indicates that the City is not currently using the effluent exchange surface water allocation from FID. For future water supply planning purposes, the

City can receive up to 13,800 AF/year of water from FID through the Wastewater Recycle Exchange water program.

The City also has a contract with the United States Bureau of Reclamation (USBR) for Class 1 water from the San Joaquin River water that runs through 2045. The City's entitlement is 58,200 AF/year of Class 1 water during normal years. This entitlement is in perpetuity.

Table 5.15-1 provides a summary of the existing surface water supply available to the City of Fresno during normal years.

Table 5.15-1
Available Surface Water Supplies to the City of Fresno during Normal Years

Source of Surface Water[1]	Quantity, Year 2010 acre-feet per year (Normal Year)[1]
Fresno Irrigation District – Kings River	97,900
U.S. Bureau of Reclamation – Central Valley Project	58,200
Wastewater Recycle Exchange with Fresno Irrigation District	13,800[2]
Total Available Surface Water Supplies	169,900

[1] Data obtained from the City of Fresno 2010 Urban Water Management Plan
[2] The City is not currently using the effluent exchange surface water allocation from the Fresno Irrigation District.
Source: FirstCarbon Solutions, 2014

Although 169,900 AFY would be available to the City of Fresno for normal year conditions, the actual surface water available for delivery was 193,916 AF (132,541 AF from FID and 61,375 AF from USBR). The City used only 18,474 AFY of the 193,916 AF of surface water that they received to meet the City's water demand. An additional 53,121 AF was used for intentional recharge. The remaining 122,321 AF of surface water was distributed to others.

Urban Water Demand

The average per capita water consumption since 1991 has been an average of approximately 295 gallons per capita per day (gpcd). The City implemented the installation of water meters on all residential connections. Residential water demand is projected to decrease by 10 percent as a result of increased customer water awareness due to meter installation.

The 2010 UWMP identifies the water demand within the City for 2010 as 132,347 AF with a per capita water use of 261 gpcd. In addition, the 2010 UWMP provides a water use by land use sector. Following is a break down for water consumed within the City: Single Family (74,403 AFY), Multi-Family (21,087 AFY), Commercial/ Institutional/Government (20,754 AFY), Industrial (6,660 AFY), Landscape (9,286 AFY), and Other –Miscellaneous (157 AFY).

Existing Water Distribution System

The City Water Division serves an area of more than 110 square miles. The City provides water to the Pinedale County Water District for use on approximately 20 parcels within the District's

boundary. The City Water Division does not supply water to three community water systems within the Planning Area. These water systems include the Bakman Water Company, the Park Van Ness Mutual Water Company, and California State University Fresno. In addition, there are private groundwater users in County islands located throughout the Planning Area.

The City of Fresno currently operates 272 groundwater wells located throughout the City. The total production capacity for the City of Fresno is 419 MGD (approximately 1,286 acre-feet per day), with an average flow rate of 146 MGD (approximately 448 acre-feet). The wells are connected to a transmission and distribution main system generally arranged in a half-mile grid configuration.

The NESWTF located in the northeast part of the City was completed in 2004 and supplements the groundwater supply. The capacity of the plant is 30 MGD, and treats surface water to drinking water standards. Surface water is supplied to the facility from the San Joaquin and Kings River via the FID Enterprise Canal.

The water distribution network is divided into four quasi-pressure zones that prevent water flowing freely from higher areas of the City to lower areas of the City. The zones are separated by valves that either impede flow or prevent it altogether.

The water system is currently monitored and controlled by a Supervisory Control and Data Acquisition (SCADA) system. The system controls on and off pressure settings for wells within each of the sub-areas within the water system.

The City's water distribution system includes approximately 1,780 miles of water system pipelines. The pipelines range in size from 4 inches to 48 inches and consist of materials such as asbestos-cement, cast iron, ductile iron, steel and polyvinyl chloride (PVC).

Three storage tanks are used within the City's water system. One is located at the NESWTF site and the other is near the intersection of Clovis Avenue and California Avenue in southeast Fresno. The NESWTF tank has a storage capacity of 1.5 million gallons (MG). The southeast Fresno tank has a storage capacity of 2 MG. The third storage tank is located at Dakota and Armstrong Avenues and has a storage capacity of 3 MG.

Three booster pump stations are part of the water distribution system that consists of Booster Pump 1, Booster Pump 2 and Booster Pump 4. These pump stations transfer water from the various pressure zones.

Wastewater

Wastewater Treatment and Disposal

The City of Fresno owns and operates two wastewater treatment facilities that serve the Fresno metropolitan area. They are the Fresno/Clovis Regional Wastewater Reclamation Facility (Regional Facility) and the North Fresno Wastewater Reclamation Facility (NFWRF).

Fresno/Clovis Regional Wastewater Reclamation Facility

The Regional Facility is located southwest of the City in the area generally bounded by Jensen, Cornelia, Central and Chateau Fresno Avenues. It provides wastewater treatment for a service area that includes most of the Cities of Fresno and Clovis, and some unincorporated areas of Fresno County. The Regional Facility received and treated approximately 72,302 acre-feet (AF) of wastewater during 2011, representing an annual average daily flow of approximately 64.5 million gallons per day (MGD). The quantity of wastewater received and treated by the Regional Facility has been declining since 2006, when it peaked at a total of approximately 80,801 AF, representing an annual average daily flow of approximately 72.1 MGD. The permitted wastewater treatment capacity of the Regional Facility is currently 80.0 MGD as an annual monthly average flow, and 88.0 MGD as a maximum monthly average flow. The City is currently evaluating upgrades and modifications to the existing Regional Facility that may result in a capacity rating increase of 15.0 MGD. The City of Clovis owns 9.3 MGD of wastewater treatment capacity at the Regional Facility, and the City of Fresno owns the remaining capacity.

The Regional Facility employs an activated sludge wastewater treatment process, which produces un-disinfected secondary effluent. Most of the effluent is discharged to an array of percolation basins, where it percolates through the underlying soil strata and into the groundwater beneath the basin. However, some of the effluent is recycled by direct delivery to nearby farmland where it is used for restricted irrigation for feed/fodder and fiber crops. In addition, some of the percolated effluent is extracted from the groundwater beneath the basins by pumping and is recycled for irrigation by delivery to the Fresno Irrigation District (FID) canal system. During 2011, 10,896 AF of effluent was delivered directly to nearby farmland, and 5,150 AF was extracted and delivered to the FID canal system for a total of 16,046 AF recycled for irrigation use. This represents approximately 22% of the wastewater received and treated by the FCRWRF in 2011. During the period from 2000 through 2011, the proportion of wastewater treated and recycled for irrigation use in this manner has varied irregularly from 22% to 52%.

The use of the Regional Facility percolation basins for effluent disposal has resulted in a groundwater mound beneath and adjacent to the FCRWRF site, and the local groundwater level in that area is higher than it would otherwise be without the addition of the Regional Facility effluent. The top of the groundwater mound ranges in depth from 25 to 60 feet below ground surface (bgs), and it extends well beyond the perimeter of the Regional Facility site, such that it affects groundwater contours throughout an area of approximately 25 square miles. The diversion and/or extraction of Regional Facility effluent for beneficial recycled water uses such as irrigation, rather than effluent disposal via the percolation basins, reduces related groundwater mounding and effluent-related effects on background groundwater quality.

The City of Fresno commissioned a team of engineering consultants to prepare the City's Recycled Water Master Plan, which is currently expected to be formally adopted by the City in August 2012. The master plan included an evaluation of potential recycled water use areas throughout the City, and evaluated a number of alternatives for the production and delivery of recycled water. The recommended alternative includes a proposed tertiary treatment facility with a planned capacity of 30 MGD (approximately 33,600 AF/year) which will be located at the Regional Facility and is

currently under preliminary design. The tertiary treatment facility will produce disinfected tertiary treated recycled water for irrigation, certain industrial uses, groundwater recharge, and other allowable recycled water uses. The City plans to begin construction of the tertiary treatment facility, together with a recycled water distribution system for delivery of recycled water to use areas throughout the City, within the next several years.

North Fresno Wastewater Reclamation Facility

The North Fresno Wastewater Reclamation Facility is located in north Fresno, near the intersection of Copper Avenue and Cedar Avenue. It was constructed in late 2006 to provide wastewater treatment service for residential and commercial development in the surrounding area of north Fresno. The NFWRF employs a sequencing batch reactor (SBR) treatment process for secondary treatment, cloth media filtration for tertiary treatment, and an ultraviolet system to produce disinfected tertiary treated effluent. The effluent is used for golf course irrigation at the nearby Copper River Country Club. Effluent in excess of the quantity that can be used for golf course irrigation is de-chlorinated and discharged to a nearby Fresno Metropolitan Flood Control District (FMFCD) stormwater basin.

The permitted capacity of the NFWRF is 0.71 MGD, as an average monthly flow, and 1.07 MGD, as a maximum daily flow. The City's master plan for the NFWRF calls for ultimate expansion to an average monthly flow capacity of 1.07 MGD upon full development of the NFWRF service area.

Other Area Wastewater Treatment Facilities

The City of Clovis owns and operates the Clovis Sewage Treatment / Water Reuse Facility (STWRF), located near the intersection of Ashlan Avenue and McCall Avenue, southeast of the City of Clovis. It produces disinfected tertiary recycled water used for irrigation and possible compatible industrial uses. Phase 1 of the STWRF is in operation, with an average flow capacity of 2.8 MGD. Future Phases 2 and 3 are planned to have average flow capacities of 5.6 MGD and 8.4 MGD, respectively.

Malaga County Water District owns and operates a wastewater treatment plant south of the City of Fresno, near the intersection of Maple Avenue and Central Avenue. It provides wastewater treatment service only for properties within the boundaries of Malaga County Water District.

There are also several small private wastewater treatment facilities in the Fresno metropolitan area, including facilities owned and operated by the Pinedale Public Utility District and the Pinedale County Water District, that provide wastewater treatment service for individual subdivisions or developments.

Wastewater Collection System

The City of Fresno owns and maintains the majority of the wastewater collection systems that convey wastewater to the FCRWRF, and all of the wastewater collection system that conveys wastewater to the NFWRF. The City's wastewater collection system consists of more than 1,380 miles of gravity flow pipelines, ranging in size from 4 inches to 84 inches in diameter, and ranging in age from new to more than 100 years old. The system also includes some pressure flow pipelines, by which pumped wastewater is conveyed to a point of discharge usually tributary to a gravity flow

pipeline. Wastewater collection system pipelines consist of a number of different pipe materials, but the majority of the gravity flow pipelines consist of polyvinyl chloride (PVC) pipe, vitrified clay pipe (VCP) or concrete pipe, which includes both reinforced concrete pipe (RCP) and standard or non-reinforced concrete pipe (SCP). Together, these pipe materials account for approximately 98.4 percent of the wastewater collection system pipelines.

Cementitious pipe materials such as RCP and SCP are subject to microbially induced corrosion (MIC), which is caused by microbiological processes in the sewer environment that result in the formation of sulfuric acid on surfaces exposed to the sewer atmosphere, the air space above the wastewater flow in a partially full pipe. Most newer RCP pipelines are manufactured with an interior plastic liner that protects the pipe from the effects of MIC. Older, unprotected pipes can be corroded by MIC to the point of loss of structural integrity and pipe failure. The effects of MIC have been observed in some of the older RCP and SCP pipelines in the City's wastewater collection system.

The City of Fresno commissioned a team of engineering consultants to prepare the 2006 Wastewater Collection System Master Plan. The master plan effort included hydraulic modeling of the wastewater collection system to evaluate system capacity for both then-existing conditions and full build-out conditions under the City's 2025 General Plan. A number of capacity-deficient sewers were identified, and recommendations for capacity relief projects were developed.

The Wastewater Collection System Master Plan also incorporated the results of a number of prior sewer inspection and evaluation efforts, including recommendations for prioritized sewer rehabilitation projects, most or all of which were necessary as a result of MIC processes. The master plan also included a number of trunk sewer projects and infill projects identified by the City of Fresno. The master plan incorporated all of the various types of recommended sewer projects in a Capital Improvement Program covering 133 projects having an estimated cost of $288.0 million (in 2004 dollars). The projects were programmed for implementation during the period from 2006 through 2025. The City of Fresno has been regularly implementing various elements of the Capital Improvement Program since the adoption of the Wastewater Collection System Master Plan.

As required by the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, the City of Fresno prepared the 2009 Sewer System Management Plan (SSMP) for the Wastewater Collection System. The SSMP provides a framework for the proper management, operation, and maintenance all elements of the wastewater collection system, with the objectives of reducing and preventing sanitary sewer overflows (SSOs), and mitigating any SSOs that may occur. An SSO is a release of untreated or partially treated wastewater resulting in public exposure, regardless of whether the wastewater reaches waters of the United States. SSOs also include wastewater backups into buildings and onto private property that are caused by blockages in the City's portion of the sanitary sewer system.

All of the mandatory elements of the SSMP were already in place and in use by the City of Fresno through other programs and ordinances, such as the Fresno Municipal Code, the Wastewater Collection System Master Plan, the Fats, Oils and Grease (FOG) Control Program, the Sanitary System Overflow Prevention and Response Plan, Performance Measures and Public Information/Education

opportunities. The City of Fresno operates the wastewater collection system under the SSMP and these related programs and ordinances to accomplish the SSMP objectives.

Drainage

Stormwater collection and disposal, and flood control for the City of Fresno, City of Clovis, and the unincorporated areas within the City of Fresno's sphere of influence are provided by the Fresno Metropolitan Flood Control District (FMFCD). The FMFCD is a special district created by the State of California Legislature and ratified by the voters of the district in 1956. The District has more than 170 urban watersheds that collect stormwater runoff and dispose of the runoff in retention basins, local canals, or the San Joaquin River. Each urban watershed, called a drainage area by FMFCD, consists of a collection system and, in most cases, a retention basin to store and dispose of the runoff. Three drainage areas are pumped directly into a nearby canal and six drainage areas have collection systems that discharge to the San Joaquin River. Pipeline collection systems have diameters that range from 15 inches to 108 inches. Retention basins range in size from 5 acres to 25 acres, with most being 8 to 10 acres in size. The flood control system consists of three dams and reservoirs, five detention basins, one diversion channel, and up to 175 miles of rural stream channels.

Stormwater Collection and Disposal

FMFCD provides drainage service to the Fresno metropolitan area. In order to provide this service, the District has organized the metropolitan area into over 170 urban drainage areas or watersheds. Watersheds are delineated along topographic boundaries and are limited in size to between 200 acres to 600 acres. The area limitation reduces the size of the required collection facilities and disposal facilities. The service is provided through the combination of surface drainage improvements, chiefly curbs and gutters, that direct runoff to storm drainage inlets, which collect the runoff and convey the runoff to underground pipeline collection systems. The collection systems convey the stormwater to disposal facilities, which in the majority of cases are excavated, unlined basins. In three cases, the collection systems discharge to pump wet wells from which the stormwater is lifted into an adjacent canal, and in six cases, the stormwater is discharged into the San Joaquin River. Two of these systems discharge directly to the San Joaquin River and four discharge to a water quality basin before discharge to the river occurs.

The collection systems are designed to provide one foot of freeboard in the pipeline collection system designed to convey runoff rates generated by rainfall intensity up to and including a 50% probability of occurrence (a 2-year return frequency). There are exceptions to this design standard in areas of the City where older drainage systems were installed prior to the formation of the District, or constructed in the very early years of the District, and shifts in land use densities have eroded the level of service. The District documents the deficiencies and develops master planned solutions to these deficiencies as they are identified.

Retention basins are designed to provide storage for up to 6 inches of rainfall on the drainage area watershed given typical runoff to rainfall ratios used for urban drainage design. Again, there are exceptions to this design standard, notably in those retention basins constructed prior to 1969 when

the design criteria was changed to increase the storage volume. The change resulted from the extreme rainfall events of the spring of 1969 and the resulting flooding at the then-existing basins.

Water quality basins are designed in accordance with the US Environmental Protection Agency's design standards to remove sediments and trash prior to discharge of stormwater to the San Joaquin River. They provide quiescent conditions for settling of suspended solids within a holding basin prior to discharge from the basin via an overflow weir. The water quality basins alternate between wet and dry, depending on the season and amount of rainfall that has occurred within the drainage area.

The District has utilized three means to implement drainage systems for the metropolitan area. One method has been to use Community Block Grants and low interest infrastructure loans from the State of California to construct drainage facilities in the older, previously developed areas of the City. A second method has been to form assessment districts under the provisions of the 1915 Bond Act. Assessment districts were formed based on drainage area boundaries, the parcels within the assessment districts were assessed a proportional share of the cost of the collection and disposal system, and the drainage system for the drainage area was constructed. The third and currently employed method is to collect drainage fees from parcels as they develop based on their prorated share of the cost of the drainage area collection and disposal systems. The implementing ordinance for the drainage fee structure is adopted by the City of Fresno, and the drainage fees are collected by the City when entitlements are granted or building permits are issued.

The District is a primary participant in groundwater recharge for the City of Fresno. Unlined retention basins provide recharge of both stormwater runoff and imported water from the San Joaquin River and Kings River. It is estimated that 80-percent of the stormwater that falls within the metropolitan area is recharged via the District's retention basins. The District has identified retention basins within the metropolitan area that have significant recharge capability. They utilize the Fresno Irrigation District (FID) canal system to deliver allocated water from the San Joaquin River and the Kings River to these basins where the water infiltrates through the underlying soil strata and into the groundwater beneath the basins. The District retention basins, largely in part through a cooperative agreement with the City, provide groundwater recharge for an estimated annual average of 30,000 AF of water.

Key FMFCD planning documents for stormwater collection and disposal, and flood control include:

- The Storm Drainage and Flood Control Master Plan. A geographical information system database that contains the master planned pipeline collection system status (existing, designed, or planned), collection system alignments and sizes, collection system hydrologic and hydraulic design calculations, and retention basin status (planned, purchased, developed), retention basin locations, and retention basin sizes.
- FMFCD District Services Plan, 2004. Contains a full description of the FMFCD storm drainage system master plan, stormwater quality programs, water conservation, and wildlife management plans.
- Draft and Final Master Environmental Impact Report for the 2004 District Services Plan.

Flood Control

The City of Fresno is located in the alluvial fans of numerous foothill streams and creeks that drain the western slope of the Sierra Nevada foothills. These streams include Big Dry Creek, Alluvial Drain, Pup Creek, Dog Creek, Redbank Creek, Mud Creek, and Fancher Creek. Numerous smaller, unnamed drainage courses also drain into the City from the rural areas east of the City. The District provides flood control measures on the major creeks for the 0.5-percent exceedance interval (200-year return frequency) flood flow event with a series of dams and detention basins located east of the City. These dams include Big Dry Creek Dam, Fancher Creek Dam, and Redbank Dam. The detention basins include the Alluvial Drain Detention Basin, Pup Creek Detention Basin, Redbank Creek Detention Basin, Fancher Creek Detention Basin, and Big Dry Creek Detention Basin.

The Big Dry Creek Dam was originally constructed in 1948 by the U.S. Army Corps of Engineers. It was subsequently raised and enlarged by the U.S. Army Corps of Engineers as part of the Redbank and Fancher Creek Flood Control Project in 1993 to provide a flood pool with 30,200 AF of storage. Redbank Creek Dam was constructed by the District in 1961. It provides a gross pool storage of 1,030 AF. The U.S. Army Corps of Engineers also constructed the Alluvial Drain Detention Basin in 1993, the Pup Creek Detention Basin in 1993, the Redbank Detention Basin in 1990 and the Fancher Creek Dam in 1991. The Redbank and Fancher Creek Flood Control Project was a jointly funded Federal, State, and local project. The District constructed the Fancher Creek Detention Basin in 2003 and recently completed the Big Dry Creek Detention Basin.

The District has master planned the Dog Creek, Pup Creek, and a portion of Redbank Creek channels to convey the 0.5-precent exceedance level flood flows within bank. The improvement of these channels will occur as funding and legal authority to proceed with the improvements are provided either through grants and purchase of right of way or through the entitlement process. Each of these channels are ephemeral streams that flow only during the latter parts of the wet season.

Solid Waste Disposal

Fresno diverts a majority of its solid waste away from landfills and into recycling and composting programs. Diversion conserves limited landfill space, keeps toxic chemicals and materials from contaminating landfills, and enhances the reuse of materials. In 2009, Fresno was ranked highest in the state among larger cities by the California Integrated Waste Management Board (CIWMB) for diverting 71 percent of its solid waste. A Council resolution commits the City to the goal of a 75 percent Waste Diversion Rate by the year 2012 and a Zero Waste goal by the year 2025. Recycling of construction & demolition is required for any City-issued building, relocation or demolition permitted project that generates at least 8 cubic yards of material by volume and all waste must be hauled to a City-approved facility (City of Fresno. Working paper 5: Resource Conservation. 2011).

The Solid Waste Division of the City of Fresno provides the following services: collection of residential and commercial solid waste, recyclables and greenwaste throughout the community at least once a week; disposes of solid waste at the County of Fresno landfill; provides and maintains containers; responds to customer complaints/concerns and provides roll-off and compactor services to residential, multi-family and commercial customers (City of Fresno Public Utilities. 2012).

Garbage disposed of in the City of Fresno is taken to Cedar Avenue Recycling and Transfer Station. Once trash has been off-loaded at the transfer station, it is sorted and non-recyclable solid waste is loaded onto large trucks and taken to the American Avenue Landfill located approximately six miles southwest of Kerman. American Avenue Landfill is owned and operated by Fresno County and began operations in 1992 for both public and commercial solid waste haulers. The American Avenue Landfill is a sanitary landfill, meaning that it is a disposal site for non-hazardous solid waste spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day (City of Fresno Solid Waste, 2012).

The American Avenue Landfill (i.e. American Avenue Disposal Site 10-AA-0009) has a maximum permitted capacity of 32,700,000 cubic yards and a remaining capacity of 29,358,535 cubic yards, with an estimated closure date of August 31, 2031. The maximum permitted throughput is 2,200 tons per day (CalRecycle, 2014).

Other landfills within the County of Fresno include the Clovis Landfill with a maximum remaining permitted capacity of 7,740,000 cubic yards, a maximum permitted throughput of 2,000 tons per day, and an estimated closure date of 2047 (CalRecycle, 2014). There is also the Coalinga Landfill with a maximum remaining capacity of 1,930,062 cubic yards, a maximum permitted throughput of 200 tons per day, and an estimated closure date of 2029 (CalRecycle, 2014).

The City of Fresno and Fresno County co-sponsor two household hazardous waste drop-off events each year, one in the spring and one in the fall. Additionally, the County of Fresno provides a Door-to-Door program that provides household hazardous waste pickup for individuals who, because of special circumstances, cannot participate in the household hazardous waste drop off events held twice a year.

5.15.3 - Regulatory Setting

Following are the utilities and service systems regulations that are applicable to the Planning Area.

Sewer

2025 Fresno General Plan

E-18. Objective: Ensure provision for adequate trunk sewer and collector main capacities to serve existing and planned urban development and economic diversification, including existing developed uses not presently connected to the public sewer system with the Wastewater Master Plan.

E-18-d. Policy: Determine that adequate trunk sewer capacity exists or can be provided to serve proposed development prior to the approval of rezoning, special permits, tract maps, and parcel maps so that the capacities of existing facilities are not exceeded.

E-20. Objective: Ensure the provision of adequate sewage treatment and disposal by utilizing the Fresno-Clovis Regional Wastewater Treatment and Reclamation Facility as the primary facility, when economically feasible, for all existing and new development within the metropolitan area.

E-20-d. Policy: Monitor wastewater treatment plant flows and loadings to the extent feasible and consider the wastewater treatment impacts of land use changes when evaluating general plan amendment proposals.

E-21. Objective: Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

E-21-a. Policy: Implement conservation and other programs and policies to reduce wastewater flows.

E-21-e. Policy: Rehabilitate existing infiltration basins and acquire additional sites for infiltration basins as needed.

County of Fresno: Revised 2000 General Plan

Goal PF-D. To ensure adequate wastewater collection and treatment and the safe disposal of wastewater.

Policy PR-D.4. Available Wastewater Treatment Capacity. The County shall limit the expansion of unincorporated, urban density communities to areas where community wastewater treatment facilities can be provided.

Policy PR-D.7. Sewer Master Plans. The County shall require preparation of sewer master plans for wastewater treatment facilities for areas experiencing urban growth.

Water

2025 Fresno General Plan

E-22. Objective: Manage and develop the City of Fresno's water facilities to ensure a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.

E-22-b. Policy: Set adequate and appropriate conditions of approval for each new development proposal to ensure that the necessary potable water production and supply facilities are in place prior to occupancy.

E-22-d. Policy: Continue to evaluate existing water production and distribution systems and facilitate necessary repair of enhancement of damaged or antiquated facilities.

E-22-i. Policy: Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.

County of Fresno: Revised 2000 General Plan

Goal PF-C. To ensure the availability of an adequate and safe water supply for domestic and agricultural consumption.

Policy PF-C.1. Retain Existing Water Supplies. The County shall actively engage in efforts and support the efforts of others within Fresno County to retain existing water supplies and to restore the water supplies that have diminished to the extent possible.

Policy PF-C.3. Surface Water Use. To reduce demand on the county's groundwater resources, the County shall encourage the use of surface water to the maximum extent feasible.

Policy PF-C.8. Water Master Plans. The County shall require preparation of water master plans for areas undergoing urban growth.

Policy PF-C.12. Adequate Sustainable Water Supply. The County shall approve new development only if an adequate sustainable water supply to serve such development is demonstrated.

Drainage and Flood Control

2025 Fresno General Plan

E-23-c. Policy: The City of Fresno shall coordinate with the Fresno Metropolitan Flood Control District in updating the Flood Control Master Plan as necessary to determine the optimum locations for drainage basins and other facilities necessary to serve urban development including planned urban intensification and the planned North Growth and Southeast Growth Areas.

E-23-h. Policy: The City of Fresno shall pursue installation of curbing and gutters on existing developed roadways, which are lacking drainage facilities.

County of Fresno: Revised 2000 General Plan

Goal PF-E. To provide efficient, cost-effective, and environmentally sound storm drainage and flood control facilities that protect both life and property and to divert and retain stormwater runoff for groundwater replenishment.

Policy PF-E.1. Flood Control Coordination. The County shall coordinate with the agencies responsible for flood control or storm drainage to assure that construction and acquisition of flood control and drainage facilities are adequate for future urban growth authorized by the County General Plan and city general plans.

Policy PF-E.4. Storm Drainage System Capacity. The County shall encourage the local agencies responsible for flood control or storm drainage to require that storm drainage systems be developed and expanded to meet the needs of existing and planned development.

Policy PF-E.10. Drainage Facility Design. In growth areas within the jurisdiction of a local agency responsible for flood control or storm drainage, the County shall encourage that agency to design drainage facilities as if the entire areas of *service* were developed to the pattern reflected in the adopted general plans to assure that the facilities will be adequate as the land use intensifies.

Solid Waste and Community Sanitation

2025 Fresno General Plan

E-30. Objective: Provide adequate solid waste facilities and services for the collection, transfer, recycling, and disposal of refuse.

E-30-a. Policy: Support programs and new techniques of solid waste disposal such as recycling, composting, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.

E-30-b. Policy: Pursue programs to maintain conformance with AB 939, the Solid Waste Management Act of 1989, in order to comply with mandated diversion goals.

County of Fresno: Revised 2000 General Plan

Goal PF-F. To ensure the safe and efficient disposal or recycling of solid waste generated in the county in an effort to protect the public health and safety.

Policy PF-F.1. Solid Waste Source Reduction. The County shall continue to promote maximum use of solid waste source reduction, reuse, recycling, composting, and environmentally safe transformation of wastes.

Policy PF-F.5. County Integrated Waste Management Plan. The County shall ensure that all new development complies with applicable provisions of the County Integrated Waste Management Plan.

5.15.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to utilities and service systems are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines as identified below. Accordingly, utilities and service systems impacts resulting from the proposed project are considered significant if the project would:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? (See Wastewater Treatment, Impact USS-1)

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? (See Water or Wastewater Treatment Facilities, Impact USS-2)

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? (See Stormwater Drainage Facilities, Impact USS-3)

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? (See Water Supplies, Impact USS-4)

e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? (See Wastewater Treatment Capacity, Impact USS-5)

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? (See Landfill Capacity, Impact USS-6)

g) Comply with federal, state, and local statutes and regulations related to solid waste? (See Compliance with Solid Waste Regulations and Statutes, Impact USS-7)

5.15.5 - Project Impacts and Mitigation Measures

This section discusses potential impacts associated with the proposed project and provides mitigation measures where necessary.

Wastewater Treatment

Impact USS-1	**The project would exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.**

Project Specific Impact Analysis

The potential long-term impacts related to waste discharge requirements of the existing and planned wastewater treatment facilities are categorized into two time frames and the assessment of both time frames include a full evaluation of the potential impacts that could occur with the buildout of the proposed General Plan Update. The first time frame includes the year 2025 and the potential buildout of the land uses that are included in the 2025 Fresno General Plan. The City of Fresno 2006 Wastewater Collection System Master Plan evaluated existing facilities and the need for additional facilities to accommodate the potential land uses proposed in the 2025 Fresno General Plan. After determining the potential impacts that could occur from the 2025 Fresno General Plan land uses, the second time frame includes full buildout in 2056 and the potential additional waste discharge impacts from the development of full buildout under the General Plan Update. The evaluations of the two separate time frames identify the potential waste discharge impacts that would occur from full buildout of the General Plan Update compared to existing conditions.

Existing Condition to 2025 General Plan

The City of Fresno owns and operates two wastewater treatment facilities, the Fresno-Clovis Metropolitan Regional Wastewater Reclamation Facility (Regional Facility) and the North Fresno Wastewater Reclamation Facility (North Fresno Facility). The Regional and North Fresno Facilities currently have a rated capacity of 80 million gallons per day (MGD) and 0.71 MGD, respectively (Brown and Caldwell, 2006). Both facilities discharge under Regional Water Quality Control Board Waste Discharge Order Requirements.

The Regional Water Quality Control Board has established a Waste Discharge Requirement Order (WDR) for the Regional Facility, Order No 5-01-254 established via Resolution No. R5-2002-0254-A01. The WDR for the Regional Facility establishes limits for the average dry weather flow discharge.

The current permitted average dry weather flow discharge is 94 MGD. The Regional Facility's current average dry weather flow is approximately 68 MGD (Regional Water Quality Control Board, 2002).

The WDR for the Regional Facility include requirements for pretreatment of wastewater at individual industrial customer sites. Some examples of industrial customers that would require pretreatment of wastewater include metal finishing plants, soft drink bottlers, meat packers, food processors, plastic manufacturers and industrial laundries. The WDR requires the City of Fresno to monitor area groundwater via a groundwater monitoring well network currently comprising of 22 wells located in the vicinity of the Regional Facility.

The WDR for the Regional Facility includes effluent discharge specifications that set requirements for BOD_5, total suspended solids, setteable solids, EC, pH, Chloride, Ammonia Nitrogen, Nitrate Nitrogen, Kjeldahl Nitrogen, Total Nitrogen, General Minerals, Metals and Priority Pollutants. Pond disposal specifications include requirements for dissolved oxygen, mosquito abatement and vegetation management requirements. Requirements for either daily, semi-weekly, monthly, quarterly or semi-annually discharge monitoring is required by the WDR, depending on the constituent being tested.

The Water Quality Control Plan for the Tulare Lake Basin (Bain Plan) designates beneficial uses, established water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates by reference plans and policies of the State Water Resources Control Board. The Basin Plan also contains water quality objectives for chemical constituents in and toxicity of the groundwater that address constituents in the discharge that are potentially harmful to beneficial uses. The Regional Facility must comply with the Basin Plan.

The North Facility operates under a WDR, Order No 5-2006-0090-01, and a NPDES Permit (No. CA0085189). The WDR for the North Facility establishes limits for the average dry weather flow discharge. The current permitted average dry weather flow discharge is 0.71 MGD. The North Fresno Facility's current average dry weather flow is less than 0.71 MGD.

Based on the City of Fresno 2006 Wastewater Collection System Master Plan that took into account the 2025 General Plan land uses, the Master Plan describes a build-out dry weather base flow of 150 million gallons per day (MGD). The Master Plan identified that the 150 MGD includes 14.2 MGD from the City of Clovis, which is a constant amount of treatment capacity dedicated to the City of Clovis based on current agreements (Brown and Caldwell, 2006). The remaining 135.8 MGD would be treated at the Regional Facility (110.6 MGD) and North Facility (1.2 MGD) and a portion of the total wastewater flow is planned to be treated at a future planned facility in the Southeast Development Area (24 MGD). Currently, the permitted discharge from the existing facilities is 94.71 MGD. Since, the dry weather base flow to the treatment plants is projected to be 150 MGD from development that would occur through approximately 2025, the current wastewater treatment requirements and waste discharge requirements would be exceeded and a potential significant impact would occur. This significant impact would occur due to the projected exceedance at the Regional Facility of 16.6 MGD (110.6 MGD – 94 MGD) and at the North Facility of 0.49 (1.2 MGD – 0.71 MGD). In addition, a new waste discharge permit for new wastewater treatment facilities

would be required for the additional 24 MGD of treated wastewater that is currently planned for the Southeast Development Area.

2025 General Plan to General Plan Update

The land use changes between the 2025 Fresno General Plan to the City of Fresno General Plan Update are projected to increase dry weather base flows to the treatment plants by an additional 33.6 MGD. The current wastewater treatment requirements and waste discharge requirements would be further exceeded, and a potential significant impact would occur. This significant effect is projected to occur at the Regional Facility. The wastewater treatment requirements and waste discharge requirements at the North Facility are anticipated to remain at 1.2 MGD, which is the same as under the development scenario of approximately the year 2025.

In addition to wastewater treatment requirements and waste discharge requirements associated with the wastewater treatment plant, the City is also planning to use the treated water for recycled water use and for groundwater recharge. Both of these proposed uses of treated water would require its own waste discharge permit from the Regional Water Quality Control Board.

In 2009, the State of California adopted a Recycled Water Policy establishing a mandate to increase the use of recycled water in California by 200,000 acre-feet per year. The City of Fresno Metro Plan Update includes two objectives regarding recycled water use. The City must increase the use of recycled water to help offset existing and future potable water demands and maximize the use of available recycled water exchange supply contractually available from the 1976 Fresno Irrigation District Agreement. The specific goal included in the City of Fresno Metro Plan is to provide 25,000 acre-feet per year of recycled water by 2025 for landscape irrigation and other non-potable uses to offset potable water uses (West Yost Associates, 2011).

Part of the City of Fresno 2012 Recycled Water Master Plan includes groundwater recharge project alternatives. Groundwater recharge projects provide a significant opportunity for improving the City's long-term sustainable water supply. Specific groundwater recharge projects and locations have not yet been identified. Current California Department of Public Health requirements for groundwater recharge with recycled water indicate approximately four times as much diluent water as recycled water is required for ground water recharge. Diluent water would be obtained from surface water via the Fresno Irrigation District or storm water from the Fresno Metropolitan Flood Control District. A six-month ground water travel time is required between groundwater recharge sites and the nearest drinking water well. Recycled water used for groundwater recharge must meet Title 22 requirements for tertiary recycled water, including filtration and disinfection and nitrification/denitrification treatment (Carollo, 2012).

To reduce the potential impacts associated with the wastewater discharge permits, the City will need to increase wastewater treatment capacity as well as obtain revised and new waste discharge permits. The following policies from the General Plan Update are designed to reduce the potential effect associated with wastewater treatment requirements and waste discharge requirements.

Public Utilities and Services Element

Policy PU-7-a. Treatment Capacity and Cost Recovery. Provide increased wastewater treatment plant capacity in a timely manner to facilitate planned urban development within the facility's planned service area, and accommodate experienced increase in flows and loadings from the existing community with the capital costs and benefits allocated equitably and fairly between existing users and new users while facilitating economic diversification.

As under Policy PU-5-b, new users must, to the extent not inconsistent with economic diversification strategies, pay for the cost of being attached to the treatment facility through connection fees, including the cost of any incremental burden that they may place on the entire system; and, pay for the full operational costs of extraordinary facilities such as satellite or "package" treatment plants.

Policy PU-7-b. Consider Capacity in Plan Amendments. Monitor wastewater treatment plant flows and loadings to the extent feasible and consider the wastewater treatment impacts of land use changes when evaluating general plan amendment proposals.

Policy PU-8. Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

Policy PU-8-a. Reduce Wastewater. Implement conservation and other programs and policies to reduce wastewater flows.

Policy PU-8-b. Reduce Stormwater Leakage. Reduce storm water infiltration to the sewer collection system, where feasible, by elimination of storm sewer cut-ins to the sanitary sewer system.

Policy PU-8-c. Ban on Storm Drainage Connection. Prohibit new sanitary sewer cut-ins for disposal of storm runoff, except for health and safety reasons.

Policy PU-8-d. Biosolid Disposal. Investigate and implement economically effective and environmentally beneficial methods of biosolids handling and disposal.

Policy PU-8-e. Wastewater Recycling. Aggressively pursue expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable and institutional evaluation of treatment, facility siting and water exchange elements.

Policy PU-8-f. Infiltration Basins. Rehabilitate existing infiltration basins and acquire additional sites for infiltration basins as needed.

Policy PU-8-g. Food and Drink Industry. Ensure adequate provision of facilities for the appropriate management of wastewater from wineries, food processing and beverage facilities, including conformance with Waste Discharge Requirements issued by the Regional Water Quality Control Board.

Policy PU-8-h. Satellite Facilites. Work with the Regional Water Quality Control Board to ensure any satellite treatment and reclamation facility proposal is consistent with governing statutes and regulations.

With the implementation of the above policies, the implementation of the General Plan Update would still result in potential significant effects associated with wastewater treatment requirements and waste discharge requirements.

Cumulative Impact Analysis

Public utility districts and other municipalities exist near or adjacent to the planning area and include the City of Clovis and Malaga Utility District. These entities have wastewater treatment facilities that could cause significant environmental impacts. However, the operation of these treatment facilities would be required to comply with the same wastewater treatment requirements and RWQCB waste discharge requirements explained above. Since the proposed project would result in potential significant impacts associated with wastewater treatment requirements and waste discharge requirements, the project's contribution to potential cumulative impacts are considerable and would be a significant cumulative impact.

Mitigation Measures

Project Specific

MM USS-1 The City shall develop and implement a wastewater master plan update.

MM USS-2 Prior to exceeding existing wastewater treatment capacity, the City shall evaluate the wastewater system and shall not approve additional development that contributes wastewater to the wastewater treatment facility that could exceed capacity until additional capacity is provided. By approximately the year 2025, the City shall construct the following improvements.

- Construct an approximately 70 MGD expansion of the Regional Wastewater Treatment Facility and obtain revised waste discharge permits as the generation of wastewater is increased.
- Construct an approximately 0.49 MGD expansion of the North Facility and obtain revised waste discharge permits as the generation of wastewater is increased.

MM USS-3 Prior to exceeding existing wastewater treatment capacity, the City shall evaluate the wastewater system and shall not approve additional development that contributes wastewater to the wastewater treatment facility that could exceed capacity until additional capacity is provided. After approximately the year 2025, the City shall construct the following improvements.

- Construct an approximately 24 MGD Wastewater Treatment Facility within the Southeast Development Area and obtain revised waste discharge permits as the generation of wastewater is increased.

- Construct an approximately 9.6 MGD expansion of the Regional Wastewater Treatment Facility and obtain revised waste discharge permits as the generation of wastewater is increased.

Cumulative

Implementation of Mitigation Measures USS-1 through USS-3 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Water or Wastewater Treatment Facilities

Impact USS-2	**The project would require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.**

Project Specific Impact Analysis

Wastewater Treatment Facilities

As discussed in Impact USS-1, the implementation of the General Plan Update will result in the need for the expansion and new wastewater treatment facilities to serve future land uses and population. In addition, according to the City of Fresno Metropolitan Water Resources Management Plan Phase 2, the expansion and new surface water treatment facilities will be needed to increase water supplies within the Planning Area. Therefore, development in accordance with the General Plan Update would result in a significant impact on the existing wastewater treatment facilities and water supplies.

The Regional Facility located southwest of the City near the intersection of Jensen and Cornelia Avenues would require an approximately 70 MGD expansion to accommodate anticipated demand by approximately the year 2025. An additional expansion of 9.6 MGD is anticipated for approximately after the year 2025. The capacity of the existing North Facility is anticipated to require expansion from 0.71 MGD to 1.2 MGD by approximately the year 2025.

The development of a new 24 MGD wastewater treatment facility is planned to be located within the Southeast Development Area to accommodate future growth.

A summary of the wastewater treatment facilities that would need to be constructed to accommodate future development associated with the General Plan Update includes the following.

- Construct 70.0 million gallon per day (MGD) expansion at the Fresno-Clovis Regional Wastewater Reclamation Facility, in accordance with the City of Fresno 2006 Wastewater Master Plan.

- Construct 25,000 acre-feet per year recycled water expansion to the Fresno-Clovis Regional Wastewater Reclamation Facility, in accordance with the January 2012 City of Fresno Metropolitan Water Resources Management Plan.
- Construct a 0.49 MGD expansion of the North Facility.
- Construct 24 MGD wastewater treatment facility within the Southeast Development Area, in accordance with the City of Fresno 2006 Wastewater Master Plan.
- Construct 9.6 million gallon per day (MGD) expansion at the Fresno-Clovis Regional Wastewater Reclamation Facility.

Surface Water Treatment Facilities

The City of Fresno owns and operates two surface water treatment facilities, the Northeast Surface Water Treatment Facility (NESWTF) and the T-3 SWTF. Based on current projections, the City anticipates the need to increase the existing capacity (30 MGD = 33,604 AF/year) of the Chestnut SWTF by an additional 30 MGD (33,604 AF/year). In addition, the City anticipates the need to construct a new 80 MGD (89,611 AF/year) SWTF near the intersection of Olive and Armstrong Avenues in the southeastern portion of the Planning Area and a possible new 20 MGD (22,403 AF/year) SWTF near the intersection of Church and Marks Avenue in the southwestern portion of the Planning Area (West Yost Associates, 2011). With the additional anticipated surface water treatment capacity of 160 MGD (179,222 AF/year), there would still need to be additional new or expanded surface water treatment or recharge facilities to accommodate the remaining 5,478 AF/year of available surface water supplies from FID and USBR which consists of 184,700 AF/year. Following is a summary of the necessary improvements.

- Construct an 80 million gallon per day (MGD) surface water treatment facility near the intersection of Armstrong and Olive Avenues, in accordance with Chapter 9 and Figure 9-1 of the City of Fresno Metropolitan Water Resources Management Plan Update Phase 2 Report, January 2012 (2012 Metro Plan Update).
- Construct a 30 MGD expansion of the existing northeast surface water treatment facility for a total capacity of 60 MGD, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 20 MGD surface water treatment facility in the southwest portion of the City, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 25,000 AF/year recycled water facility as an expansion to the Fresno-Clovis Regional Wastewater Reclamation Facility in accordance with the January 2012 City of Fresno Metropolitan Water Resources Management Plan. This improvement is required after the year 2025.

In addition to treatment facilities, the implementation of the proposed General Plan Update would result in significant impacts on existing wastewater collection system and water conveyance facilities.

Following are descriptions of the needed wastewater and water facilities to accommodate buildout in accordance with General Plan Update.

Wastewater Collection System

The existing wastewater collection system has several junction locations where flow distribution between downstream sewers can potentially be controlled. Two key junction locations include a junction structure located near the intersection of Herndon and Milburn Avenues and a junction structure located near the intersection of Dakota and Fresno Avenues, among others. The City's preliminary wastewater model did not incorporate specific decisions as to flow distribution at junction locations, but allowed uncontrolled distribution by the wastewater collection system hydraulic model. The City's modeling results indicated that a number of existing sewers would not provide sufficient capacity to accommodate General Plan Update buildout flows. Blair, Church & Flynn performed additional model analyses to evaluate the effects of various flow distribution patterns, and their effects on system capacity. The City of Fresno's preliminary wastewater model, as supplemented by the Blair, Church & Flynn analyses, also shows that several areas within the wastewater system will experience flows in excess of existing sewer capacities, at General Plan Update buildout, although to a lesser extent than for uncontrolled flow distribution conditions. There are several areas where wastewater flow rates are expected to exceed existing sewer capacity (see Figure 1.1 in Appendix J-1). Inasmuch, as the wastewater model is preliminary, it is possible that other areas within the wastewater collection system may also experience flows in excess of existing sewer capacities. Additionally, a separate wastewater analysis was performed by the City of Fresno for the downtown area as part of the Fulton Corridor Specific Plan and Community EIR Technical Report. The results of the analysis identified four potentially deficient pipe segments totaling 4,730 feet. According to the City of Fresno, the results should be considered preliminary until the sewer model input parameters are better defined. These potentially deficient pipe segments are also shown on Figure 1.1 in Appendix J-1.

The 2006 Wastewater Master Plan defines a number of capital improvement program (CIP) projects to increase system capacity to accommodate 2025 General Plan buildout flows. Some of the projects have been implemented and so are now existing sewers, while other projects have yet to be implemented. The 2006 Wastewater Master Plan Capital Improvement Projects (CIP) projects that have yet to be implemented are shown on Figure 1.2 in Appendix J-1, and the following paragraphs provide a summary of those same projects.

- Orange Avenue Trunk Sewer: This project involves a portion of the Orange Avenue Trunk Sewer, between Dakota and Jensen Avenues, Approximately 37,240 feet of new sewer main will be installed and approximately 5,760 feet of existing sewer main will be rehabilitated. The size of the new sewer main will range from 27-inches to 42-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are RS03A, RL02, C01-REP, C02-REP, C03-REP, C04-REP, C05-REP, C06-REL and C07-REP.
- Marks Avenue Trunk Sewer: This project involves a portion of the Marks Avenue Trunk Sewer, between Clinton Avenue and Kearney Boulevard. Approximately 12,150 feet of new sewer main will be installed. The size of the new sewer main will range from 33-inches to 60-inches

in diameter. The associated project designations in the 2006 Wastewater Master Plan are CM1-REP and CM2-REP. □ North Avenue Trunk Sewer: This project involves a portion of the North Avenue Trunk Sewer, located between Polk and Fruit Avenues and also between Orange and Maple Avenues. Approximately 25,700 feet of new sewer main will be installed. The size of the new sewer main will range from 48-inches to 66-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CN1-REL1 and CN3-REL1.

- North Avenue Trunk Sewer: This project involves a portion of the North Avenue Trunk Sewer, located between Polk and Fruit Avenues and also between Orange and Maple Avenues. Approximately 25,700 feet of new sewer main will be installed. The size of the new sewer main will range from 48-inches to 66-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CN1-REL1 and CN3-REL1.
- Ashlan Avenue Trunk Sewer: This project involves a portion of the Ashlan Avenue Trunk Sewer, located between Hughes and West Avenues and also between Fruit and Blackstone Avenues. Approximately 9,260 feet of new sewer main will be installed. The size of the new sewer main will range from 24-inches to 36-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CA1-REL and CA2-REP.

The results of preliminary wastewater collection system modeling indicate that the remaining capacity improvement projects included in the 2006 Wastewater Master Plan CIP, as described above and shown on Figure 1.2 in Appendix J-1, can be expected to provide sufficient sewer capacity to accommodate General Plan Update buildout wastewater flows for those particular sewers.

A comparison of Figures 1.1 and 1.2 in Appendix J-1 will show that there other areas within the wastewater collection system where the General Plan Update buildout wastewater flow is expected to exceed the existing sewer capacity, and the sewer is not part of a 2006 Wastewater Master Plan CIP capacity improvement project. Thus, it is evident that additional capacity improvement projects beyond those provided for in the 2006 Wastewater Master Plan would be required in order to accommodate General Plan Update buildout wastewater flows.

The Geographic Information System (GIS) database for the City of Fresno wastewater collection system shows that approximately 28 sewer pipeline segments were installed with very flat slopes or, in some cases, with a zero slope. For these 28 segments, the preliminary wastewater collection system modeling indicates a corresponding lack of sewer capacity. However, it is believed that the modeling results for these isolated segments do not necessarily indicate the need for a capacity improvement project for General Plan Update buildout flows. Therefore, the implementation of the General Plan Update could result in significant impacts on the 28 sewer pipeline segments identified in Figures 1.1 and 1.2 in Appendix J-1.

Water Conveyance Facilities

Based on a review of the 2012 City of Fresno Metropolitan Water Resources Management Plan (Metro Plan), the existing water infrastructure facilities are not adequate to provide service to the population and land uses associated with the buildout of the 2025 General Plan. Since the proposed General Plan Update will result in approximately 425,000 more people and substantially more non-

residential land uses, as shown in Table 3-4 in the Section 3, Project Description, compared to the 2025 General Plan, the existing water infrastructure facilities will not be adequate to serve the population and land uses associated with buildout of the General Plan Update. Therefore, the development in accordance with the General Plan Update would result in a significant impact on existing water infrastructure facilities. The 2012 Metro Update identified various improvements that will be required to adequately serve a portion of the buildout of the General Plan Update within the Planning Area. These improvements include the following.

- Construct 65 new groundwater wells, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 2.0 million gallon potable water reservoir (Reservoir T2) near the intersection of Clovis and California Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 3.0 million gallon potable water reservoir (Reservoir T3) near the intersection of Temperance and Dakota Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 3.0 million gallon potable water reservoir (Reservoir T4) in the Downtown Planning Area, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 4.0 million gallon potable water reservoir (Reservoir T5) near the intersection of Ashlan and Chestnut Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 4.0 million gallon potable water reservoir (Reservoir T6) near the intersection of Ashlan Avenue and Highway 99, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct 50.3 miles of regional water transmission mains ranging in size from 24-inch to 48-inch, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct 95.9 miles of 16-inch transmission grid mains, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 4.0 million gallon potable water reservoir (SEDA Reservoir 1) within the northern part of the Southeast Development Area. This improvement is required approximately after the year 2035.
- Construct a 4.0 million gallon potable water reservoir (SEDA Reservoir 2) within the southern part of the Southeast Development Area. This improvement is required approximately after the year 2035.

In addition to the above improvements, additional facilities such as pipelines and storage facilities within Downtown area as well as other areas of the Planning Area are expected to be required to adequately serve the buildout of the General Plan Update.

Environmental Effects of Required Facilities

The construction of expanded and new wastewater treatment facilities and surface water treatment facilities, recharge facilities, wastewater collection system facilities, and water infrastructure facilities could result in short-term environmental effects. These temporary effects include traffic, air emissions, greenhouse gas emissions, and noise from construction equipment and vehicles as well as water quality effects during construction. Following is a discussion of each potential impact.

- Traffic - Construction of these facilities may require lane closures along the adjacent roadway and could result in lower the levels of service on nearby roadways and at intersections. These effects could be potentially significant.
- Air Emissions – Construction activities would result in the generation of criteria pollutants such as ROG and NOx (ozone precursors), PM_{10}, and $PM_{2.5}$ pollutant emissions. The implementation of the proposed General Plan policies and well as existing SJVAPCD regulations identified in Section 5.3, Air Quality, would reduce potential construction emissions. However, since the timing of the construction of the expanded and new facilities is not known, there could be more than one facility under construction at one time. Therefore, there is a possibility that emission standards for the criteria pollutants identified above could be exceeded and significant impacts could occur. In addition, the operation of the treatment plants would contribute to emissions associated with the buildout of the proposed General Plan. These emissions could be criteria pollutants, toxic pollutants, and odors. These emissions could be potentially significant.
- Greenhouse Gas Emissions – Construction of the treatment plants would result in the generation of greenhouse gas emissions. Construction emissions would occur only in the short-term; however, since the timing of the construction of the expanded and new facilities is not known, there could be more than one facility under construction at one time. Therefore, there is a possibility that a substantial amount of greenhouse gas emissions could occur. In addition, the operation of the treatment plants could contribute to emissions associated with the buildout of the proposed General Plan. The greenhouse gas emissions were determined to be potentially significant.
- Noise – Construction and operation of expanded and new treatment plants would increase noise levels on and in the vicinity of each plant's site. There are various General Plan policies that are proposed (see Section 5.11, Noise) that would reduce potential noise levels to meet City noise standards. Therefore, potential increases in noise levels associated with the future construction and operation of expanded and new treatment plants would be less than significant.
- Water Quality – Construction activities associated with expanded and new treatment plants could result in potential water quality issues. However, with activities that disturb more than one acre of soil, each activity must obtain coverage under the Construction General Permit and implement Best Management Practices (BMPs) to protect surface water flows from sources of pollution at the construction site. With the implementation of the proposed General Plan policies and the required BMPs, short-term construction impacts on surface

water quality would be less than significant. In addition, the operations of the treatment facilities would discharge treated water to approved locations. The approval of these locations would require consistency with the regulatory requirements identified in a waste discharge permits. Consistency with these discharge permits would result in a less than significant impact on long-term water quality.

Depending on the specific location of the expanded or new facilities, additional construction impacts that could result in long-term effects are related to aesthetics, agricultural resources, biological resources, and cultural resources. Following is a discussion of these potential impacts.

- Aesthetics - Based on the general locations of the expanded and new facilities, impacts related to aesthetics may be adverse; however, these effects would be less than significant because these general areas do not contain a scenic vista or scenic resources. In addition, the construction of the expanded or new facilities could alter the current visual characteristics of the area; however, the proposed General Plan includes various policies (see Section 5.1, Aesthetics) to reduce potential aesthetic impacts, and the expanded or new facilities would not substantially alter the visual characteristic of the areas. These potential facilities may add lighting systems in the area; however, the increases in lighting are anticipated to be less than significant with the implementation of the proposed General Plan policies and mitigation measures identified in Section 5.1, Aesthetics).
- Agricultural Resources - The general locations of the expanded and new facilities could result in impacts to current Farmland Mapping and Monitoring Program (FMMP) designated areas. Similar to the discussion in Section 5.2, the removal of FMMP lands would result in significant impacts. Therefore, the construction of expanded and new treatment facilities could result in significant farmlands impacts.
- Biological Resources – The future construction of expanded and new treatment facilities could result in impacts to biological resources. Proposed General Plan policies and mitigation measures identified in Section 5.4, Biological Resources would reduce potential impacts to biological resources to less than significant.
- Cultural Resources - The future construction of expanded and new treatment facilities could result in impacts to cultural resources. Based on a review of the potential locations for these facilities, there is a low potential for historical resources to be affected. There is a potential for unknown cultural resources (i.e., archaeological, paleontological, and human remains) to be located at the future sites of the proposed facilities. Although there is a potential for unknown resources, the implementation of the proposed General Plan policies and mitigation measures identified in Section 5.5, Cultural Resources would reduce potential impacts to cultural resources to less than significant.

Cumulative Impact Analysis

Public utility districts, water districts, and other municipalities exist near or adjacent to the Planning Area and include the City of Clovis, Pinedale Public Utility District, Pinedale County Water District, Malaga Water District, and Bakman Water Company. These entities could have construction projects

of new water or wastewater treatment facilities or other urban development that could cause similar significant environmental impacts as discussed above. Since the proposed project would result in potential significant environmental effects from the construction of expanded and new treatment facilities and sewer and water conveyance facilities, the project's contribution to cumulative environmental impacts would be considerable, and the project would result in a significant cumulative environmental impact.

As cumulative development occurs outside of the Planning Area, these developments may not result in additional demands on the existing treatment facilities and conveyance facilities. The City of Clovis is the only entity outside of the Planning Area that contributes wastewater to the Regional Facility. This contribution is currently limited to 9.3 MGD, and there is no additional capacity within the current or future expansion of the Regional Facility that is planned to be allocated to the City of Clovis. Currently, the sewer and water conveyance facilities serve areas within the Planning Area and no areas outside of the Planning Area. Cumulative development outside of the Planning Area is not expected to impact existing or future water or sewer facilities. Therefore, as identified above, the implementation of the General Plan Update would result in a significant impact on water and sewer facilities. This impact is also considered a significant cumulative impact.

Mitigation Measures

Project Specific

MM USS-4 A Traffic Control/Traffic Management Plan to address traffic impacts during construction of water and sewer facilities shall be prepared and implemented subject to approval by the City prior to construction. The plan shall identify hours of construction and for deliveries, include haul routes, identify access and parking restrictions, plan for notifications, identify pavement markings and signage, and a plan for coordination with emergency service providers and schools.

Implementation of Mitigation Measures AQ-1 through AQ-5, AES-1 through AES-5, BIO-1 through BIO-9, and CR-1 through CR-4 is required.

In addition to the above mitigation measures, the following measures are required to ensure adequate surface water treatment capacity is provided.

MM USS-5 Prior to exceeding existing water supply capacity, the City shall evaluate the water supply system and shall not approve additional development that demand additional water until additional capacity is provided. By approximately the year 2025, the following capacity improvements shall be provided.

- **C**onstruct an approximately 80 million gallon per day (MGD) surface water treatment facility near the intersection of Armstrong and Olive Avenues, in accordance with Chapter 9 and Figure 9-1 of the City of Fresno Metropolitan Water Resources Management Plan Update Phase 2 Report, January 2012 (2012 Metro Plan Update).

- Construct an approximately 30 MGD expansion of the existing northeast surface water treatment facility for a total capacity of 60 MGD, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct an approximately 20 MGD surface water treatment facility in the southwest portion of the City, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.

The following measure is to ensure that there are adequate wastewater collection system facilities for development through approximately the year 2025.

MM USS-6 Prior to exceeding capacity within the existing wastewater collection system facilities, the City shall evaluate the wastewater collection system and shall not approve additional development that would generate additional wastewater and exceed the capacity of a facility until additional capacity is provided. By approximately the year 2025, the following capacity improvements shall be provided.

- Orange Avenue Trunk Sewer: This facility shall be improved between Dakota and Jensen Avenues. Approximately 37,240 feet of new sewer main shall be installed and approximately 5,760 feet of existing sewer main shall be rehabilitated. The size of the new sewer main shall range from 27-inches to 42-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are RS03A, RL02, C01-REP, C02-REP, C03-REP, C04-REP, C05-REP, C06-REL and C07-REP.
- Marks Avenue Trunk Sewer: This facility shall be improved between Clinton Avenue and Kearney Boulevard. Approximately 12,150 feet of new sewer main shall be installed. The size of the new sewer main shall range from 33-inches to 60-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CM1-REP and CM2-REP.
- North Avenue Trunk Sewer: This facility shall be improved between Polk and Fruit Avenues and also between Orange and Maple Avenues. Approximately 25,700 feet of new sewer main shall be installed. The size of the new sewer main shall range from 48-inches to 66-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CN1-REL1 and CN3-REL1.
- Ashlan Avenue Trunk Sewer: This facility shall be improved between Hughes and West Avenues and also between Fruit and Blackstone Avenues. Approximately 9,260 feet of new sewer main shall be installed. The size of the new sewer main shall range from 24-inches to 36-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CA1-REL and CA2-REP.

The following measure is to ensure that there are adequate wastewater collection system facilities through buildout of the General Plan Update.

MM USS-7 Prior to exceeding capacity within the existing 28 pipeline segment shown on Figures 1 and 2 in Appendix J-1, the City shall evaluate the wastewater collection system and shall not approve additional development that would generate additional wastewater and exceed the capacity of one of the 28 pipeline segments until additional capacity is provided.

The following measures are to ensure that there are adequate water conveyance facilities for buildout conditions of the General Plan Update.

MM USS-8 Prior to exceeding capacity within the existing water conveyance facilities, the City shall evaluate the water conveyance system and shall not approve additional development that would demand additional water and exceed the capacity of a facility until additional capacity is provided. The following capacity improvements shall be provided by approximately 2025.

- Construct 65 new groundwater wells, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 2.0 million gallon potable water reservoir (Reservoir T2) near the intersection of Clovis and California Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 3.0 million gallon potable water reservoir (Reservoir T3) near the intersection of Temperance and Dakota Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 3.0 million gallon potable water reservoir (Reservoir T4) in the Downtown Planning Area, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 4.0 million gallon potable water reservoir (Reservoir T5) near the intersection of Ashlan and Chestnut Avenues, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct a 4.0 million gallon potable water reservoir (Reservoir T6) near the intersection of Ashlan Avenue and Highway 99, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct 50.3 miles of regional water transmission mains ranging in size from 24-inch to 48-inch, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.
- Construct 95.9 miles of 16-inch transmission grid mains, in accordance with Chapter 9 and Figure 9-1 of the 2012 Metro Plan Update.

MM USS-9 Prior to exceeding capacity within the existing water conveyance facilities, the City shall evaluate the water conveyance system and shall not approve additional

development that would demand additional water and exceed the capacity of a facility until additional capacity is provided. The following capacity improvements shall be provided after approximately the year 2025 and additional water conveyance facilities shall be provided prior to exceedance of capacity within the water conveyance facilities to accommodate full buildout of the General Plan Update.

- Construct a 4.0 million gallon potable water reservoir (SEDA Reservoir 1) within the northern part of the Southeast Development Area.
- Construct a 4.0 million gallon potable water reservoir (SEDA Reservoir 2) within the southern part of the Southeast Development Area.

Additional water conveyance facilities shall be provided prior to exceedance of capacity within the water conveyance facilities to accommodate full buildout of the General Plan Update.

Cumulative

Implementation of Mitigation Measures USS-4 through USS-9, AQ-1 through AQ-5, AES-1 through AES-5, BIO-1 through BIO-9, and CR-1 through CR-4 is required.

Level of Significance After Mitigation

Project Specific

Significant impact. The potential project impacts during the construction of the required facilities could remain significant and unavoidable. The implementation of the above measures would reduce the potential impact on the capacities of the water and sewer facilities to less than significant.

Cumulative

Significant impact. The project's contribution to potential cumulative impacts during the construction of the required facilities could remain significant and unavoidable. The implementation of the above measures would reduce the potential impact on the capacities of the water and sewer facilities to less than significant.

Stormwater Drainage Facilities

Impact USS-3	**The project would require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.**

Project Specific Impact Analysis

As development occurs throughout the Planning Area in accordance with the General Plan and Development Code Update, new and expanded storm water drainage facilities will be needed to adequately accommodate the increases in storm water flow due to the addition of impervious surfaces. Therefore, implementation of the General Plan Update would result in a significant impact on existing storm water drainage facilities.

Storm drainage facilities within the Planning Area as well as within Clovis are planned, implemented, operated, and maintained by the FMFCD. The existing and planned storm drainage facilities are documented in the Storm Drainage and Flood Control Master Plan (SDFCMP), which is developed and updated by FMFCD. The master plan drainage system for the Planning Area consists of 130 individual drainage areas or urban watersheds. The majority of the Planning Area is located within one of the individual drainage areas or urban watersheds. There are portions of the southeastern and western portions of the Planning Area that are not within an individual drainage area or watershed.

In 2007, the FMFCD approved the 2004 District Services Plan (Services Plan) that included flood control, local stormwater drainage, water conservation, and recreational uses within its service area. A Master EIR was prepared for the 2004 Services Plan, certified in 2007, and identified various programs including the local stormwater drainage program. This program includes facilities to accommodate future growth in accordance with land use plans approved in 2007 (i.e., the City of Fresno 2025 General Plan). These facilities include conveyance systems such as streets and gutters, storm drain inlets, storm drain pipelines, detention and retention basins, pump stations, and outfall facilities that collect and drain runoff from developed land areas. The Master EIR identified the potential environmental effects associated with the construction and operation of these future stormwater drainage facilities to adequately accommodate growth in accordance with the 2025 General Plan.

A Storm Drainage Technical Report was prepared by Blair, Church & Flynn in 2013 (see Appendix G-1-), to address changes in storm water volumes within the 130 individual drainage areas of the Planning Area. The analysis included an evaluation of existing basin storage compared to the required storage to accommodate the land uses under the 2025 General Plan. The comparison found that there were 37 existing drainage areas within the Planning Area that have deficient stormwater basin storage. The analysis also included an evaluation of the changes in the future basin storage to accommodate the land uses proposed under the General Plan Update. Please note that the Storm Drainage Technical Report referred to the General Plan Update as the 2035 General Plan; however, the land uses that were evaluated were those land uses that would not be buildout until the year 2056. Under this second evaluation, there were two previous drainage areas that were found to have deficient basin storage; however, under the land use proposed under the General Plan Update, the two drainage areas would no longer have deficient storage (see Appendix G-1). The second evaluation also found one additional drainage area that would have deficient basin storage compared to the 2025 General Plan evaluation. In addition to storage basins, the development of land uses under the General Plan Update may require additional facilities beyond the facilities identified in the 2004 Services Plan. However, the type of facilities would be similar such as streets and gutters, storm drain inlets, storm drain pipelines, detention and retention basins, pump stations, and outfall facilities that collect and drain runoff from developed land areas. Therefore, the environmental analysis provided in the Final Master EIR for the 2004 District Services Plan is anticipated to adequately address the potential impacts associated with future stormwater facilities. As a result, the Master EIR that was certified for the 2004 Services Plan is hereby incorporated by reference into this Master EIR. Following is a summary of the potential significant effects that could occur with the construction and operation of the future storm water drainage facilities.

Hydrology and Water Quality

Impact USS-3.1:

- The implementation of future stormwater drainage facilities could significantly affect surface water hydrology and stream/channel geomorphology through year-round restoration of intermittent channel flows. This is Impact 4.1-4 in the 2004 District Services Plan Master EIR.

Biological Resources

Impact USS-3.2:

- Future facilities could result in the loss and/or alteration of vernal pools, seasonal wetlands and other waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers. This loss is considered a potentially significant impact. This is Impact 4.2-2 in the 2004 District Services Plan Master EIR.

Impact USS-3.3:

- Future facilities could result in the loss of special-status plant species. This is Impact 4.2-3 in the 2004 District Services Plan Master EIR.

Impact USS-3.4:

- Future facilities could result in the loss of federally listed vernal pool invertebrates crustaceans. This is Impact 4.2-4 in the 2004 District Services Plan Master EIR.

Impact USS-3.5:

- Future facilities could result in the loss of suitable habitat for the valley elderberry longhorn beetle (VELB). This is Impact 4.2-5 in the 2004 District Services Plan Master EIR.

Impact USS-3.6:

- Future facilities could result in the loss of nesting birds. This is Impact 4.2-6 in the 2004 District Services Plan Master EIR.

Impact USS-3.7:

- Future facilities could result in the loss of burrowing owl nesting habitat. This is Impact 4.2-7 in the 2004 District Services Plan Master EIR.

Impact USS-3.8:

- Future facilities could affect migratory salmonids in the San Joaquin River. This is Impact 4.2-8 in the 2004 District Services Plan Master EIR.

Impact USS-3.9:

- Future facilities would contribute to the cumulative loss and/or damage of sensitive habitats supporting native plants and wildlife species. This is Impact 4.2-10 in the 2004 District Services Plan Master EIR.

Recreation/Trails

Impact USS-3.10:

- Future facilities could result in the incompatibilities with adopted existing or planned trails and associated recreational facilities within the District service area. This is Impact 4.4-1 in the 2004 District Services Plan Master EIR.

Agricultural Resources

Impact USS-3.11:

- Future facilities could convert Prime Farmland, Farmland of Statewide Importance, and/or Unique Farmland to non-agricultural use. This is Impact 4.5-1 in the 2004 District Services Plan Master EIR.

Impact USS-3.12:

- Future facilities would contribute to the cumulative permanent loss of important farmlands. This is Impact 4.5-3 in the 2004 District Services Plan Master EIR.

Air Quality

Impact USS-3.13:

- The construction and operation of the future projects could exceed the SJVAPCD annual thresholds of significance for oxides of nitrogen (NOx). This is Impact 4.6-2 in the 2004 District Services Plan Master EIR.

Impact USS-3.14:

- Construction of the future facilities would add to the cumulative levels of ozone precursors in the SJVAB. This is Impact 4.6-6 in the 2004 District Services Plan Master EIR.

The implementation of the General Plan Update objectives and policies identified in Sections Hydrology and Water Quality (Section 5.9), Biological Resources (Section 5.4), Public Services (Section 5.13), Agricultural Resources (Section 5.2), and Air Quality (Section 5.3) would reduce the potential significant effects from the construction and operation of the future storm water drainage facilities. However, even with the implementation of these objectives and policies, the potential significant impacts identified above would remain.

The remaining environmental issues, except for greenhouse gas emissions, were addressed within the Master EIR published in 2004 as well as the as the Notice of Preparation (NOP) and Initial Study (IS/NOP) that was published in 1999 and again with the draft and final versions of the Master EIR. Each of the remaining environmental issues would result in either no impact or a less than significant impact. The implementation of future storm water drainage facilities could increase greenhouse gas emissions, primarily during construction activities. However, construction of the proposed facilities is not expected to result in a substantial increase in greenhouse gas emissions because the emissions would be temporary and would cease after construction is completed. Operation of the facilities would include infrequent vehicle trips associated with routine inspections and possibly maintenance of the basins. These operational activities would not conflict with the state's ability to meet the

Assembly Bill (AB) 32 goals for the year 2020, and therefore, would result in a less than significant impact.

Cumulative Impact Analysis

The FMFCD extends beyond the current boundaries of the spheres-of-influences for the City of Fresno and City of Clovis, but does not include the portion of the Planning Area that encompasses the southern portion of SEDA. Construction projects that are located immediately adjacent to the FMFCD boundary could cause similar significant environmental impacts as discussed above. Since the proposed project would result in potential significant environmental effects from the construction of new storm water drainage facilities, the project's contribution to cumulative environmental impacts would be considerable, and the project would result in a significant cumulative environmental impact. In addition, future cumulative development could contribute additional storm water within the Planning Area and therefore result in additional impacts to existing drainage areas. The proposed project's contribution of storm water impacts to existing drainage areas is considerable and would result in a significant cumulative impact.

Mitigation Measures

The following mitigation measures are from the Master EIR for the 2004 District Services Plan that identified specific measures to reduce potential environmental effects associated with the future construction and operation of storm water drainage facilities. The mitigation measures below are anticipated to be required for to reduce construction and operational impacts associated with drainage facilities that accommodate land uses proposed under the General Plan Update.

Project Specific

Hydrology and Water Quality

The following mitigation measure would reduce potential hydrology impacts associated with Impact USS-3.1, above.

MM USS-10 Maintain operational intermittent flows during the dry season within define channel capacity and downstream capture capabilities for recharge.

Biological Resources

The following mitigation measures would reduce potential biological resources associated with Impact USS-3.1 through USS-3.1-9, above.

MM USS-11 (a) The FMFCD shall conduct preliminary investigations on undeveloped lands outside of highly urbanized areas. These investigations shall examine wetland hydrology, vegetation and soil types. These preliminary investigations shall be the basis for making a determination on whether or not more in-depth wetland studies shall be necessary. If the proposed project site does not exhibit wetland hydrology, support a prevalence of wetland vegetation and wetland soil types then no further action is required.

(b) Where proposed activities could have an impact on areas verified by the Corps as jurisdictional wetlands or waters of the U.S. (urban and rural streams, seasonal wetlands, and vernal pools), FMFCD shall obtain the necessary Clean Water Act, Section 404 permits for activities where fill material shall be placed in a wetland, obstruct the flow or circulation of waters of the United States, impair or reduce the reach of such waters (as part of the FMFCD's CDFG Memorandum of Understanding (MOU), Section 404 and 401 permits would be obtained from the U.S. Army Corps of Engineers and Regional Water Quality Control Board for any activity involving filling of jurisdictional waters). At a minimum, to meet "no net policy", the permits shall require replacement of wetland habitat at a 1:1 ratio.

(c) Where proposed activities could have an impact on areas verified by the Corps as jurisdictional wetlands or waters of the U.S. (urban and rural streams, seasonal wetlands, and vernal pools), FMFCD shall submit and implement a wetland mitigation plan based on the wetland acreage verified by the U.S. Army Corps of Engineers. The wetland mitigation plan shall be prepared by a qualified biologist or wetland scientist experienced in wetland creation, and shall include the following or equally effective elements:

(i) Specific location, size, and existing hydrology and soils within the wetland creation area.

(ii) Wetland mitigation techniques, seed source, planting specifications, and required buffer setbacks. In addition, the mitigation plan shall ensure adequate water supply is provided to the created wetlands in order to maintain the proper hydrologic regimes required by the different types of wetlands created. Provisions to ensure the wetland water supply is maintained in perpetuity shall be included in the plan.

(iii) A monitoring program for restored, enhanced, created, and preserved wetlands on the project site. A monitoring program is required to meet three objectives; 1) establish a wetland creation success criteria to be met, 2) to specify monitoring methodology, 3) to identify as far as is possible, specific remedial actions that will be required by Fresno Metropolitan Flood Control District in order to achieve the success criteria, and 4) to document the degree of success achieved in establishing wetland vegetation.

(d) A monitoring plan shall be developed and implemented by a qualified biologist to monitor results of any on-site wetland restoration and creation for five years. The monitoring plan shall include specific success criteria, frequency and timing of monitoring, and assessment of whether or not maintenance activities are being carried out and how these shall be adjusted if necessary. If monitoring reveals that success criteria are not being met, remedial habitat creation or restoration should be designed and implemented by a qualified biologist and subject to five years of monitoring as described above.

Or

(e) In lieu of developing a mitigation plan that outlines the avoidance, purchase, or creation of wetlands, the FMFCD could purchase mitigation credits through a Corps approved Mitigation Bank.

MM USS-12 (a) During facility design and prior to initiation of ground disturbing activities in areas that support seasonal wetlands or vernal pools, the FMFCD shall conduct a preliminary rare plant assessment. The assessment will determine the likelihood on whether or not the project site could support rare plants. If it is determined that the project site would not support rare plants then no further action required. However, if the project site has the potential to support rare plants; then a rare plant survey shall be conducted. Rare plant surveys shall be conducted by qualified biologists in accordance with the most current CDFG/USFWS guidelines or protocols and shall be conducted at the time of year when the plants in question are identifiable.

(b) Based on the results of the survey, prior to design approval, the FMFCD shall coordinate with CDFG and/or implement a Section 7 consultation with USFWS, shall determine whether the project facility would result in a significant impact to any special status plant species. Evaluation of project impacts shall consider the following:

- The status of the species in question (e.g., officially listed by the State or Federal Endangered Species Acts).
- The relative density and distribution of the on-site occurrence versus typical occurrences of the species in question.
- The habitat quality of the on-site occurrence relative to historic, current or potential distribution of the population.

(c) Prior to design approval, the FMFCD in consultation with the CDFG and/or the USFWS, shall prepare and implement a mitigation plan, in accordance with any applicable State and/or federal statutes or laws, that reduces impacts to a less than significant level.

MM USS-13 (a) During facility design and prior to initiation of ground disturbing activities in areas that support seasonal wetlands or vernal pools, the FMFCD shall conduct a preliminary survey to determine the presence of listed vernal pool crustaceans.

(b) If potential habitat (vernal pools, seasonally inundated areas) or fairy shrimp exist within areas proposed to be disturbed, FMFCD shall complete the first and second phase of fairy shrimp presence or absence surveys. If an absence finding is determined and accepted by the USFWS, then no further mitigation shall be required for fairy shrimp.

(c) If fairy shrimp are found to be present within vernal pools or other areas of inundation to be impacted by the implementation of storm drainage facilities, FMFCD shall mitigate impacts on fairy shrimp habitat in accordance with the USFWS requirements of the Programmatic Biological Opinion. This shall include

on-site or off-site creation and/or preservation of fairy shrimp habitat at ratios ranging from 3:1 to 5:1 depending on the habitat impacted and the choice of on-site or off-site mitigation. Alternatively, mitigation shall be the purchase of mitigation credit through an accredited mitigation bank.

MM USS-14 (a) During facility design and prior to initiation of construction activities, the FMFCD shall conduct a project-specific survey for all potential Valley Elderberry Longhorn Beetle (VELB) habitats (elderberry shrubs), including a stem count and an assessment of historic or current VELB habitat.

(b) The FMFCD shall avoid and protect all potential identified VELB habitat where feasible.

(c) Where avoidance is infeasible, develop and implement a VELB mitigation plan in accordance with the most current USFWS mitigation guidelines for unavoidable take of VELB habitat pursuant to either Section 7 or Section 10(a) of the Federal Endangered Species Act. The mitigation plan shall include, but might not be limited to, relocation of elderberry shrubs, planting of elderberry shrubs, and monitoring of relocated and planted elderberry shrubs.

MM USS-15 Prior to ground disturbing activities during nesting season (March through July) for a project that supports bird nesting habitat, the FMFCD shall conduct a survey of trees. If nests are found during the survey, a qualified biologist shall assess the nesting activity on the project site. If active nests are located, no construction activities shall be allowed within 250 feet of the nest until the young have fledged. If construction activities are planned during the no n-breeding period (August through February), a nest survey is not necessary.

MM USS-16 (a) FMFCD shall conduct a pre-construction breeding-season survey (approximately February 1 through August 31) of proposed project sites in suitable habitat (levee and canal berms, open grasslands with suitable burrows) during the same calendar year that construction is planned to begin.

If phased construction procedures are planned for the proposed project, the results of the above survey shall be valid only for the season when it is conducted.

(b) During the construction stage, FMFCD shall avoid all burrowing owl nest sites potentially disturbed by project construction during the breeding season while the nest is occupied with adults and/or young. The occupied nest site shall be monitored by a qualified biologist to determine when the nest is no longer used. Avoidance shall include the establishment of a 160-foot diameter non-disturbance buffer zone around the nest site. Disturbance of any nest sites shall only occur outside of the breeding season and when the nests are unoccupied based on monitoring by a qualified biologist. The buffer zone shall be delineated by highly visible temporary construction fencing.

Based on approval by CDFG, pre-construction and pre-breeding season exclusion measures may be implemented to preclude burrowing owl occupation of the project site prior to project-related disturbance. Burrowing owls can be passively excluded from potential nest sites in the construction area, either by closing the burrows or placing one-way doors in the burrows according to current CDFG

protocol. Burrows shall be examined not more than 30 days before construction to ensure that no owls have recolonized the area of construction. For each burrow destroyed, a new burrow shall be created (by installing artificial burrows at a ratio of 2:1 on protected lands nearby.

MM USS-17 (a) FMFCD shall not conduct instream activities in the San Joaquin River between October 15 and April 15. If this is not feasible, FMFCD shall consult with the National Marine Fisheries Service and CDFG on the appropriate measures to be implemented in order to protect listed salmonids in the San Joaquin River.

(b) Riparian vegetation on the levee shading the main channel that is removed or damaged as a result of levee raising shall be replaced at a ratio and quantity sufficient to maintain the existing shading of the channel. The location of replacement trees on or within the levees, detention ponds or channels shall be approved by the FMFCD and State Reclamation Board.

Recreation/Trails

The following measure would reduce potential impacts to existing and planned trails and associated recreational facilities as identified above in Impact USS-3.10, above.

MM USS-18 (a) Prior to final design approval of all elements of the District Services Plan, the FMFCD shall consult with Fresno County, City of Fresno, and City of Clovis to determine if any element would temporarily disrupt or permanently displace adopted existing or planned trails and associated recreational facilities as a result of the proposed District Services Plan. If the proposed project would not temporarily disrupt or permanently displace adopted existing or planned trails, no further mitigation is necessary. If the proposed project would have an effect on the trails and associated facilities, the FMFCD shall implement the following.

(b) If short-term disruption of adopted existing or planned trails and associated recreational facilities occur, the FMFCD shall consult and coordinate with Fresno County, City of Fresno, and City of Clovis to temporarily re-route the trails and associated facilities.

(c) If permanent displacement of the adopted existing or planned trails and associated recreational facilities occur, the appropriate design modifications to prevent permanent displacement shall be implemented in the final project design or the FMFCD shall replace these facilities.

Agricultural Resources

No feasible measures to reduce potential farmland impacts as identified above in Impact USS-3.11 and USS-3.12 are available.

Air Quality

The following measures would reduce potential impacts to air quality associated with Impact USS-3.13 through USS-3.1-14, above.

MM USS-19 (a) Minimize idling time of construction equipment vehicles to no more than ten minutes, or require that engines be shut off when not in use.

(b) Construction shall be curtailed as much as possible when the Air Quality Index (AQI) is above 150. AQI forecasts can be found on the SJVAPCD web site.

(c) Off-road trucks should be equipped with on-road engines if possible.

(d) Construction equipment should have engines that meet the current off-road engine emission standard (as certified by CARB), or be re-powered with an engine that meets this standard.

The following measure is to ensure that there is adequate storm water drainage facilities for buildout conditions of the General Plan Update.

MM USS-20 Prior to exceeding capacity within the existing storm water drainage facilities, the City shall coordinate with the Fresno Metropolitan Flood Control District to evaluate the storm water drainage system and shall not approve additional development that would convey additional storm water to a facility that would experience an exceedance of capacity until the additional capacity is provided.

Cumulative

Implementation of Mitigation Measures USS-10 through USS-20 is required.

Level of Significance After Mitigation

Project Specific

Significant impact. Significant and unavoidable impacts related to agricultural resources (Impact USS-3.11 and USS-3.12) and air quality (Impacts USS-3.13 and USS-3.14) would remain. The other remaining impacts would be reduced to less than significant.

Cumulative

Significant impact. Significant and unavoidable impacts related to agricultural resources (Impact USS-3.11 and USS-3.12) and air quality (Impacts USS-3.13 and USS-3.14) would remain. The other remaining impacts would be reduced to less than significant.

Water Supplies

Impact USS-4	**The project would not have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.**

Project Specific Impact Analysis

Based on the 2010 UWMP, projected water demand is based on a per capita target. For the years of 2020 and after, the per capita target is 250 gpcd. The projected water demand for the City of Fresno in the Year 2035, based on a population of 780,600, is 218,596 AF/year. The projected water demand for the City at full buildout of the General Plan Update, based on a population of 970,000, is 271,594 AF/year. The 2010 UWMP identifies firm water supplies for the future during normal years from the following sources and amounts as shown in Table 5.15-2.

Table 5.15-2: Water Supply Sources for Planning Area

Source	Quantity, Year 2035 and Buildout Year 2056 acre-feet per year (Normal Year)[1]
San Joaquin River (surface water)	58,200
Kings River (surface water)	126,500
Kings Sub-basin (ground water)	85,000
Total Water Supply	269,700

[1] Data obtained from the 2010 Urban Water Management Plan, 2012
Source: FirstCarbon Solutions 2014.

The water supplies identified above (269,700 AFY) are adequate to accommodate the demand in 2035 (i.e., 218,596 AF/year), but not the demand at buildout of the General Plan Update (i.e, 271,594 AF/year). Therefore, implementation of the General Plan and Development Code Update would not have sufficient water supplies available to serve buildout of the project and would result in a significant impact related to water supplies.

To reduce potential impacts on water supply, the General Plan Update includes the following policies:

Objective PU-8. Manage and develop the City's water facilities on a strategic timeline basis that recognizes the long-life cycle of the assets and the duration of the resources, to ensure a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.

Policy PU-8-a. Forecast Need. Utilize available and innovative tools, such as computerized flow modeling to determine system capacity, as necessary to forecast demand on water production and distribution systems by urban development, and to determine appropriate facility needs.

Policy PU-8-b. Potable Water Supply and Cost Recovery. Prepare for provision of increased potable water capacity (including surface water treatment capacity) in a timely manner to facilitate planned urban development consistent with the General Plan. Accommodate increase in water demand from the existing community with the capital costs and benefits allocated equitably and fairly between existing users and new users, as authorized by law, and recognizing the differences in terms of quantity, quality and reliability of the various types of water in the City's portfolio.

Policy PU-8-c. Conditions of Approval. Set appropriate conditions of approval for each new development proposal to ensure that the necessary potable water production and supply facilities and water resources are in place prior to occupancy.

Policy PU-8-d. CIP Update. Continue to evaluate Capital Improvement Programs and update them, as appropriate to meet the demands of both existing and planned development, including both intensification of established areas and new development within Development Areas, consistent with the General Plan.

Policy PU-8-e. Repairs. Continue to evaluate existing water production and distribution systems and plan for necessary repair or enhancement of damaged or antiquated facilities.

Policy PU-8-f. Water Quality. Continue to evaluate and implement measures determined to be appropriate and consistent with water system policies, including prioritize the use of groundwater, installation of well-head treatment facilities, construction of above-ground storage and surface water treatment facilities, and enhancing transmission grid mains to promote adequate water quality and quantity.

Policy PU-8-g. Review Project Impact on Supply. Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.

The implementation of the above policies would reduce the potential impact on water supplies; however, the impact on water supplies will remain significant.

Cumulative Impact Analysis

The 2012 Kings Basin Integrated Regional Water Management Plan (IRWMP) was developed by the Kings Basin Water Authority, of which the City of Fresno is a member, to provide regional planning and management of water resources in the Kings Basin. The purpose of the Kings Basin IRWMP is provide a multi-agency, regional planning and management approach to maintaining a sustainable supply of the surface and groundwater resources for the water users within the basin (Kings Basin Water Authority, 2012). Other members of the Kings Basin Water Authority include: Alta Irrigation District, City of Clovis, City of Sanger, City of Dinuba, City of Reedley, City of Parlier, City of Kingsburg, City of Selma, City of Kerman, Fresno County, Tulare County, Consolidated Irrigation District, Fresno Irrigation District, Fresno Metropolitan Flood Control District, Kings County Water District, and Kings River Conservation District. The Kings Water Authority has promulgated a series of goals to maintain a sustainable water supply for the planning area. These include (Kings Basin Water Authority, 2012):

RG1: Halt, and ultimately reverse the current overdraft and provide for sustainable management of surface and groundwater

RG2: Increase the water supply reliability, enhance operations flexibility, and reduce system constraints

RG3: Improve and protect water quality

RG4: Provide additional flood protection

RG5: Protect and enhance aquatic ecosystems and wildlife habitat

To accomplish these goals, the Kings Basin Water Authority has developed Measurable Objectives, Resource Strategies, and Project and Programs. The current planning horizon of the Kings Basin IRWMP is the Year 2032.

The Kings Basin IRWMP has developed strategies to achieve the regional goal to reduce groundwater overdraft. These include (Kings Basin Water Authority, 2012):

1. Increase conjunctive use of water and groundwater storage.
2. Precipitation enhancement.
3. Increase surface storage.
4. Regional conveyance enhancement.
5. Increase recycled water use for recharge.
6. Remediation of contaminated groundwater and reinjection of the treated water.
7. Encourage the use of stormwater runoff for recharge by agencies that collect and discharge stormwater.
8. Increasing number and storage capacities of basins to store flood flows.
9. Protect recharge areas from urban development.

The Kings Basin Water Authority has developed a project review process to identify projects, rank their ability to achieve the goals of the Authority as articulated in the Kings Basin IRWMP. Participating agencies within the Kings Sub-basin vet projects with the Authority and funds are allocated to finance all or portions of projects that work to achieve the goals, including Goal RG1, reduce groundwater overdraft.

While not an instant panacea for the cumulative impacts to the availability of potable water in the Kings Basin, the coalition of water agencies that make up the Kings Water Authority and their stated goal to provide sustainable water supplies through education and providing funding for projects that work to achieve this goal through implementing the aforementioned strategies. This effort will be a long-term effort on of the Kings Basin Water Authority. Although the effort of the Kings Basin Water Authority would reduce potential impacts on water supplies, the implementation of the proposed General Plan and Development Update could contribute to impacts related to water supplies. This contribution of potential impacts is considered cumulatively considerable and a significant cumulative impact.

Mitigation Measures

Project Specific

Implementation of Mitigation Measure USS-5 is required prior to approximately the year 2025.

MM USS-21 Prior to exceeding existing water supply capacity, the City shall evaluate the water supply system and shall not approve additional development that demand additional water until additional capacity is provided. By approximately the year 2025, the City shall construct an approximately 25,000 AF/year tertiary recycled water expansion to the Fresno-Clovis Regional Wastewater Reclamation Facility in

accordance with the January 2012 City of Fresno Metropolitan Water Resources Management Plan.

Cumulative

Implementation of Mitigation Measures USS-5 and USS-21 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Wastewater Treatment Capacity

Impact USS-5	**The project would not result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.**

Project Specific Impact Analysis

As discussed in Section 5.15-2, the City of Fresno owns and operates two wastewater treatment facilities. They are the Fresno/Clovis Regional Wastewater Reclamation Facility and the North Fresno Wastewater Reclamation Facility. The Regional Facility currently has a capacity of 80 MGD. The North Facility has a capacity of 0.71 MGD. The implementation of the proposed General Plan Update is projected to increase demand to require an expansion of the Regional Facility by 70 MGD to accommodate growth associated with the 2025 General Plan which is equivalent to the current growth projection for the year 2035 and an additional expansion of 33.6 MGD that would occur at the Regional Facility (9.6 MGD) and at the water treatment plant at the SEDA (24 MGD) by buildout of the General Plan Update. The proposed General Plan Update is projected to increase demand due to future growth associated with the year 2035. This demand would require an expansion of the North Facility by 0.49 MGD. No additional increase in capacity at the North Facility would be required to accommodate development between the year 2035 and buildout of the General Plan Update.

Therefore, the existing wastewater treatment capacity at the Regional Facility and North Facility is not adequate to serve the future development anticipated under the General Plan Update. Therefore, the proposed project would result in significant impacts to existing wastewater treatment capacity.

The General Plan Update includes the following policies designed to reduce water quality impacts that may be associated with wastewater treatment operations and discharges.

Policy PU-6-a. Treatment Capacity and Cost Recovery. Prepare for and consider the implementation of increased wastewater treatment and reclamation facility capacity in a timely

manner to facilitate planned urban development within the Metropolitan Area consistent with this General Plan. Accommodate increase in flows and loadings from the existing community with the capital costs and benefits allocated equitably and fairly between existing users and new users, as authorized by law.

Policy PU-6-b. Consider Capacity in Plan Amendments. Monitor wastewater treatment plant flows and loadings to the extent feasible. Consider the effects on wastewater treatment capacity and availability of potable water when evaluating General Plan amendment proposals, specific plans, and Quarter Section Plans.

Objective PU-7. Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

Policy PU-7-a. Reduce Wastewater. Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.

Policy PU-7-b. Reduce Stormwater Leakage. Reduce storm water infiltration into the sewer collection system, where feasible, through a program of replacing old and deteriorated sewer collection pipeline; eliminating existing stormwater sewer cut-ins to the sanitary sewer system; and avoiding any new sewer cut-ins except when required to protect health and safety.

Policy PU-7-c. Biosolid Disposal. Investigate and implement economically effective and environmentally beneficial methods of biosolids handling and disposal.

Policy PU-7-d. Wastewater Recycling. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.

Policy PU-7-e. Infiltration Basins. Continue to rehabilitate existing infiltration basins, and if determined appropriate, pursue acquiring additional sites for infiltration basins, as needed.

Policy PU-7-f. Food and Drink Industry. Ensure adequate provision of facilities for the appropriate management of wastewater from wineries, food processing and beverage facilities, including conformance with Waste Discharge Requirements issued by the Regional Water Quality Control Board.

Cumulative Impact Analysis

Public utility districts and other municipalities exist near or adjacent to the planning area and include the City of Clovis, the Pinedale Public Utility District, Pinedale County Water District, and Malaga Utility District. These entities have wastewater treatment facilities that may not be adequate to serve future populations. As a result, there could be significant impacts associated with wastewater treatment capacity. Since the existing treatment facilities are not adequate to accommodate full buildout of the proposed General Plan Update, the project's contribution to potential cumulative wastewater treatment capacity would be considerable and result in a significant cumulative impact.

Mitigation Measures

The following mitigation measures are required to reduce the impacts to be less than significant.

Project Specific

Implementation of Mitigation Measures USS-1 through USS-3 is required.

Cumulative

Implementation of Mitigation Measures USS-1 through USS-3 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Landfill Capacity

Impact USS-6	**The project would not be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.**

Project Specific Impact Analysis

To determine the amount of solid waste that could be generated by the General Plan Update, the analysis uses information provided by the City of Fresno as well as CalRecycle. The following solid waste generation rates are used for the analysis:

- Single-Family Residential = 10 lbs./unit/day
- Multiple-Family Residential = 7 lbs./unit/day
- Commercial/Office/Public Facility = 6 lbs./1,000 sq ft /day
- Mixed Use = 6 lbs./1,000 sq ft /day
- Industrial = 6 lbs/1,000 sq ft /day

New residential, commercial, mixed use, and industrial land uses included within the boundaries of the proposed General Plan Update would increase the population by approximately 425,000 new residents. In addition, the buildout of the land uses identified in the General Plan Update includes the future development of approximately 60,626 single-family residential dwelling units, 84,538 multi-family residential dwelling units, 63.3 million square feet (msf) of commercial, 20.8 msf of mixed use, and 40.5 msf of industrial. The increase in growth and development as a result of the implementation of the General Plan Update could result in an increase of solid waste to transfer centers, landfills, and could contribute to an increased demand for solid waste services throughout the Planning Area.

Error! Reference source not found. below shows the estimated generated wastes for each land use.

Table 5.15-3: Estimated Waste Generation

Land Use	Existing Development units or msf	Buildout Development Under General Plan and Development Code Update units or msf	Incremental Increase units or msf	Solid Waste Generation Rate	Estimated Existing Solid Waste Generated	Estimated Buildout Solid Waste Generated Under General Plan and Development Code Update	Estimated Incremental Increase in Solid Waste Generated
Single-Family Residential	118,897 units	179,523 units	60,626 units	10 lbs per/unit/day[1]	1,188,970 lbs/day (595 tons/day)	1,795,230 lbs/day (898 tons/day)	606,260 lbs/day (303 tons/day)
Multiple-family Residential	67,943 units	152,481 units	84,538 units	7 lbs/unit/day[1]	475,601 lbs/day (238 tons/day)	1,067,367 lbs/day (534 tons/day)	591,766 lbs/day (296 tons/day)
Commercial/Office/Public Facility	66.4 msf	129.7msf	63.3 msf	6 lbs/1,000 sq ft/day[2]	398,400 lbs/day (199 tons/day)	778,200 lbs/day (389 tons/day)	379,800 pounds/day (190 tons/day)
Mixed Use	0.1 msf	20.9msf	20.8 msf	6 lbs/1,000 sq ft/day[2]	600 lbs/day (1 ton/day[4])	125,400 lbs/day (63 tons/day)	124,800 lbs/day (62 tons/day)
Industrial	72.8 msf	113.3 msf	40.5 msf	6 lbs/1,000 sq ft/day[3]	436,800 lbs/day (218 tons/day)	679,800 lbs/day (340 tons/day)	243,000 lbs/day (122 tons/day)
Total					1,251 tons/day	2,224 tons/day	973 tons/day

Notes:
msf – million square feet
units – dwelling units
lbs - pounds
1 Source: CalRecycle, Waste Characterization, Residential Developments: Estimated Solid Waste Generation Rates, 2014.
2 Source: CalRecycle, Waste Characterization, Commercial Sector: Estimated Solid Waste Generation Rates, 2014
3 Source: CalRecycle, Waste Characterization, Industrial Sector: Estimated Solid Waste Generation Rates, 2014
4 Rounded up to the nearest one.
Source: FirstCarbon Solutions, 2014.

As shown on Table 5.15-3 above, development under the General Plan Update would result in the generation of approximately 973 additional tons of solid waste. Based on the estimated closure dates of the American Avenue Landfill in 2031, Clovis Landfill in 2047, and Coalinga Landfill in 2029, there is a potential for additional landfill capacity needed to accommodate the additional development anticipated under the General Plan Update. Therefore, development under the General Plan Update could result in a significant impact on landfill capacity.

Waste Stream Diversion

With the remaining capacity and lifespan at the landfills identified above, the increase in solid waste generated by development under the proposed General Plan Update would exceed capacity of the landfill if the estimated waste streams above occur in the future. However, AB 939 mandates the reduction of solid waste disposal in landfills, and the City is currently achieving a 71 percent diversion rate (based on 2009 data) which is anticipated to increase due to a Fresno City Council resolution that commits the City to the goal of a Zero Waste goal by 2025. This analysis assumes a worst-case scenario and does not factor in the diversion rate.

City of Fresno General Plan

The General Plan Update includes the following policies relevant to solid waste.

Public Services and Utilities

Objective PU-9: Provide adequate solid waste facilities and services for the collection, transfer, recycling, and disposal of refuse.

Policy PU-9-a. New Techniques. Continue to collaborate with affected stakeholders and partners to identify and support programs and new techniques of solid waste disposal, such as recycling, composting, waste to energy technology, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.

PU-9-b. Compliance with State Law. Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.

PU-9-c. Cleanup and Nuisance Abatement. Continue and enhance, where feasible, community sanitation programs that provide services to neighborhoods for cleanup, illegal dumping, and nuisance abatement services.

PU-9-d. Facility Siting. Locate Private or public waste facilities and recycling facilities in conformance with local land use requirements, State, and federal regulations so that transportation, processing and disposal of these materials are not detrimental to the public health, safety, welfare, and aesthetic well-being of the surrounding community.

PU-9-e. Tire Dumping. Adopt and implement as determined appropriate measures to eliminate illegal tire dumping.

The implementation of the above policies would reduce potential impacts on landfill capacity; however, as a worst-case assumption, development under the General Plan Update would still result in a significant impact on landfill capacity.

Cumulative Impact Analysis

Future development associated with buildout of the proposed General Plan Update and associated cumulative projects within Fresno County that contribute waste to landfills within the County of Fresno could impact the landfill capacity and recycling facility capacities. Since the proposed project could contribute to the impact on the capacity of the landfills within the County or other recycling facilities, the project's contribution to the landfill and/or recycling facility capacity impact would be considerable and would be cumulatively significant.

Mitigation Measures

Project Specific

MM USS-22 Prior to exceeding landfill capacity, the City shall evaluate additional landfill locations and shall not approve additional development that could contribute solid waste to a landfill that is at capacity until additional capacity is provided.

Cumulative

Implementation of Mitigation Measure USS-22 is required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

Compliance with Solid Waste Regulations and Statutes

Impact USS-7	**The project would comply with federal, state, and local statutes and regulations related to solid waste.**

Project Specific Impact Analysis

Construction and operational activities that generate solid waste are handled, transported, and disposed of in accordance with applicable Federal, State, and local regulations pertaining to municipal waste. With development in accordance with the General Plan Update, solid waste will continue to be handled, transported, and disposed of according to all applicable Federal, State, and local regulation pertaining to municipal waste disposal. As shown in Table 5.15-3, the anticipated long-term generation of solid waste from the development in accordance with the General Plan Update could increase by approximately 973 tons per day for a total of approximately 2,224 tons per day for the entire Planning Area. The City currently has a number of provisions that require or promote recycling and waste reduction. As an example, the City has the Construction and

Demolition Recycling Ordinance that requires contractors to recycle construction and demolition debris.

Implementation of the proposed project would comply with existing statutes and regulations and would result in a less than significant impact.

Cumulative Impact Analysis

All development projects would be required to comply with Federal, State, and local statutes and regulations related to solid waste. Pursuant to the California Integrated Waste Management Act of 1989 (AB 939), every city and county in the State is required to divert 50 percent of solid waste generated in its jurisdiction away from landfills. Implementation of source reduction measures, such as recycling, would serve to divert solid waste away from landfills. Cumulative development would be required to comply with existing statutes and regulations, and therefore, cumulative impacts related to solid waste would be less than significant. The proposed project's contribution to statutes and regulation compliance would be less than considerable and therefore, the project would result in a less than significant cumulative impact.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.

5.16 - Energy Conservation

5.16.1 - Introduction

This section describes the existing energy resources that are provided to the City of Fresno Planning Area as well as within the State. Information used for the preparation of this section includes data from the General Plan Update Resource Conservation and Resilience Element, Pacific Gas & Electric Company (PG&E), and California Department of Transportation. Potential impacts associated with energy conservation are assessed.

5.16.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding energy is the City of Fresno Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative energy impacts is the Pacific Gas and Electric's (PG&E) service area that spans approximately 70,000 square miles from Eureka in the north to Bakersfield in the south and from the Pacific Ocean in the west to the Sierra Nevada in the east.

Energy Resources

As discussed in the Resource Conservation and Resilience Element of the proposed General Plan, Pacific Gas and Electric (PG&E) provides almost all the energy for the City of Fresno Planning Area. PG&E provides electricity and natural gas services throughout its service area.

Electricity

PG&E identifies service territories for their electric transmission system. The Planning Area is located within the Greater Fresno Area service territory. This service area interconnects to the bulk PG&E transmission system by 12 transmission circuits. They include nine 230 kV lines, three 500/230 kv electrical banks, and one 70 kV line. This transmission system connects to the Gates substation in the south, Moss Landing in the west, Los Banos in the northwest, Bellota in the northeast, and Templeton in the southwest. The Greater Fresno area generates approximately 3,987 Megawatts (MW) of electricity through thermo, hydro, solar, and biomass facilities. The largest electrical generating facility is the Helms Pumped Storage Plant that pumps water up and down between two reservoirs located at different elevations. This facility produces and stores up to 1,212 MW of electricity that represents approximately 30 percent of the electricity produced in the Greater Fresno area.

Based on electrical demand factors that were provided by PG&E as shown in Table 5.16-1, the approximate residential demand is approximately 2,610 kWh per person per year and the non-residential demand is approximately 7,503 kWh per employee per year. Based on the Year 2010 residential population of 545,000 and an employment population of 209,261 for the Planning Area, the residential population would result in a demand for approximately 1,422 million kWh/year and

the non-residential demand would be approximately 1,570 million kWh/year for a total of 2,992 million kWh/year.

Table 5.16-1: Year 2010 Electrical Demand within City of Fresno Planning Area

Use	Population or Employment	Demand Factor (kWh/person/year)[1]	Total (million kWh/year)
Residential	545,000[2]	2,610	1,422
Non-Residential	209,261[3]	7,503	1,570
Total			2,992

[1] Pacific Gas & Electric, 2012.
[2] Obtained from Table 3-3 in Section 3, Project Description.
[3] Fehr & Peers, 2013.
Source: FirstCarbon Solutions 2014

Natural Gas

PG&E's natural gas system encompasses approximately 70,000 square miles in Northern and Central California. Approximately 90 percent of the natural gas supply for PG&E is from out-of-state imports. The primary pipeline that extends through California includes Lines 400 and 401 consisting of 725 miles of 36-inch and 42-inch pipelines. These pipelines extend from the TransCanada's system that originates in Canada and extends through Malin, Oregon. In addition, there is Line 300 that consists of 1,004 miles of 34-inch pipeline that extends from four interstate pipelines through Topock, Arizona. The natural gas system includes various storage facilities and compressor stations along the transmission lines.

Based on natural gas demand factors that were provided by PG&E as shown in Table 5.16-2, residential demand is approximately 138 therms per person per year and the non-residential demand is approximately 403 therms per employee per year. Based on a 2010 residential population of 545,000 and an employment population of 209,261 for the Planning Area, the residential population would result in a natural gas demand for approximately 75 million therms per year and the non-residential demand would be approximately 84 million therms per year for a total of approximately 159 therms per year.

Table 5.16-2: Year 2010 Natural Gas Demand within City of Fresno Planning Area

Use	Population or Employment	Demand Factor (therms/person/year)[1]	Total (million therms/year)
Residential	545,000[2]	138	75
Non-Residential	209,261[3]	403	84
Total			159

[1] Pacific Gas & Electric, 2012.
[2] Obtained from Table 3-3 in Section 3, Project Description.
[3] Fehr & Peers, 2013
Source: FirstCarbon Solutions 2014

Petroleum

According to the U.S. Energy Information Administration, California is one of the top producers of crude oil in the nation, accounting for almost one-tenth of the production in the United States. Drilling operations are concentrated in the San Joaquin basin in the southern half of the Central Valley and drilling occurs offshore in both State and Federal waters. California ranks third in the U.S. in petroleum refining capacity and accounts for more than one-tenth of the total U.S. capacity (U.S. Energy Information Administration, 2014)

California motorists are required to use a special motor gasoline blend call California Clean Burning Gasoline. In 2004, California completed a transition from methyl tertiary butyl-ether (MBTE) to ethanol as a gasoline oxygenate additive, making California the largest ethanol fuel market in the U.S. There are four ethanol production plants in central and southern California, but most of California's ethanol supply is transported by rail from corn-based producers in the Midwest.

California's petroleum consumption for 2012 was approximately 620 million barrels, accounting for approximately 9.2 percent of total U.S. consumption, (motor vehicle gasoline accounted for approximately 29 million barrels or 9.4 percent of total U.S. consumption (Voegele, 2013). Based on the last version of the California Motor Vehicle Stock, Travel and Fuel Forecast, which was in 2008, the total vehicle miles traveled in California in 2010, was approximately 346 billion, and the total vehicle miles traveled in the County of Fresno in 2010 was approximately 8.576 billion (California Department of Transportation, 2009).

According to the 2008 California Motor Vehicle Stock, Travel and Fuel Forecast, the average fuel consumption by all classes of motor vehicles was projected to be 18.200 miles per gallon in 2010 and 18.754 miles per gallon in 2030.

Based on the vehicle miles traveled within the Planning Area (see Appendix F-1, Greenhouse Gas Emissions Reduction and Modeling Results), the vehicle miles traveled per year for 2010 was approximately 2.987 billion miles by gasoline powered vehicles and 358 million miles by diesel-powered vehicles as shown in Table 5.16-3. Based on an average of 18.2 miles per gallon of gasoline or diesel (average of all vehicle types), approximately 164 million gallons of gasoline and approximately 20 million gallons of diesel were consumed in 2010.

Table 5.16-3: Year 2010 Fuel Consumption within City of Fresno Planning Area

Vehicle Fuel	Vehicle Miles Traveled Per Year (in millions)[1]	Average Miles Per Gallon[2]	Total (million gallons/year)
Gasoline	2,987[3]	18.2	164
Diesel	358[4]	18.2	20
Total			184

[1] Appendix -, Greenhouse Gas Emissions
[2] California Department of Transportation, June 2009
[3] Derived from the estimated total vehicle miles per year for 2010 (approximately 3,344 million miles per year) and the

Vehicle Fuel	Vehicle Miles Traveled Per Year (in millions)[1]	Average Miles Per Gallon[2]	Total (million gallons/year)
estimated percentage of vehicle miles traveled by a vehicle using gasoline (89.3 percent). [4] Derived from the estimated total vehicle miles per year for 2010 (approximately 3,344 million miles per year) and the estimated percentage of vehicle miles traveled by a vehicle using gasoline (10.7 percent). Source: FirstCarbon Solutions 2014			

5.16.3 - Regulatory Setting

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. Generally, federal agencies influence and regulate transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy related research and development projects, and through funding for transportation infrastructure improvements. On the state level, the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) are two agencies with authority over different aspects of energy.

The CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies and serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy (California Public Utilities Commission, 2012).

The California Energy Commission is the state's primary energy policy and planning agency. The CEC forecasts future energy needs, promotes energy efficiency, supports energy research, develops renewable energy resources and plans for/directs state response to energy emergencies (California Energy Commission, 2012). Some of the more relevant federal and state energy-related laws and plans are discussed below.

Federal Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. This Act enabled Congress to establish the first fuel economy standards for on-road motor vehicles in the United States. In compliance with this Act, the National Highway Traffic and Safety Administration has the responsibility for establishing additional vehicle standards and revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon and since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 miles per gallon. Currently, heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not subject to fuel economy standards. Compliance with federal fuel economy standards is determined based on the basis of each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, administered by U.S. EPA, was

created to determine vehicle manufacturers' compliance with the fuel economy standards. The CAFE value is calculated by the U.S. EPA for each manufacturer based on city and highway fuel economy test results and vehicle sales. Using the information generated under the CAFE program, the United States Department of Transportation has the authority to assess penalties for noncompliance (South Coast Air Quality Management District. 2012).

Energy Policy Act of 2005

This Act addresses energy efficiency; renewable energy requirements; oil, natural gas and coal; alternative-fuel use; tribal energy, nuclear security; vehicles and vehicle fuels, hydropower and geothermal energy, and climate change technology. The Act provides revised annual energy reduction goals (two percent per year beginning in 2006), revised renewable energy purchase goals, federal procurement of Energy Star or Federal Energy Management Program-designated products, federal green building standards, and fuel cell vehicle and hydrogen energy system research/demonstration (South Coast Air Quality Management District, 2012).

Corporate Average Fuel Economy (CAFE) Program

The Corporate Average Fuel Economy (CAFE) Program was enacted by Congress in 1975. The purpose of the program is to reduce the consumption of energy by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) has set standards to increase CAFE levels rapidly over the next several years, which will improve the nation's energy security and save consumers money on fuel (NHTSA, 2012). The United States' CAFE Program is administered by the United States Environmental Protection Agency (U.S. EPA). The program was created to determine vehicle manufacturers' compliance with the fuel economy standards. The CAFE value for each manufacturer is calculated based on city and highway fuel economy test results and vehicle sales. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the U.S. The United States Department of Transportation has the authority to assess penalties for non-compliance, based on information that is generated under the CAFE program (South Coast Air Quality Management District, 2012).

Energy Independence and Security Act of 2007 (EISA)

In December 2007 the Energy Independence and Security Act of 2007 was signed into law. The objectives of the Act are to stage the United States for greater energy independence and security, increase the production of clean renewable fuels, protect consumers, increase the efficiency of products, buildings and vehicles, promote greenhouse gas research, improve the energy efficiency of the Federal government, and improve vehicle fuel economy (South Coast Air Quality Management District, 2012).

The Act contains a renewable fuel standard that requires 36 billion gallons of ethanol per year by 2022, and corn ethanol is limited to 15 billion gallons. Additionally, this Act establishes appliance energy efficiency standards for: boilers, dehumidifiers, dishwashers, clothes washers, external power supplies, commercial walk-in coolers and freezers, federal buildings; lighting energy efficiency

standards for general service incandescent lighting in 2012; and standards for industrial electric motor efficiency (South Coast Air Quality Management District, 2012).

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) was enacted to promote the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs), such as Fresno COG, were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values that were to guide transportation decisions in that metropolitan area. The planning process for specific projects would then address these policies. Another requirement was to consider the consistency of transportation planning with federal, state, and local energy goals. Through this requirement, energy consumption was expected to become a decision criterion, along with cost and other values that determine the best transportation solution.

The Transportation Equity Act for the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. The Transportation Equity Act for the 21st Century was enacted June 1998 and authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 1998-2003 period.

The TEA 21 Restoration Act

The TEA 21 Restoration Act, enacted July 1998, provided technical corrections to the original law. TEA-21 builds on the initiatives established in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). TEA-21 provides initiatives to address the goals of improving safety, protecting and enhancing communities and the natural environment, and advancement of America's economic growth and competitiveness through efficient and flexible transportation (U.S. Department of Transportation, 2012).

Moving Ahead for Progress in the 21st Century Act (MAP-21)

On July 6, 2012, President Obama signed into law P.L. 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21). Funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014, MAP-21 is the first long-term highway authorization enacted since 2005. MAP-21 provides funds and a policy and programmatic framework to guide development of the country's transportation infrastructure. MAP-21 creates a program to address improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.

California Solar Initiative

In January 2006, the California Public Utilities Commission (CPUC) approved the California Solar Initiative (CSI), which provides $2.9 billion in incentives between 2007 and 2017. The CPUC oversees

the California Solar Initiative, and includes a $2.5 billion program for commercial and existing residential customers, funded through revenues and collected from gas and electric utility distribution rates. Additionally, the California Energy Commission (CEC) will manage $350 million targeted for new residential building construction, using funds, which were already allocated to the CEC to foster renewable projects between 2007 and 2011 (South Coast Air Quality Management District, 2012).

State of California Energy Action Plan

The CEC initially adopted the Energy Action Plan in 2003, which identified emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The CEC's goal for the Energy Action Plan is to ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies, including prudent reserves, are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers (California Energy Commission, California Public Utilities Commission, and Consumer Power and Conservation Financing Authority, 2003). The plan called for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identified a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

Integrated Energy Policy Report

In 2002, Senate Bill 1389 was passed that requires the California Energy Commission to prepare the Integrated Energy Policy Report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources, protect the environment, ensure reliable, secure, and diverse energy supplies. The report is required to be prepared every two years. Information from the Energy Action Plan was incorporated into this policy report and the Energy Action Plan was no longer updated.

Title 24, Energy Efficiency Standards

Title 24, which was promulgated by the CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption, provides energy efficiency standards for residential and nonresidential buildings.

First adopted in 1977, the Standards have been periodically updated approximately on a three-year cycle. The most recent update, the 2013 Building Energy Efficiency Standards, went into effect on July 1, 2014. A copy of the 2013 Energy Efficiency Standards may be reviewed on-line at http://www.energy.ca.gov/2012publications/CEC-400-2012-004/CEC-400-2012-004-CMF-REV2.PDF.

According to the CEC, reducing energy use has been a benefit to all. Building owners save money, Californians have a more secure and healthy economy, the environment is less negatively impacted, and our electrical system can operate in a more stable state. The 2013 Standards (for residential and nonresidential buildings) are expected to reduce the growth in electricity use by 613 gigawatt-hours

per year (GWh/yr) and reduce the growth in natural gas use by 10 million therms per year (therms/yr).

City of Fresno 2025 General Plan Resource Conservation Element

G-9-a Policy. The city shall continue its leadership role in energy conservation through its own facilities and operations.

- The city shall continue its existing beneficial energy conservation programs.
- All new construction and major renovations in municipal buildings shall conform to applicable Title 24 energy standards.

G-9-b Policy. The city shall periodically consult with utilities and regulatory, and state-level planning agencies to refine service demand estimates and to facilitate area-wide energy distribution.

G-9-c. Policy. Through its regulation of land use planning and development, the city will provide for energy conservation.

- Current energy-efficient planning and construction guidelines will be maintained.
- Environmental review of development projects (including changes in land use designations) will include a description of energy consumption and conservation features that are, or feasibly could be, incorporated into these projects.
- Siting, building orientation, structural design, and landscaping of a proposed land use or development project will be considered in relation to energy efficiency. Energy efficiency will be a factor that is considered in the decision process for projects.
- In regard to the Solar Rights and Solar Shade Acts of 1978, the city shall observe provisions in state law regarding solar access and shall continue to study whether further legislation is necessary.
- At the interface of commercial or industrial and residential land uses, or the interface of multi-family with single-family residential land uses, height restrictions and/or setbacks should be used at the common boundary to ensure solar access to structures on both sides of the boundary.
- Updated information on California Title 24 and other energy conservation guidelines and measures will be made available to staff and the area construction industry.

5.16.4 - Thresholds of Significance

CEQA Thresholds

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impacts on the environment. The criteria used to determine the significance of an energy conservation impact is based on Appendix F of the State CEQA Guidelines as identified

below. Accordingly, energy conservation impacts associated with the proposed project are considered significant if the project would:

a) Result in the inefficient, wasteful and unnecessary consumption of energy? (See Energy Consumption, Impact EC-1)

5.16.5 - Project Impacts and Mitigation Measures

Energy Consumption

Impact EC-1	**The project would not result in the inefficient, wasteful and unnecessary consumption of energy.**

Project Specific Impact Analysis

Development in accordance with the proposed General Plan and Development Code Update would increase the population within the Planning Area from 545,000 persons to a projected 970,000 persons as well as result in an approximately 88 percent increase in non-residential employment. This increase in development will increase the demand for electricity and natural gas and increase the consumption of fuel by motor vehicles.

Electricity

As shown in Table 5.16-4, the approximate residential demand for electricity at buildout is projected to be approximately 2,532 million kWh/year and the non-residential demand is projected to be approximately 2,950 million kWh/year for a total of approximately 5,482 million kWh/year. Based on a 2010 consumption of approximately 2,992 kWh per year, development in accordance with the General Plan and Development Code Update would result in an incremental increase of approximately 2,490 million kWh/year within the Planning Area. This estimate was based on electrical demand factors for residential and non-residential uses (i.e., persons and employees) identified in Table 5.16-1 and Table 5.16-4.

Table 5.16-4: Buildout (Year 2056) Electrical Demand within City of Fresno Planning Area

Use	Population or Employment	Demand Factor (kWh/person/year)[1]	Total (million kWh/year)
Residential	970,000[2]	2,610	2,532
Non-Residential	393,200[3]	7,503	2,950
Total Year 2056 Electrical Demand			5,482
2010 Electrical Demand			2,992
Incremental Increase in Electrical Demand			2,490

[1] Pacific Gas & Electric, 2012.
[2] Obtained from Table 3-3 in Section 3, Project Description.
[3] Fehr & Peers, 2013.
Source: FirstCarbon Solutions 2014

Natural Gas

As shown in Table 5.16-5, the approximate residential demand for natural gas at buildout is projected to be approximately 134 million therms/year and the non-residential demand is projected to be approximately 158 million therms/year for a total of approximately 292 million therms/year. Based on a 2010 consumption of approximately 159 million therms per year, development in accordance with the General Plan and Development Code Update would result in an incremental increase of approximately 133 million therms/year within the Planning Area. This estimate was based on natural gas factors for residential and non-residential uses (i.e., persons and employees) identified in Table 5.16-2 and Table 5.16-5.

Table 5.16-5: Buildout (Year 2056) Natural Gas Demand within City of Fresno Planning Area

Use	Population or Employment	Demand Factor (therms/person/year)[1]	Total (million therms/year)
Residential	970,000[2]	138	134
Non-Residential	393,200[3]	403	158
Total Year 2056 Natural Gas Demand			292
Year 2010 Natural Gas Demand			159
Incremental Increase in Natural Gas Demand			133

[1] Pacific Gas & Electric, 2012.
[2] Obtained from Table 3-3 in Section 3, Project Description.
[3] Fehr & Peers, 2013
Source: FirstCarbon Solutions 2014

Fuel

As shown in Table 5.16-6, the approximate demand for gasoline at buildout is projected to be approximately 334 million gallons/year, and the demand for diesel is projected to be approximately 47 million gallons/year for a total of approximately 381 million gallons/year. Based on a 2010 fuel demand of approximately 184 million gallons per year, development in accordance with the General Plan and Development Code Update would result in an incremental increase in fuel demand of approximately 197 million gallons/year within the Planning Area. This estimate was based on the projected vehicles miles traveled for 2056 for vehicles powered by gasoline and diesel.

Table 5.16-6: Buildout (Year 2056) Fuel Consumption within City of Fresno Planning Area

Vehicle Fuel	Vehicle Miles Traveled Per Year (in millions)[1]	Average Miles Per Gallon[2]	Total (million gallons/year)
Gasoline	6,273[3]	18.754	334
Diesel	888[4]	18.754	47
Total Year 2056 Fuel Consumption			381
Year 2010 Fuel Consumption			184
Incremental Increase in Fuel Consumption			197

[1] Appendix -, Greenhouse Gas Emissions
[2] California Department of Transportation, June 2009. The average miles per gallons for the year 2030 was used because there were no further projections beyond the year 2030.
[3] Derived from the estimated total vehicle miles per year for 2056 (approximately 7,161 million miles per year) and the estimated percentage of vehicle miles traveled by a vehicle using gasoline (87.6 percent).
[4] Derived from the estimated total vehicle miles per year for 2056 (approximately 7,160 million miles per year) and the estimated percentage of vehicle miles traveled by a vehicle using gasoline (12.4 percent).
Source: FirstCarbon Solutions 2014

To reduce the potential use of electricity, natural gas and fuel, the City has various objectives and policies within the General Plan Update. These objectives and policies are identified below.

Objective UF-12: Locate roughly one-half of future residential development in infill areas — defined as being within the 2012 city limits—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land.

Policy UF-12-a: Bus Rapid Transit Development Corridors. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.

Policy UF-12-b: Intensive Activity Centers. Mixed-use designated areas along BRT corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.

Policy UF-12-d: Appropriate Mixed-Use. Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one site or adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.

Policy UF-12-e: Access to Activity Centers. Promote adoption and implementation of standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.

Objective UF-14: Create an urban form to facilitate multi-modal connectivity.

Policy UF-14-a: Design Guidelines for Walkability. Develop and use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.

Policy LU-3-c: Zoning for High Density on Major BRT Corridors. Encourage adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish the long-term growth and development potential for Downtown.

Policy LU-5-f: High Density Residential Uses. Promote high-density residential uses to support Activity Centers and BRT Corridors, affordable housing, and walkable access to transit stops.

Policy LU-6-b: Commercial Development Guidelines. Adopt commercial development guidelines to assure high quality design and site planning for large commercial developments, consistent with the Urban Form policies of this Plan.

Policy LU-6-g: Lodging Facilities Location. Site lodging facilities and related accommodations near major transportation facilities.

Policy LU-8-b: Access to Public Facilities. Ensure that major public facilities and institutions have adequate multi-modal access and can be easily reached by public transit.

Policy RC-4-e: Support Employer-Based Efforts. Support and promote employer implementation of staggered work hours and employee incentives to use carpools, public transit and other measures to reduce vehicular use and traffic congestion.

Policy RC-4-f: Municipal Operations and Fleet Actions. Continue to control and reduce air pollution emissions from vehicles owned by the City and municipal operations and facilities by undertaking the following:

- Expand the use of alternative fuel, electric, and hybrid vehicles in City fleets.
- Create preventive maintenance schedules that will ensure efficient engine operation.
- Include air conditioning recycling and charging stations in the City vehicle maintenance facilities, to reduce freon gases being released into the atmosphere and electrostatic filtering systems in City maintenance shops, when feasible or when required by health regulations.
- Use satellite corporation yards for decentralized storage and vehicle maintenance.
- Convert City-owned emergency backup generators to natural gas fuels whenever possible, and create an advanced energy storage system.

Policy RC-4-g. FAX Actions. Continue efforts to improve Fresno Area Express (FAX) bus transit system technical performance, reduce emission levels, streamline system operations, and implement

Bus Rapid Transit (BRT) where supportive land uses are proposed by the General Plan Land Use Diagram (Figure LU-1).

Objective RC-8. Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

Policy RC-8-a. Existing Standards and Programs. Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.

Policy RC-8-b. Energy Reduction Targets. Strive to reduce per capita residential electricity use to 1,800 kWh per year and non-residential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy source, and cost-effective savings.

Policy RC-8-c. Energy Conservation in New Development. Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.

Policy C-8-d. Incentives. Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Policy RC-8-e. Energy Use Disclosure. Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

Policy RC-8-f. City Heating and Cooling. Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.

Policy RC-8-g. Revolving Energy Fund. Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Policy RC-8-h. Solar Assistance. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Policy RC-8-i. Renewable Target. Adopt and implement a program to increase the use of renewable energy to meet a given percentage of the City's peak electrical load within a given time frame.

Policy RC-8-j. Alternative Fuel Network. Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

Policy RC-8-k. Energy Efficiency Education. Provide long-term and on-going education of homeowners and businesses as to the value of energy efficiency and the need to upgrade existing structures on the regular basis as technology improves and structures age.

With the implementation of the above objectives and policies, the proposed project would result in no impacts related to the inefficient, wasteful and unnecessary consumption of energy.

Cumulative Impact Analysis

Development of cumulative projects within the PG&E service area which encompasses 70,000 square miles would result in a substantial increase in electricity and natural gas demand as well as an increase in the consumption of fuel for vehicles. The jurisdictions throughout the PG&E service area are working with the state to reduce the consumption of energy. Given that development within the Planning Area would be required to adhere to the policies identified in the General Plan Update, future development in the Planning Area would not contribute to potential cumulative impacts associated with the potential inefficient, wasteful and unnecessary consumption of energy within other parts of the PG&E service area. The project would not contribute because compliance with the objectives and policies identified above would not result in the inefficient, wasteful and unnecessary consumption of energy. As an example, Policy RC-8-b includes reducing residential and non-residential electricity use. In addition, there are various other policies to reduce the demand for electricity and natural gas. Furthermore, the General Plan Update includes intensive land uses and transit opportunities to reduce fuel consumption. The implementation of the project would result in no cumulative impacts related to the inefficient, wasteful and unnecessary consumption of energy.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

No impact.

Cumulative

No impact.

SECTION 6: OTHER CEQA CONSIDERATIONS

6.1 - Growth Inducing Impacts

Section 15126.2(d) of the CEQA Guidelines requires that an EIR evaluate the growth inducing impacts of a proposed action:

> Discuss the way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects that would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also, discuss the characteristic of some projects, which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

There are two types of growth inducing impacts, direct and indirect. To assess the potential for growth inducing impacts, the project characteristics that may encourage and facilitate activities that may individually or cumulatively affect the environment must be evaluated.

Growth-inducing impacts can occur when the development of a project imposes new burdens on a community by directly inducing population growth, or by leading to the construction of additional developments in the same area of the proposed project. Also included in this category are projects that would remove physical obstacles to population growth (such as a new road into an undeveloped area or a wastewater treatment plant with excess capacity that could allow additional new development in the service area). Construction of these types of infrastructure projects cannot be considered isolated from the development they facilitate and serve. Projects that physically remove obstacles to growth or projects that indirectly induce growth are those that may provide a catalyst for future unrelated development in the area (such as a new residential community that requires additional commercial uses to support residents).

Based on the information provided in CEQA Section 15126.2(d) quoted above, two specific issues must be addressed when determining the growth-inducing impacts of a project:

> **Elimination of Obstacles to Population Growth**: The extent to which additional infrastructure capacity (such as extension of roads, sewer, water infrastructure etc.) or change in regulatory structure (such as a change in policies) will allow additional development; and

Economic Growth: The extent to which a proposed project could result in increased activity in the local economy or the regional economy.

Each of the growth-inducing impacts above are discussed in more detail below.

6.1.1 - Elimination of Obstacles to Population Growth

Eliminating physical or regulatory obstacles to growth can result in a growth-inducting impact because those obstacles are removed. An example of a physical obstacle to growth is the need for public service infrastructure (such as roadways, water mains, sewer lines etc.). Extending public service infrastructure into an area that lacks infrastructure would induce population growth because the infrastructure needed to serve the area would be available, and therefore, the area would then have the capacity to allow population growth. Also, the addition, deletion or alteration of a regulatory obstacle (such as a growth or development policy) could result in new growth because the regulatory obstacle would be altered such that new growth would subsequently not be hindered.

The Fresno General Plan Update policies provide for the expansion of transportation and utility infrastructure to accommodate new growth within the Planning Area in accordance with the General Plan Update. This new growth would accommodate approximately 970,000 people at buildout that is projected to be in the year 2056. The General Plan Update includes Policy LU-1-f, which states that the City's current Sphere of Influence boundary shall be maintained without expansion, except for uses associated with the future High Speed Rail (HSR) maintenance yard. This policy is intended to direct growth primarily to locations within the Planning Area. The HSR maintenance yard is not part of the General Plan Update, and at this time, the specific location of the maintenance yard has not been determined by the HSR Authority. Various alternative locations extend from Merced to Bakersfield. If the area directly south of the Planning Area is selected for the future HSR maintenance yard, the City of Fresno would be required to approve a General Plan amendment and a zone change as well as obtain an approval of an annexation by the Fresno Local Area Formation Commission.

In addition to population growth, the City would experience an increase in employment. As discussed in Section 5.12 of this Master EIR, there are approximately 9,993 employees who resided in the Planning Area in 2010 who left the Planning Area for employment. In 2010, the resident employees to jobs ratio was 0.95. In the buildout year of 2056, approximately 7,363 employees are projected to reside in the Planning Area and leave the Planning Area for employment. In 2056, the resident employees to jobs ratio would be 0.98, which is closer to a balanced ratio of 1.0 employee who resides in the Planning Area to a job within the Planning Area. Therefore, growth in accordance with the General Plan and Development Code Update would provide a beneficial effect on the resident employees to jobs ratio compared to the 2010 ratio. A greater balanced resident employee to jobs ratio would support the conclusion that the proposed General Plan land uses would not induce growth outside of the Planning Area to accommodate residents or employment within the Planning Area.

6.1.2 - Promotion of Economic Growth

The promotion of economic growth is the extent to which a proposed project could cause increased activity in the local or regional economy. A "multiplier effect" is an economic phrase, which pertains to the interrelationships between various sectors of the economy. The multiplier effect is a quantitative description and can be described as how an increase in some economic activity starts a chain reaction that generates more activity than the original increase. During the development of the proposed General Plan Update, the City planned for residential development to accommodate the Fresno Council of Government's population projections and extend the projections to accommodate future residential development planned within the Planning Area. To account for the planned residential growth within the Planning Area, the City identified a variety of non-residential designated areas to support the future residents. The non-residential areas are designated for commercial, employment uses such as office and industrial, mixed use, public facilities, and open space. These non-residential uses are intended to accommodate the economic growth anticipated to occur through buildout of the General Plan Update in 2056. Therefore, the implementation of the project would not result in further economic development beyond the development anticipated from buildout of the General Plan.

6.2 - Significant Irreversible Changes

As mandated by the CEQA Guidelines, an EIR must address any significant irreversible environmental change that would result from project implementation. According to Section 15126.2(c) of the CEQA Guidelines, such a change would occur if one of the following scenarios is involved:

- The project would involve a large commitment of nonrenewable resources;
- Irreversible damage can result from environmental accidents associated with the project; and
- The proposed consumption of resources is not justified (e.g., the project would result in the wasteful use of energy).

The environmental effects of the proposed project are thoroughly discussed in Section 5, Environmental Impact Analysis, of this Master EIR and summarized in the Executive Summary. Implementation of the project would require the long-term commitment of natural resources and land, as discussed below.

Approval and implementation of actions related to future development in accordance with the General Plan and Development Code Update would result in an irretrievable commitment of nonrenewable resources such as energy and construction materials. As discussed in Section 5.16, Energy, of this Master EIR, the General Plan Update includes an objective and policies to reduce the consumption of non-renewable energy resources by adhering to the California Energy Code, establishing standards and regulations to achieve energy conservation targets, and providing incentives and financing programs to reduce energy use.

The consumption of nonrenewable or slowly renewable resources would result from the implementation of future projects developed in accordance with the General Plan and Development

Code Update. These resources include, but are not limited to, lumber and other forest products, sand and gravel, asphalt and concrete, steel, copper, lead, water, electricity, natural gas, and oil.

6.3 - Significant and Unavoidable Impacts

The environmental effects of the proposed project, along with recommended mitigation measures, are discussed in detail in Section 5, Environmental Impact Analysis, of this Master EIR and summarized in the Executive Summary. The following environmental issues were determined to be less than significant, or can be reduced to less than significant with the incorporation of mitigation measures:

- Biological Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Population and Housing
- Public Services
- Energy

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe any significant impacts, including those that can be mitigated but not reduced to less than significant levels, as a result of implementation of the project. The following environmental issues were determined to result in potential significant and unavoidable impacts.

- Aesthetics – visual character and illumination of the dark sky.
- Agricultural Resources – loss of farmland and removal of Williamson Act Contract land.
- Air Quality – criteria pollutant emissions and toxic air contaminants pollutant concentrations.
- Cultural Resources – potential removal of historic resources.
- Greenhouse Gases – increase in greenhouse gas emissions beyond the year 2020.
- Noise – exceed noise standards and substantial permanent increases in noise levels.
- Transportation and Traffic – potentially exceed thresholds of levels of service on roadways under the jurisdictions of the County of Fresno, City of Clovis, and Caltrans.
- Utility and Service Systems – construction of water, wastewater, and drainage facilities that could cause substantial impacts associated with loss of agriculture and increases in air emissions.

SECTION 7: ALTERNATIVES TO THE PROPOSED PROJECT

7.1 - Introduction

In accordance with Section 15126.6 of the CEQA Guidelines, as amended, this Draft Master EIR contains a comparative evaluation of the proposed project with the alternatives to the project, including a No Project Alternative. Per Section 15126.6 of the CEQA Guidelines, this section focuses on alternatives to the proposed General Plan and Development Code Update (proposed project) that are capable of avoiding or substantially lessening any significant adverse impacts associated with the proposed project, despite the possibility that the alternatives could impede attainment of project objectives. Additionally, the alternatives could result in new impacts that would not have resulted from the proposed project. CEQA requires that an alternatives analysis provide sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.

Under case law and CEQA Section 15126.6(f), the discussion of alternatives need not be exhaustive and is subject to a rule of reason. CEQA Section 15126.6(d) states that "if an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternatives shall be discussed, but in less detail than the significant effects of the project as proposed." Determining factors that may be used to eliminate alternatives from detailed consideration in an EIR are (a) failure to meet most of the basic project objectives, (b) infeasibility, or (c) inability to avoid significant environmental impacts. CEQA Section 15364 defines "feasibility" as "Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

An EIR need not consider an alternative whose effects cannot be reasonably ascertained, whose implementation is remote and speculative, or whose execution does not substantially lessen or avoid the significant effects of the project.

The implementation of the General Plan and Development Code Update would result in significant and unavoidable impacts and significant impacts prior to mitigation incorporated, but less than significant with mitigation incorporated. These potential significant and unavoidable impacts and less than significant impacts with mitigation incorporated are evaluated for each of the alternatives that are considered and evaluated as discussed below.

The environmental issues that were found to be significant and unavoidable include the following:

- Aesthetics – visual character and illumination of the dark sky.
- Agricultural Resources – loss of farmland and removal of Williamson Act Contract land.
- Air Quality – criteria pollutant emissions and toxic air contaminants pollutant concentrations.
- Cultural Resources – potential removal of historic resources.

- Greenhouse Gases – increase in greenhouse gas emissions beyond the year 2020.
- Noise – exceed noise standards and substantial permanent increases in noise levels.
- Transportation and Traffic – potentially exceed thresholds of levels of service on roadways under the jurisdictions of the County of Fresno, City of Clovis, and Caltrans.
- Utility and Service Systems – construction of water, wastewater, and drainage facilities that could cause substantial impacts associated with loss of agriculture and increases in air emissions.

The following impacts were found to be significant prior to mitigation and less than significant with mitigation incorporated.

- Biological Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Public Services

The impacts that were found to be less than significant or no impact include geology and soils, land use and planning, population and housing, and energy conservation.

As addressed in Section 3, Project Description, of this Draft Master EIR, the following are the objectives of the General Plan and Development Code Update.

1. Increase opportunity, economic development, business and job creation.
2. Support a successful and competitive Downtown.
3. Emphasize conservation, successful adaptation to climate and changing resource conditions, and performance effectiveness in the use of energy, water, land, buildings, natural resources, and fiscal resources required for the long-term sustainability of Fresno.
4. Emphasize achieving healthy air quality and reduced greenhouse gas emissions.
5. Support agriculture as an integral industry and sustainable food production system.
6. Protect, preserve, and enhance natural, historic, and cultural resources.
7. Provide for a diversity of districts, neighborhoods, housing types (including affordable housing), residential densities, job opportunities, recreation, open space, and educational venues that appeal to a broad range of people throughout the City.
8. Develop “complete neighborhoods” and districts with a compact and diverse mix of residential densities, building types, and affordability which are designed to be healthy, attractive, and centered by schools, parks, public and commercial services to provide a sense of place and that meet daily needs within walking distance.
9. Promote a city of healthy communities and improve quality of life in existing neighborhoods.

10. Emphasize increased land use intensity and mixed-use development at densities supportive of greater use of transit in Fresno.
11. Emphasize and plan for all modes of travel on local and major streets in Fresno.
12. Resolve existing public infrastructure and service deficiencies, make full use of existing infrastructure, and invest in improvements to increase competitiveness and promote economic growth.
13. Emphasize the City as a role model for growth management planning, regional cooperation, collaborative planning, efficient processing and permit streamlining, public-private partnerships and shared financing, sustainable urban development policies, environmental quality, and a strong economy, and work with other jurisdictions and institutions to further these values throughout the region.
14. Provide a network of safe, well-maintained parks, open spaces, athletic facilities, and walking and biking trails connecting the city's districts and neighborhoods to attract and retain a broad range of individuals, benefit the health of residents, and provide the level of public amenities required to encourage and support development of higher density urban living and transit use.
15. Improve Fresno's visual image and enhance its form and function through urban design strategies and effective maintenance.
16. Protect and improve public health and safety.
17. Recognize, respect, and plan for Fresno's cultural, social, and ethnic diversity, and foster an informed and engaged citizenry.
18. Retain the existing sphere-of-influence.
19. Provide project development direction for future annexations within the existing sphere-of-influence.
20. Encourage development within urban infill areas.

During the development process of the General Plan and Development Code Update as well as during the scoping process, various alternatives were identified. Sections 7.2 and 7.3 provide discussions of the alternatives. These discussions include brief descriptions of the alternatives and documentation why the alternative was rejected, or if the alternative was not rejected, providing a comparative evaluation to the proposed project.

7.2 - Alternatives Considered But Rejected

Following are the alternatives to the proposed General Plan and Development Code Update that were considered but rejected. As discussed below, Concept Alternative A was rejected from further consideration. Concept Alternatives B through E are similar to the Growth Area Expansion that is evaluated in Section 7.3.3.

7.2.1 - The Boulevard Plan – Concept Alternative A

This alternative is known as Concept Alternative A from the Alternatives Report that was prepared for the General Plan Citizens Committee in March 2012. This plan is similar, but different than the proposed project. This alternative provides a slightly higher gross density (9.4 dwelling units per acre) compared to the proposed project (9.12 dwelling units per acre). The number of residential units associated with this alternative is anticipated to be slightly more under buildout conditions compared to the proposed project. The amount of non-residential development is assumed to be the same as the proposed project. As a result, this alternative would result in higher densities and potentially a greater number of residential units. An increase in the number of residential units when factoring in the same amount of other development as the proposed project would result in greater environmental effects. These greater effects could be aesthetics (visual character and lighting), air emissions, greenhouse gas emissions, noise, public services, traffic, and utilities in the areas with greater residential densities compared to the proposed project. This alternative would not avoid a significant and unavoidable effect of the proposed project. This alternative could meet all of the project objectives. However, since this alternative would not avoid a significant and unavoidable environmental effect of the proposed project, this alternative meets one of the factors identified above to eliminate an alternative from detailed consideration in this Master EIR as discussed in Section 15126.6 (c) of the CEQA guidelines.

7.2.2 - The Growth Areas Plan – Concept Alternative B

This alternative is known as Concept Alternative B from the Alternatives Report that was prepared for the General Plan Citizens Committee in March 2012. This alternative includes more housing units and a lower gross density (7.5 dwelling units per acre) compared to the proposed project (9.12 dwelling units per acre). With a lower density and greater number of units, this alternative would result in more residential acreage compared to the proposed project; however, the amount of non-residential development is assume to be the same, but more dense than the proposed project. Development of this alternative could result in less environmental effects due to lower residential densities, but greater environmental effects due to a greater amount of residential units. A similar increase in residential development (i.e., four percent more than the proposed project) is evaluated in Section 7.3.3 (Growth Area Expansion). The Growth Area Expansion also includes lower residential densities (i.e., 5.3 units per acre) compared to the proposed project. As a result, Section 7.3.3 includes an evaluation of an alternative that has similar components as this alternative.

7.2.3 – The Expanded SOI Plan – Alternative Concept C

This alternative is known as Concept Alternative C from the Alternatives Report that was prepared for the General Plan Citizens Committee in March 2012. This alternative is similar to the Growth Area Expansion that is evaluated in Section 7.3.3. This alternative includes a similar four percent increase in residential units and the same gross average residential density as the Growth Area Expansion. In addition, this alternative as well as the Growth Area Expansion would include a similar amount of non-residential development. Therefore, see Section 7.3.3 for an evaluation of an alternative with similar components as this alternative.

7.2.4 – The Hybrid Plan – Concept Alternative D

This alternative is known as Concept Alternative D from the Alternatives Report that was prepared for the General Plan Citizens Committee in March 2012. This alternative would result in a greater amount of residential development, less gross average residential density (6.7 units per gross acre), and expand outside of the Planning Area. This alternative would result in similar components as the Growth Area Expansion Alternative discussed in Section 7.3.3. Both of these alternatives would expand the Planning Area and reduce the gross average residential density compared to the proposed project. Potential environmental effects associated with this alternative would be similar to the potential environmental effects associated with the Growth Area Expansion Alternative discussed in Section 7.3.3. Therefore, see Section 7.3.3 for an evaluation of an alternative with similar components as this alternative.

7.2.4 – BIA Alternative – Concept Alternative E

This alternative is known as Concept Alternative E that was included for consideration by the General Plan Citizens Committee in April 2012. This alternative includes similar development parameters as those that are evaluated in the Growth Area Expansion Alternative discussed in Section 7.3.3. The similar development parameters are gross average residential densities (5.3 units per gross acre), expansion of the Planning Area, and an approximately four percent increase in residential development compared to the proposed project. Therefore, see Section 7.3.3 for an evaluation of an alternative with similar components as this alternative.

7.3 - Alternatives Considered and Evaluated

An evaluation of four alternatives to the proposed project is provided below. These alternatives represent a reasonable range of alternatives to the proposed project. This analysis includes alternatives that could feasibly accomplish most of the basic objectives of the proposed project and could avoid or substantially lessen one or more of the significant effects.

Following is an evaluation of each of the alternatives to the proposed project that were further considered for analysis. Table 7-1 provides a summary of impacts comparison between the proposed project and the project alternatives. Table 7-1`includes the impacts of the alternatives and compares each impact to the impacts of the proposed project. Table 7-1 also provides the level of impact significance for each issue.

For each impact issue listed, Table 7-1 first gives the level of significance under the project and each alternative, and then in parenthesis it compares the impact of the alternative to the project. For example, where the project's impact, Effects on Species, is shown as "LSM" (less than significant with mitigation), the table shows that the impact of the Growth Area Reduction Alternative would also be "LSM" but the alternative would have less impact than the project, "(L)". The analysis of each alternative assumes that all applicable mitigation measures as well as objectives and policies of the General Plan Update could be implemented with the appropriate alternative. However, applicable mitigation measures may be scaled to reduce or avoid a potential impact of the alternative under consideration and may not precisely match those identified for proposed project.

Table 7-1: Comparison Summary of Impacts between the Proposed Project and Project Alternatives

Environmental Issue	Proposed General Plan and Development Code Update	No Project - No Development	No Project - Development in Accordance with Existing 2025 General Plan	Growth Area Expansion Alternative	Growth Area Reduction Alternative
Aesthetics					
Scenic Vista	LS	NI (L)	LS (L)	LS (G)	LS (L)
Scenic Resources within a State Scenic Highway	NI	NI (E)	NI (E)	NI (E)	NI (E)
Visual Character	SU	NI (L)	SU (L)	SU (G)	SU (L)
Light and Glare (Illumination of night sky)	SU	NI (L)	SU (L)	SU (G)	SU (L)
Agricultural Resources					
Convert Farmland to Non-Agricultural Use	SU	NI (L)	SU (E)	SU (G)	SU (L)
Conflict with Existing Zoning or Williamson Act Contract	SU	NI (L)	SU (E)	SU (G)	SU (L)
Other Changes Resulting in Conversion to Non-Agricultural or Non-Forest Use	NI	NI (E)	NI (E)	NI (E)	NI (E)
Air Quality					
Air Quality Plan	LS	NI (L)	LS (E)	LS (G)	LS (L)
Air Quality Standards/Violations (CO and SOx)	LS	NI (L)	LS (L)	LS (G)	LS (L)
Criteria Pollutants (Exceedance of ROG, NOx, PM10, and PM2.5 standards)	SU	NI (L)	SU (L)	SU (G)	SU (L)
Sensitive Receptors (Substantial Pollutant Concentrations)	SU	NI (L)	SU (L)	SU (G)	SU (L)
Odors	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Biological Resources					
Effect on Species	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Riparian Habitat	LSM	NI (L)	LSM (E)	LSM (G)	LSM (L)

NI = No Impact
LS = Less Than Significant, No Mitigation Required
LSM = Less Than Significant with Mitigation
SP = Speculative (Impact is too speculative to assess)

(E) = Equivalent Impact (same level of impact significance compared to the proposed project)
(L) = Lesser adverse impact (lesser level of impact compared to the proposed project)
(G) = Greater adverse impact (greater level of impact compared to the proposed project)

Environmental Issue	Proposed General Plan and Development Code Update	No Project - No Development	No Project - Development in Accordance with Existing 2025 General Plan	Growth Area Expansion Alternative	Growth Area Reduction Alternative
Federally Protected Wetlands	LSM	NI (L)	LSM (E)	LSM (G)	LSM (L)
Wildlife Corridors and Nursery Sites	LS	NI (L)	LS (E)	LS (E)	LS (L)
Local Policies or Ordinances Protection Biological Resources	LS	NI (L)	LS (E)	LS (E)	LS (L)
Conservation Plans	NI	NI (E)	NI (E)	NI (E)	NI (E)
Cultural Resources					
Historical Resources	SU	NI (L)	SU (L)	SU (E)	SU (E)
Archaeological Resources	LSM	NI (L)	LSM (E)	SU (G)	SU (L)
Unique Paleontological Resources/Site or Unique Geologic Feature	LSM	NI (L)	LSM (E)	SU (G)	SU (L)
Human Remains	LSM	NI (L)	LSM (E)	SU (G)	SU (L)
Geology and Soils					
Earthquakes (Exposure to Fault Ruptures)	LS	NI (L)	LS (E)	LS (E)	LS (E)
Seismic Ground Shaking)	LS	NI (L)	LS (E)	LS (E)	LS (E)
Seismic Ground Failure	LS	NI (L)	LS (E)	LS (E)	LS (E)
Landslides	LS	NI (L)	LS (E)	LS (E)	LS (E)
Soil Erosion or Topsoil Loss	LS	NI (L)	LS (L)	LS (G)	LS (L)
Unstable Geologic Location (landslide, lateral spreading, subsidence, liquefaction or collapse)	LS	NI (L)	LS (E)	LS (E)	LS (E)
Expansive Soil	LS	NI (L)	LS (E)	LS (E)	LS (E)
Wastewater Disposal Systems (Soils Incapable to Support Use of Septic Tanks)	NI	NI (E)	NI (E)	NI (E)	NI (E)

NI = No Impact
LS = Less Than Significant, No Mitigation Required
LSM = Less Than Significant with Mitigation
SP = Speculative (Impact is too speculative to assess)

(E) = Equivalent Impact (same level of impact significance compared to the proposed project)
(L) = Lesser adverse impact (lesser level of impact compared to the proposed project)
(G) = Greater adverse impact (greater level of impact compared to the proposed project)

Environmental Issue	Proposed General Plan and Development Code Update	No Project - No Development	No Project - Development in Accordance with Existing 2025 General Plan	Growth Area Expansion Alternative	Growth Area Reduction Alternative
Greenhouse Gases					
Greenhouse Gas Emissions	SU	NI (L)	SU (L)	SU (G)	SU (L)
Conflict with Plan, Policy, or Regulation that Reduces Emissions	LS	NI (L)	LS (E)	LS (E)	LS (E)
Hazards and Hazardous Materials					
Routine Use (Hazard Caused by Routine Transport, Use, or Disposal)	LS	NI (L)	LS (L)	LS (G)	LS (L)
Accident Conditions (Accidental Release of Hazardous Materials)	LS	NI (L)	LS (L)	LS (G)	LS (L)
Schools (Hazardous Emissions or Materials Within One-Quarter Mile of School)	LS	NI (L)	LS (L)	LS (G)	LS (L)
Hazardous Materials Site Listing (Create a Significant Hazard to Public or Environment)	LS	NI (L)	LS (L)	LS (G)	LS (L)
Airports (Safety Hazard)	LSM	NI (L)	LS (L)	LSM (E)	LSM (E)
Emergency Plans (Physically Interfere with Plans)	LSM	NI (L)	LSM (E)	LSM (E)	LSM (E)
Wildland Fires	LS	NI (L)	LS (E)	LS (E)	LS (E)
Hydrology and Water Quality					
Water Quality Standards and Requirements	LS	NI (L)	LS (E)	LS (E)	LS (E)
Groundwater Supplies and Recharge	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Drainage Pattern: Erosion or Siltation	LS	NI (L)	LS (L)	LS (G)	LS (L)
Drainage Pattern: Flooding	LS	NI (L)	LS (L)	LS (G)	LS (L)
Runoff Water and Drainage Systems	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Water Quality	LS	NI (L)	LS (L)	LS (G)	LS (L)

NI = No Impact
LS = Less Than Significant, No Mitigation Required
LSM = Less Than Significant with Mitigation
SP = Speculative (Impact is too speculative to assess)

(E) = Equivalent Impact (same level of impact significance compared to the proposed project)
(L) = Lesser adverse impact (lesser level of impact compared to the proposed project)
(G) = Greater adverse impact (greater level of impact compared to the proposed project)

Environmental Issue	Proposed General Plan and Development Code Update	No Project - No Development	No Project - Development in Accordance with Existing 2025 General Plan	Growth Area Expansion Alternative	Growth Area Reduction Alternative
Housing Placement: Flood Hazard Area (Placing Housing Within 100-Year Flood Hazard Area	LS	NI (L)	LS (E)	LS (E)	LS (L)
Structures: Flood Hazard Area (Placing Structures within 100-Year Flood Hazard Area	LS	NI (L)	LS (E)	LS (E)	LS (L)
Flooding (Exposure of People of Structures)	LS	NI (L)	LS (E)	LS (E)	LS (L)
Seiche, Tsunami, or Mudlfow (Inundation)	LS	NI (L)	LS (E)	LS (E)	LS (L)
Land Use and Planning					
Divide Establish Community	LS	NI (L)	LS (E)	LS (E)	LS (E)
Conflict with Applicable Plans, Policies, or Regulations	LS	NI (E)	SU (G)	LS (E)	LS (E)
Conflict with Conservation Plans	NI	NI (E)	NI (E)	NI (E)	NI (E)
Noise					
Noise Levels in Excess of Standards	SU	NI (L)	SU (L)	SU (G)	SU (L)
Excessive Groundborne Vibration	LS	NI (L)	LS (L)	LS (G)	LS (L)
Permanent Increase in Ambient Noise Levels	SU	NI (L)	SU (L)	SU (G)	SU (L)
Temporary or Periodic Increase in Ambient Noise Levels	LS	NI (L)	LS (L)	LS (G)	LS (L)
Airport Noise Levels	LS	NI (L)	LS (L)	LS (E)	LS (E)
Population and Housing					
Induce Population Growth (Inducement of Substantial Growth)	LS	NI (L)	LS (E)	LS (G)	LS (L)
Displacement of Housing	LS	NI (L)	LS (L)	LS (G)	LS (L)

NI = No Impact
LS = Less Than Significant, No Mitigation Required
LSM = Less Than Significant with Mitigation
SP = Speculative (Impact is too speculative to assess)

(E) = Equivalent Impact (same level of impact significance compared to the proposed project)
(L) = Lesser adverse impact (lesser level of impact compared to the proposed project)
(G) = Greater adverse impact (greater level of impact compared to the proposed project)

Environmental Issue	Proposed General Plan and Development Code Update	No Project - No Development	No Project - Development in Accordance with Existing 2025 General Plan	Growth Area Expansion Alternative	Growth Area Reduction Alternative
Public Services					
Fire Protection	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Police Protection	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Schools	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Other Public Facilities (Courts, Libraries, and Hospitals)	LSM	NI (L)	LSM (L)	LSM (G)	LSM (L)
Transportation and Traffic					
Traffic Increase					
City of Fresno Jurisdiction	LS	NI (L)	LS (L)	LS (L)	LS (L)
County of Fresno Jurisdiction	SU	NI (L)	SU (L)	SU (G)	SU (L)
City of Clovis Jurisdiction	SU	NI (L)	SU (L)	SU (L)	SU (E)
Caltrans Jurisdiction	SU	NI (L)	SU (L)	SU (L)	SU (L)
Other Surrounding County Jurisdictions	SP	NI (L)	SP	SP	SP
Congestion Management Plan	NI	NI (E)	NI (E)	NI (E)	NI (E)
Air Traffic Patterns	LS	NI (L)	LS (L)	LS (E)	LS (E)
Emergency Access	LS	NI (L)	LS (L)	LS (L)	LS (L)
Conflict with Alternative Transportation	LS	NI (L)	LS (L)	LS (G)	LS (L)
Utilities and Service Systems					
Wastewater Treatment (Exceeding Wastewater Treatment Requirements)	LSM	NI (L)	LSM (L)	LSM (G)	LS (L)
Water and Wastewater Treatment Facilities					
Construction of New Facilities	SU	NI (L)	SU (L)	SU (G)	SU (L)
Impact on Capacities of Facilities	LSM	NI (L)	LSM (L)	SU (G)	SU (L)

NI = No Impact
LS = Less Than Significant, No Mitigation Required
LSM = Less Than Significant with Mitigation
SP = Speculative (Impact is too speculative to assess)

(E) = Equivalent Impact (same level of impact significance compared to the proposed project)
(L) = Lesser adverse impact (lesser level of impact compared to the proposed project)
(G) = Greater adverse impact (greater level of impact compared to the proposed project)

Environmental Issue	Proposed General Plan and Development Code Update	No Project - No Development	No Project - Development in Accordance with Existing 2025 General Plan	Growth Area Expansion Alternative	Growth Area Reduction Alternative
Stormwater Drainage Facilities Construction of New Facilities Impact on Capacities of Facilities	 SU LSM	 NI (L) NI (L)	 SU (L) LSM (L)	 SU (G) SU (G)	 SU (L) SU (L)
Water Supplies (Sufficient Water Supplies for Project)	LSM	NI (L)	LSM (L)	LSM (G)	LS (L)
Wastewater Treatment Capacity	LSM	NI (L)	LSM (L)	LSM (G)	LS (L)
Landfill Capacity	LSM	NI (L)	LSM (L)	LSM (G)	LS (L)
Compliance with Solid Waste Regulations and Statutes	LS	NI (L)	LS (L)	LS (G)	LS (L)
Energy Conservation					
Energy Consumption	NI	NI (E)	NI (E)	NI (E)	NI (E)

NI = No Impact
LS = Less Than Significant, No Mitigation Required
LSM = Less Than Significant with Mitigation
SP = Speculative (Impact is too speculative to assess)

(E) = Equivalent Impact (same level of impact significance compared to the proposed project)
(L) = Lesser adverse impact (lesser level of impact compared to the proposed project)
(G) = Greater adverse impact (greater level of impact compared to the proposed project)

7.3.1 - No Project/No Development Alternative

Description

Under the No Project/No Development Alternative (No Project Alternative), the Planning Area would remain unchanged and no new development would occur onsite. The Planning Area would continue to have 545,000 people and include 186,840 dwelling units. No additional land uses would be developed. The existing agricultural uses within the Planning Area would continue their operations.

Analysis

Since this alternative would not include any additional development, no additional environmental effects would occur. The significant and unavoidable effects associated with the proposed project (aesthetics, agricultural resources, air quality, cultural resources, greenhouse gases, noise, traffic, and utility/service systems) would be eliminated with the implementation of this alternative. In addition, the effects that were found to be significant prior to mitigation under the proposed project (biological resources, hazards and hazardous materials, hydrology and water quality, and public services) would also be eliminated. Impacts that were found to be less than significant under the proposed project (geology and soils, land use and planning, and population and housing) would also be eliminated with this alternative. Both the proposed project and this alternative would result in a similar no impact related to energy conservation. This alternative is considered environmentally superior to the proposed project; however, this alternative would not meet any of the project's objectives.

7.3.2 - No Project/Development in Accordance with the Existing General Plan

Description

The No Project/Development in Accordance with the Existing General Plan would result in development occurring within the 106,027-acre Planning Area. This alternative would include a population of 790,000 people and a total of approximately 260,000 housing units. Substantially less non-residential development would be developed under this alternative compared to the proposed project. This alternative contemplated buildout of the Planning Area by the year 2025 and due to the economic recession during the past decade, the current estimate of buildout of this alternative is the year 2035. The projected residential density of new residential units after the year 2010 is 6.09 under this alternative.

Analysis

Due to substantially less development under this alternative compared to the proposed project, environmental effects associated with this alternative would be less compared to the proposed project. This alternative would include approximately 180,000 less people and approximately 72,000 fewer residential units compared to the proposed project. This alternative would also include a lower gross residential density (6.09 units per acre) for new residences compared to the proposed project (9.12 units per acre).

With less development, this alternative would be able to reduce the significant and unavoidable effects associated with the proposed project (aesthetics, air quality, cultural resources, greenhouse gases, noise, traffic, and utility/service systems). Potential impacts to agricultural resources would be the same under this alternative compared to the proposed project because this alternative contemplates the removal of all existing farmland. Effects that were found to be significant prior to mitigation under the proposed project (biological resources [effects on species], hazards and hazardous materials, hydrology and water quality, and public services) would also be reduced under this alternative. Impacts that were found to be less than significant under the proposed project (i.e., geology and soils [soil erosion], land use and planning, and population and housing [displacement of housing]) would also be reduced with this alternative. Both the proposed project and this alternative would result in a similar impact related to agricultural resources as discussed above, biological habitat because a similar amount of disturbance within the Planning Area is assumed, seismic hazards, land use and planning, and energy conservation. This alternative is considered environmentally superior to the proposed project.

This alternative would not meet many of the basic objectives of the proposed project. This alternative would not include the development of "complete neighborhoods", promote healthy communities and improve quality of life, emphasize increase land use intensity and mixed use development, provide for a plan for all modes of travel on local and major streets, and encourage development within urban infill areas. Since this alternative does not meet many of the basic objectives of the proposed project, this alternative would meet one of the factors identified in Section 15126.6(c) of the CEQA guidelines to reject an alternative from further consideration.

7.3.3 - Growth Area Expansion

Description

The Growth Area Expansion Alternative incorporates components that were identified in the Growth Area Plan, The Expanded SOI Plan, and The Hybrid Plan that were developed for the General Plan Citizens Committee in March 2012 and are discussed in Section 7.2, above. The Growth Area Expansion Alternative includes an average residential density of 5.3 units per gross acre for new residential development and an approximately four percent increase in new residential development compared to the proposed project. The total new residential development beyond the existing units in the year 2010 is approximately 151,000 dwelling units compared to the proposed project's 145,164 new residential units. With a decrease in density within the Planning Area, new residential communities would be required to be constructed outside of the Planning Area. These new

communities would occur contiguous to the Planning Area boundary and within the current jurisdiction of the County of Fresno. Based on no new residential designations within the Planning Area compared to the proposed project, a four percent increase in new residential units compared to the proposed project, and a 5.3 units per gross acre for the approximately 151,000 new dwelling units, a total of approximately 15,000 acres would be required outside of the Planning Area. This new area would also accommodate uses that would support the residential communities. The total population that would be accommodated under this alternative would be approximately 988,000 people which would be approximately 18,000 more people and less than a two percent increase compared to the proposed project.

Analysis

This alternative would result in approximately 15,000 more acres of development compared to the proposed project and would result in a reduced density within the Planning Area. With a slight increase in the total amount of residential and non-residential development compared to the proposed project, this alternative would not be able to reduce the significant and unavoidable aesthetics, air quality, greenhouse gas, noise, and utility/service systems impacts associated with the proposed project. In addition, with more acres of development compared to the proposed project, the significant and unavoidable agricultural impacts associated with the proposed project would not be reduce, but would result in greater impacts. This alternative would also be inconsistent with the City's policies to retain the existing sphere-of-influence boundary and not prohibit urban development such as residential and commercial development to extend beyond the Planning Area proposed under the project. With a reduction of densities within the Planning Area, traffic volumes throughout the Planning Area could be reduced and levels of service on City of Fresno roadway segments as well as on roadway segment under the jurisdictions of the County of Fresno, City of Clovis, and Caltrans could be reduced. Although potential impacts on roadway segments could be reduced under this alternative, the impacts would remain significant and unavoidable on roadway segments under the jurisdictions of the County of Fresno, City of Clovis, and Caltrans, and the impacts under the jurisdiction of the City of Fresno could be reduce to less than significant. Similar to the finding with the implementation of the proposed project, potential traffic effects outside of the Planning Area and within the surrounding counties is speculative.

Effects that were found to be significant prior to mitigation under the proposed project (biological resources [effects on species], hazards and hazardous materials, hydrology and water quality, and public services) would not be reduced under this alternative because a slightly greater amount of residential and non-residential development would occur under this alternative compared to the proposed project. Impacts that were found to be less than significant under the proposed project (geology and soils [soil erosion] and population and housing [displacement of housing]) would remain less than significant under this alternative. Both the proposed project and this alternative would result in a similar impact related to energy conservation. Since this alternative would result in greater impacts in a number of environmental issue areas compared to the proposed project, this alternative is not considered environmentally superior to the proposed project.

This alternative could meet many of the basic objectives of the proposed project. This alternative could include the development of "complete neighborhoods", promote healthy communities and

improve quality of life, provide for a plan for all modes of travel on local and major streets, and encourage development within urban infill areas. However, this alternative would not emphasize increased land use intensity because this alternative would include a lower residential density for new residential units (5.3 units per gross acre) compared to the density under the proposed project (9.12 units per gross density). In addition, this alternative would not retain the existing sphere-of-influence and not prohibit urban development such as residential and commercial development to extend beyond the existing sphere-of-influence.

7.3.4 - Growth Area Reduction

Description

The Growth Area Reduction Alternative would remove future development within the area known as the Southeast Development Area (SEDA), but would include this area as part of the Planning Area. Therefore, the Planning Area would remain 106,027 acres. With the removal of future development within SEDA, the existing rural uses including agricultural uses would remain. This alternative would accommodate approximately 850,000 people which would be approximately 120,000 less people compared to the proposed project. A total of approximately 286,000 residential units would be included under this alternative. This includes approximately 99,000 new residential units within the Planning Area at an average density of approximately 8.4 units per gross acre. This density would be less than the average density of 9.12 units per gross acre under the proposed project; however, since the residential densities in SEDA were higher than the average residential density for the proposed project, the average density of residential units would be less under this alternative. Outside of SEDA, the densities throughout the Planning Area under this alternative would be the same densities as proposed under the proposed project.

Analysis

This alternative would result in approximately 7,700 less acres of development compared to the proposed project and would result in the same density in the remaining portions of the Planning Area. With a reduction of a substantial area for new land uses as well as a reduction of a substantial amount of development in SEDA of approximately 45,800 residential units and approximately 18 million square feet (obtained from Table 3-6 in Section 3 of this Master EIR), this alternative would result in substantially less environmental effects compared to the proposed project.

The implementation of this alternative could reduce impacts associated with the proposed project's significant and unavoidable environmental impacts. These reduced impacts would include reductions in aesthetics, agricultural resources, greenhouse gases, noise, traffic, and utility and service systems. Although these impacts could be reduced, the implementation of this alternative would still result in significant and unavoidable impacts. Aesthetics impacts could remain significant and unavoidable due to development throughout the Planning Area. Agricultural resources would remain significant and unavoidable because development outside of SEDA would still remove agricultural resources. This alternative would generate a substantial amount of greenhouse gases that would continue to represent a significant and unavoidable impact. Noise levels would continue to substantially increase and exceed thresholds throughout the Planning Area and outside of SEDA. Traffic levels would be reduced in the vicinity of SEDA; however, impacts on roadway segments under

the jurisdictions of the County of Fresno, City of Clovis, and Caltrans would still be significant and unavoidable. Similar to the finding with the implementation of the proposed project, potential traffic effects outside of the Planning Area and within the surrounding counties is speculative. Impacts associated with utility and service systems would be substantially reduced under this alternative; however, the significant and unavoidable impacts associated with the construction of new facilities to provide adequate services would remain.

Effects that were found to be significant prior to mitigation under the proposed project (biological resources [effects on species], hazards and hazardous materials, hydrology and water quality, and public services) would be reduced under this alternative because substantially less residential and non-residential development would occur under this alternative compared to the proposed project. Impacts that were found to be less than significant under the proposed project (geology and soils [soil erosion] and population and housing [displacement of housing]) would be less under this alternative and remain less than significant. Both the proposed project and this alternative would result in a similar impact related to energy conservation. Since this alternative would result in less impacts in a number of environmental issue areas compared to the proposed project, this alternative is considered environmentally superior to the proposed project.

This alternative could meet many of the basic objectives of the proposed project. This alternative could include the development of "complete neighborhoods", promote healthy communities and improve quality of life, provide for a plan for all modes of travel on local and major streets, and encourage development within urban infill areas. This alternative would also emphasize increased land use intensity throughout the Planning Area and outside of SEDA similar to the proposed project. In addition, this alternative would retain the existing sphere-of-influence and not allow urban development such as residential and commercial development to extend beyond the existing sphere-of-influence. Based on the population growth projections presented in Table 3-5 in Section 3 of this Master EIR, development under this alternative would reach buildout in approximately the year 2043 based on a similar growth rate as the proposed project. This alternative would have 13 fewer years of growth compared to the proposed project.

7.4 - Environmentally Superior Alternative

CEQA requires that the City identify an Environmentally Superior Alternative. If the No Project Alternative is the Environmentally Superior Alternative as in this case, the City must identify an Environmentally Superior Alternative among the other alternatives considered in the EIR (CEQA Guidelines, Section 15126.6). This alternatives analysis includes two different no project alternatives. Therefore, based on the evaluation of the two remaining alternatives, the Growth Area Reduction Alternative would reduce most of the environmental impacts of the proposed project and would be considered the Environmentally Superior Alternative.

SECTION 8: EFFECTS FOUND NOT TO BE SIGNIFICANT

This section is based on the Initial Study/Notice of Preparation (IS/NOP) prepared for the project and included in this Master Environmental Impact Report (Master EIR) as Appendix A-1, Initial Study and Notice of Preparation, as well as additional information added after the preparation of the IS/NOP that supports the less than significant and no impact findings. There was only one environmental topic, mineral resources, that was scoped out of this Master EIR. All other environmental topics are addressed in Section 5, Environmental Impact Analysis, of this Master EIR.

During the scoping of the environmental issues to be addressed in the Master EIR, there was one comment that requested a discussion of the project's impact on the regional mineral resources. Following is the discussion of Mineral Resources.

8.1 - Mineral Resources

8.1.1 - Impact Discussion

The principal area for mineral resources is located in and immediately adjacent to the Planning Area along the San Joaquin River Corridor. These materials are removed via surface mining operations. These areas have been and are proposed to continue to be designated as Open Space, and the activities have been and will continue to require conditional use permits. The City anticipates that these uses will continue until the resources are substantially removed, and it is no longer economically feasible to mine the areas.

To further ensure less than significant impacts to mineral resources occur during the implementation of the proposed project, the City of Fresno General Plan Update includes an objective and policies to conserve aggregate mineral resources. These objective and policies are identified below.

Resource Conservation and Resilience Element

Objective RC-10: Conserve aggregate mineral resources within the Planning Area, as identified by the Division of Mines and Geology, and allow for responsible extraction to meet Fresno's needs.

Policy RC-10-a: Meet Future Needs. Adopt land use and resource protection regulations that support mining of the high-quality, close-to-market aggregate resources to meet the needs of the Fresno Production-Consumption Region.

RC-10-b: Zoning in San Joaquin Riverbottom. Maintain zoning consistent with on-going mineral extraction in the San Joaquin Riverbottom that also allows multiple open space uses in conformance with State law and the City's Surface Mining Ordinance.

RC-10-c: Processing-Mining Link. Accommodate only those mineral processing activities in the San Joaquin Riverbottom that are associated and co-located with mining operations when such industrial activities will sunset with the mining operation and do not stimulate unplanned growth or conversion of multi-use open space to urban uses.

RC-10-d: Manage MRZ-2 Areas. Prohibit land uses and development projects that preclude mineral extraction in potential high-quality mineral resource areas designated MRZ-2 by the California Department of Conservation Division of Mines and Geology.

RC-10-e: Existing Permits. Honor surface mining permits approved by Fresno County upon annexation, provided that the mining operation is in compliance with the terms of its current permit(s) and State law. Require new permit applications in the event of noncompliance, permit expiration, or permit revocation, and ensure compliance with law or regulations.

RC-10-f: Cooperate on Uniform Criteria. Work with Fresno County, Madera County, and the City of Clovis to develop uniform criteria applicable to existing, new, and altered mineral extraction sites in the San Joaquin Riverbottom.

8.1.2 - Conclusion

With the future implementation of the General Plan and Development Code Update as well as the above objective and policies, future development would result in less than significant impacts to mineral resources.

SECTION 9: INFORMATION RESOURCES

9.1 - Report Preparation Personnel

9.1.1 - Lead Agency

City of Fresno

Development and Resource Management Department ..... Jennifer Clark
Keith Bergthold
Darrell Unruh
Eric VonBerg
Michelle Zumwalt
Arnoldo Rodriquez
Franklin Spees
Edward Smith
Trai Her
Public Works Department ..... Scott Mozier
Scott Tyler
Jill Gromley
Brock Buche
Martin Querin
Kevin Norgaard
City Attorney Office ..... Shannon Chaffin

9.1.2 - Lead Consultant

FirstCarbon Solutions

Project Director ..... Jason Brandman
Project Manager ..... Michael E. Houlihan, AICP
Environmental Specialist ..... Shawn Nevill, J.D.
Margaret Partridge
Collin Ramsey
Arabesque Said
Kevin Shannon
Air Quality and Greenhouse Gas Specialist ..... Dave Mitchell
Cori Wilson
Chryss Meier
Elena Nuno
Noise Specialist ..... Greg Tonkavich
Ian McIntire
Cultural Resources Specialist ..... Carrie Wills
Michael Dice

Arabesque Said
Biological Resources Specialist ..... Tommy Molioo
Scott Crawford
Senior Editor ..... Jolene Miller
Ed Livingston
Sandi Tomlin
GIS Technician ..... Karlee McCracken
John DeMartino
Reprographics ..... Octavio Perez

9.1.3 - Technical Subconsultants

Fehr & Peers ..... David Robinson
Blair, Church & Flynn ..... Karl Kienow
Cordie Qualle
Luis Gonzalez
Krazan & Associates ..... Stephen Nelson
Art Farkas

9.2 - Organizations and Persons Consulted

9.2.1 - Public Agencies

Local Agencies

City of Fresno

Development and Resource Management Department ..... Jennifer Clark
Keith Bergthold
Darrell Unruh
Eric VonBerg
Michelle Zumwalt
Arnoldo Rodriquez
Franklin Spees
Edward Smith
Trai Her
Scott Tyler
Jill Gromley
Brock Buche
Martin Querin
Kevin Norgaard

City of Clovis

Deputy City Planner ..... David E. Fey, AICP

County of Fresno

Director, Department of Public Health ..... Edward L. Moreno, MD, MPH
Environmental Health Specialist, Department of Public Health ..... Glenn Allen, REHS., MS

County of Madera

Director, Planning Department ..... Norman L. Allinder, AICP

State of California

Director, State Clearinghouse ..... Scott Morgan

Department of Transportation

Division of Land Resource Protection ..... Molly A. Penberth
Gail Miller
Michael Navarro
David Garza
John Liu
Steven McDonald

9.3 - References

American Fact Finder. 2012. Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?fpt=table. Accessed April 17, 2012.

Architectural Energy Corporation. 2007. Impact Analysis- 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Website: http://www.energy.ca.gov/title24/2008standards/rulemaking/documents/2007-11-07_IMPACT_ANALYSIS.PDF. Accessed on November 7, 2012.

Arnold, et al. 2004. The Archaeology of California. Journal of Archaeological Research 12:1-73.

Bancroft, Hubert Howe. 1884-1890. History of California, 7 vols. The History Company, San Francisco, California.

Beardsley, R.K. 1954. Temporal and Areal Relationships in Central California Archaeology. Berkeley: University of California Archaeological Survey Reports 25.

Beardsley, R.K. 1948. "Cultural Sequences in Central California Archaeology." American Antiquity 14:1-28. Buena Vista Museum of Natural History. 2000. The San Joaquin Valley Through Time. Website: http://www.sharktoothhill.org/california.html. Accessed August 2012.

Brown and Caldwell. 2006. Fresno Wastewater Collection System Master Plan. Website: http://www.fresno.gov/NR/rdonlyres/9B7A044C-1895-4B5E-8163-B9FB43064340/0/469CollectionSystemWastewaterCollectionSystemMasterPlan2006.pdf. Accessed on July 12, 2014.

CALAFCO. 2012. The Governor's Office of Planning and Research. LAFCO's, General Plans and City Annexations. February 7. Website: http://www.calafco.org. Accessed November 12, 2012.

California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. Website: http://www.capcoa.org/documents. Accessed July 18, 2013.

California Air Pollution Control Officers Association (CAPCOA). 2009. Health Risk Assessments for Proposed Land Use Projects. Website: www.capcoa.org/wp-content/uploads /downloads/2010/05/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf. Accessed October 21, 2013.

California Air Pollution Control Officers Association (CAPCOA). 2010. Quantifying Greenhouse Gas Mitigation Measures. August. Website: www.capcoa.org/wp-content/uploads /2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf, Accessed October 21, 2013.

California Air Resources Board (ARB). 1998. The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines. Website: www.arb.ca.gov/toxics /dieseltac/factsht1.pdf. Accessed July 18, 2013.

California Air Resources Board (ARB). 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles. Website: http://www.arb.ca.gov/diesel /documents/rrpfinal.pdf. Accessed July 18, 2013.

California Air Resources Board (ARB). 2005. California Environmental Protection Agency. Air Quality and Land Use Handbook: A Community Health Perspective. April 2005. Website: www.arb.ca.gov/ch/landuse.htm. October 21, 2013.

California Air Resources Board (ARB). 2007. Staff Report. California 1990 Greenhouse Gas Level and 2020 Emissions Limit. November 16, 2007. Website: www.arb.ca.gov/cc/inventory /pubs/reports/staff_report_1990_level.pdf. Accessed July 18, 2013.

California Air Resources Board (ARB). 2008. (includes edits made in 2009) Climate Change Scoping Plan, a framework for change. Website: www.arb.ca.gov/cc/scopingplan/document /scopingplandocument.htm. Accessed July 18, 2013.

California Air Resources Board (ARB). 2008b. Preliminary Draft Staff Proposal Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act. Website: www.arb.ca.gov/cc/localgov/ceqa/meetings /102708/prelimdraftproposal102408.pdf. Accessed July 18, 2013.

California Air Resources Board (ARB). 2008c. Greenhouse Gas Inventory - Archived 2020 Forecast. Last updated in October 2008. Website: www.arb.ca.gov/cc/inventory/archive /forecast_archive.htm. Accessed July 18, 2013.

California Air Resources Board (ARB). 2009. California Air Resources Board. Vinyl Chloride. Website: www.arb.ca.gov/research/aaqs/caaqs/vc/vc.htm. Accessed July 18, 2013. (Note: information is used in Table 1)

California Air Resources Board (ARB). 2009b. The California Almanac of Emissions and Air Quality - 2009 Edition. Chapter 4, Air Basin Trends and Forecasts - Criteria Pollutants. Website: www.arb.ca.gov/aqd/almanac/almanac09/chap409.htm. Accessed July 18, 2013.

California Air Resources Board (ARB). 2010. Greenhouse Gas Inventory - 2020 Forecast. Updated October 28, 2010. Website: www.arb.ca.gov/cc/inventory/data/forecast.htm. Accessed July 18, 2013.

California Air Resources Board (ARB). 2011a. California Greenhouse Gas Emissions Inventory 2000-2009. Website: http://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-09_report.pdf. Accessed July 18, 2013. (Note: Data is used in Figure 5 and Figure 6)

California Air Resources Board (ARB). 2011b. Regulation for Reducing Emissions from Consumer Products. Website: www.arb.ca.gov/consprod/regs /fro%20consumer%20products%20regulation.pdf. Accessed July 18, 2013.

California Air Resources Board (ARB). 2011c. Status of Scoping Plan Recommended Measures. Website: www.arb.ca.gov/cc/scopingplan/sp_measures_implementation_timeline.pdf. Accessed October 21, 2013.

California Air Resources Board (ARB). 2013a. Area Designation Maps/State and National. 2012 State Area Designations. Changes became effective April 1, 2013. Website: www.arb.ca.gov/desig/adm/adm.htm. Accessed July 18, 2013.

California Air Resources Board (ARB). 2013b. California Air Resources Board. Ambient Air Quality Standards. Updated June 4, 2013. Website: www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed July 18, 2013.

California Air Resources Board (ARB). 2014. Historical Air Quality, Top 4 Summary. Website: http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed June 20, 2014.

California Air Resources Board (ARB). 2014. First Update to the Scoping Plan. May 22, 2014. Website: http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm. Accessed July 13, 2014.

California Climate Change Center. 2006. Our Changing Climate, Assessing the Risks to California: A Summary Report from the California Climate Change Center. July 2006. CEC-500-2006-077. Website: www.scc.ca.gov/webmaster/ftp/pdf/climate_change/assessing_risks.pdf. Accessed July 18, 2013.

California Department of Finance. 2012. Website: http://www.dof.ca.gov/research/demographic/state_census_data_center/products-services/view.php#SF1 Accessed April 17, 2012.

California Department of Fish and Game. 2012. Website: http://www.dfg.ca.gov/habcon/nccp/status/ Accessed November 8, 2012.

CDFG (California Department of Fish and Game). 2011 (January). Endangered and Threatened Animals List. The Resources Agency of California, Department of Fish and Game, Natural Heritage Division, Natural Diversity Data Base. Sacramento, California.

CDFG (California Department of Fish and Game). 2012 (July). Endangered, Threatened, and Rare Plants. The Resources Agency of California, Department of Fish and Game, Natural Heritage Division, Natural Diversity Data Base. Sacramento, California.

CDFG (California Department of Fish and Game). 2011 (January). Special Animals List. The Resources Agency of California, Department of Fish and Game, Natural Heritage Division, Natural Diversity Data Base. Sacramento, California.

CDFG (California Department of Fish and Game). 2012 (July). Special Vascular Plants, Bryophytes, and Lichens List. The Resources Agency of California, Department of Fish and Game, Natural Heritage Division, Natural Diversity Data Base. Sacramento, California.

CDFG (California Department of Fish and Game). 2012. RareFind 4 personal computer program. Data Base Record Search for Information on Threatened, Endangered, Rare, or Otherwise Sensitive Species for the Fresno North, Fresno South, Malaga, Clovis, Sanger, Lane's Bridge, Friant, Herndon, and Kerney Park, California USGS Topographic Quadrangles. California Department of Fish and Game, State of California Resources Agency. Sacramento, California.

California Department of Fish and Wildlife. 2010. List of Vegetation Alliances and Associations, Vegetation Classification and Mapping Program.

California Department of Fish and Wildlife. 2014. Natural Diversity Database, Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication.

California Department of Resources Recycling and Recovery (CalRecycle). 2012a. Report Years 1995-2006 - Jurisdiction Diversion/Disposal Rate Summary (1995-2006). Website: http://www.calrecycle.ca.gov/LGCentral/DataTools/Reports/DivDispRtSum.htm. Last Updated May 28, 2012. November 19, 2012.

California Department of Resources Recycling and Recovery (CalRecycle). 2012b. Report Years Post 2006- Jurisdiction Diversion/Disposal Rate Summary (2007-Current). Website: http://www.calrecycle.ca.gov/LGCentral/DataTools/Reports/DivDispRtSum.htm. Last Updated May 28, 2012. November 19, 2012.

California Department of Transportation. June 2009. 2008 California Motor Vehicle Stock, Travel and Fuel Forecast. Website: http://dot.ca.gov/hq/tsip/otfa/tab/documents/mvstaff/mvstaff08.pdf Accessed on June 17, 2014.

California Department of Water Resources. Update 2003. DWR Bulletin 118 California's Groundwater, Chapter 6 Basin Groundwater Concepts.

CalEEMod. California Emissions Estimator Model. Version 2013.2.2 Website: http://caleemod.com/. Accessed October 21, 2013.

California Energy Commission, California Public Utilities Commission, and Consumer Power and Conservation Financing Authority. 2003. Energy Action Plan. Website: http://www.energy.ca.gov/energy_action_plan/2003-05-08_ACTION_PLAN.PDF. Accessed on July 9, 2014.

California Energy Commission. 2008 (Revised 2010). 2008 Building Energy Efficiency Standards Residential Compliance Manual. Website: http://www.energy.ca.gov/2008publications/CEC-400-2008-016/CEC-400-2008-016-CMF-REV1.PDF. Accessed on November 7, 2012.

California Energy Commission. 2012. Website: http://www.energy.ca.gov/commission/. Accessed on November 6, 2012.

California Energy Commission, 2012. Background on the 2013 Building Energy Efficiency Standards. Website: http://www.energy.ca.gov/title24/2013standards/background.html. Accessed November 6, 2012.

California Environmental Health Tracking Program. 2011. Traffic Linkage Service Demonstration. Website: http://www.ehib.org/traffic_tool.jsp. October 22, 2013.

California Environmental Protection Agency. 2002. Office of Environmental Health Hazard Assessment. Health Effects of Diesel Exhaust. Website: www.oehha.ca.gov/public_info/facts/pdf/diesel4-02.pdf. Accessed July 18, 2013. (Note: information is used in Table 1)

California High Speed Rail Authority. 2012. California High-Speed Train Project EIR/EIS Merced to Fresno Section.

CNPS (California Native Plant Society). 2012. California Native Plant Society's Electronic Inventory of Rare and Endangered Vascular Plants of California. Website: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi.

California Natural Resources Agency. 2009. 2009 California Climate Adaptation Strategy. Website: http://www.climatechange.ca.gov/adaptation/strategy/index.html. Accessed July 18, 2013.

California Public Utilities Commission. 2012. 2013 Building Energy Efficiency Standards. Website: http://www.energy.ca.gov/2012publications/CEC-400-2012-004/CEC-400-2012-004-CMF-REV2.PDF. Accessed on November 6, 2012.

California Public Utilities Commission, 2012. Website: http://www.cpuc.ca.gov/Environment/info/esa/c3etp/index.html . Accessed on November 7, 2012.

California Regional Water Quality Control Board, Central Valley Region. 2006. Order No. 5-2006-0090-01 and NPDES Permit No. CA0085189. Website:

http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/fresno/r5-2006-0090-01.pdf. Accessed on July 12, 2014.

California Regional Water Quality Control Board, Central Valley Region. 2002. Order No. 5-01-254.

California, State of. nd. California Courts. Website: http://www.courts.ca.gov/2989.htm Accessed June 15, 2014.

California, State of. 2012. California Scenic Highway Program. Website: http://www.dot.ca.gov/hq/LandArch/scenic_highways/scenic_hwy.htm. Accessed on April 18, 2012.

California, State of. 1989. Fish And Game Code.

California, State of. 1996. Governor's Office of Planning and Research, CEQA & Historical Resources. May. Website: http://ceres.ca.gov/ceqa/more/tas/page1.html#introduction. Accessed 2012.

California, State of. 2010. Governor's Office of Planning and Research. California Environmental Quality Act, Section 15064.5. 2010.

CalRecycle. 2014. Facility/Site Summary Details: Coalinga Disposal Site (10-AA-0006). Website: http://calrecycle.ca.gov/SWFacilities/Directory/10-AA-0006/Detail/. Accessed on July 9, 2014.

CalRecycle. 2014. Facility/Site Summary Details: City of Clovis Landfill (10-AA-0004). Website: http://www.calrecycle.ca.gov/SWFacilities/Directory/10-AA-0004/Detail/. Accessed on July 9, 2014.

CalRecycle. 2014. Waste Characterization, Residential Development: Estimated Solid Waste Generation Rates. Website: http://www.calrecycle.ca.gov/WASTECHAR/WasteGenRates/Residential.htm. Accessed on July 10, 2014.

CalRecycle. 2014. Waste Characterization, Commercial Sector: Estimated Solid Waste Generation Rates. Website: http://www.calrecycle.ca.gov/WASTECHAR/WasteGenRates/Commercial.htm. Accessed on July 10, 2014.

CalRecycle. 2014. Waste Characterization, Industrial Sector: Estimated Solid Waste Generation Rates. Website: http://www.calrecycle.ca.gov/WASTECHAR/WasteGenRates/Industrial.htm. Accessed on July 10, 2014.

Carollo Engineers, Inc. 2012. City of Fresno Recycled Water Master Plan.

Centers for Disease Control and Prevention (CDC). 2010. Department of Health and Human Services, the National Institute for Occupational Safety and Health. Carbon Dioxide.

Website: www.cdc.gov/niosh/npg/npgd0103.html. Accessed July 18, 2013.

Centers for Disease Control and Prevention (CDC). 2012. Construction - website: www.cdc.gov/niosh/construction/. Indoor Environmental Quality - Website: www.cdc.gov/niosh/topics/indoorenv/constructionieq.html. Accessed May 7, 2012.

Central Valley Regional Water Quality Control Plan. 2011 (Revised). The Sacramento River Basin and the San Joaquin River Basin Water Quality Control Plan. October.

Central Valley Regional Water Quality Control Plan. 2004 (Revised). Tulare Lake Basin Water Quality Control Plan. January.

Changala, Donald. Staff . Pacific Gas and Electric (PG&E). Personal communication: email. December 4, 2012.

City of Fresno. 2002. 2025 Fresno General Plan. February 1. Website: http://www.fresno.gov/Government/DepartmentDirectory/DARM/AdvancedPlanning/2025FresnoGeneralPlan.htm. Accessed on November 7, 2012.

City of Clovis. 1993. Chapter 2, Land Use of the City of Clovis General Plan. Website: https://www.ci.clovis.ca.us/Portals/0/Documents/Planning/ClovisGeneralPlan/GeneralPlanChapter2.pdf. Accessed on July 21, 2014.

City of Clovis. 2014. Draft Program Environmental Impact Report, Volume 1: Draft PEIR and Appendix A, General Plan and Development Code Update. Website: https://www.ci.clovis.ca.us/Portals/0/Documents/Planning/GeneralPlanUpdate/June2014Review/Ch%2002-04.pdf. Accessed on July 21, 2014.

City of Fresno. 2014. Fresno Court Facilities. Website: http://www.fresno.courts.ca.gov/courthouses/#1. Accessed June 15, 2014.

City of Fresno. 2011. Fresno General Plan and Development Code Update Working Paper 2: Land Use. October 12.

City of Fresno. 2011. General Plan Map Atlas-Existing Conditions Report, General Plan & Code Update August. Website: http://www.fresno.gov/Government/DepartmentDirectory/PlanningandDevelopment/AdvancedPlanning/Downloads.htm Accessed April 4, 2012.

City of Fresno. Draft MEIR, 2025 General Plan. Chapter V Environmental Analysis. 1. Loss of Biological Resources.

City of Fresno. 2011.Working Paper 2: Urban Form and Land Use.

City of Fresno Municipal Code. 2012. Website: http://library.municode.com/index.aspx?clientId=14478 Accessed April 10, 2012.

Clough, C.W. 1963. Madera: The Rich, Colorful and Exciting Historical Heritage. Madera County

Historical Society, Madera, California.

Clough, C.W. 1986. Fresno County in the 20th Century: From 1900 to 1980s. Panorama West Books, Sacramento, California.

Code of Federal Regulations. 2012. Website: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=821d154fab2683acdc5cce7486d3d93c&rgn=div5&view=text&node=14:2.0.1.2.9&idno=14#14:2.0.1.2.9.3 Accessed November 15, 2012.

Cook, S.F. 1976. The Population of the California Indians 1769-1970. University of California Press. Berkeley, California.

County of Fresno. 2000. Fresno County General Plan Background Report.

County of Fresno. 2000. Fresno County General Plan. Website: http://www.co.fresno.ca.us/ViewDocument.aspx?id=58409. Accessed on July 21, 2014.

County of Fresno Department of Agriculture. 2012. Fresno County Annual Crop & Livestock Report.

County of Fresno. 2000. County of Fresno General Plan. Website: http://www2.co.fresno.ca.us/4510/4360/General_Plan/GP_Final_policy_doc/Table_of_Contents_rj_blue.pdf Accessed November 15, 2012.

County of Madera. 1995. Final Environmental Impact Report, County of Madera General Plan. Website: file:///C:/Documents%20and%20Settings/MHoulihan/My%20Documents/Downloads/1222905041_document_upload_maderacountygeneralplanfinaleirvol.isch93102017oct241995%20(4).pdf. Accessed on July 21, 2014.

Department of Water Resources. 2003 (Updated). Bulletin 118: Tulare Lake Hydrologic Region.

Department of Water Resources, the Resources Agency, State of California. October 2008. Managing an Uncertain Future, Climate Change Adaptation Strategies for California's Water. Website: www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf. Accessed July 18, 2013.

EIP Associates. 2006. Draft MEIR for 2004 District Services Plan. Website: http://www.fresnofloodcontrol.org/MEIR%20Draft/meir_draft.html. Accessed on May 26, 2014.

EIP Associates. 2007. Final MEIR for 2004 District Services Plan. Website: http://www.fresnofloodcontrol.org/MEIR%20Draft/meir_draft.html. Accessed on July 12, 2014.

Energy Almanac. 2012. Website: http://energyalmanac.ca.gov/overview/energy_sources.html Accessed November 7, 2012.

Enstrom, James E. 2008. Misrepresentation of the Health Effects of Diesel Exhaust in California by

the California Air Resources Board and the Goods Movement Emission Reduction Plan. Website: www.scientificintegrityinstitute.org/GMERPEnstrom050808.pdf. Accessed July 18, 2013.

Fagan, Brian. 2003. Before California. Landham, MD: Rowman & Littlefield.

Far Western. 2009. Cultural Resources Sensitivity Study and Research Design for the San Joaquin River Restoration Program, Fresno, Madera, Merced, and Stanislaus Counties, California.

Fresno ALUC. 2012. Website: http://www.fresnocog.org/airport-land-use-commission-fresno-county accessed April 13, 2012.

Fresno-Chandler Downtown Airport Land Use Policy Plan. 2000. Website: http://www.fresnocog.org/sites/default/files/publications/ALUC/Chandler_CLUP_2000_revision.pdf Accessed October 17, 2012.

Fresno, City of. 2008. Development and Resource Management Department. Excerpt taken from: Architecture, Ethnicity and Historic Landscapes of California's San Joaquin Valley.

Fresno, City of. 2002. 2025 Fresno General Plan. February 1.

Fresno, City of. 2008. Urban Water Management Plan. August.

Fresno COG. 2014. Conformity. Website: http://www.fresnocog.org/conformity. Accessed June 15, 2014.

Fresno COG. 2014. Regional Transportation Plan and Sustainable Communities Strategy. Website: http://www.fresnocog.org/sites/default/files/publications/RTP/Final_RTP/2014_RTP_Chapter_Four_Final.pdf. Accessed July 13, 2014.

Fresno Council of Governments (GOG). 2012. Website: http://www.fresnocog.org/about-cog Accessed April 13, 2012.

Fresno County Local Area Formation Commission. 2012. Website: http://www.fresnolafco.org/ Accessed April 13, 2012.

Fresno County Library. 2014. About the Library. Website: http://www.fresnolibrary.org/about/index.html. Accessed on April 24, 2014.

Fresno County Public Library. 2014. Map of Fresno-Clovis Metro Area. Website: http://www.fresnolibrary.org/branch/metro.html, Accessed April 24, 2012

Fresno Irrigation District et al. 2006. Fresno Area Regional Groundwater Management Plan. December.

Fresno LAFCO. 2012. Fresno Local Agency Formation Commission. Commission Policies, Standards and Procedures Manual. August 8. Website: http://fresnolafco.org/documents/POLICIES%20STANDARDS%20%20PROCEDURES.pdf

Accessed November 12, 2012.

Fresno Metropolitan Flood Control District. 2009. Distrct Services Delivery Plan. Website: http://fresnofloodcontrol.org/About%20Us/2009%20District%20Services%20Plan%20web.pdf. Accessed on July 12, 2014.

Fresno Yosemite International Airport Compatibility Land Use Policy Plan. June 4, 2012. Website: http://www.fresnocog.org/sites/default/files/publications/Final_2012_FYI_ALUC_ALUCP_text_only.pdf Accessed October 17, 2012.

Governor's Office of Planning and Research. 2008. Technical Advisory. CEQA AND CLIMATE CHANGE: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review. Website: http://opr.ca.gov/docs/june08-ceqa.pdf. Accessed July 18, 2013.

Greenwood and Associates (Slawson and Kay). 2012. Archaeological Resources Assessment Report Fresno Fulton Corridor Specific Plan and Downtown Neighborhoods Community Plan Project.

Healthcare Atlas. 2014. Community Behavioral Health Center. Website: http://gis.oshpd.ca.gov/atlas/places/facility/106104008. Accessed on January 12, 2014.

Healthcare Atlas. 2014. Community Subacute and Transitional Care Center. Website: http://gis.oshpd.ca.gov/atlas/places/facility/206100718. Accessed on January 12, 2014.

Healthcare Atlas. 2014. Crestwood Psychiatric Health Facility-Carmichael. Website: http://gis.oshpd.ca.gov/atlas/places/facility/106344170. Accessed on January 12, 2014.

Healthcare Atlas. 2014. Fresno Heart and Surgical Hospital. Website: http://gis.oshpd.ca.gov/atlas/places/facility/106105029. Accessed January 12, 2014.

Healthcare Atlas. 2014. Fresno Surgical Hospital Website: http://gis.oshpd.ca.gov/atlas/places/facility/106104047. Accessed on January 12, 2014.

Hickman, J. C. 1993. The Jepson Manual: Higher Plants of California. University of California Press. Berkeley, California.

Holland, R.F. 1986 (updated 1996). Preliminary Descriptions of the Terrestrial Natural Communities of California. Non-game Heritage Program. California Department of Fish and Game. Sacramento, California.

Hospital-Data.com. 2014. Community Regional Medical Center – Fresno, CA. Website: http://www.hospital-data.com/hospitals/COMMUNITY-MEDICAL-CENTER-FRESNO-FRES300.html. Accessed on January 12, 2014.

Hospital-Data.com. 2014. Kaiser Foundation Hospital – Fresno – Fresno, CA. Website: http://www.hospital-data.com/hospitals/KAISER-FOUNDATION-HOSPITAL---FRESNO-207.html. Accessed on January 12, 2014.

Hughes, Richard E. 1994. Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Frederickson. Contributions of the University of California Archaeological Research Facility, No. 52. Berkeley.

Intergovernmental Panel on Climate Change (IPCC). 2001. Climate Change 2001: The Scientific Basis. Website: http://www.grida.no/climate/ipcc_tar/wg1/pdf/WG1_TAR-FRONT.pdf. Accessed July 18, 2013.

Intergovernmental Panel on Climate Change (IPCC). 2007a. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, Website: www.ipcc.ch /publications_and_data/ar4/wg1/en/contents.html. Accessed July 18, 2013.

Intergovernmental Panel on Climate Change (IPCC). 2007b. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland. Website: www.ipcc.ch /publications_and_data/ar4/syr/en/contents.html. Accessed July 18, 2013.

Kavalec, Chris, Nicholas Fugate, Tom Gorin, Bryan Alcorn, Mark Ciminelli, Asish Gautam, Glen Sharp, and Kate Sullivan. 2012. California Energy Demand Forecast 2012-2022 Volume 1: Statewide Electricity Demand and Methods, End-User Natural Gas Demand, and Energy Efficiency. California Energy Commission, Electricity Supply Analysis Division. Publication Number: CEC-200-2012-001-SF-VI.

Kings Basin Water Authority. 2012. Kings Basin Integrated Regional Water Management Plan. Website: http://krcd.org/_pdf_ukbirwma/20121017_KB_IRWMP.pdf. Accessed on July 12, 2014.

Kroeber. A. L. 1925. Handbook of the Indians of California (1976 Diver Edition). Bureau of American Ethnology Bulletin 76, Smithsonian Institution, Washington D.C.

Levin, D. 2012. Big Road Blues. TuftsNow. Website: http://now.tufts.edu/articles/big-road-blues-pollution-highways. Accessed March 14, 2013.

McIntyre, S. and R. McKitrick. 2003. Corrections to the Mann et al. (1998) Proxy Data Base and Northern Hemisphere Average Temperature Series. Energy and Environment, Vol. 14, No. 6, Pgs. 751-772. Website: http://www.uoguelph.ca/~rmckitri/research/MM03.pdf. Accessed July 18, 2013.

McKitrick. 2005. What is the 'Hockey Stick' Debate About? APEC Study Group, Australia. Website: www.uoguelph.ca/~rmckitri/research/McKitrick-hockeystick.pdf. Accessed July 18, 2013.

Michael Brandman Associates (MBA). 2008. Phase I Cultural Resources Assessment, Fresno 40 Project.

Modesto General Plan Update. 2008. Chapter V. Environmental Analysis. Section 7. Loss of Sensitive Wildlife and Plant Habitat. Final Master EIR. October 2008.

Moratto, Michael J. 1984. California Archaeology.

Moser et al. 2009. Moser, Susie, Guido Franco, Sarah Pittiglio, Wendy Chou, Dan Cayan. 2009. The Future Is Now: An Update on Climate Change Science Impacts and Response Options for California. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-071. Website: www.energy.ca.gov/2008publications/CEC-500-2008-071/CEC-500-2008-071.PDF. Accessed July 18, 2013.

Munz, P.A. 1974. A Flora of Southern California. University of California Press. Berkeley, California.

National Geographic Society. 1999. National Geographic Society Field Guide to the Birds of North America. 3rd ed. National Geographic Society. Washington D.C.

National Highway Traffic Safety Administration (NHTSA), 2012. Website: http://www.nhtsa.gov/fuel-economy. Accessed on November 7, 2012.

National Toxicology Program. 2011a. Report on Carcinogens, Twelfth Edition; U.S. Department of Health and Human Services, Public Health Service. June 10, 2011. Benzene. Website: http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/Benzene.pdf. Accessed July 18, 2013. (Note: information is used in Table 1)

National Toxicology Program. 2011b. Report on Carcinogens, Twelfth Edition; U.S. Department of Health and Human Services, Public Health Service. Diesel Exhaust Particles. Website: http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/DieselExhaustParticulates.pdf. Accessed July 18, 2013. (Note: information is used in Table 1)

Natural Resources Conservation Service (NRCS). 2012. Farmland Protection Policy Act. Website: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/?ss=16&navtype=SUBNAVIGATION&cid=nrcs143_008275&navid=100170180000000&pnavid=100000000000000&position=Welcome.Html&ttype=detail&pname=Farmland%20Protection%20Policy%20Act%20|%20NRCS. Accessed on November 12, 2012.

New York Natural Heritage Program. Riverine Communities. Ch. III. Riverine Sytem. Pp. 18. accessed from: http://www.dec.ny.gov/docs/wildlife_pdf/riverine.pdf.

Occupational Safety and Health Administration (OSHA). 2003. United States Department of Labor. Safety and Health Topics: Methane. Website: www.osha.gov/dts/chemicalsampling/data/CH_250700.html. Accessed July 18, 2013.

Office of Environmental Health Hazard Assessment (OEHHA 2003). Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Website: http://oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf. Accessed September 18, 2013.

Pinney, T. 1989. A History of Wine in America: From the Beginnings to Prohibition. University of California Press Berkeley and Los Angeles, California.

Provost & Pritchard, Fresno Area Regional Groundwater Management Plan, December 2006.

Recompiled San Joaquin River Parkway Master Plan. July 20, 2000. Website: http://www.sjrc.ca.gov/docs/Recompiled%20SJR%20Parkway%20Master%20Plan.pdf accessed November 13, 2012.

Rosenthal, Jeffrey S., et al. 2007. The Central Valley: A View from the Catbird's Seat. In California Prehistory: Colonization, Cultural, and Complexity.

Saint Agnes Medical Center. 2014. See Our Facilities. Website: http://www.samc.com/see-our-facilities. Accessed on January 12, 2014.

San Joaquin River Restoration Program (SJRRP). 2011. San Joaquin River Restoration Program Draft Program Environmental Impact Statement/Environmental Impact Report. Website: http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=7557. Accessed on July 16, 2014.

San Joaquin Valley Air Pollution Control District 2012b. What is a Health Risk Assessment. Website: http://www.valleyair.org/brochures/docs/hra%20brochure.pdf. Accessed June 5, 2013.

San Joaquin Valley Air Pollution Control District. 2002. Guide for Assessing and Mitigated Air Quality Impacts. Website: http://www.valleyair.org/transportation/ceqa_guidance_documents.htm. Accessed June 1, 2013.

San Joaquin Valley Air Pollution Control District. 2007. 2007 Ozone Plan. Website: www.valleyair.org/Air_Quality_Plans/AQ_Final_Adopted_Ozone2007.htm. Accessed May 31, 2013.

San Joaquin Valley Air Pollution Control District. 2008. Climate Action Plan. Website: http://www.valleyair.org/programs/CCAP/CCAP_menu.htm. Accessed January 25, 2013.

San Joaquin Valley Air Pollution Control District. 2009a. Guidance for Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA. Website: www.valleyair.org/programs /CCAP/11-05-09/3_CCAP_FINAL_LU_Guidance_Nov_05_2009.pdf. Accessed June 9, 2013.

San Joaquin Valley Air Pollution Control District. 2009b. "Addressing Greenhouse Gas Emissions Impacts under the California Environmental Quality Act." December.

San Joaquin Valley Air Pollution Control District. 2012b. Proposed 2012 2.5 Plan. Website: http://www.valleyair.org/Workshops/postings/2012/12-20-12PM25/v2/03Chapter3AQinSJV.pdf. Accessed June 8, 2014.

Sawyer, J.O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant

Society. Sacramento, California.

Sierra Sky Park Land Use Policy Plan. Amended September 15, 1998. Website: http://www.fresno.gov/NR/rdonlyres/4D54BAE0-7F0C-419A-9C5D-0345A19713A0/0/SierraSkyPark.pdf Accessed October 17, 2012.

South Coast Air Quality Management District (SCAQMD). 2007a. Final 2007 Air Quality Management Plan. Website: www.aqmd.gov/aqmp/07aqmp/index.html. Accessed July 18, 2013. (Note: information is used in Table 1)

South Coast Air Quality Management District. 2012 Website: http://www.aqmd.gov/ceqa/documents/2012/aqmd/draftEA/2012AQMP/Chapter3/DPEIR_3_3_Energy.pdf . Accessed on November 6, 2012.

State Water Resources Control Board. 2010. 2010 California 303(d) List of Water Quality Limited Segments.

Stebbins, R. C. 2003. A Field Guide to Western Reptiles and Amphibians. 2nd ed. Houghton-Mifflin Company. Boston, Massachusetts.

The Planning Center. 2010. Draft Fresno El Paso Environmental Impact Report. Fresno, California.

Tibor, D. P. 2001. California Native Plant Society's Inventory of Rare and Endangered Plants of California. California Native Plant Society. Special Publication, No. 1, 6th ed.

Udvardy, M.D. 1994. National Audubon Society Field Guide to North American Birds. Alfred A. Knopf, Inc. New York, New York.

URS Corporation. 2002. Draft Master Environmental Impact Report No. 10130 2025 Fresno General Plan. May.

United Nations Framework Convention on Climate Change. 2010. National Greenhouse Gas Inventory Data for the Period 1990-2008. Website: http://unfccc.int/resource/docs/2010/sbi/eng/18.pdf. Accessed July 18, 2013. (Note: data is used in Figure 4)

United States Department of Transportation, 2012. Website: http://www.fhwa.dot.gov/tea21/sumover.htm . Accessed on November 7, 2012.

USFWS (United States Fish and Wildlife Service). 1993 (Sep 30). Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review. Federal Register 50 CFR Part 17. U.S. Department of the Interior. Washington, D.C.

USFWS (United States Fish and Wildlife Service). 1994 (Nov 15). Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species. Federal Register 50 CFR Part 17. U.S. Department of the Interior. Washington, D.C.

USFWS (United States Fish and Wildlife Service). 1997c (Oct. 31). Endangered and Threatened Wildlife and Plants. Federal Register 50 CFR Part 17.11 and 17.12. U.S. Department of the

Interior. Washington, D.C.

United States District Court, Eastern District of California. 2014. Welcome to the Fresno Division of the Eastern District of California. Website: http://www.caed.uscourts.gov/caed/staticOther/page_471.htm. Accessed on July 18, 2014.

United States Energy Information Administration. 2014. Profile Analysis. Website: http://www.eia.gov/state/analysis.cfm?sid=CA. Accessed on June 17, 2014.

U.S. Environmental Protection Agency (EPA). 2003. Particle Pollution and your Health. EPA-452/F-03-001. Website: http://epa.gov/pm/pdfs/pm-color.pdf. Accessed July 18, 2013. (Note: information is used in Table 1)

U.S. Geological Survey. 2000. Operational Guidelines (version 1.0) for Geological Fieldwork in Areas Endemic for Coccidioidomycosis (Valley Fever).

U.S. Environmental Protection Agency (EPA). 2009a. Ozone and your Health. EPA-456/F-09-001. Website: http://www.epa.gov/airnow/ozone-c.pdf. Accessed July 18, 2013. (Note: information is used in Table 1)

U.S. Environmental Protection Agency (EPA). 2009b. Fact Sheet, Proposed Revisions to the National Ambient Air Quality Standards for Nitrogen Dioxide. July 22, 2009. Website: www.epa.gov/air/nitrogenoxides/pdfs/20090722fs.pdf. Accessed July 18, 2013. (Note: information is used in Table 1)

U.S. Environmental Protection Agency (EPA). 2010. Technology Transfer Network, Air Toxics Website: . Page updated April 5, 2010. Health Effects Notebook for Hazardous Air Pollutants. Website: www.epa.gov/ttn/atw/hlthef/hapindex.html. Accessed July 18, 2013. (Note: information is used in Table 1)

U.S. Environmental Protection Agency (EPA). 2011a. Indoor Air Quality. Sources of Indoor Air Pollution - Organic Gases (Volatile Organic Compounds - VOCs). Website: www.epa.gov/iaq/voc.html. Accessed July 18, 2013. (Note: data is used in Table 1)

U.S. Environmental Protection Agency (EPA). 2011b. 2011 U.S. Greenhouse Gas Inventory Report. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009. EPA 430-R-11-005. Website: www.epa.gov/climatechange/ghgemissions/usinventoryreport/archive.html. Accessed July 18, 2013. (Note: data is used in Figure 4)

U.S. Environmental Protection Agency (EPA). 2012. Green Book Nonattainment Areas for Criteria Pollutants as of December 14, 2012. Website: www.epa.gov/air/oaqps/greenbk/. Accessed July 18, 2013.

U.S. Environmental Protection Agency (EPA). 2012. Technology Transfer Network, Air Toxics Website: . Benzene. Revised January 2012. Website: www.epa.gov/ttn/atw/hlthef /benzene.html. Accessed July 18, 2013. (Note: information is used in Table 1)

U.S. Environmental Protection Agency (EPA). 2013. Federal Register. National Ambient Air

Quality Standards for Particulate Matter. Website: http://www.gpo.gov/fdsys/pkg/FR-2013-01-15/pdf/2012-30946.pdf. Accessed March 16, 2013.

U.S. Geological Survey. 2011. Van Gosen, B.S., and Clinkenbeard, J.P. California Geological Survey Map Sheet 59. Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California. Open-File Report 2011-1188 Website: http://pubs.usgs.gov/of/2011/1188/. Accessed October 22, 2013.

US News & World Report. 2014. Health Hospitals, San Joaquin Valley Rehabilitation Hospital. Website: http://health.usnews.com/best-hospitals/area/ca/san-joaquin-valley-rehabilitation-hospital-6930055. Accessed on January 14, 2014.

University of California, Davis. 1997. Prepared for California Department of Transportation. 1997. Transportation Project-Level Carbon Monoxide Protocol. Website: www.dot.ca.gov /hq/env/air/pages/coprot.htm. Accessed July 18, 2013.

Voegele, Erin. December 2013. Ethanol Producer Magazine. Website: http://www.ethanolproducer.com/articles/10591/eia-updates-state-profiles-adds-data-on-renewables. Accessed on June 17, 2014.

Von Storch et al. 2004. Reconstructing Past Climate from Noisy Data. Science, Vol. 306, Pgs. 679-682. Website: www.sciencemag.org/content/306/5696/679.abstract. Accessed July 18, 2013.

Wallace, William J. 1978. Southern Valley Yokuts. In Handbook of North American Indians, Vol 8, California. Smithsonian Institution, Washington D.C.

Wessels, Bruce. Staff. Pacific Gas and Electric (PG&E). Personal communication: email. January 17, 2013.

Western Regional Climate Center. 2012. Website: http://www.wrcc.dri.edu/. Accessed October 18, 2013.

Western Regional Climate Center, Fresno WSO AP, California Period of Record General Climate Summary – Precipitation. Website: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3257. Accessed February 4, 2014.

West Yost Associates. 2008. City of Fresno 2008 Urban Water Management Plan. Website: http://wwwdwr.water.ca.gov/irwm/grants/docs/Archives/Prop1E/Submitted_Applications /P1E_Round1_SWFM/City%20of%20Fresno/Att3_SWF_WorkPlan_2of5.pdf. Accessed on July 12, 2014.

West Yost Associates. 2012. City of Fresno 2010 Urban Water Management Plan. Website: http://www.fresno.gov/NR/rdonlyres/3795B9BD-E030-492D-8215-1A6654C1D932/0/TextFinal2010CityofFresnoUWMPNovember2012.pdf. Access on July 12, 2014.

West Yost Associates. (2011). City of Fresno Metropolitan Water Resources Management Plan Phase 2. Development and Evaluation of Future Water Supply Plan. Website:

http://www.fresno.gov/NR/rdonlyres/D7776740-91FA-438C-B4D3-7C2755A89632/0/Phase2DevelopmentandEvaluationofFutureWaterSupplyPlanJan2011.pdf. Accessed on July 12, 2014.

Wilson, C. and R. Walters. 2012. Emerging Topics (Chapter 10 in the Association of Environmental Professionals (AEP) Forecasting Community-Wide Greenhouse Gas Emissions and Setting Reduction Targets. Available to AEP members only.

Appendix A: Notice of Preparation and Scoping

A.1 - Notice of Preparation and Initial Study

NOTICE OF PREPARATION
OF AN ENVIRONMENTAL IMPACT REPORT
FOR
THE CITY OF FRESNO GENERAL PLAN AND DEVELOPMENT CODE UPDATE

Date: November 6, 2012

To: Office of Planning and Research, Responsible and Trustee Agencies, Other Public Agencies and Other Interested Parties

From: Keith Bergthold, Assistant Director

Subject: Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update

In compliance with Section 15082(a) of the California Environmental Quality Act (CEQA) Guidelines, the City of Fresno, as the Lead Agency, has prepared this Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the project generally described below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approvals for the project.

The City has determined that a Master EIR in accordance with Article 11.5 of the State CEQA Guidelines will be prepared. This NOP provides information describing the project and the potential environmental effects to enable the Office of Planning and Research and the Responsible and Trustee agencies to make a meaningful response to the City of Fresno regarding the scope and content of the environmental issues that will be evaluated in the Master EIR. The City of Fresno is also inviting comments from the public regarding the scope and content of the environmental issues to be evaluated in the Master EIR.

A complete project description, location, and probable environmental effects are contained in the attached Initial Study. The Initial Study is also available for review at the following website:

http://www.fresno.gov/Government/DepartmentDirectory/DARM/AdvancedPlanning/Downloads.htm

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but ***not later than 30 days*** after receipt of this notice. Please send your response to **Keith Bergthold** at the address provided below. Please provide the name of a contact person at your agency along with your response.

Project Title: City of Fresno General Plan Update and Development Code Update

Project Description: The City of Fresno is proposing to update its General Plan and Development Code for its Planning Area that encompasses approximately 106,000 acres and includes all areas within the City's current City limits, the current Sphere of Influence, the City's Wastewater Treatment Plant site, and an area north of the City's most northeasterly portion of the City. The General Plan Update includes a comprehensive update of the City-approved 2025 General Plan and includes

amendments to and repeal of certain community plans and specific plans. The Development Code Update includes a comprehensive revision of the City's Zoning Code and Subdivision regulations contained in Section 12 of the Fresno Municipal Code. In addition, the project will include a repeal of the current Planning Guidelines and adoption of proposed Planning Guidelines that provides direction for the preparation, amendment, and repeal of plans. For a complete description of the proposed project, please review the Notice of Preparation and a copy of the Initial Study at the website referenced above.

Project Applicant: City of Fresno

Date: 11/5/12 Signature: Keith A. Bergthold

Title: Assistant Director

Address: 2600 Fresno Street, Room 3065, Fresno, CA 93721

Telephone: 559.621.8003

E-mail: Keith.Bergthold@fresno.gov

Reference: California Administrative Code, Title 14, Sections 15082(a), 15103, 15375.

Initial Study
City of Fresno General Plan and Development Code Update
City of Fresno, California

Prepared for:

City of Fresno
Development and Resource Management Department
2600 Fresno Street, Room 3065
Fresno, CA 93721
559.621.8003

Contact: Keith Bergthold, Assistant Director

Prepared by:

Michael Brandman Associates
220 Commerce, Suite 200
Irvine, CA 92602
714.508.4100

Contact: Michael E. Houlihan, AICP, Project Manager

Michael Brandman Associates

November 6, 2012

Table of Contents

Acronyms and Abbreviations vii

Section 1: Introduction 1
1.1 - Purpose 1
1.2 - Project Background 1
1.3 - Project Location 3
1.4 - Project Description 4
1.4.1 - The City of Fresno General Plan Update 4
1.4.2 - The Development Code Update 22
1.4.3 - Comparison of City of Fresno General Plan Update to City of Fresno 2025 General Plan 26
1.4.4 - Comparison of Existing Development to the City of Fresno General Plan Update 27
1.5 - Lead Agency, Responsible Agencies, Approvals 28
1.5.1 - City of Fresno 29
1.5.2 - Other Agencies 30
1.6 - Intended Uses of this Initial Study Document 30

Section 2: Environmental Checklist 31
1. Aesthetics 31
2. Agriculture and Forestry Resources 31
3. Air Quality 32
4. Biological Resources 32
5. Cultural Resources 33
6. Geology and Soils 33
7. Greenhouse Gas Emissions 34
8. Hazards and Hazardous Materials 34
9. Hydrology and Water Quality 35
10. Land Use and Planning 36
11. Mineral Resources 36
12. Noise 37
13. Population and Housing 37
14. Public Services 38
15. Recreation 38
16. Transportation / Traffic 38
17. Utilities and Service Systems 39
18. Mandatory Findings of Significance 40

Section 3: Discussion of Environmental Evaluation 43
1. Aesthetics 43
2. Agriculture and Forestry Resources 45
3. Air Quality 47
4. Biological Resources 49
5. Cultural Resources 51
6. Geology and Soils 53
7. Greenhouse Gas Emissions 56
8. Hazards and Hazardous Materials 57
9. Hydrology and Water Quality 60
10. Land Use and Planning 63
11. Mineral Resources 64

12. Noise 64
13. Population and Housing 67
14. Public Services 68
15. Recreation 70
16. Transportation/Traffic 71
17. Utilities and Service Systems 73
18. Mandatory Findings of Significance 75

Section 4: References 77

Section 5: List of Preparers 79
Michael Brandman Associates - Environmental Consultant 79

List of Tables

Table 1: Proposed Zone District Revisions for the Planning Area Excluding the Downtown 23

Table 2: General Plan Land Use and Zoning Consistency for Downtown Area 26

Table 3: Existing General Plan and General Plan Update Comparison 26

Table 4: Incremental Development for Buildout of Fresno General Plan and Development Code Update 28

List of Exhibits

Exhibit 1: Regional Location Map 5

Exhibit 2: Local Vicinity Map, Topographic Base 7

Exhibit 3: Planning Area 9

Exhibit 4: Planned Land Use 13

ACRONYMS AND ABBREVIATIONS

CBD	Central Business District
CEQA	California Environmental Quality Act
FAR	Floor Area Ratio
FEMA	Federal Emergency Management Agency
GPCC	General Plan Citizen's Advisory Committee
HCP	Habitat Conservation Plan
IS	Initial Study
LAFCO	Local Agency Formation Commission
Master EIR	Master Environmental Impact Report
MBA	Michael Brandman Associates
NCCP	Natural Communities Conservation Plan
SEGA	Southeast Growth Area
SFR	Single-family residential
SOI	Sphere-of-Influence
SR	State Route

SECTION 1: INTRODUCTION

1.1 - Purpose

This Initial Study (IS) was prepared for the City of Fresno (City), and evaluates the potential environmental impacts associated with the implementation of the City of Fresno General Plan and Development Code Update (proposed project). This IS has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code, Section 21000 et seq.), the Guidelines for Implementation of the California Environmental Quality Act published by the Resources Agency of the State of California (California Administrative Regulations Section 15000 et seq.), and the City of Fresno CEQA Procedures. The purpose of this IS is to conduct a preliminary environmental review of the proposed project to determine the environmental issues that will require further evaluation and the environmental issues that will not require further evaluation based on documentation for determining that effects would not be significant.

The City of Fresno intends to prepare a Master Environmental Impact Report (Master EIR) in accordance with Section 15175 and 15176.

Pursuant to Section 15367 of the State CEQA Guidelines, the City of Fresno is the lead agency in the preparation of this IS. Therefore, the City has primary responsibility for approval or denial of the proposed project.

The remainder of this section provides a description of the proposed location and the characteristics of the proposed project. Section 2, Environmental Checklist, gives an overview of the potential environmental impacts that would or would not result from project implementation. Section 3, Discussion of Environmental Evaluation, elaborates on the information contained in the environmental checklist.

1.2 - Project Background

A general plan is a state-required legal document that each planning agency within California is required to prepare and its legislative body is required to adopt (California Government Code Section 65300). It is a comprehensive, long-term general plan for the physical development of the jurisdiction.

The City of Fresno's current 2025 City of Fresno General Plan, which is a set of policies and programs that form a blueprint for the physical development of the City, was adopted in the 2002. Since 2002, laws have changed, technology has advanced, and markets have evolved. Many of the objectives of the current 2025 City of Fresno General Plan have been met, and new opportunities and challenges have arisen. The current 2025 City of Fresno General Plan needs to be reexamined to ensure that it reflects the City's goals and priorities for future growth of the City. Substantial new

population growth is expected over the next several decades. To manage the City's future growth, attract high quality businesses and jobs, protect natural resources, conserve energy and water, promote high quality design of buildings and public spaces, provide land for new parks and schools, and maintain public safety and municipal services, the current 2025 City of Fresno General Plan needs to be updated.

In 2010, the City of Fresno began the planning process for the update of the City of Fresno 2025 General Plan. It consisted of an initial phase of information gathering through an existing conditions report called "Map Atlas" and service provider correspondence, followed by an in-depth exploration of targeted issues and potential policy initiatives via a series of working papers reviewed with the General Plan Citizen's Advisory Committee (GPCC) and at public workshops. These findings, along with the GPCC's visioning process that set goals for the update of the City of Fresno 2025 General Plan, culminated in the alternatives phase.

The alternatives process explored four fundamentally different approaches to accommodating projected population and job growth while meeting the proposed vision for the City of Fresno. The Alternatives Report, issued in March 2012, reviewed four options, which differed by the type, density, mix, and location of future growth. A fifth alternative was included, and all five alternatives were reviewed at public hearings by the Planning Commission, and City Council. The City Council modified one of the five alternatives and identified the modified alternative as the Preferred Draft General Plan Alternative among the alternatives that were explored. The Preferred Draft General Plan Alternative will be evaluated in detail as a component of the proposed project in the Master EIR.

In addition to the City of Fresno General Plan Update, the City of Fresno is proposing a Development Code Update. In essence, the process will result in Chapter 12 of the Fresno Municipal Code being devoted to planning processes, while all items currently in Chapter 12 will be updated and moved to a newly created Chapter 15 or otherwise re-distributed throughout the remainder of the Fresno Municipal Code. Portions of the City of Fresno Municipal Code will need to be amended or repealed in order to effectuate this process.

The Development Code Update will apply to all areas outside the Downtown Planning Area, as well as the Downtown Planning Area if updates have not been otherwise made at the time of approval. The current Zoning Ordinance of the City of Fresno has been adapted over the years from the adoption of the original Zoning Ordinance of the City of Fresno in 1962. The proposed Development Code Update will be easier to understand and use compared to the current Zoning Ordinance. The proposed Development Code Update incorporates contemporary planning and business practices, procedures, sets objective criteria for new development and streamlines the entitlement process while also providing incentives for development by offering flexible property development standards. In addition, the updates facilitate revitalization, infill, transit-oriented development, and more sustainable development practices.

The project also includes retaining the current Zoning Ordinance of the City of Fresno, with amendments including those to synchronize it with the updated designations for planned land uses, for the Downtown Planning Area (approximately 7,237 acres) in the inset as depicted on Exhibit 4 (Downtown). The City of Fresno General Plan Update anticipates this area may be further refined in community or specific plans such as the proposed Downtown Neighborhoods Community Plan (DNCP) and Fulton Corridor Specific Plan (FCSP) which may be adopted by the City along with any appropriate development code update specific to the Downtown. If Downtown Plans and a development code update specific to the Downtown are adopted prior to the approval of the City of Fresno General Plan and Development Code Update, then the current Zoning Ordinance of the City of Fresno for the Downtown Planning Area will not be proposed for approval as to the Downtown.

1.3 - Project Location

The City of Fresno is located in Fresno County, which is in Central San Joaquin Valley. The City is located approximately 200 miles north of the Los Angeles and 170 miles south of Sacramento. The City is located on State Route (SR) 99 corridor that links it to other Central Valley cities. Exhibit 1 shows the City of Fresno in its regional context. To the north of Fresno is Madera County. The City of Clovis is located northwest of the City. East, south, and west of the City is unincorporated land. Exhibit 2 illustrates the local vicinity.

The Planning Area is the geographic area for which the General Plan establishes policies about future growth. The boundary of the Planning Area was determined in response to State law (California Government Code Section 65300) requiring each city to include in its General Plan all territory within the boundaries of the incorporated area as well as "any land outside its boundaries which in the planning agency's judgment bears relation to its planning". The Planning Area established by the City of Fresno includes all areas within the City's current City limits, the areas within the current Sphere of Influence (SOI), the City's Wastewater Treatment Plant, and an area north of the City's most northeasterly portion of the City. The SOI is a boundary that encompasses lands that are expected to ultimately be annexed into the City, although until annexed the lands fall under the jurisdiction of the County of Fresno.

The Planning Area encompasses approximately 106,000 acres, or approximately 166 square miles of both incorporated (approximately 73,000 acres) and unincorporated (approximately 33,000 acres) land bearing relation to the City's future growth. More specifically, the Planning Area extends from the San Joaquin River to the north, American Avenue to the south, Garfield Avenue to the west, and McCall Avenue to the east. The Planning Area includes various unincorporated islands surrounded by Fresno's city limits (Exhibit 3).

1.4 - Project Description

The proposed project is comprised of two components: the General Plan Update and the Development Code Update. The implementation of these two components will result in an increase in development within the Planning Area. Following is a description of the proposed General Plan Update and Development Code Update followed by a discussion of the proposed project that will be evaluated in this Master EIR.

1.4.1 - The City of Fresno General Plan Update

The City of Fresno is comprehensively updating its General Plan that was last updated in 2002. The General Plan is a set of policies and programs that form a blueprint for the physical development of the City. The City of Fresno General Plan Update includes the following elements.

General Plan Elements

Economic Development and Fiscal Sustainability Element - This element relates the long-term economic development and job potential to the fiscal health and sustainability over the long-term.

Urban Form, Land Use, and Design Element - This element provides policy direction on urban form and provides a basis for land use decision-making. It also establishes a land use classification system, intensity and height standards, and citywide and area-specific land use policies.

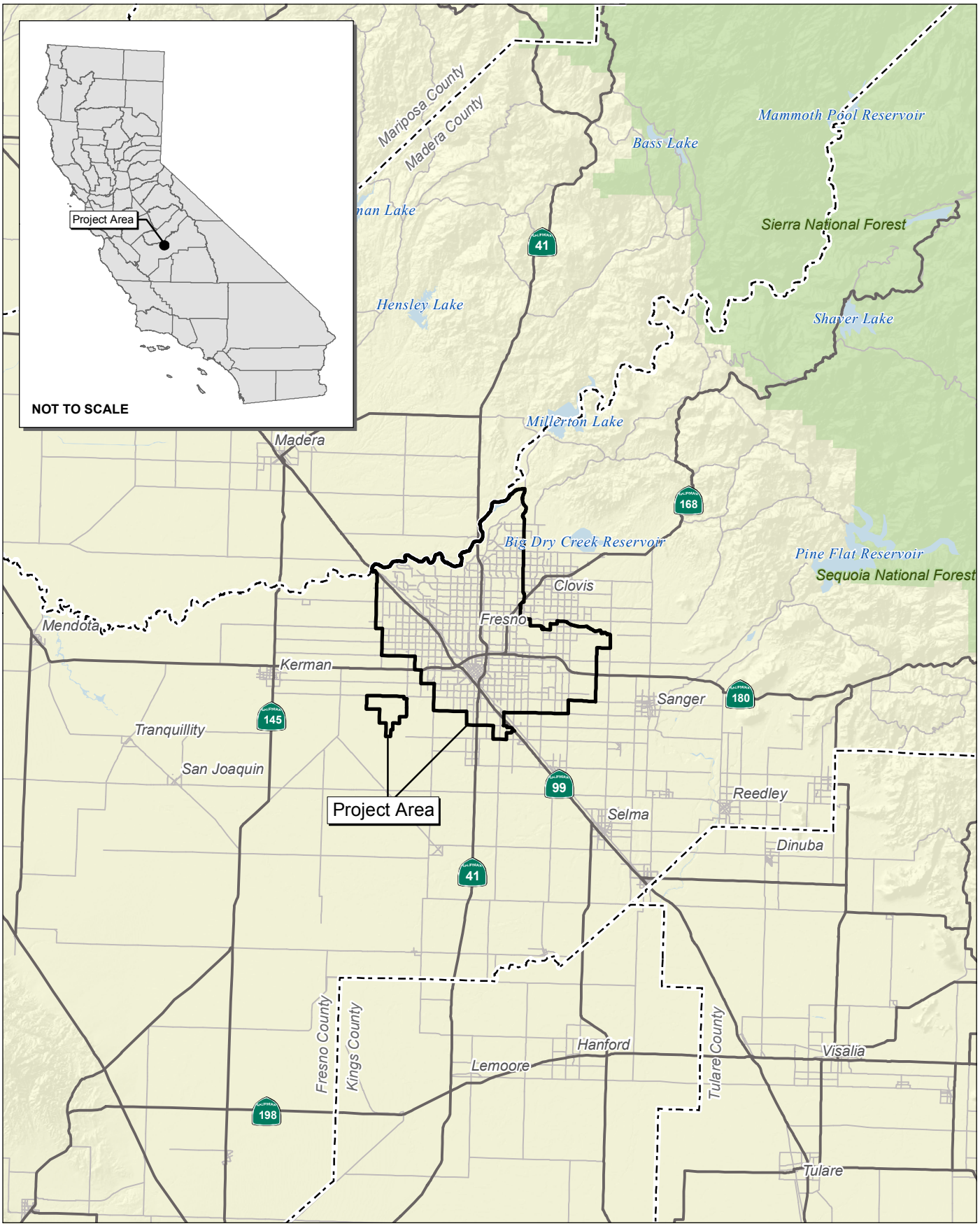
Mobility and Transportation Element - This element addresses the multi-modal transportation needs throughout the Planning Area including all users of streets and highways, transit, sidewalks and trails, and bicycle transportation modes.

Parks, Open Space, and Schools Element - This element provides guidance for green spaces and community facilities in the Planning Area such as parks, recreation, open space, biological resources, and schools.

Public Utilities and Services Element - This element addresses public facilities and services including police, fire protection, potable water, sewage collection and treatment, solid waste, and storm drainage/flood control.

Resource Conservation and Resilience Element - This element establishes policies for the conservation of natural resources, land resources including air quality and greenhouse gas emissions, water resources including groundwater and waterways, energy resources and farmland, urban agriculture, food system resources, and mineral resources.

Historic and Cultural Resources Element - This element establishes policies to address historic and cultural resources within the Planning Area.



Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

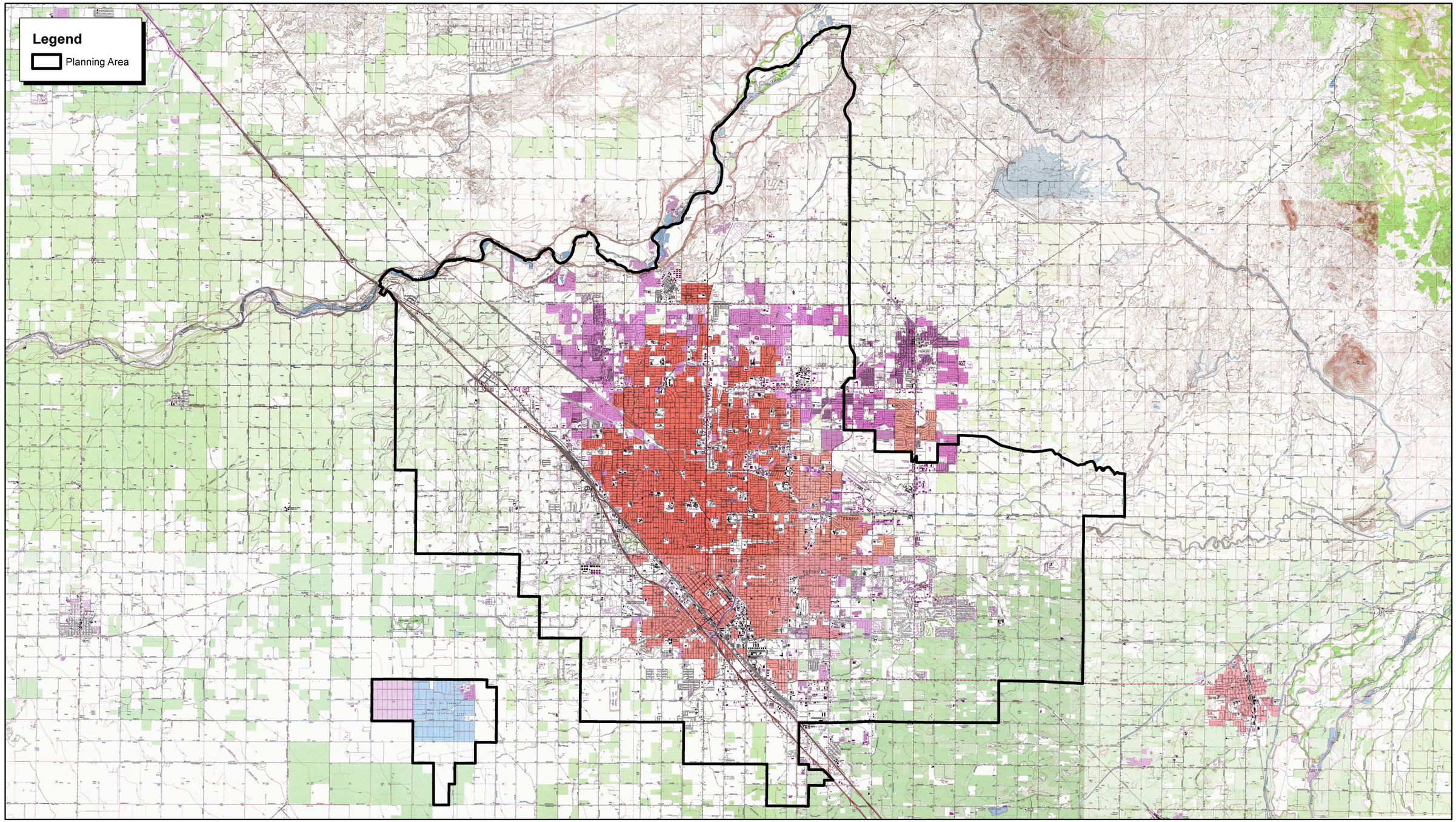
NORTH

10 5 0 10

Miles

Michael Brandman Associates

Exhibit 1
Regional Location Map



Source: TOPO! USGS Lanes Bridge (1973), Friant (1964), Herndon (1978), Fresno North (1978), Clovis (1978), Kearney Park, Fresno South (1978), Malaga (1978) 7.5' DRG.

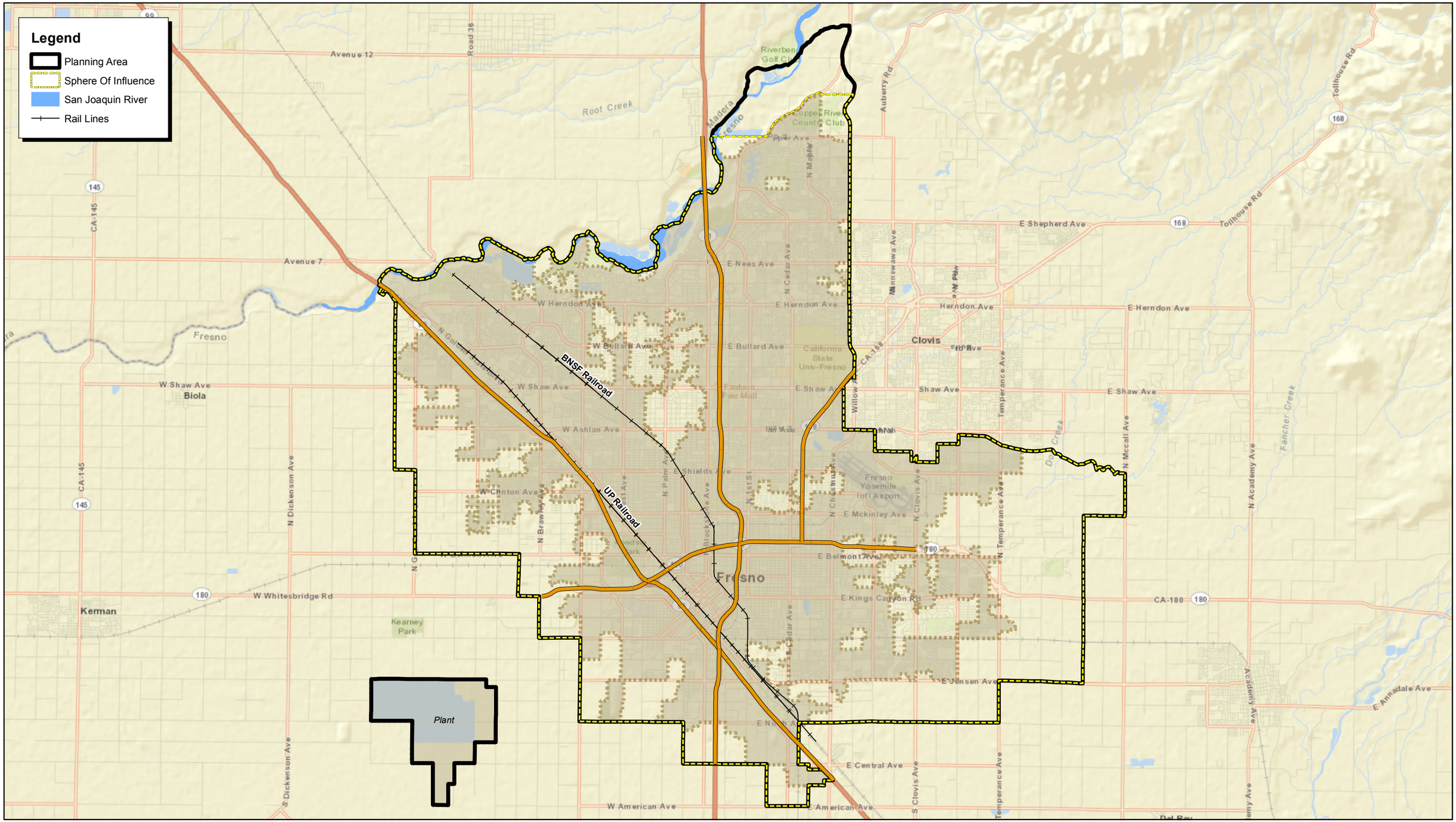
NORTH

2.2 1.1 0 2.2
Miles

Michael Brandman Associates

31680016 • 10/2012 | 2_local_topo.mxd

Exhibit 2
Local Vicinity Map
Topographic Base



Source: Boundary and circulation information, City of Fresno Development And Resource Management Department, 2010; World Street Map, developed by Esri using DeLorme basemap layers, Automotive Navigation Data, USGS, UNEP-WCMC, Tele Atlas Dynamap, 2009

Michael Brandman Associates

31680016 • 10/2012 | 3_planning_area.mxd

Exhibit 3
Planning Area

Noise and Safety Element - This element identifies the natural and man-made public health and safety hazards that exist within the Planning Area, and establishes preventative and responsive objectives and policies and programs to mitigate their potential impacts.

Healthy Communities Element - This element discusses the relationships between the built, natural, and social environments and community health and wellness outcomes, such as death, chronic disease, and effects of drug abuse and crime.

Implementation Element - This element describes the implementation process in general terms and the major actions to be undertaken by the City; the implementing policies in each element of the City of Fresno General Plan Update provide details that will guide program development.

Housing Element - The Housing Element was recently adopted by the City and is required to be updated every five years. The proposed City of Fresno General Plan Update does not include a comprehensive update to the Housing Element; however, the City acknowledges that technical amendments will be required and will be incorporated into the Housing Element to ensure consistency of the Housing Element with the City of Fresno General Plan Update.

Community Plans and Specific Plans

The City of Fresno proposes amendments to and repeal of the community plans and specific plans outlined in Section 1.5 of this Initial Study.

Greenhouse Gas Reduction Plan

The City of Fresno is preparing a Greenhouse Gas Reduction Plan to inventory existing and projected greenhouse gases and establish targets to demonstrate consistency with Assembly Bill 32 (California Global Warming Solutions Act of 2006). Strategies will be proposed for existing development and future development in accordance with the City of Fresno General Plan and Development Code Update to meet greenhouse gas reduction targets established by Assembly Bill 32.

Proposed Land Use Diagram

The City of Fresno is proposing to update the current City of Fresno 2025 Land Use and Circulation Map with the proposed Land Use Diagram to accommodate future growth. In the past, growth has been mostly of a suburban style development that relies heavily on the automobile as the single means of mobility. This has created a condition of sprawl, sometimes leaving neglected neighborhoods and districts, and vacant or underutilized land. To address this issue, the proposed Land Use Plan maintains the same sphere-of-influence (SOI) as established in the current General Plan. The proposed land use pattern and policies will encourage infill development and revitalization of the Downtown Planning Area, older neighborhoods, and along established major street corridors as well as development of compact and complete communities in Growth Areas located on the outer areas of the Planning Area.

Following is a discussion of the land use categories throughout the Planning Area. Exhibit 4 illustrates the location of the land use categories. Below, these land use categories are divided into (1) the Planning Area excluding The Downtown Planning Area and (2) the Planning Area exclusive to the Downtown Planning Area.

Planning Area Excluding The Downtown Planning Area

Residential

Residential land use provide for a wide range of neighborhoods and housing types, anywhere from larger lot single-family residential (SFR) development to neighborhoods with a mix of houses and townhouse/duplexes, to high density apartment communities.

Single-family residential development is typically arranged as stand-alone detached units, or attached as duplexes or triplexes. They may range in density from 1 to 12 units per acre. Garages may be accessed from the front or from alleys.

Townhomes or row homes are typically clustered in groups of four to six units. They range from two to three stories in height and from seven to 16 units per acre. Where possible, garage access should be from the rear of the site.

Multi-family residential buildings may be multiple stories while garage spaces should be integrated into the ground level of the development or below grade, in individually secured garages.

Residential land uses also allow for neighborhood-serving community facilities such as parks, churches, schools, family day care, libraries, community gardens, and farmers markets. Residential uses are designated by density.

Low Density

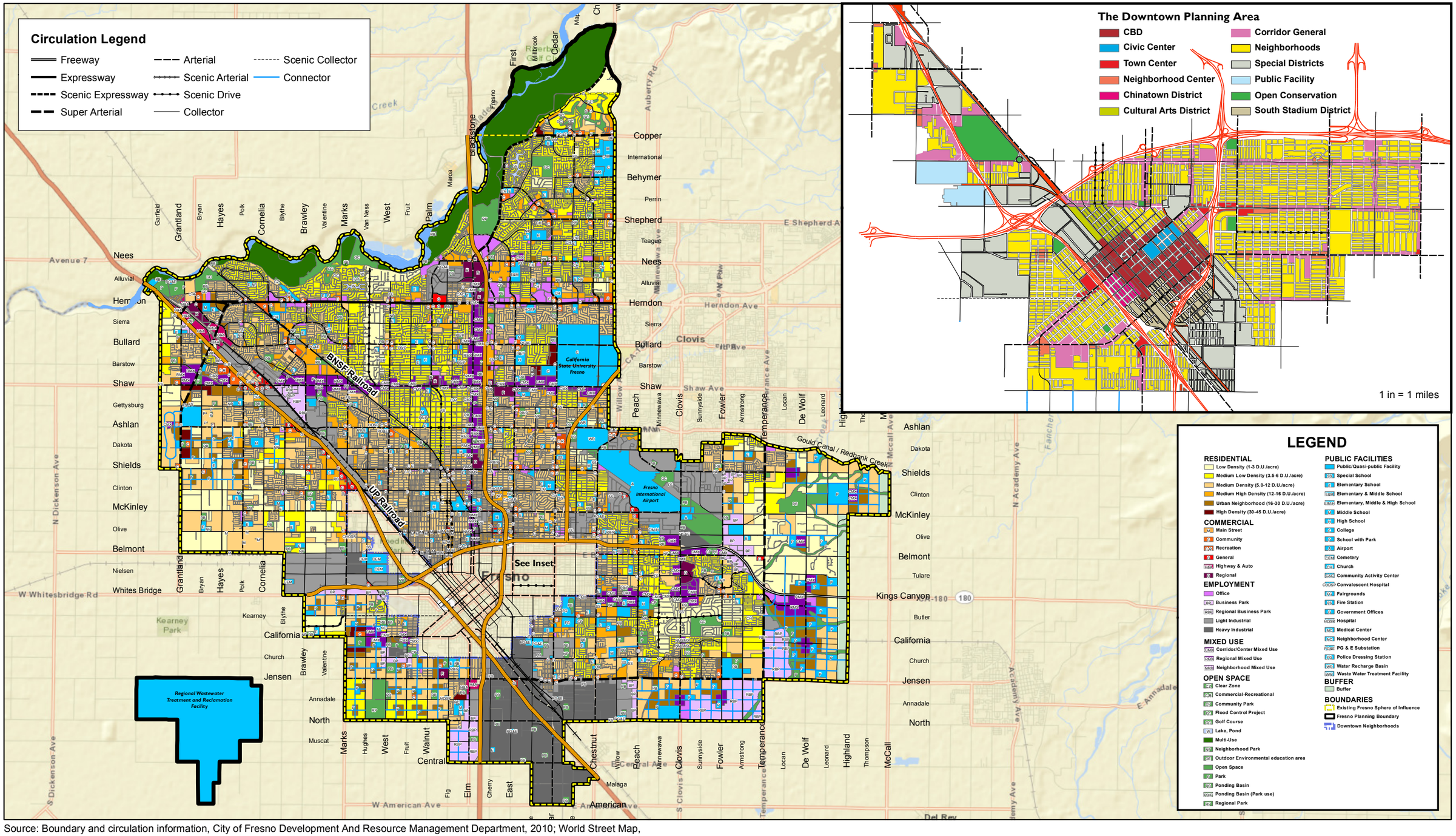
This designation is intended to provide for large lot residential development. Low Density residential allows one to 3.5 housing units per acre. The resulting land use pattern is large lot residential in nature, such as rural residential, ranchettes, or estate homes, with densities up to 3.5 units per acre.

Medium Low Density

The Medium Low Density designation is intended to provide for single-family detached housing with densities of 3.5 to 6 units per acre.

Medium Density

Medium Density residential covers developments of 5 to 12 units per acre and is intended for areas with predominantly single-family residential development, but can also accommodate a mix of housing types, from small-lot starter homes, zero-lot-line developments, and duplexes, to townhouses. Much of the city's existing neighborhoods fall within this designation.



Source: Boundary and circulation information, City of Fresno Development And Resource Management Department, 2010; World Street Map, developed by Esri using DeLorme basemap layers, Automotive Navigation Data, USGS, UNEP-WCMC, Tele Atlas Dynamap, 2009

NORTH

2.2 1.1 0 2.2 Miles

Michael Brandman Associates

31680016 • 10/2012 | 4_planned_lu.mxd

Exhibit 4
Planned Land Use

Medium High

Medium High Density residential is intended for neighborhoods with a mix of single-family residences, townhomes, garden apartments, and multi-family units intended to support a fine-grain, pedestrian scale. This land use accommodates densities from 12 to 16 units per acre overall—individual parcels may have densities outside of that range so long as a master planned neighborhood has a density that conforms.

Urban Neighborhood

Urban Neighborhood residential covers densities from 16 to 30 units per acre, which will require multi-family dwellings but still allows for a mix of housing types including single-family houses. This land use is intended to provide for a compact community that includes community facilities, walkable access to parkland and commercial services, and supports efficient, frequent transit service. Urban Neighborhood is designated for targeted areas with complementary land uses adjacent.

High Density

High Density residential is intended to accommodate attached homes, two- to four-plexes, and apartment buildings, supported by walkable access to frequent transit, retail and services, and community facilities such as parks and schools. High Density allows for 30 to 45 units per acre.

Commercial

Commercial land use designations allow a wide range of retail and service establishments intended to serve local and regional needs. Some designations allow residential mixed use, but must include a commercial component.

Main Street

Main Street commercial encourages a traditional "Main Street" character with active storefronts, outdoor seating, and pedestrian-oriented design. This designation promotes primarily one to two story retail uses, with moderate office and minimal multi-family as supportive uses. It also preserves small-scale, fine-grain character in neighborhoods where single-family residential and townhomes are predominant. The maximum Floor Area Ratio (FAR) is 1.0. A FAR is the ratio of a building's total floor area to the size of a site. An example is a 3-acre site with a 1.0 FAR could have up to approximately 130,000 square feet of floor area within a building.

Community

Community commercial is intended for pedestrian-oriented commercial development that primarily serves local needs such as convenience shopping and offices. Many of the city's current commercial districts fall into this designation. Specific uses allowed include medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores and supporting uses. The maximum FAR is 1.0.

Recreation

The commercial recreation designation is intended for areas of private commercial recreation uses such as bowling alleys, family entertainment centers, and golf driving ranges. The maximum FAR is 0.5.

General

This designation is intended for a range of retail and service uses that are not appropriate in other areas because of higher volumes of vehicle traffic and potential adverse impacts on other uses. Development such as strip malls would fall into this designation. Examples of allowable uses include: building materials, storage facilities with active storefronts, equipment rental, wholesale businesses, and specialized retail not normally found in shopping centers. The maximum FAR is 2.0.

Highway & Auto

The Highway & Auto land use designation is intended for limited areas near the freeway to accommodate uses that depend on or are supported by freeway access but do not generate a large volume of traffic. Hotels, restaurants, and auto malls are typical land uses. The maximum FAR is 0.75.

Regional

This land use designation is intended to meet local and regional retail demand, such as large-scale retail, office, civic and entertainment uses, shopping malls, with large format or "big-box" retail, are allowed, as are supporting uses such as gas stations, and hotels. Buildings are typically larger-footprint and urban-scaled. Development and design standards will create a pedestrian orientation within centers and along major corridors, with parking generally on the side or rear of major buildings, but automobile-oriented uses also will be accommodated on identified streets and frontages. The maximum FAR is 1.0.

Employment

Office

The Office land use designation is intended for administrative, financial, business, professional, medical, and public offices. This designation is mainly intended to apply to existing office uses on smaller lots, generally located on arterial roadways. This designation is also considered compatible with existing residential neighborhoods given the smaller level of noise and traffic generation than commercial uses. Retail uses would be limited to business services and food service and convenience goods for those who work in the area. The maximum FAR is 2.0.

Business Park

The Business Park designation provides for office/business parks in campus-like setting that is well suited for large offices or multi-tenant buildings. This designation is intended to accommodate and allow for the expansion of small businesses with limited outdoor storage proximate to residential

uses, thus adequate landscaping is imperative. Typical land uses include research and development, laboratories, administrative and general offices, medical offices and clinics, professional offices, prototype manufacturing, testing, repairing, packaging, and printing. No freestanding retail is permitted, except for small uses serving businesses and employees. The maximum FAR is 1.0.

Regional Business Park

The Regional Business Park land use designation is intended for large or campus-like office and technology development that includes office, research and development, manufacturing, and other large-scale, professional uses, with limited and properly screened outdoor storage. Permitted uses include incubator-research facilities prototype manufacturing, testing, repairing, packaging, and printing as well as offices and research facilities. Small-scale retail and service uses serving local employees and visitors are permitted as secondary uses. The maximum FAR is 1.0.

Light Industrial

The Light Industrial designation accommodates a diverse range of light industrial uses, including limited manufacturing and processing, research and development, fabrication, utility equipment and service yards, wholesaling, warehousing, and distribution activities. Small-scale retail and ancillary office uses are also permitted. Light Industrial areas may serve as buffers between Heavy Industrial and other land uses and otherwise are generally located in areas with good transportation access, such as along railroads and freeways. The maximum FAR is 1.5.

Heavy Industrial

The Heavy Industrial designation accommodates the broadest range of industrial uses including manufacturing, assembly, wholesaling, distribution, and storage activities that are essential to the development of a balanced economic base. Small-scale commercial services and ancillary office uses are also permitted. The maximum FAR is 1.5.

Mixed Use

Mixed-use land use designations are based on commercial uses and require a residential component.

Corridor/Center Mixed Use

The Corridor/Center Mixed Use designation is higher intensity than Neighborhood Mixed Use, and is intended to allow for either horizontal or vertical mixed-use development in multiple story buildings along key circulation corridors in the city where height and density can be easily accommodated. Ground-floor retail and upper-floor residential or offices are the primary uses, with personal and business services and public and institutional space as supportive uses. Development will facilitate the transformation of existing transportation corridors into vibrant, highly walkable areas with broad, pedestrian-friendly sidewalks, trees, landscaping, and local-serving uses with new buildings that step down in relationship to the scale and character of adjacent neighborhoods. This designation will largely apply along arterial streets, at targeted locations between regional activity centers. Residential

densities range between 16 and 30 units per acre with a maximum 40 percent residential uses and the maximum FAR is 1.5.

Regional Mixed Use

This land use designation is intended to accommodate mixed use development in urban-scale buildings and retail establishments that serve residents and businesses of the region at large. Medium-scale retail, housing, office, civic and entertainment uses, and shopping malls, with large format or "big-box" retail, are allowed, as are supporting uses such as gas stations and hotels and residential in mixed use or single use buildings. Design standards will support a pedestrian orientation within centers and along major corridors, with parking on the side or rear in general, but automobile-oriented uses also will be accommodated on identified streets and frontages. Residential densities range between 30 and 45 units per acre with a maximum 30 percent residential uses and the maximum FAR is 2.0.

Neighborhood Mixed Use

The Neighborhood Mixed Use designation is similar to the Main Street and Community commercial land use designations, however it allows up to 50 percent residential uses, whereas the commercial districts do not allow residential uses. This designation provides for mixed use districts of local-serving, pedestrian-oriented commercial development, such as convenience shopping and professional offices in two- to three-story buildings. Development is expected to include ground-floor neighborhood retails uses and upper-level housing or offices, with a mix of small lot single family houses, townhomes, and multi-family dwelling units on side streets, in a horizontal or vertical mixed-use orientation. The built form will have a scale and character that is consistent with pedestrian-orientation, to attract and promote a walk-in clientele, with small lots and frequent roadway and pedestrian connections permitting convenient access from residences to commercial space. Automobile-oriented uses are not permitted. Residential densities range between 12 and 16 units per acre and the maximum FAR is 1.5.

Open Space

These designations apply to open space areas that are not parks or trails, such as riparian corridors, the clear zone around Fresno-Yosemite International Airport, and the San Joaquin River bottom, which is primarily designated as open space even though it includes a limited number of existing homes.

Public Facilities

These designations apply to lands owned by public entities, including City Hall and other City buildings, county buildings, schools, the municipal airport and hospitals. They also include public facilities such as fire and police stations, City-operated recycling centers and sewage treatment. In addition, these designations apply to public facilities, including neighborhood, community and regional parks, recreational centers, and golf courses. It also applies to multi-purpose trails that serve

both regional and neighborhood level needs, some of which are paved while others, in particular those found along the San Joaquin River Bluff Environs, may be unpaved.

Buffer

This designation is intended to separate urban uses from commercial agricultural uses in order to preserve long-term viable agricultural areas and intensive farming operations adjoining but outside the Planning Area, which is coterminous with the SOI established by the Local Agency Formation Commission (LAFCO). The buffer will serve to prevent urban residential and related uses from developing near agricultural operations, and thereby infringing on full operation of farmland of importance. A variety of uses are compatible with the purpose of the buffer that will be defined in detail in the Development Code Update. General categories include environmental, habitat, water conveyance, retention and recharge, preservation and preparation of gravel resources for beneficial uses related to permanent water resource facilities, limited agriculture and necessary supportive uses, such as agricultural processing, sans animal processing or uses that have the potential to create obnoxious noise, odor, etc., and residential uses with 20 acres of land required per residence. The one-quarter mile wide Buffer designated along the eastern Planning Area boundary (in the Southeast Growth Area [SEGA]) may be modified and reduced to a narrower band of appropriate Buffer uses if designed as part of a sub-area master plan, and if the narrower Buffer design clearly achieves the goal of the Buffer classification to separate urban uses from commercial agricultural uses in order to preserve long-term viable agricultural areas and intensive farming operations adjoining but outside the Planning Area.

Planning Area Exclusive to the Downtown Planning Area (Downtown).

These land use classifications are specific to just the Downtown portion of the Planning Area as depicted in the inset to Exhibit 4. It is anticipated the land use classifications may be further refined in community or specific plans such as the proposed Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan, which may be adopted by the City.

CBD

The Central Business District (CBD) is the cultural, civic, shopping, and transit center of Fresno and the region. This designation is applied to areas of the Downtown Core bounded by Stanislaus Street, the Union Pacific tracks, Inyo Street, and the alley between Van Ness Avenue and L Street. New buildings will be at least two stories, up to 15 stories in height, and located at or near the sidewalk. Buildings will be occupied with ground floor commercial, retail, and office activity to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will accommodate a wide variety of office, civic, lodging, housing, or additional commercial uses.

Civic Center

The Civic Center is intended for civic and office uses, including numerous public buildings containing City, County, State, and Federal uses. This designation is applied to properties currently fronting Mariposa Street and the south side of Fresno Street and the north side of Tulare Street

between Van Ness and Q Avenues. New buildings will be block-scale, up to 10 stories in height and set back from the sidewalk along a continuous build-to line to maintain a formal alignment and arrangement of building frontages. Upper stories will be expressed in volumes that enhance and support the civic presence of buildings along these streets. A full range of civic and office uses, including ground floor retail, are envisioned to support active streetscapes and walking. Upper floors will have office and civic uses.

Town Center

The Town Center designation is applied to nodes at major intersections along corridors and is intended for medium-scale retail, housing, office, civic, and entertainment uses that serve several neighborhoods. New buildings will be block-scale, up to five stories in height and located at or near the sidewalk to generate focused and active, commercial activity along corridors. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Ground floor uses will include commercial, retail, and office uses to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will have office, civic, residential or additional commercial uses.

Neighborhood Center

The Neighborhood Center designation is applied to nodes at secondary intersections along corridors and is comprised of primarily small-scale neighborhood uses such as retail, office, civic, and entertainment, including housing. New buildings will be block and house-scale, up to three stories in height, completely compatible in scale with adjacent single-family houses, and located at or near the sidewalk to generate pedestrian activity. Upper stories will be expressed in volumes compatible with adjacent houses. Buildings will have ground floor commercial, retail, and office uses to support active streetscapes and walking. Upper floors and the floor area behind shop fronts will have office, civic, residential or additional commercial uses.

Chinatown District

The Chinatown District designation is applied to the areas bounded by the Union Pacific Railroad tracks, Highway 99, Stanislaus Street, and Inyo Street. Its close proximity to Highway 99 and the Downtown Core create the unique opportunity to introduce buildings and uses that serve both the region and the surrounding neighborhoods. F Street is preserved and developed as Chinatown's "main street." New buildings will be block-scale, up to 3 stories in height and located at the sidewalk to activate the sidewalk with pedestrian-oriented commercial activity. Most upper stories will be expressed in single volumes to enhance the small scale of this urban neighborhood and historic main street. Ground floor uses will include commercial, retail, civic or office uses to support active streetscapes and walking. Upper floors and the space behind shop fronts will have offices, housing or additional commercial uses.

Cultural Arts District

This designation is applied to the area immediately north of the CBD that is undergoing transformation into a thriving artist community. This designation is intended to encourage the area's transformation by encouraging mixed-use buildings comprised primarily of small-scale retail, office, industrial, and multi-family housing. New buildings will be block scale, up to five stories tall that will be located at or near the sidewalk to generate an active public realm. Most upper stories will be expressed in single volumes with multiple volumes moderating larger buildings. Buildings will have ground floor retail uses, live-work, and uses such as art galleries on key streets to support active streetscapes and walking.

Corridor General

This designation is applied to areas fronting on corridors including Belmont Avenue, East Kings Canyon Road, Blackstone Avenue, Abby Street, and North Fresno Street. It is intended for moderate intensity housing and neighborhood services, while also accommodating automobile-oriented commercial uses. New buildings will be block-scale and house-scale, up to three stories in height located at or near the sidewalk to generate more pedestrian activity. Buildings will vary in size and type, but be compatible in massing and scale with adjacent buildings. Most upper stories will be expressed in single volumes along the corridor and in multiple volumes with significant setbacks when adjacent to neighborhoods. Living rooms, dining rooms, and other formal rooms will face the street. Ground floor uses will include housing as well as commercial, retail and office uses. Upper floors will be for housing, office, or additional commercial uses.

Neighborhoods

This designation is applied to areas outside of the Downtown Core, including the Lowell neighborhood, much of the Southwest and Southeast neighborhoods, the "L" Street area and to Huntington Boulevard area east of Downtown, the Jefferson Neighborhood, areas south of Elm and B Streets in Southwest, several Southeast neighborhoods adjacent to Highway 180, and areas west of Highway 99 including the Jane Addams area. New buildings will be house-scale up to two stories in height and some buildings may be up to two and one-half stories. All buildings will set back from the sidewalk to provide a buffer between the sidewalk and the dwellings. Living rooms, dining rooms, and other formal rooms will face and activate the street. Other house-scale buildings are compatible in these neighborhoods when scaled and massed in relation to the predominant single-family houses. Buildings will be occupied with residential uses, limited live/work uses and home occupation activity.

Special Districts

The Special Districts designation is applied to areas that are best suited for a variety of moderate to intense industrial and manufacturing activity. These areas are comprised primarily of large and varied building sizes with substantial activity from large cargo vehicles. New buildings will be block-scale, up to three stories in height and located with a portion or all of their frontage at or near or the sidewalk. Ground floor activity will range from industrial and manufacturing uses and outdoor assembly to offices. Included in the Special Districts designation are (1) the Chandler Airport area

between Kearney Boulevard, and Thorne and Whitesbridge Avenues and (2) Downtown Hospital district, including the hospital campus as well as on surrounding streets such as Fresno Street, Illinois Avenue, Clark Street, and Divisadero Street.

Public Facility

This designation applies to lands owned by public entities, including City Hall and other City buildings, county buildings, schools, the municipal airport and hospitals. They also include public facilities such as fire and police stations, and City-operated recycling centers. In addition, this designation applies to public facilities, including neighborhood and community parks and recreational centers.

Open Conservation

This designation is intended to provide for permanent open spaces, and does not include neighborhood and community parks and recreational center.

South Stadium District

This designation is applied to the areas immediately to south of the CBD, including the Monterrey and Los Angeles Street areas, and is intended for small-scale retail, office, industrial and multi-family housing. New buildings will be block-scale, with non-industrial buildings up to five stories in height located at or near the sidewalk to generate an active public realm. Secondary streets and upper floors will have residential and office uses. Industrial buildings may have larger footprints and may be up to two stories tall.

1.4.2 - The Development Code Update

The citywide Development Code Update was initiated to comprehensively re-evaluate the City of Fresno's regulation of land use and development that is included in the Zoning Ordinance of the City of Fresno and subdivision regulations contained in Title 12 of the Fresno Municipal Code. The Development Code Update incorporates contemporary planning and business practices, procedures, sets objective criteria for new development and streamlines the entitlement process while also providing incentives for development by offering flexible property development standards. The Development Code will better address ever changing market demands and implement the City's vision as outlined in the City of Fresno General Plan Update. The Development Code includes an update to the Zoning Ordinance of the City of Fresno that was last updated comprehensively in the early 1960s and is the regulatory tool that outlines how development occurs. The Zoning Ordinance of the City of Fresno is required to implement and be consistent with the vision delineated in the City of Fresno General Plan Update. The current Zoning Ordinance of the City of Fresno has been adapted over the years from the adoption of the original Zoning Ordinance of the City of Fresno in 1962. The proposed Development Code Update will be easier to understand and use compared to the current Zoning Ordinance of the City of Fresno.

The project also includes retaining the current Zoning Ordinance of the City of Fresno, with minor amendments to synchronize it with the updated designations for planned land uses, for the Downtown Planning Area (approximately 7,237 acres) in the inset as depicted on Exhibit 4 (Downtown). The City of Fresno General Plan Update anticipates this area may be further refined in community or specific plans that may be adopted by the City along with any appropriate development code update specific to the Downtown. If Downtown plans and a development code update specific to the Downtown are adopted prior to the approval of the City of Fresno General Plan and Development Code Update, then the current Zoning Ordinance of the City of Fresno for the Downtown Planning Area will not be proposed for approval as to the Downtown.

The proposed revisions to the Zone Districts for the Planning Area excluding the Downtown Planning Area are shown in Table 1. The Zone Districts are categorized in Residential, Commercial, Employment, Mixed Use, and Other. As shown in Table 1, there are existing Zone Districts that do not have a corresponding proposed Zone District, and there are proposed Zone Districts that do not have a corresponding existing Zone District.

The Zone Districts for the Downtown Planning Area will essentially remain the same as they currently exist within the Zoning Ordinance of the City of Fresno, except for amendments to synchronize it with the updated designations for planned land uses. A land use and zoning consistency table is provided in Table 2 and identifies the corresponding existing Zone District to the Downtown Planning Area land use categories proposed in the City of Fresno General Plan Update.

Table 1: Proposed Zone District Revisions for the Planning Area Excluding the Downtown

Existing Zone District		Proposed Zone District	
Residential Districts			
	No Corresponding District	RE	Residential Estate
R-1-E and R-1-EH	Single-family Residential Estate District	RS-36	Single-family 36,000 sf/unit
R-A	Single-family Residential-Agricultural	RS-36	Single-family Res-36,000sf
R-1-A	Single-family Residential	RS-20	Single-family 20,000 sf/unit
R-1-AH	Single-family Residential (Horses)	RS-20	Single-family 20,000 sf/unit
R-1-B	Single-family Residential	RS-12	Single-family 12,000 sf/unit
R-1-C	Single-family Residential	RS-9	Single-family 9,000 sf/unit
R-1	Single-family Residential	RS-5	Single-family 5,000 sf/unit
	No Corresponding District	RS-2.5	Single-family 2,500 sf/unit
R-2-A	Low Density Multiple-family Residential District One Story	RM-2.5	Multiple-family 2,500 sf/unit

Table 1 (cont.): Proposed Zone District Revisions for the Planning Area Excluding the Downtown

Existing Zone District		Proposed Zone District	
Residential Districts (cont.)			
R-2	Low Density Multiple-family Residential	RM-2.5	Multiple-family 2,500 sf/unit
R-3	Medium Density Multiple-family Residential	RM-1.5	Multiple-family 1,500 sf/unit
R-4	High Density Multiple-family Residential	RM-1	Multiple-family 1,000 sf unit
T-P	Trailer Park Residential	MHP	Mobile Home Park
MH	Mobile Home Single-family Residential		No Corresponding District
Commercial			
	No Corresponding District	MSC	Main Street Commercial
C-1	Neighborhood Shopping Center	CC	Community Commercial
C-2	Community Shopping Center	CC	Community Commercial
C-3	Regional Shopping Center	RC	Regional Commercial
C-4	Central Trading		No Corresponding District
C-5	General Commercial	GC	General Commercial
C-6	Heavy Commercial	GC	General Commercial
CR	Commercial Recreation	CR	Commercial Recreation
CL	Limited Neighborhood Shopping Center		No Corresponding District
	No Corresponding District	HAC	Highway and Auto Commercial
Employment			
CC	Civic Center		No Corresponding District
RP-L	Residential and Professional Limited Office	O	Office
R-P	Residential and Professional Office	O	Office
C-P	Administrative and Professional Office	O	Office
C-M	Commercial and Light Manufacturing		No Corresponding District
M-1-P	Industrial Park Manufacturing	RBP, BP	Business Park, Regional Business Park
M-1	Light Manufacturing	LI	Light Industrial
S-L	Storage/Limited, Mini Storage Facility	SL	Storage Limited, Mini Storage Facility

Table 1 (cont.): Proposed Zone District Revisions for the Planning Area Excluding the Downtown

Existing Zone District		Proposed Zone District	
Employment (cont.)			
M-2	General Industrial	HI	Heavy Industrial
M-3	Heavy Industrial	HI	Heavy Industrial
Mixed Use			
	No Corresponding District	NMX	Neighborhood Mixed Use
	No Corresponding District	CMX	Corridor /Center Mixed Use
	No Corresponding District	RMX	Regional Mixed Use
Other			
O	Open Conservation	OS	Open Space
	No Corresponding District	PK	Park
	No Corresponding District	PI	Public and Institutional
AE-20	Exclusive Twenty Acre Agricultural	AE	Exclusive Agricultural
AE-5	Exclusive Five Acre Agricultural	AE	Exclusive Agricultural
P	Off-Street Parking District		No Corresponding District
	No Corresponding District	B	Buffer
Overlay District			
BA	Boulevard Area	BA	Boulevard Area
CCO	Civic Center Area Modifying		No Corresponding District
R-M	Residential Modifying	RM	Residential Modifying
BP	Bluff Preservation Overlay	BP	Bluff Protection
EA	Expressway Area Overlay	S	Special Setback
ANX	Annexed Rural Residential Transitional Overlay	ANX	Annexed Rural Residential Transitional Overlay
	No Corresponding District	PD	Planned Development

Notes:
sf = square feet
Source: City of Fresno Development and Resource Management Department, 2012.

Table 2: General Plan Land Use and Zoning Consistency for Downtown Area

City of Fresno General Plan Update Downtown Planning Area Land Use	Implementing Existing Zone Districts
CBD	C-4, Central Trading District
Civic Center	CC, Civic Center District
Town Center	C-2, Community Shopping Center District, and C-6, Heavy Commercial District
Neighborhood Center	C-1, Neighborhood Shopping Center District, C-2; Community Shopping Center District, and C-5; General Commercial District
Chinatown District	C-4, Central Trading District
Cultural Arts District	C-4, Central Trading District
Corridor General	C-1, Neighborhood Shopping Center District, C-2; Community Shopping Center District; and C-5, General Commercial District
Neighborhoods	R-1, Single-Family Residential District; R-2, Low Density Multiple Family Residential District; R-3, Medium Density Multiple Family Residential District; and R-4, High Density Multiple Family Residential District
Special District	C-M, Commercial and Light Manufacturing, and M-1, Light Manufacturing District
Public Facility	O, Open Conservation District
Open Conservation	O, Open Conservation District
South Stadium District	C-M, Commercial and Light Manufacturing
Source: City of Fresno Development and Resource Management Department, 2012.	

1.4.3 - Comparison of City of Fresno General Plan Update to City of Fresno 2025 General Plan

The differences in general land use categories within the Planning Area between the City of Fresno 2025 General Plan and the City of Fresno General Plan Update are detailed in Table 3 with regard to acreage and population. The Planning Area encompasses the City's current City limits, the current Sphere of Influence, the City's Wastewater Treatment Plant site, and an area north of the City's most northeasterly portion of the City.

Table 3: Existing General Plan and General Plan Update Comparison

Land Use Designation	City of Fresno 2025 General Plan Acreage	City of Fresno General Plan Update Acreage	Change in Acreage
Residential	41,688	46,043[1]	4,355
Commercial	6,456	6,913	457
Industrial	12,072	9,578	-2,494

Table 3 (cont.): Existing General Plan and General Plan Update Comparison

Land Use Designation	City of Fresno 2025 General Plan Acreage	City of Fresno General Plan Update Acreage	Change in Acreage
Mixed use	557	4,223	3,666
Public facilities[2]	17,329	19,127	1,798
Open space[3]	1,665	1,546	-119
Other	26,260[4]	18,597[5]	-7,663
TOTAL	**106,027**	**106,027**	**0**
Population	790,000	970,000[6]	180,000

[1] The residential designation includes all designations that allow residential units except for Mixed use. The Neighborhoods designation in the Downtown Area primarily allows residences. There are 477 acres in this designation that allow schools and other public facilities.
[2] Public facilities include parks, schools, and other facilities publicly owned.
[3] Open space includes ponding basins, commercial recreation, clear zones, flood control facilities, and Open space
[4] The "Other" category for existing General Plan includes agriculture, the entire Southeast Growth Area (SEGA) because no specific land uses have been approved, and "Other" such as roads, canals, railroads, etc.
[5] The "Other" category for the General Plan Update does not include SEGA because the individual land uses are included in the land use designations. This category includes roads canals, railroads, etc. and the buffer area designated in SEGA.
[6] The population identified for the City of Fresno General Plan Update represents full buildout of the Planning Area. Full buildout will occur sometime after the year 2035.

Source: City of Fresno Development and Resource Management Department, 2012.

1.4.4 - Comparison of Existing Development to the City of Fresno General Plan Update

Exhibit 4 illustrates the distribution of land uses proposed under the City of Fresno General Plan Update. Table 4 identifies general land use categories for existing development and the full buildout development that ultimately could occur under the City of Fresno General Plan Update. The incremental increase in development is identified by general land use category for the Planning Area (the City and SOI area). Table 4 includes units and acre figures for the residential categories and square footage and acres for the non-residential categories. The column depicting incremental increase represents the amount of development that is projected to occur beyond existing development with full buildout of the General Plan and Development Code Update. Full buildout is projected to occur sometime after the year 2035.

Table 4: Incremental Development for Buildout of Fresno General Plan and Development Code Update

Land Use	Existing Development units in msf (acres)	General Plan and Development Code Update units in msf (acres)	Incremental Increase units in msf (acres) [1]
Single-Family Residential	109,000 (26,147)	169,626 (38,961)	60,626 (12,814)
Multiple-Family Residential	62,288 (3,496)	146,826 (6,605)	84,538 (3,109)
Commercial/Office/Public Facility	66.4 (14,804)	129.7 (26,517)	63.3 (11,713)
Mixed Use	0.1 (10)	20.9 (4,223)	20.8 (4,213)
Industrial	72.8 (6,765)	113.3 (9,578)	40.5 (2,813)
Open Space	(12,288)	(1,546)	(-10,742)[2]
Agriculture	(11,714)	(736)[3]	(-10,978)
Vacant	(12,522)	(0)	(-12,522)
Other[4]	(18,821)	(17,862)	(-420)
TOTAL	**(106,027)**	**(106,027)**	**(0)**
Populations (persons)	545,000	970,000[5]	425,000

Notes:
units - dwelling units msf - million square feet

[1] The incremental increase is the amount of additional development that could occur within the Planning Area above the existing development. This additional development is assumed to be full buildout within the Planning Area. Full buildout will occur sometime after the year 2035.

[2] The acreage of Open Space is projected to substantially decrease due to a difference in the definition of Open Space between Open Space under existing development and Open Space under the City of Fresno General Plan Update. The Open Space under existing development is characterized as ponding basins, recreational use, clear zone, flood control, golf course, canals, parks, recharge basins, and open space. Open Space under the City of Fresno General Plan Update is categorized as ponding basins, commercial recreation, clear zones, flood control, and open space. The primary reason for the substantial reduction is the categorizing of parks from Open Space to Public Facilities.

[3] This Agriculture land use includes the Buffer area within the Southeast Growth Area (SEGA) because agricultural uses will be allowed in the "Buffer" category of the General Plan and Development Code Update.

[4] The "Other" category includes roads, canals, railroads, etc.

[4] The population identified for the City of Fresno General Plan Update represents full buildout of the Planning Area. Full buildout will occur sometime after the year 2035.

Source: City of Fresno Development and Resource Management Department, 2012.

1.5 - Lead Agency, Responsible Agencies, Approvals

The City of Fresno is the Lead Agency for the General Plan and Development Code Update. A list of the initial approvals associated with the Update is provided below. As subsequent projects are proposed, the individual projects may require plan and permit approvals. When subsequent approvals by the City and/or Responsible Agencies require discretionary actions, the Master EIR can be reviewed and used, as appropriate, for evaluations of environmental issues associated with subsequent

projects. If the City or Responsible Agencies use the Master EIR, the agency approving the subsequent discretionary actions will be responsible to determine if the environmental evaluation in the Master EIR adequately addresses the potential effects associated with the subsequent projects.

The following are the initial discretionary approvals that are required by the City of Fresno, the Lead Agency:

1.5.1 - City of Fresno

- Approval of the General Plan Update
- Repeal of Chapter 12 of the City of Fresno Municipal Code
- Amendments and repeal of portions of the City of Fresno Municipal Code including Chapter 12
- Approval of the Development Code Update
- Approval of Amendments to the following Plans:
  - Fresno-Chandler Downtown Airport Master and Environs Specific Plan
  - Highway City Specific Plan
  - Fresno Air Terminal/Yosemite International Environs Area Specific Plan
  - Tower District Specific Plan
  - Butler-Willow Specific Plan
  - North Avenue Industrial Plan
  - Sun Garden Acres Specific Plan
  - Bullard Community Plan (which includes the Pinedale Neighborhood Plan and the Sierra Sky Park Land Use Policy Plan)
  - Hoover Community Plan (which includes the El Dorado Park Neighborhood Plan)
- Approval of the Repeal of the following Plans:
  - West Area Community Plan
  - Roosevelt Community Plan
  - Fulton/Lowell Specific Plan
  - Woodward Park Community Plan
  - Central Area Community Plan
  - McLane Community Plan
  - Fresno-High Roeding Plan
  - Yosemite School Area Specific Plan
  - Dakota-First Street Specific Plan
  - Edison Community Plan
  - Civic Center Master Plan
  - Bullard Community Plan (which includes the Pinedale Neighborhood Plan and Sierra Sky Park Land Use Policy Plan)
  - Hoover Community Plan (Which includes the El Dorado Park Neighborhood Plan)

- Approval of Amendment to the Zone District Consistency Table in the Zoning Ordinance (FMC Section 12-403-B) to update the current Zoning Ordinance with the new land uses identified in the Downtown Planning Area
- Approval of a Greenhouse Gas Reduction Plan

1.5.2 - Other Agencies

As subsequent projects that are specifically identified in the Master EIR as well as future development in accordance with the City of Fresno General Plan and Development Code Update are proposed for development, numerous agencies may be defined as Responsible and Trustee Agencies. Development of these future projects may require approval of discretionary actions by other agencies. These Responsible and Trustee Agencies can use the Master EIR that will be prepared for the City of Fresno General Plan and Development Code Update for their discretionary approval, if they determine that the environmental evaluation adequately addresses the effects associated with the discretionary action requested of them for approval.

Following is a general list of potential Responsible and Trustee Agencies.

- Federal Agencies
- State Agencies
- Regional Agencies
- Local Agencies
- Special Districts
- Any Other Responsible or Trustee Agency that may need to provide discretionary approval.

1.6 - Intended Uses of this Initial Study Document

This Initial Study will be used by the City of Fresno as lead agency in evaluating the environmental impacts of the project. The intended use of this Initial Study is to provide environmental analysis for the proposed project and to determine which environmental issues require further evaluation in the Master EIR that will be prepared for the General Plan and Development Code Update.

SECTION 2: ENVIRONMENTAL CHECKLIST

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Aesthetics *Would the project:*				
a) Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?	☒	☐	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐
2. Agriculture and Forestry Resources *In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:*				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☒	☐	☐	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☒	☐	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☒	☐	☐	☐
3. Air Quality *Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.* *Would the project:*				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐
4. Biological Resources *Would the project:*				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐
5. Cultural Resources *Would the project:*				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐
6. Geology and Soils *Would the project:*				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☒	☐	☐	☐
7. Greenhouse Gas Emissions *Would the project:*				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐
8. Hazards and Hazardous Materials *Would the project:*				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☒	☐	☐	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☒	☐	☐	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☒	☐	☐	☐
9. Hydrology and Water Quality *Would the project:*				
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?	☒	☐	☐	☐
c) Substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☒	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
f) Otherwise substantially degrade water quality?	☒	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☒	☐	☐	☐
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☒	☐	☐	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☒	☐	☐	☐
j) Inundation by seiche, tsunami, or mudflow?	☒	☐	☐	☐
10. Land Use and Planning *Would the project:*				
a) Physically divide an established community?	☒	☐	☐	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
c) Conflict with any applicable habitat conservation plan or natural communities conservation plan?	☒	☐	☐	☐
11. Mineral Resources *Would the project:*				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐
12. Noise *Would the project result in:*				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☒	☐	☐	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
13. Population and Housing *Would the project:*				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☒	☐	☐	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☒	☐	☐	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
14. Public Services *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*				
a) Fire protection?	☒	☐	☐	☐
b) Police protection?	☒	☐	☐	☐
c) Schools?	☒	☐	☐	☐
d) Parks?	☒	☐	☐	☐
e) Other public facilities?	☒	☐	☐	☐
15. Recreation				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☒	☐	☐	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☒	☐	☐	☐
16. Transportation / Traffic *Would the project:*				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐
e) Result in inadequate emergency access?	☒	☐	☐	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☒	☐	☐	☐
17. Utilities and Service Systems *Would the project:*				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☒	☐	☐	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☒	☐	☐	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☒	☐	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☒	☐	☐	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
18. Mandatory Findings of Significance				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Environmental Factors Potentially Affected					
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.					
☒	Aesthetics	☒	Agriculture and Forestry Resources	☒	Air Quality
☒	Biological Resources	☒	Cultural Resources	☒	Geology / Soils
☒	Greenhouse Gas Emissions	☒	Hazards / Hazardous Materials	☒	Hydrology / Water Quality
☒	Land Use / Planning	☐	Mineral Resources	☒	Noise
☒	Population / Housing	☒	Public Services	☒	Recreation
☒	Transportation / Traffic	☒	Utilities / Services Systems	☒	Mandatory Findings of Significance

Environmental Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measure based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signed Kurt R. Cryderman Date 11/5/12

SECTION 3: DISCUSSION OF ENVIRONMENTAL EVALUATION

1. Aesthetics

Would the project:

a) Have a substantial adverse effect on a scenic vista?

Potentially Significant Impact. Although the current General Plan does not identify any scenic vistas within the Planning Area, there are areas of scenic qualities such as the San Joaquin River located in the northern portion of the City, the open views of agricultural landscapes that are located on the fringes of the Planning Area, and views of historic-age structures that have unique architectural styles. Implementation of land use changes associated with the General Plan and Development Code Update may significantly affect scenic qualities of views within the community. These potential effects on views will be evaluated in the Master EIR and mitigation measures will be recommended, as necessary, to reduce potential significant impacts on scenic views.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?

Potentially Significant Impact. There are no state scenic highways within or immediately adjacent to the Planning Area. As identified in Checklist Item 1.a, the scenic resources within the Planning Area include the San Joaquin River, the agricultural landscape, and historical structures. Development in accordance with the General Plan and Development Code Update could result in impacts to scenic resources. As such, the Master EIR will evaluate the potential impacts to scenic resources within the Planning Area, and recommend mitigation measures, if necessary.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Potentially Significant Impact. Future development resulting from the implementation of the proposed General Plan and Development Code Update could result in potential significant impacts to the visual character of the City. The Master EIR will assess potential impacts to the visual character within the Planning Area and recommend measures to reduce these potential impacts, if necessary

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Potentially Significant Impact. Land use changes associated with the General Plan and Development Code Update have the potential to increase the amount of light and glare due to increased development within the City and its sphere of influence. This increase in light and glare could be significant. The Master EIR will evaluate the potential increase in light and glare from the

development that could occur under the General Plan and Development Code Update. This assessment will include an evaluation of the potential for denser and taller structures within the Planning Area to create new sources of light and glare and the potential for spillover onto neighboring sensitive receptors. Mitigation measures will be recommended, where necessary.

2. Agriculture and Forestry Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

Potentially Significant Impact. Future development in accordance with the General Plan and Development Code Update for the City of Fresno may result in the conversion of existing farmland to urban uses. The Master EIR will evaluate the current condition of the areas that are proposed for land use changes to determine if the soils meet the U.S. Natural Resources Conservation Service's designation for Prime Farmland. Additionally, the Master EIR will include an evaluation of whether the land use changes will result in the removal of existing productive agricultural land. Mitigation measures will be provided, if available.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

Potentially Significant Impact. The Development Code Update addresses the proposed zoning districts throughout the Planning Area. The proposed Update will result in the removal of agricultural zoning districts within the Planning Area; therefore, this removal will increase the potential for existing agricultural land to not renew existing Williamson Act contracts. The Master EIR will address this potential affect of the Development Code Update and include mitigation measures, if available.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. Based on a review of the California's Forest and Rangelands: 2010 Assessment prepared by the California Department of Forestry and Fire Protection in June 2010, the Planning Area does

not contain forest land or timberland. In addition, the City of Fresno does not have forest land or timberland as zoning district. Therefore, the implementation of the General Plan and Development Code Update would result in no impacts to forest land or timberland. Therefore, this issue will not be further addressed in the Master EIR.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. As described in CEQA Checklist Item 2.c, the Planning Area does not include forest land, and therefore the General Plan and Development Code Update will not result in the conversion of forest land to non-forest use. Therefore, this issue will not be further addressed in the Master EIR.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Potentially Significant Impact. The General Plan and Development Code Update could result in the conversion of Farmland to non-agricultural land within the Planning Area as described in CEQA Checklist Item 2.a. Future development within the fringes of the Planning Area may induce property owners that are located immediately outside the Planning Area to convert Farmland to non-agricultural land. This conversion could result in further impact to farmland. This issue will be further discussed in the Master EIR, and mitigation measures will be identified, if available.

Since the Planning Area and areas immediately adjacent to the Planning Area do not contain forest land, the project would not be involved in the conversion of forest land to non-forest land.

3. Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

Potentially Significant Impact. Implementation of the General Plan and Development Code Update has the potential to result in increases in pollutants and alter long-term local and regional air quality in the Planning Area and surrounding community. Consistency of the proposed Update with the San Joaquin Valley Air Pollution Control District's Air Quality Attainment Plans will be evaluated in the Master EIR, and mitigation measures will be recommended to reduce potentially significant air quality impacts.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update may significantly alter long-term local and regional air quality conditions. Short-term impacts include construction equipment exhaust emissions and fugitive dust from grading and soil disturbances. Long-term emissions are anticipated to primarily consist of mobile emissions from automobiles. The Master EIR will focus on addressing local and regional impacts on sensitive land uses. Changes in motor vehicle travel associated with circulation modifications will be evaluated in the Master EIR to determine impacts to local and regional air quality. Mitigation measures will be recommended to reduce potential significant air quality impacts.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update may contribute to significant cumulative alterations to long-term local and regional air quality conditions. As such, the proposed project has the potential to result in a cumulatively considerable net increase in criteria pollutants. Therefore, the Master EIR will analyze the project's potential impacts regarding increases in criteria pollutants and the potential for the project to exceed quantitative thresholds for ozone precursors.

d) Expose sensitive receptors to substantial pollutant concentrations?

Potentially Significant Impact. Implementation of land use changes associated with the General Plan and Development Code Update may significantly alter long-term local and regional air quality conditions, which has the potential to expose sensitive receptors to increase pollutant concentrations. Mitigation measures will be recommended to reduce potential significant air quality impacts to sensitive receptors.

e) Create objectionable odors affecting a substantial number of people?

Potentially Significant Impact. Implementation of land use changes associated with the General Plan and Development Code update may result in an increase in the emission of odors. The Master EIR will discuss the potential odor sources and procedures for identifying significant odor impacts. Odor emitted from facilities year-round or only during certain times of the year will be discussed. Mitigation measures will be provided, if necessary.

4. Biological Resources

Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Potentially Significant Impact. There are known and potential sensitive biological resources within the City of Fresno and its Sphere of Influence. The San Joaquin River corridor represents suitable habitat for numerous plant, wildlife, and avian species, including several special status species. Based on habitat requirements, special status species that occur, or could potentially occur in the San Joaquin River corridor include valley elderberry longhorn beetle, California red-legged frog, burrowing owl, San Joaquin kit fox, San Joaquin pocket mouse, and Swainson's hawk. These as well as other biological resources could be significantly affected under the proposed General Plan and Development Code Update. The Master EIR will analyze the potential for impacts to sensitive habitats and species. Such analysis will incorporate updated spatial data from the California Natural Diversity Database, and will address recent changes to the status of federal and State listed species. Mitigation measures will be recommended to reduce potential significant impacts to biological resources.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Potentially Significant Impact. Implementation of future development consistent with the proposed General Plan and Development Code Update may significantly affect existing riparian areas. These potential impacts may occur along existing drainages within the Planning Area as well as along the San Joaquin River, which borders the northern portion of the City of Fresno. Potential impacts to riparian resources will be discussed in the Master EIR, and mitigation measures will be provided, if required.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Potentially Significant Impact. Future development under the proposed General Plan and Development Code Update may significantly affect existing wetland areas. These potential impacts may occur along existing drainages within the Planning Area as well as along the San Joaquin River, which borders the northern portion of the City of Fresno. Potential impacts to wetland resources will be discussed in the Master EIR, and mitigation measures will be provided, if necessary.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?

Potentially Significant Impact. Implementation of the land use changes from the proposed General Plan and Development Code Update may significantly affect habitat linkages (i.e., wildlife and riparian corridors). The Master EIR will evaluate the potential for future development within the Planning Area to affect wildlife movement corridors. Mitigation measures will be recommended in the Master EIR to reduce potential significant impacts.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Potentially Significant Impact. Existing local policies or ordinances protecting biological resources may potentially be impacted by the General Plan and Development Code Update. The Master EIR will include a review of all relevant policies and ordinances, and mitigation measures will be recommenced, if required.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Potentially Significant Impact. The proposed General Plan and Development Code Update may result in development of existing open space land. The Master EIR will assess potential impacts to existing conservation plans and mitigation measures will be recommended, if necessary.

5. Cultural Resources

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Potentially Significant Impact. Several historically significant sites and structures are located within the Planning Area. Fresno and the immediate surrounding area contain numerous historic resources, including 29 sites on the National Register of Historical Places, 230 on the Local Register of Historical Places, and several historical districts. Record searches for historical resources will be conducted to provide updated information since the preparation of the existing Master EIR in 2002. Existing historical resources will be ascertained via research and the use of existing information. Potential impacts to historical resources will be discussed and any necessary mitigation measures will be provided in the Master EIR.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Potentially Significant Impact. Archeological resources may be impacted by future development consistent with the General Plan and Development Code Update. Record searches for archaeological resources will be utilized to provide updated information since the preparation of the existing Master EIR in 2002. The existing information and the updated information will be used to map sensitivity areas throughout the Planning Area. Potential impacts to archaeological resources will be assessed, and mitigation measures will be recommended in the Master EIR, as necessary, to reduce potentially significant impacts to archaeological resources.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Potentially Significant Impact. Paleontological resources may be impacted by future development consistent with the General Plan and Development Code Update. Record searches for paleontological resources will be utilized to provide updated information since the preparation of the existing Master EIR in 2002. The existing information and the updated information will be used to map sensitivity areas throughout the Planning Area. Potential impacts to paleontological resources will be assessed, and mitigation measures will be recommended in the Master EIR, as necessary, to reduce potentially significant impacts to paleontological resources.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Potentially Significant Impact. Potential impacts to human remains associated with future development consistent with the General Plan and Development Code Update will be assessed in the

Master EIR. The Native American Heritage Commission will be contacted regarding existing resources in the project area. Mitigation measures will be recommended in the Master EIR, as necessary, to reduce potentially significant impacts to human remains

6. Geology and Soils

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Less Than Significant Impact. As detailed in the Draft EIR for the Fresno County 2025 General Plan, in the Fresno sphere of influence, the principal earthquake hazard is related to ground shaking (discussed in CEQA Checklist Item 6.a.iii, below). The City's relative earthquake safety is considered such that the State of California contingency plans designate the City of Fresno as a location for emergency housing for those who must be relocated following earthquake disasters in other areas of California.

Fresno is in one of the more geologically stable areas of California and does not lie within a known active earthquake fault zone. Although a number of faults are located within the Sierra Nevada Mountain Range, none are considered active. The nearest active fault is located by Independence, California, approximately 100 miles east of the City of Fresno, along the Fresno County-Inyo County boundary. The Planning Area is not located in an Alquist-Priolo Special Fault Study Zone, and as such, it has not been identified as a zone of special study around active faults (City of Fresno Map Atlas 2011). A less than significant impact is anticipated regarding the rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, because the nearest active fault is approximately 100 miles from the City of Fresno. Therefore, a less than significant impact is anticipated regarding rupture of a known earthquake fault. No further analysis of impacts from earthquake fault ruptures is necessary in the Master EIR.

ii) Strong seismic ground shaking?

Potentially Significant Impact. Future development under the proposed General Plan and Development Code Update has the potential to expose persons to hazards from strong seismic ground shaking. In the future, the Planning Area could be affected by major seismic events from the following active fault systems in other regions of California:

- The San Andreas Fault paralleling the Coast Ranges in western Fresno County;
- The Owens Valley Fault system in the Eastern Sierra Region of California;
- The White Wolf Fault paralleling the Tehachapi range southeast of Bakersfield;

- Hidden thrust fault(s) in the west side of the San Joaquin Valley; and
- The Long Valley Caldera, a seismic and volcanic area in the Eastern Sierra that lies between Mono Lake and Crowley Lake.

The principal potential earthquake hazard for Fresno is ground shaking which could cause damage to buildings and infrastructure such as bridges and pipes. The distance between the City of Fresno and major faults minimizes this potential (City of Fresno Map Atlas 2011). The Master EIR will evaluate geologic hazards that could affect future development within the Planning Area. Mitigation measures will be developed to address potential impacts from strong seismic ground shaking.

iii) Seismic-related ground failure, including liquefaction?

Potentially Significant Impact. Future development under the proposed General Plan and Development Code Update has the potential to expose persons to hazards such as seismic-related ground failure. Therefore, the Master EIR will evaluate this potential effect and include mitigation measures, as applicable.

iv) Landslides?

Potentially Significant Impact. The relatively flat terrain within Fresno makes landslide unlikely, except in the vicinity of the San Joaquin River Bluffs. Future development under the proposed General Plan and Development Code Update and located in the vicinity of the San Joaquin River Bluffs, will be required to conform to the latest adopted Uniform Building Code and will be reviewed by the City regarding potential landslide impacts. The potential impacts will be discussed in the Master EIR and mitigation measures will be provided, as necessary.

b) Result in substantial soil erosion or the loss of topsoil?

Potentially Significant Impact. Highly erodible soils are easily carried by water and wind. Soil erosion potential is identified by a specific soil's "K Factor." The K-Factor is an indication of a soil's inherent susceptibility to erosion, absent slope and groundcover factors. Values of K range from 0.05 to 0.43. Higher K values indicate that soils are more susceptible to sheet erosion by water. The San Joaquin River Bluffs' steep slopes and soil composition predispose it to instability and erosion. According to the City of Fresno Map Atlas prepared in 2011, seventy-two percent of the land within the City of Fresno and its sphere of influence have a high erosion susceptibility, while 22 percent is designated as moderate erosion susceptibility. Therefore, future development in accordance with the proposed General Plan and Development Code Update may result in potentially significant impacts regarding soil erosion or the loss of topsoil. The Master EIR will address potential project impacts associated with erosion, and mitigation will be recommended, as necessary.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Potentially Significant Impact. As described in geology and soils CEQA Checklist Item 6.b, above, seventy-two percent of the land within the City of Fresno and its Sphere of Influence have a high erosion susceptibility, while 22 percent is designated as moderate erosion susceptibility (City of Fresno Map Atlas 2011). Therefore, future development under the proposed General Plan and Development Code Update may result in potentially significant impacts regarding unstable soils. The Master EIR will evaluate the potential unstable soils impacts and mitigation measures will be developed, as necessary, to reduce potential significant impacts.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Potentially Significant Impact. Expansive soils are predominantly comprised of clays, which expand in volume when water is absorbed and shrink when the soil dries. Expansion is measured by shrink-swell potential, which is the volume change in soil with a gain in moisture. Soils with a moderate to high shrink-well potential can cause damage to roads, buildings, and infrastructure. The northern portion of the City of Fresno's sphere of influence contains some areas of expansive clay soil that require special construction standards for foundations and infrastructure. Future development within the Planning Area may be exposed to potential significant impacts regarding expansive soil. Therefore, the Master EIR will discuss this issue and provide mitigation measures, as necessary.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Potentially Significant Impact. Future development under the proposed General Plan and Development Code Update may involve septic tank uses or alternative wastewater disposal systems. Therefore, the potential impacts on these systems from potential unstable soils will be discussed in the Master EIR, and mitigation measures will be provided, if necessary.

7. Greenhouse Gas Emissions

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Potentially Significant Impact. Future development under the proposed General Plan and Development Code Update has the potential to increase the generation of greenhouse gas emissions, which may have a significant impact on the environment. Therefore, the Master EIR will estimate the project's direct and indirect emissions of greenhouse gases and evaluate the incremental contribution to global warming impacts.

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

Potentially Significant Impact. Future development under the proposed General Plan and Development Code has the potential to increase greenhouse gas emissions and as such, has the potential to result in levels of emissions that may conflict with applicable air quality/greenhouse gas plans and policies adopted by local agencies. The Master EIR will assess whether or not the General Plan and Development Code Update will conflict with any applicable plan, policy or regulations related to the reduction of greenhouse gas emissions.

8. Hazards and Hazardous Materials

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Potentially Significant Impact. Potential development under the General Plan and Development Code Update may result in development of industrial and manufacturing land uses, which may use and/or transport hazardous materials. The transport, use, or storage of hazardous materials will be assessed in the Master EIR. Past hazardous materials incidents will be investigated in the Master EIR to determine their potential effect on future land uses within the Planning Area. This potential may be significant and mitigation measures will be provided, if necessary.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Potentially Significant Impact. As described in CEQA Checklist Item 8.a, potential development associated with the General Plan and Development Code Update may result in development of industrial and manufacturing land uses, which may use and/or transport hazardous materials. Therefore, the potential exists for there to be upset/accident conditions involving the release of hazardous materials into the environment. The Master EIR will address this issue in more detail and will provide mitigation measures, as necessary.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Potentially Significant Impact. The proposed General Plan and Development Code Update will apply to land uses that have the potential to emit hazardous emissions or handle hazardous or acutely hazardous materials and substances. The Master EIR will analyze the potential for this to occur within one-quarter mile of existing/proposed schools within the Planning Area. Mitigation measures will be developed, as necessary to reduce potential impacts to schools from hazardous materials.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Potentially Significant Impact. Hazardous materials are those which, by their nature (chemical, physical, or biological properties) have the potential to cause death or serious illness during use/consumption, processing, storage, transport, or when improperly disposed of. These materials may be flammable, explosive, corrosive, chemically reactive, toxic, carcinogenic, radioactive,

infectious, or may harm people upon contact. Sites previously contaminated by these materials are required to be identified and cleaned up (City of Fresno Map Atlas 2011).

Contaminated sites are mainly associated with leaking underground storage tanks and are predominately clustered south of downtown, Fresno Yosemite International Airport, Palm Bluffs Corporate Center (northwest Fresno) and along the Union Pacific Railroad Tracks. These sites may include Superfund, Environmental Protection Agency, Storage and Disposal Facilities, Toxic Release Inventory System, National Discharge Elimination System Majors, Large Quantity Generators, Major Discharge of Air Pollutants, Corrective Actions, Risk Management Plan, Section Seven Tracking System (pesticides) and Brownfield Properties, as defined by the Environmental Protection Agency (City of Fresno Map Atlas 2011). The Master EIR will analyze the potential impact of these sites in light of the General Plan and Development Code Update and will develop mitigation measures, as necessary to address potential impacts.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Potentially Significant Impact. As detailed in the Safety Element of the 2025 General Plan for the City of Fresno, there are three public airports in the City of Fresno: (1) Fresno-Yosemite International Airport (2) Fresno Chandler Downtown Airport and (3) Sierra Sky Park Airport. The 2025 General Plan also states that in conjunction with the Fresno-Yosemite International Airport, the Air National Guard maintains an airbase for military flight and training operations. Implementation of the proposed General Plan and Development Code Update is anticipated to increase the population within the Planning Area and more specifically within the vicinity of the airports. As a result, the increased population from future development may expose those working or living in the area to potential safety hazards associated with airport operations. The master plans for these airports will be reviewed for potential conflicts with the proposed General Plan and Development Code Update. Potential impacts will be evaluated and mitigation measures will be provided, if necessary.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The City contain airports that are discussed in CEQA Checklist Item 8.e, however, there are no private airstrips located in the City of Fresno (Airnav.com 2012). Additionally, the Safety Element of the 2025 General Plan does not identify any airstrips in the Planning Area. Therefore, there will be no impacts in this regard, and no further analysis of this issue is necessary in the Master EIR.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Potential Significant Impact. The proposed update of the City's General Plan and Development Code may result in development intensities that could increase traffic that could physically interfere with an adopted emergency response plan. An example is the proposed modification of the traffic threshold, which would allow higher degraded levels of service than currently exist. As a result, the potential for future development to physically interfere with an adopted emergency response plan or emergency evacuation plan will be assessed, and mitigation measures will be provided, as necessary.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Potentially Significant Impact. Fire hazards are typically highest in heavily wooded areas because trees and grasslands are a great source of fuel for fires. Given that the city is largely urbanized with the exception of agricultural land on the periphery and given that the City lacks steep topographies, wildfire threats are minimal. Most fires in the city involve structures rather than grasslands (City of Fresno Map Atlas 2011). However, development under the proposed General Plan and Development Code Update has the potential to subject persons/structures to wildfires, including those undeveloped agricultural lands. The Master EIR will analyze potential impacts from the proposed project regarding wildfires and will recommend mitigation measures, as necessary.

9. Hydrology and Water Quality

Would the project:

a) Violate any water quality standards or waste discharge requirements?

Potentially Significant Impact. Development in accordance with the proposed General Plan and Development Code Update may result in the degradation of water quality and result in violations of water quality or water discharge standards. The Master EIR will qualitatively address the water quality standards and waste discharge requirements and assess the potential for impacts from future development. Mitigation measures will be recommended, if necessary.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Potentially Significant Impact. The proposed General Plan and Development Code Updates may result in development that could substantially reduce groundwater supplies and increase impervious surfaces that could reduce the potential for groundwater recharge. The Master EIR will address these issues and provide mitigation measures to reduce potential impacts.

c) Substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Potentially Significant Impact. Development in accordance with the General Plan and Development Code Update may result in an increased amount of runoff during construction and operational activities. Construction activities could increase runoff that could lead to erosion or siltation within or adjacent to the Planning Area. Operational activities associated with future development could alter existing drainage patterns that could cause erosion or siltation. The Master EIR will address the potential for future development to cause substantial erosion due to drainage pattern alterations within or adjacent to the Planning Area. Mitigation measures will be recommended to reduce potential impacts.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Potentially Significant Impact. Development in accordance with the General Plan and Development Code Update may result in an increased amount of runoff during construction and operational activities. Construction activities could increase runoff that could lead to flooding within

or adjacent to the Planning Area. Operational activities associated with future development could alter existing drainage patterns that could cause flooding. The Master EIR will address the potential for future development to substantially increase the rate or amount of surface runoff that could flood areas within or adjacent to the Planning Area. Mitigation measures will be recommended to reduce potential impacts.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Potentially Significant Impact. The proposed General Plan and Development Code Update may result in development that could affect existing infrastructure systems, including existing flood control facilities. Urban development within currently undeveloped areas is anticipated to result in higher runoff volumes during storm events, as a result of the increase in impervious surfaces within these areas, which may require additional flood control facilities. Runoff from these impervious surfaces may carry surface pollutants to local rivers and streams and may affect water quality. The Master EIR will assess the project's potential impacts to existing or planned stormwater drainage systems as well as the potential for future development to contribute substantial additional polluted runoff.

f) Otherwise substantially degrade water quality?

Potentially Significant Impact. Development in accordance with the proposed General Plan and Development Code Update may result in the degradation of water quality during construction and operational activities. The Master EIR will address the potential water quality impacts and provide mitigation measures to reduce impacts.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Potentially Significant Impact. Portions of the Planning Area are located in flood prone areas, such as the portion of the Planning Area located along the San Joaquin River (Flood Zone AE) and Flood Zone X in the center of the Planning Area (FEMA Map Service Center 2012). Potential changes in land uses and General Plan policies may involve development of housing in areas of the Planning Area that are located within the 100-year floodplain. The Master EIR will evaluate the potential to expose future housing developments within the 100-year flood hazard area. Mitigation measures will be recommended, as necessary to reduce flood related risks in the Planning Area.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Potentially Significant Impact. Portions of the Planning Area are located in flood prone areas, such as the portion of the Planning Area located along the San Joaquin River (Flood Zone AE) and Flood Zone X in the center of the Planning Area (FEMA Map Service Center, 2012). Potential changes in land uses and General Plan policies may involve development of structures in areas of the Planning Area that are located within the 100-year floodplain. The Master EIR will evaluate the potential to expose structures within the 100-year flood hazard area. Mitigation measures will be recommended, as necessary to reduce flood related risks in the Planning Area.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Potentially Significant Impact. The General Plan and Development Code Update may have the potential to expose people or structures to hazards resulting from the failure of a dam or levee because the nearest dam, Big Dry Creek Dam, is located less than one mile north of the City's sphere of influence. The Master EIR will discuss the potential for failure of this dam and expose persons or structures to a significant risk of loss, injury or death involving flooding. Mitigation measures will be provided to reduce potential impacts.

j) Inundation by seiche, tsunami, or mudflow?

Potentially Significant Impact. Due to the Planning Area's distance from the ocean, no impact is anticipated regarding tsunamis. In addition, due to the Planning Area's distance from a large body of water that could result in substantive seiche effects, no impact is anticipated from seiches. Finally, the terrain of the Planning Area is relatively flat; however, there may be some areas that could be subject to mudflow. The Master EIR will address the potential for mudflow impacts from future development and mitigation measures will be recommended, as necessary.

10. Land Use and Planning

Would the project:

a) Physically divide an established community?

Potentially Significant Impact. Future development in accordance with the General Plan and Development Code Update could result in land uses that could divide established communities. This division could result from corridors that are planned for higher intensities of uses compared to existing uses. In addition, the rural communities that are located in the outer areas of the Planning Area could be physically divided as new development is constructed. The Master EIR will address the potential for future development to result in physically dividing established communities and mitigation measures will be recommended to reduce potential impacts.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

Potentially Significant Impact. Development in accordance with the General Plan and Development Code may result in conflicts with regional plans and policies. The Master EIR will evaluate regional plans and policies that apply to the Planning Area such as the airport land use plans, San Joaquin River Parkway Plan, Countywide Integrated Waste Management Plan, and Water Quality Control Plan and determine the potential for conflicts. Mitigation measures will be recommended to reduce potential conflicts, if necessary.

c) Conflict with any applicable habitat conservation plan or natural communities conservation plan?

Potentially Significant Impact. The Planning Area is not encompassed within a habitat conservation plan (HCP) or natural communities conservation plan (NCCP). Therefore, the implementation of the proposed General Plan and Development Code Update would result in no impacts to a HCP or NCCP.

11. Mineral Resources

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Less Than Significant Impact. The principal mineral resources located in and immediately adjacent to the Planning Area are aggregate materials along the San Joaquin River corridor. These materials are removed via surface mining operations. These areas have been and are proposed to be continued to be designated as Open Space, and the activities have been and will continue to require conditional use permits. These uses are considered legal non-conforming uses. It is anticipated that these uses will continue until the resources are substantially removed and it is no longer economically feasible to mine the areas. As a result, future development under the General Plan and Development Code Update would result in less than significant impacts to mineral resources. Therefore, this issue will not be further addressed in the Master EIR.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Less than Significant Impact. As stated in CEQA Checklist Item 11.a, the mining activities are expected to continue in the areas with aggregate materials and future development under the General Plan and Development Code Update would result in less than significant impacts to mineral resources. Therefore, this issue will not be further addressed in the Master EIR.

12. Noise

Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially Significant Impact. Development in accordance with the General Plan and Development Code Update has the potential to create noise impacts that may adversely affect surrounding land uses, as well as the uses contemplated by the General Plan and Development Code Update. Noise levels from mobile and stationary sources may increase where new or more intensive development is proposed. The Master EIR will evaluate potential noise impacts and a noise impact analysis will be conducted. The noise impact analysis will analyze construction noise and vibration, roadway noise contours, stationary noise impacts as well as vibration impacts that could occur during operational activities. The Master EIR will include appropriate mitigation measures to reduce potential impacts.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Potentially Significant Impact. Development in accordance with the General Plan and Development Code Update has the potential to create excessive groundborne vibration impacts that may adversely affect land uses. These impacts could occur during construction activities or operational activities. The Master EIR will evaluate potential construction and operational vibration impacts, and mitigation measures will be recommended to reduce potential impacts.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Potentially Significant Impact. Development that is implemented under the General Plan and Development Code Update has the potential to create stationary and mobile noise impacts that could adversely affect surrounding land uses. These increases will occur as development occurs throughout the Planning Area. The Master EIR will evaluate potential long-term noise impacts associated with the project and recommend mitigation measures to reduce potential impacts.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Potentially Significant Impact. Development that is implemented under the General Plan and Development Code Update has the potential to create temporary increases in noise levels. These temporary increase could occur during construction activities. Potential noise impacts that could affect surrounding land uses will be discussed. The Master EIR will evaluate potential construction noise impacts associated with the project and recommend mitigation measures to reduce potential impacts.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Potentially Significant Impact. As detailed in the Safety Element of the 2025 General Plan for the City of Fresno, there are three public airports in the City of Fresno: (1) Fresno-Yosemite International Airport (2) Fresno Chandler Executive Airport and (3) Sierra Sky Park Airport. The 2025 General Plan also states that in conjunction with the Fresno-Yosemite International Airport, the Air National Guard maintains an airbase for military flight and training operations. Implementation of the proposed General Plan and Development Code Update is anticipated to increase the population within the Planning Area and more specifically within the vicinity of the airports. As a result, the increased population from future development may expose those working or living in the area to potential noise impacts associated with airport operations. The master plans for these airports will be reviewed for

potential conflicts with the proposed General Plan and Development Code Update. Potential impacts will be evaluated and mitigation measures will be provided, if necessary.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The City contain airports that are discussed in CEQA Checklist Item 12.e, however, there are no private airstrips located in the City of Fresno (Airnav.com 2012). Additionally, the Safety Element of the 2025 General Plan does not identify any airstrips in the Planning Area. Therefore, there will be no impacts in this regard, and no further analysis of this issue is necessary in the Master EIR.

13. Population and Housing

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Potentially Significant Impact. The proposed General Plan update is being prepared to modify policies and programs for the future development buildout within the Planning Area. This modification will result in a greater population and number of housing units compared to the existing 2025 General Plan and includes the same size of Planning Area. Therefore, the policies and programs will direct growth to intensify within the Planning Area. The Master EIR will evaluate the potential impacts related to population and housing growth and provide mitigation measures to reduce potential impacts.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update may result in the displacement of housing as new more intense development occurs in areas of less intense residential development. The Master EIR will assess the long-term impacts related to potential displacement of housing within the Planning Area as a result of the proposed General Plan and Development Code Update, and mitigation measures will be recommended, if necessary.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update may result in the displacement of people. Existing residential land uses are scattered throughout the Planning Area and in areas that are proposed for more intense land uses. The Master EIR will assess the long-term impacts related to potential displacement of people within the City as a result of the proposed project and mitigation measures will be recommended, if necessary.

14. Public Services

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a) Fire protection?

Potentially Significant Impact. Fire services for the Planning Area are provided by the City of Fresno Fire Department, the Fresno County Fire Protection District, North Central Fire Protection District, and Fig Garden Fire Protection District. Changes in land use associated with the General Plan and Development Code Update will allow an increased level of urban development within the Planning Area. This increased intensity is expected to increase fire service needs and could increase the need for additional fire personnel and facilities. The Master EIR will analyze potential environmental impacts associated with increases in fire facilities that are required to adequately serve the buildout development of the General Plan and Development Code Update. Mitigation measures will be recommended as necessary.

b) Police protection?

Potentially Significant Impact. Police services for the Planning Area are provided by the City of Fresno Police Department, the County of Fresno Sheriff Department, and the California Highway Patrol. Changes in land use associated with the General Plan and Development Code Update will allow an increased level of urban development within the Planning Area. This increased intensity is expected to increase police services and could increase the need for additional police personnel and facilities. The Master EIR will analyze potential environmental impacts associated with increases in police facilities that are required to adequately serve the buildout development of the General Plan and Development Code Update. Mitigation measures will be recommended as necessary.

c) Schools?

Potentially Significant Impact. There are many school districts that currently serve the student population within the Planning Area. The primary school districts that serve the majority of the students within the Planning Area include Fresno Unified, Clovis Unified, and Central Unified. Buildout of the proposed General Plan and Development Code Update will result in a substantial increase in housing units within the Planning Area, and therefore, will result in a substantial increase in student population. The Master EIR will address the potential impacts to school facilities and include mitigation measures to ensure adequate school facilities are provided as new residential development is proposed.

d) Parks?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update will increase the demand for parks within the Planning Area. The Master EIR will analyze potential impacts to parks and will include mitigation measures to reduce potential impacts.

e) Other public facilities?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update has the potential to impact various public facilities including courts, libraries, social welfare facilities, and public health facilities. The Master EIR will analyze potential impacts from the buildout of land uses within the Planning Area. Mitigation measures will be recommended as necessary.

15. Recreation

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code update will result in a substantial increase in population that will increase the demand for recreation facilities within the Planning Area. The Master EIR will evaluate the potential physical deterioration impacts on existing parks and recreational facilities from the increase in demand. Mitigation measures will be identified to reduce potential impacts. This evaluation will be included in the Public Services and Utilities section of the Master EIR.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update will result in the development of park and recreational facilities to serve the increase population. The potential adverse physical effects resulting from the addition of new facilities will be addressed in the Master EIR. These potential physical effects will be addressed in various sections of the Master EIR that address topical issues such as traffic, air quality, noise, etc. Mitigation measures will be recommended in the individual topical issue evaluations, as appropriate.

16. Transportation/Traffic

Would the project:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Potentially Significant Impact. Development under the General Plan and Development Code Update will result in increased vehicle trips that may result in traffic impacts that may conflict with a plan, policy, or ordinance. The Master EIR will evaluate existing applicable plans, ordinances and/or policies related to traffic performance. Mitigation measures will be recommended, as necessary, to reduce potential traffic impacts.

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Potentially Significant Impact. Development under the General Plan and Development Code Update will result in increased vehicle trips that may conflict with the congestion management program. The Master EIR will evaluate the applicable congestion management program and will recommend mitigation measures, as necessary.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Potentially Significant Impact. The proposed General Plan and Development Code Update will increase population that could increase the use and frequency of air travel and could increase development in the vicinity of the three existing airports located within the Planning Area. This increase in development will increase population in close proximity of the airports and could increase safety risks. The plans that address land use compatibility adjacent to airports will be reviewed for each of the airports in the Master EIR to determine the potential safety risks associated with future development within the Planning Area. Mitigation measures will be recommended, where necessary.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Potentially Significant Impact. Currently, there are agricultural activities that occur within the Planning Area. As development occurs adjacent to land that is under agricultural activities, increased traffic hazards may occur if mobile agricultural equipment uses the same roadways as automobiles.

This potential impact will be analyzed in the Master EIR, and mitigation measures will be recommended, as necessary.

e) Result in inadequate emergency access?

Potentially Significant Impact. Implementation of the General Plan and Development Code Update will result in the construction of numerous new developments. These construction activities could impede emergency vehicles from accessing their destination. In addition, future development may reduce capacities of roadways and intersections that could impede emergency vehicles from accessing their destination. These potential construction and operational impacts will be analyzed in the Master EIR and mitigation measures will be recommended, as necessary.

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Potentially Significant Impact. The proposed General Plan and Development Code Update has the potential to result in increased vehicle trips and as such may conflict with adopted policies, plans or programs regarding public transit, bicycle or pedestrian facilities. The Master EIR will evaluate the potential for future development to conflict with adopted plans, policies, and programs. Mitigation measures will be recommended were necessary.

17. Utilities and Service Systems

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Potentially Significant Impact. Implementation of the proposed General Plan and Development Code Update will increase the amount of wastewater generated within the Planning Area. The Master EIR will analyze potential impacts regarding wastewater and wastewater treatment requirements of the Central Valley Regional Water Quality Control Board. Mitigation measures will be recommended, as necessary.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Potentially Significant Impact. Future development in accordance with the General Plan and Development Code Update will substantially increase the amount of wastewater generated and the amount of water demand. It is anticipated that additional waster and wastewater treatment facilities will be required to serve the future buildout of the Planning Area. The Master EIR will include an evaluation of the potential environmental effects associated with the future development of new facilities to meet the increase in water and wastewater service demands. These potential physical effects will be addressed in various sections of the Master EIR that address topical issues such as traffic, air quality, noise, etc. Mitigation measures will be recommended in the individual topical issue evaluations, as appropriate.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Potentially Significant Impact. Future development in accordance with the General Plan and Development Code Update will substantially increase the amount of impervious surfaces within the Planning Area. This increase in impervious surfaces will increase the amount of storm water runoff and require the construction of new storm water drainage facilities or expansion of existing facilities. An evaluation of the potential increase in storm water generation will be provided in the Master EIR as well as identification of new facilities that will be required to adequately serve future development. The potential environmental effects associated with the future development of the new facilities will be addressed in various sections of the Master EIR such as traffic, air quality, noise, etc. Mitigation measures will be recommended in the individual topical issue evaluations, as appropriate.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Potentially Significant Impact. Future buildout within the Planning Area in accordance with the General Plan and Development Code Update will substantially increase water demand. This increase in demand may substantially impact the existing available water supplies. The Master EIR will address the increase in water demand and the need for additional sources of water supply to adequately serve the projected buildout within the Planning Area. Mitigation measures will be recommended, as necessary.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Potentially Significant Impact. Future buildout within the Planning Area in accordance with the General Plan and Development Code Update will substantially increase the generation of wastewater. This increase in wastewater generation may substantially impact the existing wastewater treatment facilities that currently serve the Planning Area. The Master EIR will address the potential impacts from the future buildout within the Planning Area, and mitigation measures will be recommended, as necessary.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Potentially Significant Impact. Future buildout within the Planning Area in accordance with the General Plan and Development Code Update will substantially increase the generation of solid waste. This increase in solid waste may substantially impact the existing landfills that currently serve the Planning Area. The Master EIR will evaluate these potential impacts and mitigation measures will be recommended, as necessary.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Potentially Significant Impact. Statewide policies regarding solid waste have become progressively more stringent, reflecting Assembly Bill 939, which requires local government to develop waste reduction and recycling policies and meet mandated solid waste reduction targets. The Master EIR will address the potential increase in the generation of solid waste and the potential for future development to comply with federal, state, and local solid waste statutes and regulations. Mitigation measures will be recommended, as necessary.

18. Mandatory Findings of Significance

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Potentially Significant Impact. Future development in accordance with the General Plan and Development Code Update will result in conversion of vacant land into developed land. As construction activities occur on vacant land, potential impacts to sensitive plant and wildlife species and habitat could occur. In addition, as future development occurs, potential impacts to historical resources may result. The Master EIR will address the project's potential impact on biological and cultural resources, and mitigation measures will be recommended, where necessary.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Potentially Significant Impact. Future development in accordance with the General Plan and Development Code Update could contribute considerably to cumulative impacts. Each of the issues identified above as potentially significant will be evaluated for cumulative impacts within the Master EIR. Mitigation measures will be provided, as necessary.

c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?

Potentially Significant Impact. Implementation of the General Plan and Development Code Update could result in significant impacts that may result in substantial adverse effects on human beings. These potential effects will be addressed in the Master EIR and mitigation measures will be recommended, as necessary.

SECTION 4: REFERENCES

Airnav.com. 2012. Website http://www.airnav.com/airports/. Accessed April 5, 2012.

Federal Emergency Management Agency (FEMA) Map Service Center. 2012. Website https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1. Accessed April 9, 2012.

Fresno, City of. 2002. 2025 Fresno General Plan. February 1.

Fresno, City of. 2011. General Plan Map Atlas-Existing Conditions Report, General Plan & Code Update August. Website http://www.fresno.gov/Government/DepartmentDirectory/PlanningandDevelopment/AdvancedPlanning/Downloads.htm. Accessed April 4, 2012.

Fresno, City of. 2012. Website http://www.fresno.gov/Government/DepartmentDirectory/PlanningandDevelopment/AdvancedPlanning/About+Project.htm. Accessed April 4, 2012.

Fresno, City of. Municipal Code. 2012. Website http://library.municode.com/index.aspx?clientId=14478. Accessed April 10, 2012.

Fresno, City of. Water Division. 2012. Website http://www.fresno.gov/Government/DepartmentDirectory/PublicUtilities/Watermanagement/Default.htm. Accessed April 9, 2012.

SECTION 5: LIST OF PREPARERS

Michael Brandman Associates - Environmental Consultant

7440 N. Palm Avenue, Suite 101
Fresno, CA 93771
Phone: 559.497.0310
Fax: 559.449.4515

Project Principal-in-Charge ..... Jason Brandman
Project Manager ..... Mike Houlihan, AICP
Assistant Project Manager ..... Shawn Nevill, JD
Environmental Analyst ..... Margaret F. Partridge, MURP, AICP, LEED Green Associate
Senior Editor and Publications Specialist ..... Sandra L. Tomlin
GIS/Graphics ..... Karlee McCracken
Reprographics ..... Jose Morelos
Administrative Assistant ..... Daphne Ott de Vries

A.2 - Public Notice for Notice of Preparation and Notice of Public Scoping Meeting

PUBLIC NOTICE

#22666

PUBLIC NOTICE OF THE NOTICE OF PREPARATION
AND A NOTICE OF PUBLIC SCOPING MEETING
AND MEETING WITH AGENCIES
FOR
CITY OF FRESNO GENERAL PLAN AND
DEVELOPMENT CODE UPDATE

This public notice is to inform the public of the availability of the Notice of Preparation. Additionally, it is a public notice that identifies the date, time, and location of a public scoping meeting and meeting with agencies for the City of Fresno General Plan and Development Code Update.

Notice of Preparation: In compliance with Section 15082(a) of the California Environmental Quality Act (CEQA) Guidelines, the City of Fresno, as the Lead Agency, has prepared a Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the project generally described below. The complete project description, location, and probable environmental effects of the project are contained in an Initial Study that is available for review at the following website:

http://www.fresno.gov/Government/DepartmentDirectory/DARM/AdvancedPlanning/Downloads.htm

The City has determined that a Master EIR in accordance with Article 11.5 of the State CEQA Guidelines will be prepared. The NOP provides information describing the project and the potential environmental effects to enable the Office of Planning and Research and the Responsible and Trustee agencies to make a meaningful response to the City of Fresno regarding the scope and content of the environmental issues that will be evaluated in the Master EIR. The City of Fresno is also inviting comments from the public regarding the scope and content of the environmental issues to be evaluated in the Master EIR. Due to the time limits mandated by State law, comments on the NOP, including the Initial Study, must be sent to the City of Fresno at the earliest possible date, but not later than 30 days after receipt of the NOP, or public commentary no later than December 6, 2012. Comments should be sent to Keith Bergthold at the address provided below.

Notice of Public Scoping Meeting and Meeting with Agencies: The City of Fresno will hold a meeting for the project with agencies to assist in determining the scope and content of the environmental information that the agencies may require per Section 15082(c) of the CEQA Guidelines. Additionally, the public is invited to attend and provide comments regarding concerns with the environmental effects of the project. The public meeting will include a brief overview of the proposed project, description of the environmental issues that will be addressed in the Master EIR, and a general schedule for the Master EIR process. The meeting will be held on Tuesday, November 27, 2012 at 6:00 p.m. at the City of Fresno Council Chambers at 2600 Fresno Street, Fresno, CA 93721.

Proposed Project

Project Title: City of Fresno General Plan Update and Development Code Update

Project Description: The City of Fresno is proposing to update its General Plan and Development Code for its Planning Area that encompasses approximately 106,000 acres and includes all areas within the City's current City limits, the current Sphere of Influence, the City's Wastewater Treatment Plant site, and an area north of the City's most northeasterly portion of the City. The General Plan Update includes a comprehensive update of the City-approved 2025 General Plan and includes amendments to and repeal of certain community plans and specific plans. The Development Code Update includes a comprehensive revision of the City's Zoning and Subdivision Ordinances as well as other land use planning, zoning and development related regulations contained in Chapter 12 of the Fresno Municipal Code. In addition, the project will include a repeal of the current Planning Guidelines and adoption of proposed Planning Guidelines that provides direction for the preparation, amendment, and repeal of plans. For a complete description of the proposed project, please review the Notice of Preparation at the website referenced above.

Project Applicant: City of Fresno

Contact: Please contact Keith Bergthold at 559.621.8003, Keith.Bergthold@fresno.gov, or at 2600 Fresno Street, Room 3065, Fresno, CA 93721 with any questions regarding this Public Notice for the Notice of Preparation and this Notice of Public Scoping Meeting.

A.3 - Comments Received on Notice of Preparation and Initial Study

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

November 6, 2012

To: Reviewing Agencies

Re: City of Fresno General Plan and Development Code Update
SCH# 2012111015

Attached for your review and comment is the Notice of Preparation (NOP) for the City of Fresno General Plan and Development Code Update draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Keith Bergthold
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721-3604

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2012111015
Project Title City of Fresno General Plan and Development Code Update
Lead Agency Fresno, City of

Type NOP Notice of Preparation

Description The City of Fresno is proposing to update its General Plan and Development Code for its Planning Area that encompasses approximately 106,000 acres and includes all areas within the City's current City limits, the current Sphere of Influence, the City's Wastewater Treatment Plant site, and an area north of the City's most northeasterly portion of the City. The General Plan Update includes a comprehensive update of the City-approved 2025 General Plan and includes amendments to the repeal of certain community plans and specific plans. The Development Code Update includes a comprehensive revision of the City's Zoning Code and Subdivision regulations contained in Section 12 of the Fresno Municipal Code.

Lead Agency Contact

Name Keith Bergthold
Agency City of Fresno
Phone (559) 621-8003 **Fax**
email
Address 2600 Fresno Street, Room 3065
City Fresno **State** CA **Zip** 93721-3604

Project Location

County Fresno
City Fresno
Region
Cross Streets Numerous
Lat / Long 36° 44' 23.2" N / 119° 47' 04.5" W
Parcel No. Numerous
Township 14S **Range** 20E **Section** 3 **Base** Mt.Diabl

Proximity to:

Highways SR-99, -41, -180, -168
Airports FYI, FCH, Sierra Sky Park
Railways BNSF, Union Pacific
Waterways San Joaquin River, Millerton Lake, Irrigation Canals
Schools K-12, Colleges
Land Use The project includes a comprehensive update to the current General Plan and zoning designations, resulting in numerous changes in designations throughout the city of Fresno Planning Area.

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies Department of Conservation; California Energy Commission; Central Valley Flood Protection Board; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 4; CA Department of Public Health; Native American Heritage Commission; State Lands Commission; Caltrans, Division of Aeronautics; Caltrans, Division of Transportation Planning; California Highway Patrol; State Water Resources Control Board; Air Resources Board, Transportation Projects

Note: Blanks in data fields result from insufficient information provided by lead agency.

Document Details Report
State Clearinghouse Data Base

Date Received 11/06/2012 *Start of Review* 11/06/2012 *End of Review* 12/05/2012

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

Resources Agency

Resources Agency
Nadell Gayou

- Dept. of Boating & Waterways
  Nicole Wong
- California Coastal Commission
  Elizabeth A. Fuchs
- Colorado River Board
  Gerald R. Zimmerman
- Dept. of Conservation
  Elizabeth Carpenter
- California Energy Commission
  Eric Knight
- Cal Fire
  Dan Foster
- Central Valley Flood Protection Board
  James Herota
- Office of Historic Preservation
  Ron Parsons
- Dept of Parks & Recreation
  Environmental Stewardship Section
- California Department of Resources, Recycling & Recovery
  Sue O'Leary
- S.F. Bay Conservation & Dev't. Comm.
  Steve McAdam
- Dept. of Water Resources Resources Agency
  Nadell Gayou

Fish and Game

- Depart. of Fish & Game
  Scott Flint
  Environmental Services Division
- Fish & Game Region 1
  Donald Koch
- Fish & Game Region 1E
  Laurie Harnsberger
- Fish & Game Region 2
  Jeff Drongesen
- Fish & Game Region 3
  Charles Armor
- Fish & Game Region 4
  Julie Vance
- Fish & Game Region 5
  Leslie Newton Reed
  Habitat Conservation Program
- Fish & Game Region 6
  Gabrina Gatchel
  Habitat Conservation Program
- Fish & Game Region 6 I/M
  Brad Henderson
  Inyo/Mono, Habitat Conservation Program
- Dept. of Fish & Game M
  George Isaac
  Marine Region

Other Departments

- Food & Agriculture
  Sandra Schubert
  Dept. of Food and Agriculture
- Depart. of General Services
  Public School Construction
- Dept. of General Services
  Anna Garbeff
  Environmental Services Section
- Dept. of Public Health
  Jeffery Worth
  Dept. of Health/Drinking Water
- Delta Stewardship Council
  Kevan Samsam

Independent Commissions,Boards

- Delta Protection Commission
  Michael Machado
- Cal EMA (Emergency Management Agency)
  Dennis Castrillo
- Native American Heritage Comm.
  Debbie Treadway
- Public Utilities Commission
  Leo Wong
- Santa Monica Bay Restoration
  Guangyu Wang
- State Lands Commission
  Jennifer Deleong
- Tahoe Regional Planning Agency (TRPA)
  Cherry Jacques

Business, Trans & Housing

- Caltrans - Division of Aeronautics
  Philip Crimmins
- Caltrans - Planning
  Terri Pencovic
- California Highway Patrol
  Suzann Ikeuchi
  Office of Special Projects
- Housing & Community Development
  CEQA Coordinator
  Housing Policy Division

Dept. of Transportation

- Caltrans, District 1
  Rex Jackman
- Caltrans, District 2
  Marcelino Gonzalez
- Caltrans, District 3
  Gary Arnold
- Caltrans, District 4
  Erik Alm
- Caltrans, District 5
  David Murray
- Caltrans, District 6
  Michael Navarro
- Caltrans, District 7
  Dianna Watson
- Caltrans, District 8
  Dan Kopulsky
- Caltrans, District 9
  Gayle Rosander
- Caltrans, District 10
  Tom Dumas
- Caltrans, District 11
  Jacob Armstrong
- Caltrans, District 12
  Marlon Regisford

Cal EPA

Air Resources Board

- Airport/Energy Projects
  Jim Lerner
- Transportation Projects
  Douglas Ito
- Industrial Projects
  Mike Tollstrup

- State Water Resources Control Board
  Regional Programs Unit
  Division of Financial Assistance
- State Water Resources Control Board
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- State Water Resouces Control Board
  Phil Crader
  Division of Water Rights
- Dept. of Toxic Substances Control
  CEQA Tracking Center
- Department of Pesticide Regulation
  CEQA Coordinator

20121

Regiona

Board (F

- Cath
  North
- Envi
  Coor
  San
- Cent
- Tere
  Los
- Cent
- Lahc
- Colc
- San
- San

Last Upd

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

November 8, 2012

Mr. Keith Bergthold, Planner
City of Fresno Department of Development and Resource Management
2600 Fresno Street, Room 3065
Fresno, CA 93721-3604

Re: SCH#2012111015; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the **"City of Fresno General Plan and Development Code Update;"** located in the City of Fresno; Fresno County, California

Dear Mr. Bergthold:

The NAHC is the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604).

This letter includes state and federal statutes relating to Native American historic properties or resources of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9. This project is also subject to California Government Code Section 65253.2, *et seq.*

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendment s effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC advises the Lead Agency to request a Sacred Lands File search of the NAHC if one has not been done for the 'area of potential effect' or APE previously. This area is known to the NAHC to be very culturally sensitive..

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254 (r).

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to CA Public Resources Code § 5097.95, the NAHC requests cooperation from other public agencies in order that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties, including archaeological studies. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and California Public Resources Code Section 21083.2 (Archaeological Resources) that requires documentation, data recovery of cultural resources, construction to avoid sites and the possible use of covenant easements to protect sites.

Furthermore, the NAHC if the proposed project is under the jurisdiction of the statutes and regulations of the National Environmental Policy Act (e.g. NEPA; 42 U.S.C. 4321-43351). Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Confidentiality of "historic properties of religious and cultural significance" should also be considered as protected by California Government Code §6254(r) and may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity.

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for inadvertent discovery of human remains mandate the processes to be followed in the event of a discovery of human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

Finally, when Native American cultural sites and/or Native American burial sites are prevalent within the project site, the NAHC recommends 'avoidance' of the site as referenced by CEQA Guidelines Section 15370(a).

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

Native American Contacts
Fresno County
November 8, 2012

Big Sandy Rancheria of Mono Indians
Elizabeth Hutchins Kipp, Chairperson
P.O. Box 337 / 37302 — Western Mono
Auberry , CA 93602
ck@bigsandyrancheria.com
(559) 855-4003
(559) 855-4129 Fax

Choinumni Tribe; Choinumni/Mono
Lorrie Planas
2736 Palo Alto — Choinumni
Clovis , CA 93611 — Mono

Cold Springs Rancheria of Mono Indians
Robert Marquez, Chairperson
P.O. Box 209 — Mono
Tollhouse , CA 93667
(559) 855-5043
559-855-4445 - FAX

Table Mountain Rancheria
Bob Pennell, Cultural Resources Director
P.O. Box 410 — Yokuts
Friant , CA 93626-0177
(559) 325-0351
(559) 217-9718 - cell
(559) 325-0394 FAX

Dumna Wo-Wah Tribal Goverment
Robert Ledger SR., Tribal Chairperson
2216 East Hammond Street — Dumna/Foothill
Fresno , CA 93602 — Mono
ledgerrobert@ymail.com
559-519-1742 - office

Kings River Choinumni Farm Tribe
John Davis, Chairman
1064 Oxford Avenue — Foothill Yokuts
Clovis , CA 93612-2211 — Choinumni
(559) 307-6430

Sierra Nevada Native American Coalition
Lawrence Bill, Interim Chairperson
P.O. 125 — Mono
Dunlap , CA 93621 — Foothill Yokuts
(559) 338-2354 — Choinumni

Dunlap Band of Mono Historical Preservation Soc
Mandy Marine, Board Chairperson
P.O Box 18 — Mono
Dunlap , CA 93621
mandy_marine@hotmail.com
559-274-1705

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012111015; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the City of Fresno General Plan and Development Code Update; located in the City of Fresno; Fresno County, California.

Native American Contacts
Fresno County
November 8, 2012

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct. — Foothill Yokuts
Salinas , CA 93906 — Mono
kwood8934@aol.com — Wuksache
831-443-9702

Dumna Wo-Wah Tribal Goverment
Eric Smith, Cultural Resource Manager
2216 East Hammond Street — Dumna/Foothill
Fresno , CA 93602 — Mono
nuem2007@yahoo.com
559-519-1742 - office

Chowchilla Tribe of Yokuts
Jerry Brown
10553 N. Rice Road — North Valley Yokuts
Fresno , CA 93720
559-434-3160

Dumna Wo-Wah Tribal Goverment
John Ledger, Assistant Cultural Resource Manage
2216 East Hammond Street — Dumna/Foothill
Fresno , CA 93602 — Mono
ledger17bonnie@yahoo.com
559-519-1742 - office

The Choinumni Tribe of Yokuts
Rosemary Smith, Chairperson
1505 Barstow — Choinumni
Clovis , CA 96311 — Foothill YoKut
monoclovis@yahoo.com

Santa Rosa Tachi Rancheria
Lalo Franco, Cultural Coordinator
P.O. Box 8 — Tachi
Lemoore , CA 93245 — Tache
(559) 924-1278 - Ext. 5 — Yokut
(559) 924-3583 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012111015; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the City of Fresno General Plan and Development Code Update; located in the City of Fresno; Fresno County, California.

DEPARTMENT OF TRANSPORTATION
1352 WEST OLIVE AVENUE
P.O. BOX 12616
FRESNO, CA 93778-2616
PHONE (559) 445-5868
FAX (559) 488-4088
TTY (559) 488-4066

Flex your power!
Be energy efficient!

December 6, 2012

2131-IGR/CEQA
6-FRE-GEN
NOP DEIR
CITY OF FRESNO GENERAL
PLAN & DEVELOPMENT
CODE UPDATE
SCH 2007071008

Mr. Keith Bergthold, Assistant Director
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721

Dear Mr. Bergthold:

We have completed our review of the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the City of Fresno's General Plan and Development Code Update. Caltrans has the following comments:

It is recognized that the Master EIR would include extensive evaluation of traffic and would recommend mitigation measures to both local and State facilities. While we were provided the opportunity to meet with the City and their traffic consultant previously, Caltrans would request the opportunity to remain involved throughout this process. At our previous meeting we offered to provide the traffic consultant with any traffic data we possessed to assist them. However, to date we have not been contacted. It is recommended that the traffic consultant provide a formal scope of work for our review and comment prior to conducting the traffic analysis. This information should include assumptions, modeling, forecasting, methodologies, etc.

If you have any questions, call me at (559) 445-5868.

Sincerely,

MICHAEL NAVARRO
Office of Transportation Planning
District 06

C: SCH

DEPARTMENT OF CONSERVATION

Managing California's Working Lands

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • **FAX** 916 / 327-3430 • **TDD** 916 / 324-2555 • **WEBSITE** conservation.ca.gov

December 17, 2012

Keith Bergthold, Assistant Director
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721-3604

Subject: Notice of Preparation for the City of Fresno General Plan and Development Code Update – SCH # 2012111015

Dear Mr. Bergthold:

The Department of Conservation's (Department) Division of Land Resource Protection (Division) has reviewed the Notice of Preparation (NOP) for the City's General Plan and Development Code Update. The Division monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act and other agricultural land conservation programs. We offer the following comments and recommendations with respect to the proposed project's potential impacts on agricultural land and resources.

Project Description

The project consists of a planning area that encompasses 106,000 acres and includes the current City limits, the City's Sphere of Influence, and several other areas, all within Fresno County. The proposed project is a comprehensive update and implementation of the City of Fresno's General Plan and Development Code. Development of the project within the proposed study area will result in the loss of 10,978 acres of farmland.

The project also contains land under Williamson Act contract, and the NOP acknowledges that the Development Code update will remove agricultural zoning districts from the planning area. This will result in potential impacts to contracted land. Implementation of the proposed project would convert this farmland to urban uses and would preclude future agricultural uses on the site.

Division Comments

Per the 2008 Important Farmland Map for Fresno County, produced by the Farmland Mapping and Monitoring Program (FMMP), the planning area contains approximately 11,000 acres of Prime Farmland, 2,700 acres of Farmland of Statewide Importance, and 3,200 acres of Unique Farmland. The conversion of this land is a material consideration for the California Environmental Quality Act (CEQA). Therefore, the Division recommends that the Draft EIR address the following items to provide a comprehensive discussion of potential impacts of the project on agricultural land and activities:

Agricultural Setting of the Area

- Location and extent of FMMP Important Farmland in the project area and other types of agricultural land adjacent to the project area.
- Current and past agricultural use of the project areas. Please include data on the types of crops grown.

To help describe the full agricultural resource value of the soils on the site, the Department recommends the use of economic multipliers to assess the total contribution of the site's potential or actual agricultural production to the local, regional, and state economies. Two sources of economic multipliers can be found at the University of California Cooperative Extension Service and the United States Department of Agriculture (USDA).

Impacts on Agricultural Land

Land use conversion statistics from the Important Farmland Data Availability webpage[1] documents a net decrease of more than 102,000 acres of irrigated Important Farmland[2] in Fresno County between 2000 to 2008; an average loss of more than 12,750 acres per year. This cumulative loss represents a significant impact to the agricultural resources of the County and the State, and shows why the remaining prime agricultural resources should be protected whenever feasible.

When determining the agricultural value of the land, it is important to recognize that the value of a property may have been reduced over the years due to inactivity, but it does not mean that there is no longer any agricultural value. The inability to use the land for agriculture, rather than the choice not to do so, is what could constitute a reduced agricultural value. The Division recommends the following discussion under the Agricultural Resources section of the DEIR:

- Type, amount, and location of farmland conversion resulting directly and indirectly from the General Plan and Development Code updates.
- Impacts on any current and future agricultural operations; e.g., land-use conflicts, loss of agricultural support infrastructure such as processing facilities, increases in land values and taxes, etc.
- Incremental impacts leading to cumulative impacts on agricultural land. This would include impacts from projects in process at the time the Master EIR is analyzed, as well as impacts from past and likely future projects.

In 2010, approximately $ 5.9 billion in farm sales was generated in Fresno County[3], which demonstrates the high productivity of available agricultural lands in this top-ranked region. The

[1] http://redirect.conservation.ca.gov/dlrp/fmmp/product_page.asp
[2] Important Farmland consists of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland.
[3] California Agricultural Resource Directory 2010-2011
http://www.cdfa.ca.gov/statistics/PDFs/ResourceDirectory_2011-2012.pdf

City of Fresno proposes changes to, and adjacent to, some of the highest quality and longest producing agricultural land in the County.

Any loss of this agricultural land should be avoided or mitigated whenever possible. Under Title 14 of the California Code of Regulations, Section 15064.7, impacts on agricultural resources may also be both quantified and qualified by use of established thresholds of significance. As such, the Department has developed a California version of the USDA Land Evaluation and Site Assessment (LESA) Model. The California LESA model is a semi-quantitative rating system for establishing the environmental significance of project-specific impacts on farmland. The model may also be used to rate the relative value of alternative project sites. The LESA Model is available on the Division's website at:

http://www.consrv.ca.gov/DLRP/qh_lesa.htm

Williamson Act

The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or compatible uses. California Government Code § 51230 enables local governments to enter into Williamson Act contracts, which have an initial term of 10 years. Section 51296 enables local governments to enter into Farmland Security Zone (FSZ) contracts (also known as "super Williamson Act" contracts), which have an initial term of 20 years. Both kinds of contracts are entered into between private landowners and the County, and both are present in Fresno County. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use (i.e. farming, grazing, and/or open space), as opposed to potential market value.

We recommend that the Draft EIR include a discussion of how the Development Code Updates will remain consistent with the conditions set upon existing Williamson Act contracts, and if not, how any cancellations that may be involved in this project would (or would not) meet the required findings of Government Code § 51282 Cancellation, or § 51297 Cancellation of Farmland Security Zone Contract.

Mitigation Measures

Although direct conversion of agricultural land may be an unavoidable impact under CEQA analysis, mitigation measures, including compensatory mitigation, must be considered and adopted if feasible. This Master EIR has noted that at least 10,978 acres of agricultural land would be developed, with full buildout within the Planning Area sometime after the year 2035[4].

The document states that there will be a further analysis of these potential impacts, and that "mitigation measures will be provided, if available"[5]. This interpretation of the City's responsibility for the Master EIR does not address Public Resources Code § 21100(b)(3), which

[4] Introduction, Section 1.4.4 – Comparison of Existing Development to the City of Fresno General Plan update, page 28, Table 4. City of Fresno General Plan and Development Code Update, Initial Study. November 6, 2012.
[5] Discussion of Environmental Evaluation, Section 3 – 2. Agriculture and Forestry Resources, page 45. City of Fresno General Plan and Development Code Update, Initial Study. November 6, 2012.

mandates the inclusion of "mitigation measures proposed to minimize significant effects on the environment" in the CEQA document. The approval and use of a Master EIR provides a mechanism for mitigating the overall project, thus allowing subsequent, identified projects to meet a lower threshold when examining irreversible significant environmental impacts.

CEQA Guideline § 15370 defines mitigation measures as those that "avoid, minimize, rectify, reduce or eliminate, or compensate" for project impacts. Given the City's location, it may not be feasible to completely avoid agricultural land conversion; nor does CEQA require that impacts be reduced to a level below significance. Rather, CEQA's criterion is feasible mitigation that lessens a project's impacts.

The General Plan Update stage of the land use planning process provides the best opportunity for the City to incorporate General Plan Policies and Ordinances to create agricultural mitigation programs. These Policies and Ordinances create a blanket approach for all subsequent projects that provide for compensatory mitigation as the later site-specific projects move through their individual review. Mitigations such as conservation easements and in-lieu mitigation fee banking are considered viable tools for achieving impact reduction under CEQA.

Should the City decide not to incorporate available, feasible mitigation measures into their Master EIR, then they must consider mitigation measures when a subsequent Focused EIR is reviewed, i.e. during a Specific Plan proposal CEQA analysis. As the Master EIR would not contemplate any mitigation measures, the City must analyze them on a project-by-project basis for any anticipated subsequent project. CEQA Guidelines § 15178(c)(1) states that a Focused EIR must include the following:

> *The focused EIR shall incorporate by reference the Master EIR and analyze only the subsequent project's additional significant environmental effects and <u>any new or additional mitigation measures or alternatives that were not identified and analyzed by the Master EIR</u>. "Additional significant environmental effects" are those project-specific effects on the environment which were not addressed as significant in the Master EIR.* (emphasis added)

Therefore, all potentially feasible mitigation measures which could lessen impacts from the General Plan and Development Code Update should be included in the Master EIR for the City of Fresno. A measure brought to the attention of the Lead Agency should not be left out unless

it is infeasible based on its elements. Agricultural conservation easements are an available mitigation tool that should be considered in the CEQA process. Finally, when presenting mitigation measures in the Master EIR, it is important to note that a mitigation consisting only of a statement of intention or an unspecified future action may not be adequate pursuant to CEQA.

The loss of agricultural land represents a permanent reduction in the State's agricultural land resources. As such, the Department recommends the use of permanent agricultural conservation easements on land of at least equal quality and size as compensation for the direct loss of agricultural land. Conservation easements will protect a portion of those remaining

land resources and lessen project impacts in accordance with CEQA Guideline § 15370. The Department highlights this measure because of its acceptance and use by lead agencies as an appropriate mitigation measure under CEQA and because it follows an established rationale similar to that of wildlife habitat mitigation.

Mitigation via agricultural conservation easements can be implemented by at least two alternative approaches: the outright purchase of easements or the donation of mitigation fees to a local, regional, or statewide organization or agency whose purpose includes the acquisition and stewardship of agricultural conservation easements. The conversion of agricultural land should be deemed an impact of at least regional significance. Hence, the search for replacement lands need not be limited strictly to lands within the project's surrounding area, but should be roughly equivalent in proximity, acreage, and agricultural characteristics to the affected property.

A number of agricultural conservation easements currently exist in Fresno County; additional easement projects are potentially feasible. If the City were not able to make arrangements for easement mitigation through one of these or many other land trusts operating in California, the Department would be glad to help. Of course, the use of conservation easements is only one form of mitigation that should be considered. Any other feasible mitigation measures should also be considered.

Thank you for giving us the opportunity to comment on the NOP for the City of Fresno's General Plan and Development Code Update. Please provide this Department with the date of any hearings for this particular action, and any staff reports pertaining to it. If you have questions regarding our comments, or require technical assistance or information on agricultural land conservation, please contact Meri Meraz, Associate Environmental Planner, at 801 K Street, MS 18-01, Sacramento, California 95814, or by phone at (916) 445-9411.

Sincerely,

Molly A. Penberth, Manager
Division of Land Resource Protection
Conservation Program Support Unit

cc: State Clearinghouse

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

December 5, 2012

Keith Bergthold
City of Fresno
Development and Resource Management Department
2600 Fresno Street
Fresno, CA 93721

Project: City of Fresno General Plan Update and Development Code Update

District CEQA Reference No: 20120749

Dear Mr. Bergthold:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Notice of Preparation for the project referenced above. The City of Fresno is proposing to update its General Plan and Development Code for its Planning Area that encompasses approximately 106,000 acres and includes all areas within the City's current City limits, current Sphere of Influence, the City's Wastewater Treatment Plant site, and an area north of the City's most northeasterly portion of the City. The General Plan and Development Code Update is a master level project and, while project-specific data may not be available until specific approvals are being granted, the Environmental Impact Report (EIR) should include a discussion of policies, which when implemented, will reduce or mitigate impacts on air quality at the individual project level. To aid the Lead Agency in addressing project specific issues, the District offers the following comments and recommendations:

Land Use Planning

1) Nearly all future development projects within the San Joaquin Valley Air Basin, from general plans to individual development projects have the potential to generate air pollutants, making it more difficult to attain state and federal ambient air quality standards.

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

Printed on recycled paper.

Land use decisions are critical to improving air quality within the San Joaquin Valley Air Basin because land use patterns greatly influence transportation needs and motor vehicle emissions are the largest source of air pollution. Land use decisions and project design elements such as preventing urban sprawl, encouraging mix-use development, and project designs that reduce vehicle miles traveled (VMT) have proven benefit for air quality. The District recommends that the General Plan and Development Code Update include or incorporate by reference, policies that will reduce or mitigate VMT impacts to the extent feasible. VMT can be reduced through encouragement of mixed-use development, walkable communities, etc. Recommended design elements can be found on the District's website at:

http://www.valleyair.org/ISR/ISROnSiteMeasures.htm

To aid agencies in addressing VMT impacts the District has prepared the following guidance documents: *Air Quality Guidelines for General Plans*, and *AB 170 Requirements for General Plans*. These documents provide general information and recommendations for policies that are effective in reducing impacts from growth and development projects. These documents are available on the District's web site at:

http://www.valleyair.org/transportation/Guidelines_for_General_Plans.htm

Emissions Analysis

2) The District is currently designated as extreme nonattainment for the 8-hour ozone standard, attainment for PM10 and CO, and nonattainment for PM2.5 for the federal air quality standards. At the state level, the District is designated as nonattainment for the 8-hour ozone, PM10, and PM2.5 air quality standards. The District recommends that the Air Quality section of the Environmental Impact Report (EIR) include a discussion of the following impacts:

   a) **Criteria Pollutants:** Future development project related criteria pollutant emissions should be identified and quantified. The discussion should include existing and post-project emissions.

      i) Construction Emissions: Construction emissions are short-term emissions and should be evaluated separate from operational emissions. The District recommends preparation of an Environmental Impact Report (EIR) if annual construction emissions cannot be reduced or mitigated to below the following levels of significance: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10).

      ii) Operational Emissions: Permitted (stationary sources) and non-permitted (mobile sources) sources should be analyzed separately. The District recommends preparation of an Environmental Impact Report (EIR) if the sum of annual permitted and non-permitted emissions cannot be reduced or mitigated to below the following levels of significance: 10 tons per year of

oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10).

iii) Project related criteria pollutant emissions should be identified and quantified. Emissions analysis should be performed using CalEEMod (California Emission Estimator Model), which uses the most recent approved version of relevant Air Resources Board (ARB) emissions models and emission factors. CalEEMod is available to the public and can be downloaded from the CalEEMod website at: http://www.caleemod.com/ .

b) **Nuisance Odors:** Future development projects should be evaluated to determine the likelihood that the project would result in nuisance odors. Nuisance orders are subjective, thus the District has not established thresholds of significance for nuisance odors. Nuisance odors may be assessed qualitatively taking into consideration of project design elements and proximity to off-site receptors that potentially would be exposed objectionable odors.

c) **Health Impacts:** Toxic air contaminants (TACs) are defined as air pollutants that which may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. The most common source of TACs can be attributed to diesel exhaust fumes that are emitted from both stationary and mobile sources. Health impacts may require a detailed health risk assessment (HRA).

i) The location of development projects is a major factor in determining whether they will result in localized air quality impacts. The potential for adverse air quality impacts increase as the distance between the source of emissions and receptors decrease. From a health risk perspective there are two types of land use projects that have the potential to cause long-term public health risk impacts: those that locate new toxic sources in the vicinity of existing receptors and those that locate new receptors in the vicinity of existing toxics sources.

Accurate quantification of health risks and operational emissions requires detailed site specific information, e.g. type of emission source, proximity of the source to sensitive receptors, and trip generation information. The required level of detail is typically not available until project specific approvals are being granted. Therefore, the District recommends that potential health risks be further reviewed when approving future projects. This recommendation includes projects that would otherwise appear to be exempt from CEQA requirements, such as projects that could be categorically exempt or allowed land uses under current zoning.

ii) Various tools exist to perform a screening level analysis for emissions from new stationary sources, such as prioritization charts, SCREEN3, and various

spreadsheets available from the District's website. For projects being impacted by existing emission sources, one screening tool is contained in the ARB Handbook: *Air Quality and Land Use Handbook: A Community Health Perspective.* The document includes a table with recommended buffer distances associated with various types of common sources. The ARB handbook can found on the ARB's website at:

http://www.arb.ca.gov/ch/landuse.htm.
If the screening level analysis indicates that TACs are a concern, the District recommends that a more detailed HRA be performed. If an HRA is to be performed, it is recommended that the project proponent contact the District to review the proposed modeling approach. The project would be considered to have a significant health risk if the HRA demonstrates that project related health impacts would exceed the District's significance threshold of 10 in a million.

More information on TACs, prioritizations and HRAs can be obtained by:
- E-mailing inquiries to: hramodeler@valleyair.org; or
- Visiting the District's website at:

http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm

3) In addition to the discussions on potential impacts identified above, the District recommends the EIR also include the following discussions:

d) A discussion of the methodology, model assumptions, inputs and results used in characterizing the project's impact on air quality. To comply with CEQA requirements for full disclosure, the District recommends that the modeling outputs be provided as appendices to the EIR. The District further recommends that the District be provided with an electronic copy of all input and output files for any modeling referenced in the EIR.

e) A discussion of the components and phases of the project and the associated emission projections, including ongoing emissions from each previous phase.

f) A discussion of project design elements and mitigation measures, including characterization of the effectiveness of each mitigation measure incorporated into the project.

i) The following policies/mitigation measures are recommended to reduce or mitigate impacts from criteria pollutant emissions:

(1) Use of off-road construction fleets that can achieve fleet average emissions equal to or less than the Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. The District recommends

incorporating, as a condition of project approval, a requirement that off-road construction equipment used on site achieve fleet average emissions equal to or less than the Tier II emissions standard of 4.8 NOx g/hp-hr. This can be achieved through any combination of uncontrolled engines and engines complying with Tier II and above engine standards.

(2) For future projects exceeding the applicability thresholds identified in Section 2.0 of District Rule 9510 (Indirect Source Review), a condition of project approval requiring demonstration of compliance with Rule 9510, prior to the issuance of grading and/or building permits.

(3) Air quality impacts from future development projects exceeding the District's thresholds of significance for criteria pollutants after the implementation of mitigation measures can be mitigated to less than significant through payment of funds into an emissions reduction program. Also known as a Voluntary Emission Reduction Agreement (VERA), a VERA is a mitigation measure by which a project proponent provides pound-for-pound mitigation of emissions increases through a process that develops, funds, and implements emission reduction projects, with the District serving the role of administrator of emission reduction projects and verifier of the successful mitigation effort. To implement a VERA, the project proponent and the District enter into a contractual agreement, in which the project proponent agrees to mitigate project specific emissions by providing funds to the District's Strategies & Incentives (SI) Department. The funds are disbursed by SI in the form of grants for projects that achieve emission reductions. Thus resulting in project specific impacts on air quality can be fully mitigated.

The District has been developing and implementing VERA contracts with project developers to mitigate project specific emissions since 2005. It is the District's experience that implementation of a VERA is a feasible mitigation measure and effectively achieves the emission reductions required by a Lead Agency, by mitigating project related impacts on air quality to a net zero level by supplying real and contemporaneous emissions reductions. To assist the Lead Agency and project proponent in ensuring that the environmental document is compliant with CEQA, the District recommends the environmental document include an assessment of feasibility of implementing a VERA. More information regarding participation in a VERA can be obtained by calling (559) 230-6000 and asking to speak to a District CEQA staff member.

(4) For future projects subject to District permitting requirements, demonstration of compliance with District Rule 2201 (New and Modified Stationary Source Review Rule), such as a copy of the Authority to

Construct (ATC), before issuance of the first building permit, be made a condition of project approval.

ii) The following policies/mitigation measures are recommended to mitigate potential health impacts of individual projects:

(1) Future development projects resulting in toxic air contaminant emissions will be located an adequate distance from residential areas and other sensitive receptors in accordance to ARB's *Air Quality and Land Use Handbook: A Community Health Perspective.*

(2) A health risk screening and/or assessment will be performed to assess potential risks to sensitive receptors for the following projects:

- Future projects whose proposed locations are within the established buffer distances identified in ARB's handbook;
- Future projects whose land uses are not specifically identified in ARB's handbook (such as shopping centers), but there is sufficient information to reasonably conclude that sensitive receptors would be exposed to significant sources of toxic air contaminants; and
- Future projects that would otherwise appear to be exempt from CEQA requirements, but there is sufficient information to reasonably conclude that sensitive receptors would be exposed to significant sources of toxic air contaminants, such as industrial use projects allowed by right.

g) A discussion of whether the project would result in a cumulatively considerable net increase of any criteria pollutant or precursor for which the San Joaquin Valley Air Basin is in non-attainment. More information on the District's attainment status can be found online by visiting the District's website at:

http://www.valleyair.org/aqinfo/attainment.htm

District Rules and Regulations

4) Individual future development projects would be subject to District Rule 9510 (Indirect Source Review) if upon full build-out the project would include or exceed any one of the following:

- 50 dwelling units
- 2,000 square feet of commercial space;
- 25,000 square feet of light industrial space;
- 100,000 square feet of heavy industrial space;
- 20,000 square feet of medical office space;
- 39,000 square feet of general office space; or
- 9,000 square feet of educational space; or

- 10,000 square feet of government space; or
- 20,000 square feet of recreational space; or
- 9,000 square feet of space not identified above.

District Rule 9510 is intended to mitigate a project's impact on air quality through project design elements or by payments of applicable off-site mitigation fees. Any applicant subject to District Rule 9510 is required to submit an Air Impact Assessment (AIA) application to the District no later than applying for final discretionary approval, and to pay any applicable off-site mitigation fees before issuance of the first building permit.

The District recommends that a mitigation measure be included that requires, for any project within the scope of this EIR subject to Rule 9510, demonstration of compliance with District Rule 9510, including payment of all applicable fees before issuance of the first building permit, be made a condition of project approval.

District ISR staff is available to meet with the Lead Agency or project proponent to further discuss the requirements of Rule 9510 for individual development projects. More information on District Rule 9510 can be obtained by:

- Calling the District's ISR staff at (559) 230-6000;
- E-mailing inquiries to: ISR@valleyair.org; or
    - Visiting the District's website at: http://www.valleyair.org/ISR/ISRHome.htm

5) Individual future development projects may also be subject to District regulations including, but limited to: Regulation VIII (Fugitive PM10 Prohibitions), District Rule 2010 (Permits Required), Rule 2201 (New and Modified Stationary Source Review), Rule 4002 (National Emission Standards for Hazardous Air Pollutants), Rule 4102 (Nuisance), Rule 4601 (Architectural Coatings), and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations). To avoid potential delays in project development, the District strongly encourages project proponents contact the District's Small Business Assistance (SBA) Office early in the planning phase to discuss whether an Authority to Construct (ATC) and Permit to Operate (PTO) are required, and to identify other District rules or regulations that apply to their project.

   The District recommends that a mitigation measure be included that requires, for any project within the scope of this EIR that is subject to District permits, demonstration of compliance with District permitting requirements, such as a copy of the ATC, before issuance of the first building permit, be made a condition of project approval.

6) The above list of rules is neither exhaustive nor exclusive. To identify other District rules or regulations that apply to this project or to obtain information about District permit requirements, the applicant is strongly encouraged to contact the District's

Small Business Assistance (SBA) Office at (559) 230-5888. Current District rules can be found online at the District's website at:

http://www.valleyair.org/rules/1ruleslist.htm

The District recommends that a copy of the District's comments be provided to the project proponent. If you have any questions or require further information, please call Mark Montelongo at (559) 230-5905.

Sincerely,

David Warner
Director of Permit Services

Mark Montelongo

for: Arnaud Marjollet
Permit Services Manager

DW:mm

cc: File

County of Fresno

Department of Public Health
Edward L. Moreno, M.D., M.P.H., Director-Health Officer

November 19, 2012

999999999
LU0016586
PE 2601
CX

Keith Bergthold, Assistant Director
City of Fresno
2600 Fresno Street, Room 3065
Fresno, CA 93721

Dear Mr. Bergthold:

SUBJECT: Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update

Thank you for the opportunity to review the above project. The Fresno County Department of Public Health, Environmental Health Division concurs with the probable environmental effects outlined in the Notice of Preparation and has no additional comments to offer at this time. However, we request to be included in the future routing of the Draft Environmental Impact Report

If I can be of further assistance, please contact me at (559) 600-3271.

Sincerely,

R.E.H.S., M.S.
Supervising Environmental Health Specialist
Environmental Health Division

ga

Fresno NOP EIR GP & Development Code Update.docx

RESOURCE MANAGEMENT AGENCY
PLANNING DEPARTMENT

Norman L. Allinder, AICP
Director

- 2037 W. Cleveland Avenue
- Mail Stop G
- Madera, CA 93637
- (559) 675-7821
- FAX (559) 675-6573
- TDD (559) 675-8970
- mc_planning@madera-county.com

December 5, 2012

ATTN: Keith Bergthold
City of Fresno
2600 Fresno Street, Room 3065
Fresno CA 93721

RE: Notice of Preparation of a MEIR for City of Fresno General Plan and Development Code Update

Dear Mr. Bergthold:

We are in receipt of your Notice of Preparation (NOP) for the Master Environmental Impact Report (MEIR) for the City of Fresno General Plan Update. It is important to note the long-term implications that the proposed Fresno General Plan Update will have not only upon the City of Fresno, County of Fresno, and Clovis, but also upon Madera County.

It is necessary to highlight the City of Fresno's impacts on southern Madera County. From a transportation perspective, the historical and more recent build-out of the northern portion of the City of Fresno has led to slower commute times along major east/west routes, including Herndon Avenue and Shaw Avenue. Therefore, many Valley residents have become reliant upon southern Madera County's major east/west routes, including Avenue 7, Avenue 9 and Avenue 12 in order to by-pass congestion along the City of Fresno's east-west connectors. In addition, due in large part to the significant population of the Fresno/Clovis metropolitan area, Madera County has been experiencing increased impacts upon other main transportation routes, including State Route 99 and State Route 41.

The MEIR for the City of Fresno must identify the significant cumulative impacts of the General Plan Update, and the impacts it will have upon all citizens of Madera County. The MEIR must include a detailed analysis of the environmental and economic impacts upon the existing planned new growth areas of Madera County.

We would like to offer the following as significant environmental issues of interest relating to the City of Fresno General Plan and Development Code Update. We trust that these comments will be addressed in the General Plan Update Draft MEIR, we have been, and remain available if you would like to meet concerning any of the issues outlined.

Aesthetics: The proposed General Plan Update has the potential to cause significant impacts to a number of scenic areas within Madera County, most notable the properties adjacent to the San Joaquin River. In addition to scenic resources of the San Joaquin River being impacted, the

MEIR should look at the impact of Madera County's existing visual character and quality of the properties located adjacent to and in proximity of the San Joaquin River. The MEIR must address the potentially significant new source of light or glare which could adversely impact Madera County properties and residents, most notable Children's Hospital of Central California.

Air Quality: The City of Fresno MEIR for the General Plan Update must analyze the air quality impacts of its proposed development expansion for the entire San Joaquin Valley Air Pollution Control District. In regards to Madera County the MEIR must analyze the numerous sensitive receptors within close proximity to the City of Fresno (i.e., Children's Hospital of Central California, Golden Valley Unified School District Facilities, Madera Unified School District Facilities, and Chawanakee Unified School District Facilities planned and approved). The General Plan will have significant direct impacts upon Madera County. The MEIR must analyze the air quality impacts of traffic on Madera County roads.

Biological Resources: The MEIR must analyze not only the impacts of the infrastructure requirements needed to serve the General Plan's inducement of development within Madera County (i.e., road facilities) but the biological impacts of needing to expand those facilities such as Highway 41, Highway 145, Road 206, Highway 99, Avenue 9, Avenue 7, Avenue 12, and Avenue 15. The potential biological impacts associated with the off-site infrastructure requirements to facilitate the City of Fresno's General Plan are significant and must be analyzed.

Cultural Resources: The MEIR must analyze not only the impacts of the infrastructure requirements needed to serve the General Plan's required development within Madera County (i.e., road facilities) but the potential cultural impacts of needing to expand those facilities such as Highway 41, Highway 145, Road 206, Highway 99, Avenue 9, Avenue 7, Avenue 12, and Avenue 15. The potential cultural impacts associated with the off-site infrastructure requirements to facilitate the City of Fresno's General Plan are significant and must be analyzed.

Greenhouse Gas Emissions: The MEIR must assess and address any conflicts the plan has related to the Madera County General Plan Air Quality element. The development contemplated within the City of Fresno General Plan Update is significant and as stated previously will impact the San Joaquin Air Basin significantly.

Hazards and Hazardous Materials: The MEIR must assess the potential impacts to Madera County's adopted emergency response and evacuation plans. The General Plan update considers massive development which will impact Madera County roadways vital to our emergency response and evacuation plans.

Hydrology and Water Quality: The MEIR should address the potential impacts upon the San Joaquin River Restoration Project. The MEIR must address the existing subsidence within the water basin that will have negative impacts around areas designated and approved for development within Madera County. The City of Fresno MEIR and General Plan Update must identify how new development within the City will have a one to one water balance, thereby addressing the existing subsidence of the City of Fresno water basin.

Land Use and Planning: The project has the potential to promote the continued growth of commercial development in the City of Fresno, and Fresno County, thereby generating traffic trips from Madera County for employment, retail, and service opportunities. The July 2012 jobs to housing ratio for the Fresno Metropolitan Service Area (MSA) was 1.067—meaning that the area contains an excess of commercial and industrial uses that attract employment from outside of the

MSA (an estimated excess of 21,245 jobs). To correct the imbalance, effective and measurable efforts must be taken through the General Plan to obtain jobs to housing balance within the City's boundary and Sphere of Influence (SOI). Such an effort will be important in determining the General Plan's consistency with the, Madera County General Plan, Rio Mesa Area Plan, Gunner Ranch West Area Plan, Gateway Village Area Plan, O'Neals Area Plan, Madera County Regional Transportation Plan, San Joaquin River Parkway Plan, Fresno COG Regional Transportation Plan, SCS's, Blueprint, and State greenhouse gas goals.

The documents provided with the Notice of Preparation do not clearly identify what amendments will be considered within the community plans identified on page 29 of the report. Please provide a detailed explanation of what amendments or approvals are being considered as a part of this General Plan Update.

Mineral Resources: The MEIR must address the regional growth impacts associated with the General Plan Update as proposed and its impacts upon the regional mineral resources. The General Plan needs to identify where the mineral resources that will be required to build the necessary infrastructure to implement the City of Fresno's is coming from.

Noise: The City General Plan contemplates significant population growth which in turn has the potential for significant noise impacts related to traffic generated by the City of Fresno on Madera County roadways (i.e., Avenue 9, Avenue 7, Avenue 12, SR 41, SR 145, Avenue 15), and new planned industrial and commercial land uses within the City sphere of influence.

Transportation and Traffic: The proposed General Plan Update has the potential to cause significant impacts to the County's transportation infrastructure—impacts not anticipated in the Madera County General Plan. A detailed analysis is warranted of the project's direct, indirect, and cumulative impacts on the level of service for the following segments and intersections:
Segments:

- Avenue 7 from State Route 99 to Road 16
- Avenue 9 from Children's Boulevard to State Route 99
- Avenue 12 from State Route 41 to State Route 99
- Avenue 15 from State Route 41 to Road 28
- State Route 145 from Road 206 to Tozer Avenue
- State Route 145 from the City of Madera south to the Madera County line
- State Route 41 from the Madera County line to Yosemite National Park
- State Route 99 from the Madera County line to Merced County
- Road 206 from the Madera County line to State Route 145
- Children's Boulevard from State Route 41 to Avenue 9

Intersections:

- Children's Boulevard & State Route 41
- Avenue 12 & State Route 41
- Avenue 7 & State Route 99
- Avenue 9 & State Route 99
- Avenue 12 & State Route 99
- State Route 145 and State Route 41
- Avenue 15 & State Route 41

- Road 206 & State Route 145

A critical aspect to Smart Growth is the ability for urban areas to have substantially high internal capture rates, thereby reducing the total vehicle miles traveled in the region and promoting alternative modes of transportation within urban centers. The MEIR should involve a detailed analysis of how each urban area in the City of Fresno will substantially increase their internal capture rates, thereby reducing impacts on Madera County.

The City of Fresno General Plan must address the regional traffic impacts of its proposed development, therefore it is appropriate that the City plan for and begin implementing a Highway 65 alignment through the City, as proposed within the San Joaquin River Transportation Study.

Population and Housing: The proposed project will also involve plans to accommodate substantial amounts of population growth. The proposed General Plan Update has the potential to induce population growth both directly and indirectly—such potential impacts must be thoroughly analyzed in the MEIR. In particular, this analysis must focus on the impacts of direct and indirect population growth upon Madera County.

In addition to the items listed above, Madera County would request that page 30, of the initial study identify those entities that the City of Fresno considers potential Responsible and Trustee Agencies. The County of Madera would request that the City General Plan discuss the regional impacts that the City of Fresno has historically had upon Madera County and the continuing impacts that this General Plan will create. The City of Fresno should look at a regional financing mechanism to begin funding improvements along State Route 41 within Madera County which is a main economic engine for the City of Fresno with international flights and commerce into the City of Fresno traveling to Yosemite National Park. In addition to the impacts upon State Route 41, the City of Fresno needs to identify within its General Plan a funding mechanism to construct a new bridge crossing of the San Joaquin River as identified within the San Joaquin River Transportation Study prepared by Madera County in cooperation with the City of Fresno, Caltrans, County of Fresno, and the City of Madera.

Madera County would strongly urge the City of Fresno to amend the General Plan planning area to encompass and address the existing growth areas of southeast Madera County. The City General Plan would be fatally flawed without this area's inclusion in the study area under Government Code Section 65300, which states the following:

> "Each planning agency shall prepare and the legislative body of each county and city shall adopt a comprehensive, long-term general plan for the physical development of the county or city, **and of any land outside its boundaries which in the planning agency's judgment bears relation to its planning.** Chartered cities shall adopt general plans which contain the mandatory elements specified in Section 65302."

The City of Fresno has routinely made claim to regionalism and the impacts Madera County potentially has upon the City. However, in reviewing the NOP and initial study, the issue of how the City of Fresno will accommodate the population expansion proposed in the General Plan is not properly discussed within the initial study. The proposed growth within the General Plan will significantly burden all citizens of Madera County. The Eastern Madera County citizens

of O'Neals, Coarsegold, Oakhurst, Ahwahnee, Bass Lake, and North Fork rely upon State Route 41 to provide emergency medical access which has been and continues to be severely impacted by the developments occurring and planned in the City of Fresno.

We appreciate the opportunity to provide comments on the NOP and will follow the project as it proceeds. The County also looks forward to commenting on the DMEIR. After reviewing this letter, if you have any specific questions, feel free to contact me (559-675-7821).

Sincerely,

Norman Allinder, AICP
Planning Director

City of Clovis

Department of Planning and Development Services

CITY HALL · 1033 FIFTH STREET · CLOVIS, CA 93612

December 4, 2012

Keith Bergthold, Assistant Director
Planning and Development Department
City of Fresno
2600 Fresno Street, Third Floor
Fresno, CA 93721-3604

Dear Mr. Bergthold,

SUBJECT: Response to the Fresno General Plan Update EIR Notice of Preparation

Thank you for the opportunity to review the Fresno GP Update EIR NOP. Fresno's 2025 GP Urban Boundary Map depicted a "North Growth Area and Sphere of Influence Addition" extending north of its current (2009) sphere of influence to the confluence of Willow/Friant Road with Little Dry Creek. My copy of the of the 2025 GP (2007 edition) depicts this land as designated for Low Density Residential uses; it is planned by Fresno County for agricultural or rural residential purposes.

Based on the documents provided with the current NOP, Fresno's proposed planning area continues to encompass this area. Planning it for Low Density Residential uses implies that development of this area would occur after annexation to city of Fresno. However, the "proposed project" description in the public notice, the NOP, and the Initial Study (including the initial discretionary approvals in section 1.5), do not reference an amendment of the Fresno sphere of influence.

We recommend that if the city is still considering this land use designation on property currently not in the city limits that a SOI amendment be included in the record as an initial or reasonably foreseeable subsequent discretionary approval.

We also recommend that the Fresno GP update and the EIR public facility analysis depict the route of the raw water pipeline between the Friant-Kern Canal and Fresno's surface water treatment plant and discuss to some degree the potential service interties between the cities and/or services to county service areas as identified in LAFCo's Fresno MSR.

Thank you for the opportunity to comment on this project. If you have any questions, feel free to contact me at 324-2338.

Sincerely,

David E. Fey, AICP
Deputy City Planner

J:\EnvAssmt\City of Fresno\NWC Copper_Willow\Ltr K Bergthold Fresno GPU EIR NOP 113012.doc

Mark Reitz, PE
246 E. Denise Avenue
Fresno, CA 93720
(559) 905-4523

December 4, 2012

Jamie Holt
City of Fresno Planning Commission
2600 Fresno Street
Fresno, CA 93721

Initial Study – General Plan and Development Code Update

Enclosed are copies of correspondence sent to the City of Fresno Planning Department related to an approximately 200-acre area within the SEGA bounded by Temperance Avenue on the west, the railroad on the north, the Briggs Canal on the east, and Church Avenue on the south. The correspondence dates back to August 18, 2008 and November 20, 2008.

Modifications were requested from the land use designation of Industrial/Flex R&D as proposed under the SEGA plan. This was requested in an application with a fee paid to the City Planning Department, which was acknowledged in the enclosed letter dated October 2, 2008.

Based on our attendance at many planning meetings since then, we understand that this area is now proposed as a Regional Business Park (RBP) and no longer the Industrial/Flex R&D per SEGA.

The landowners within this 200-acre area are also not in favor of the RBP land use designation for this area and would prefer the alternatives proposed in our correspondence for the environmental and planning reasons stated.

We would appreciate your consideration in incorporating our proposed land uses or something similar and more flexible for this area in the new General Plan.

Please call if you have any questions.

Sincerely,

Mark Reitz

Trai Her

From: Jeffrey Roberts [JRoberts@gvhomes.com]
Sent: Thursday, December 06, 2012 10:58 AM
To: Keith Bergthold
Subject: FW: General Plan Update Comments - EIR Scoping Session
Attachments: Message from KMBT_C550; Message from KMBT_C550

From: Jeffrey Roberts
Sent: Thursday, December 6th, 2012 11:00 am
To: Jeffrey Roberts
Subject: General Plan Update Comments - EIR Scoping Session

Keith,

The written comments contained in this email are intended to supplement the oral comments that were made at the Scoping Session" held in the City Council Chambers on November 27th, 2012. I have also attached the two letters that were submitted to you and to the Planning Commission several weeks ago. These letters contain General Plan Update comments that pertain to current Granville Homes projects at various locations with the current and future City limits.

Comments:

1. The EIR Scope should include the study of at least one of the other alternatives that were reviewed by the General Plan Update Committee. With a change in the makeup of the City Council members, the "dynamics" of the body could change and the newer members may or may not be supportive of the Modified Alternative "A" that the current Council members endorsed. I would suggest that Alternative "D" also be studied by the EIR consultant. This was the alternative recommended by the General Plan Update Committee.
2. The Zoning Ordinance does not need to be repealed because it isn't broken. The original document is 50 years old but there have been many text amendments and director classifications over the years that have kept the document relevant and "current". I am very concerned about the elimination of some of the very useful zone districts that are in place all over the City. I am also concerned that the process of changing over from the old code to the new code will take years if not decades. I mentioned that real estate lenders may have a concern if any of the zoning rights that were in place on a property when they made a loan are eliminated. I believe that the EIR consultant needs to look very hard at this issue and consider the "No Project" alternative when it comes to putting a new code in place.
3. I asked a question about the population estimate and didn't get a very good answer from the EIR consultant. I was under the impression that the City had to design a plan to accommodate a population estimate handed down from the State Department of Finance. I guess that isn't the case anymore. I question the response provided and clearly recall a discussion in Room 4017 one night about a new population estimate (done by the Planning Center) for the Valley. I was under the impression that the City was going to "adopt" that number and plan for that population.
4. I asked a question about zoning consistent with the General Plan. The answer given leaves me with the impression that the City will not be doing any proactive zoning. If this is the case, then there will be even more inconsistent situations in the City than ever before. The new designations and zone districts that are suggested coupled with the newly increased fees will make it even tougher for the "customer" to achieve the consistency required by State law when a subdivision is proposed.
5. It would seem to me that the environmental review for a population of 970,000 would be more time consuming and costly than for the projected 2035 population (which will be substantially less than 970,000). If this is true, then why do we need to spend time and money right now evaluating the impacts of a population that may not be here for 50 years?

6. Since the focus of this General Plan seems to be on "Infill" development, it would seem to be an appropriate time to consider policies that actually help incentivize that construction of this housing product. In order to achieve a greater density per acre, the City needs to revisit the fairly recent discussion of the public and private street standards. With the recent imposition of sidewalks on both sides of private streets, the City has created a dis-incentive to developing any private streets. The unintended consequence of the sidewalk policy change is that the City will now have more public streets to maintain than if the private standard without sidewalks were left in place. In addition, street widths, as currently required, consume a tremendous amount of land that could be put to a better use. The EIR needs to look at some alternatives to the street and sidewalk standards to determine which of these is superior in light of the General Plans' focus.
7. The acceptable sound level should be raised from 60 to 65 db. This is the standard used in most of the State.
8. A policy regarding CFDs' needs to be included and assessed in the EIR.
9. The proposed General Plan policy regarding annexations (LU 1-E) eliminated. This policy would require developers to utilize a process and pay a fee that is not required today. The option should remain but this unnecessary requirement should not be mandatory.
10. Fresno does not have an "Agricultural Mitigation" fee or policy. (see page 45) Since the current General Plan and the new General Plan are virtually identical (no proposed Agricultural uses) the discussion of a new policy should be eliminated. There would be no reason to study the impacts in the EIR if this concept were eliminated from the text.
11. There is a reference to Dry Creek Dam on page 62 of the initial study and its proximity to the Sphere of Influence. This is an error and should be eliminated.

Additionally, we have been wondering if the suggestions that we made on the attached letters have been addressed in any way. A review of the land use map against the wall last night showed the same pattern that was in place in August, when the map was first released. We would like to know if you or your staff intend to make any of the changes that we suggested. Please let us know.

Thanks for the opportunity to provide these comments. We do intend to be present at any and all public forums where the General Plan is being discussed.

Jeffrey T. Roberts
Granville Homes
Passion, Commitment & Innovation Everlasting
1396 W. Herndon Suite 101, Fresno, CA 93711
559.436.0900 / fax 559.436.1659 / cell 559.288.0688
Visit us at www.gvhomes.com to follow us on facebook® and YouTube®!

COPY

GRANVILLE HOMES, INC

November 12, 2012

Keith Bergthold
City of Fresno, Development Department
Fresno City Hall
2600 Fresno Street
Fresno, CA 93721

SUBJECT: WESTLAKE DEVELOPMENT PROPOSAL
(A-07-001/R-07—008/TTM 5915)

Dear Mr. Bergthold:

Thank you for the opportunity to comment on the pending General Plan Update and how it may affect our "Westlake" Master Planned Development Proposal.

As you are aware, the proposed "Westlake" project has been discussed on numerous occasions and has been on file with the City since 2007. The DEIR is now being reviewed by City staff and will be out for the 45 day public review next month (before December 18, 2012). Public hearings on the EIR and other applications will be considered in public hearings in the spring of 2013, well ahead of any scheduled General Plan hearings.

It is our understanding that the City's intent is to reflect the "Westlake" proposal as a "pipeline" project. We sincerely appreciate your efforts in this regard, and have several comments to help clarify our project as it relates to the General Plan Update Land Use Diagram Draft Figure 2 which was initiated on August 9, 2012.

1. The key open space element in the "Westlake" project is a 55 acre lake. We would like Draft Figure 2 to be revised and illustrate the lake in its location reflected by the existing applications on file.

2. The Draft Figure 2 reflects a "Corridor/Center Mixed Use" land use designation within the central area of the project site which is proposed for the lake. This designation should be removed altogether.

3. The Draft Figure 2 illustrates a Medium Density residential land use description on all lands proposed for residential uses. The Map needs to be revised to reflect the "blend" of land use designations consistent with the Plan Amendment A0-07-008 application. As you are aware, our intent is to have a variety of residential densities in the project. Some of the residential neighborhoods will be developed at less than 5 units/acre. The minimum density proposed in the new "Medium Density Designation" is 5 units to the acre and this is too high for a portion of the Westlake project.

4. The Draft Figure 2 illustrates several "Connector" roadways within the boundaries of the project. It was our intent to design "Special Collector" streets for the project. We are unclear what a "Connector" street is and what the cross section looks like.

1396 West Herndon Avenue Suite 101 Fresno, California 93711 Telephone: 559.436.0900 Facsimile: 559.436.1659 Web: www.gvhomes.com

Thanks again for this opportunity. We do intend to attend the Planning Commission and make oral comments on Westlake and other Granville Homes projects that are affected by the update of the General Plan.

Sincerely,

Jeffrey T. Roberts

COPY

GRANVILLE

Passion, Commitment & Innovation *Everlasting*

October 30, 2012

Keith Bergthold
City of Fresno
2600 Fresno Street
Fresno, CA 93721

Dear Keith:

Subject: City of Fresno 2035 Fresno General Plan Land Use Diagram Draft Figure 2 for Initiation Purposes Only - August 9, 2012

This letter is in reiterate our discussions regarding the City's intent to maintain the existing zoning/density on "Pipeline Projects" (projects that are currently submitted to the City and are being processed for approval) and "Areas of Stability" (areas that have current entitlements in place). We have reviewed our various land holdings and have identified discrepancies in the Land Use Diagram that are in conflict with the City's proposed intent to leave the zoning/density for the areas of stability and the pipeline projects intact.

The enclosed attachment "Granville Homes review of City of Fresno 2035 Fresno General Plan Land Use Diagram Draft Figure 2 dated August 9, 2012" identifies properties that qualify under the "Pipeline Projects" and "Areas of Stability" categories. We are bringing these to your attention to insure that the final land use diagram incorporates the changes.

In addition, we discussed the inclusion of policy language to document and address any future discrepancies that may be overlooked in the planning process to insure that the "Pipeline Projects" and "Areas of Stability" entitlements remain intact.

The attachment brings to your attention several discrepancies on the Land Use Diagram in the Copper River project. Copper River should be considered an "Area of Stability" and should remain at the current approved densities. The Copper River project has limited sewer capacity and additional densities cannot be accommodated at this location. We are requesting revisions to the Land Use Diagram to conform to the Master CUP for the approved Copper River Project.

Numbers 1 through 9 on the enclosed attachment reference approved tentative maps and projects in the City of Fresno. These maps/projects are currently active and should be considered as "Areas of Stability". Modifications should be made to the land use diagram to accurately reflect land uses/densities per the approved entitlements.

It is our understanding that the any tentative map extensions that the City will extend these maps in accordance with the provisions of the subdivision map act and any extensions provided through legislation.

Granville Homes

GRANVILLE

Passion, Commitment & Innovation *Everlasting*

We have several recorded final maps that are identified inaccurately on the Land Use Diagram. Reference is made to the attachment, Numbers 11 through 15 . The designated land uses on the Land Use Diagram to not conform to the approved projects and would result in a non conforming land use. We are requesting that the General Plan Land Use Diagram be revised to accurately reflect the zoning/densities for these approved final maps.

As far as projects in the pipeline, we are currently processing the EIR for the Westlake project and will forward you comments regarding that project in a separate transmittal. In addition, we have several properties that have been prezoned for future development and are identified on the attachment by assessor's parcel number. The proposed designations on the Land Use Diagram are not compatible with existing zoning nor are they compatible with the existing adjacent land uses. Several of these parcels have divided zoning/densities within the parcel which are not conducive to development of the parcels given the limited size. We are recommending that the existing prezonings remain in place for these parcels.

.

We appreciate your attention to this matter and these modifications to the plan will minimize conflicts in the future and meet Staff's intent to accommodate areas of stability and projects in the pipeline. Should you have any questions regarding this proposal, please do not hesitate to contact us at 559.436.0900.

Very truly yours,

Goldie Lewis
Granville Homes, Inc.

Jeff Roberts
Granville Homes, Inc.

Attachment

Granville Homes

October 30, 2012

Granville Homes review of City of Fresno 2035 Fresno General Plan Land Use Diagram Draft Figure 2 dated August 9, 2012

AREAS OF STABILITY

Copper River Ranch
The subject area has been zoned and subject to both an approved map and Master CUP. The proposed land use designations shown on the Land Use Diagram do not comply with the approved densities for this area. In addition, there is a "fixed" amount of sewer capacity in this area some of the proposed changes to the multi-family designations would surpass the available sewer capacity.

Outlet M – 579-090-22
CUP designates as R3 Density of 22.8 DU/AC
Designated as High Density 30-45 Units per Acre on Land Use Diagram
Should all be Urban Neighborhood Density 16-30 DU/AC

5 Acre Park
The five acre park depicted at the northwest corner of Copper Avenue and Chestnut Avenue, straddles two parcels one of which is owned by our partnership. If the City wants to have a park here, we would need to know how the park would be maintained. The park site is not conserved in any of the Copper River Ranch Planning documents nor is it programmed in the Community Facilities District (CFD 15) that is now being formed to maintain all green space in this area. The park location is not positioned correctly for the residents of the Copper River Ranch to take advantage of the facilities. We believe that this facility should not be planned or developed at the location illustrated

Tract 5273 579-074-17
Tentative Map Low Density Residential
Designated as Medium Density 5 -12 Units per Acre on Land Use Diagram
Should all be Low Density per Acre 1-3 DU/AC

Village I – 579-074-62, 59, 58
Tentative Map Low Density Residential 1-3 DU/AC
Designated as Medium Low Density 3.5 -6 Units per Acre on Land Use Diagram
Should all be Low Density per Acre 1-3 DU/AC

Reference should be made to the existing zoning/prezoning for this area and verification should be made that the designated land use complies with the approved plan.

Approved Tentative Maps/Projects

1. **Tract 5717 310-040-99**
   Northwest corner of Armstrong and Clinton
   Currently Zoned Medium Low Density Residential existing tentative map is 4.55 DU/Acre
   Designated as Medium Density 5 -12 Units per Acre on Land Use Diagram
   General Plan should reflect Medium Low Density per Acre 3.5-6 DU/AC

2. **Tract 5717 310-740-07, 08 & 09**
   Princeton and Bliss
   Currently Zoned CM
   Designated as Business Park on Land Use Diagram

Is Business Park Compatible with CM Zoning?

3. Tract 5717 - 310-040-10 & 11
East side of Fowler between Clinton and Princeton
Currently Zoned CM
Designated as Commercial on the Corner and Urban Neighborhood (16-30 DU/Acre) approximately 34.5 Acres on Land Use Diagram, this density is not sustainable at this location.
Supportive of 10 Acres of Community Commercial on NEC of Clinton and Fowler with Approximately 10 acres of Medium High Density 12-16 DU/AC and Buffer of 14.5 acres of Medium Density 5/12 DU/AC

4. Tract 5584 504-080-16S
Tentative Subdivision Map located at the North Side of Bullard near Bryan alignment 11.44 DU/acre
Designated as Medium High Density 12-16 DU/AC
Should all be Medium Density per Acre 5-12 DU/AC

5. Tract 5597 505-040-13, 21, 70 and 71
Tentative Subdivision Map located at the northeast corner of Garfield and Barstow Avenue 5.2 DU/Acre
Designated as Medium High Density 12 – 16 and Medium Low Density per Acre 3.5-6 DU per Acre
Should all be Medium Low Density per Acre 3.5-6 DU/AC

6. Tract 5560 - 312-061-18
Tentative Subdivision Map located on the north side of Clinton (between Polk and Hayes) 4.4 DU/acre
Designated as Medium Density 5-12 Units Per Acre on Land Use Diagram
Should all be Medium Low Density per Acre 3.5-6 DU/AC

7. Tract 5770 Phase II of Tract 5300 – 312-062-49
Tentative Map Medium Low Density Residential
Designated as Low Density1- 3 DU/AC and Medium Density 12-16 DU/AC
Should be Medium Low Density Residential 3.5-6 DU/AC

8. Tract 5567 312-062-34, 35, 36 & 46
Tentative Subdivision Map located at the northeast corner of Clinton and Polk Avenues 4.4 DU/acre
Designated as Medium High Density 12-16 DU/Acre, Medium Density 5-12 Units Per Acre and Low Density 1-3 DU/acre on Land Use Diagram
Should all be Medium Low Density per Acre 3.5-6 DU/AC

9. Tract 5584
Tentative Subdivision Map located at the North Side of Bullard near Bryan alignment 11.44 DU/acre
Designated as Medium High Density 12-16 DU/AC
Should all be Medium Density per Acre 5-12 DU/AC

10. Northeast Corner of Grantland and Barstow PM 2179 505-281-16, 17, 18
Approved Neighborhood Commercial Corner
Designated as Urban Neighborhood 16-30 DU/Acre
Should all be Community Commercial.

Recorded Final Maps

11. Tract 5450 – Southwest corner of Church and Fowler
Recorded Final Map 5.9 Dwelling Units per acre
Designated as Urban Neighborhood 16-30 DU/Acre on the Land Use Diagram

Should all be Medium Density per Acre 5-12 DU/AC

12. Tract 5248/Tract 5477
Recorded Maps at the Southeast corner of Sunnyside and Church Avenues 3.5 DU/acre
Designated as Medium Density 5 -12 Units per Acre on Land Use Diagram
Should all be Medium Low Density per Acre 3.5-6 DU/AC

13. Tract 5357
Recorded Map at Northeast Corner of Bullard and Barstow Avenues 4.2 Units per Acre
Designated as Medium Density 5-12 Units Per Acre on Land Use Diagram
Should all be Medium Low Density per Acre 3.5-6 DU/AC

14. Tract 5300 312-062-34, 35
Recorded Subdivision Map Phase I located at the northeast corner of Clinton and Polk Avenues
4.4 DU/acre
Designated as Medium High Density 12-16 DU/Acre, Medium Density 5-12 Units Per Acre and Low Density 1-3 DU/acre on Land Use Diagram
Should all be Medium Low Density per Acre 3.5-6 DU/AC

15. Tract 5278 507-360-15S and 16S
4171 and 4179 W Sample Ave.
Designated as Medium Low Density Residential
Existing Density Low Density 1-3 DU/Acre

PROJECTS IN THE PIPELINE

Tract 5915 – Westlake (Will be addressed via a separate letter)

Future Projects

512-150-01
Located on the east side of Grantland north of Shields Avenue
Designated as Low Density1-3 DU/AC and Medium Density 5-12 DU/AC
Maintain Medium Density per Acre 5-12 DU/AC

512-050-89
West Side of Bryan South of Ashlan. This site is a 17 acre site south of large lot subdivision 2 acres per lot. The General Plan proposes two designations on the parcel. The Urban High Neighborhood is not sustainable at this location. There should be a transition from the large lot existing subdivision.
Designated as Urban High Neighborhood 16-30 and Medium Density 5-12 DU/AC
Should all be Medium Low Density per Acre 3.5-6 DU/AC

512-141-33
SEC of Grantland and Dakota
Designated as High Density Residential 30-45 DU/AC This is not sustainable at this location.
Maintain Existing Land Use Designation of Residential Medium High 12-16 DU/Acre

Baker Manock
& Jensen PC
ATTORNEYS AT LAW

Robert D. Wilkinson
Attorney at Law
rwilkinson@bakermanock.com

Fig Garden Financial Center
5260 North Palm Avenue
Fourth Floor
Fresno, California 93704
Tel: 559.432.5400
Fax: 559.432.5620
www.bakermanock.com

December 6, 2012

VIA ELECTRONIC MAIL AND U.S. MAIL

Mr. Keith Bergthold
Assistant Director
City of Fresno
2600 Fresno Street, Room 365
Fresno, CA 93721
E-Mail: Keith.Bergthold@fresno.gov

Re: Notice of Preparation of an Environmental Impact Report for the City of Fresno General Plan and Development Code Update

Dear Mr. Bergthold:

Please accept the following comments on behalf of our client Vie-Del Company. Thank you for your consideration.

I. INTRODUCTION

Vie-Del Company ("Vie-Del") owns Assessor Parcel Number ("APN") 508-020-04S (the "Property"), which is located southwest of the existing North Golden State Boulevard between Veterans Boulevard and the Herndon Canal in north Fresno. Vie-Del is a family owned business established in 1946. It is a majority woman-owned manufacturing and food processing business.

On the Property, Vie-Del maintains the largest industrial site and largest industrial building north of downtown Fresno. The property is unique in terms of its size, location and fixtures, which include cranes and high capacity electrical outlets that make it particularly well suited for manufacturing. Currently the Property is occupied by three tenants, two of whom are also majority woman-owned businesses. One of the businesses manufactures agricultural harvesters and is one of the few domestic manufacturers of this type competing in an international market. A second tenant manufactures road repair equipment. These two tenants take advantage of the facility's unique properties. The third tenant stores agricultural products at the site.

II.
BACKGROUND

A. California High Speed Train

Earlier this year, the California High Speed Rail Authority ("CHSRA") certified the Merced to Fresno Final Environmental Impact Report/ Environmental Impact Statement (Final EIR/EIS) and approved the Hybrid Route as the Preferred Alternative. An aerial map with engineering designs dated February 24, 2012, is attached hereto as Exhibit "A" and was included in the Final EIR/EIS. Exhibit "A" shows the proposed California High Speed Train ("HST") route, the existing right of ways for North Golden State Boulevard, the proposed right of ways for the HST, and the property that would be affected by a realignment of North Golden State Boulevard. This map covers an area along the existing North Golden State Boulevard from southwest of Veterans Boulevard (not identified on the map) to just past the Herndon Canal, at North Market Street.

The right of way shown as "proposed" in Exhibit "A" was approved by the CHSRA based on the certification of the Final EIR/EIS for the HST. As shown in Exhibit "A," this right of way to the southwest of the railway does have impacts on parcels that are currently located adjacent to the southwest side of North Golden State Boulevard. However, in the HST Final EIR/EIS the CHSRA determined that such impacts were less than significant.

Exhibit "A" also shows the planned new alignment of North Golden State Boulevard, which would generally run adjacent and parallel to the HST, on the southwest side. The proposed new alignment of North Golden State Boulevard as shown in Exhibit "A," and as approved by the CHSRA, will impact those same parcels as the right of way. Of course, the new North Golden State Boulevard alignment will impact those parcels to a greater degree than the right of way for the HST, but the impact is still less than significant.

Among the parcels impacted by the approved HST right of way and new North Golden State Boulevard alignment (as identified in the Final EIR/EIS), is property owned by Vie-Del. Specifically, Assessor's Parcel Number ("APN") 508-020-04S is impacted. The area of the Property impacted by the HST and new alignment of North Golden State Boulevard is currently used as a temporary drainage basin by the Fresno Metropolitan Flood Control District. There are no existing structures on this area of the Property.

The CHSRA, in the HST Final EIR/EIS has already evaluated and made a determination about the impacts to all the properties along the HST right of way and within the area of the proposed new North Golden State Boulevard. The CHSRA concluded that the alignment of North Golden State Boulevard adjacent and parallel to the HST is the preferred route. Therefore, no party can make further comments on the impacts and findings of the CHSRA concerning the HST and the associated relocation of Golden State Boulevard.

III.
ISSUES

A. City of Fresno General Plan Update

On October 26, 2012, we obtained a copy of the City of Fresno's ("City") proposed Golden State and West Barstow Businesses and Owners site plan dated September 25, 2012 ("Golden State Site Plan"), which is attached hereto as Exhibit "B." Unlike the HST Final EIR/EIS, the Golden State Site Plan shows two different alignments for North Golden State Boulevard. Shown on Exhibit "B" with a solid black line and teal outline, is the path of the North Golden State Boulevard alignment as identified in the Final EIR/EIS and as adopted by the CHSRA. Shown on Exhibit "B" with two red lines, is the City's new proposed alignment for North Golden State Boulevard ("Proposed Alignment"). This Proposed Alignment is to be evaluated in the City of Fresno 2035 General Plan Master Environmental Impact Report ("Master EIR"). Vie-Del was very disappointed to learn that the Proposed Alignment was the product of meetings with its neighbors, meetings to which Vie-Del was not invited. Vie-Del only learned of the Proposed Alignment indirectly from City staff after it was already decided the Proposed Alignment would be included in the 2035 General Plan Update.

Notably, the Proposed Alignment no longer runs adjacent to the HST, but instead creates a new route from north of Veterans Boulevard to Herndon Canal. This new Proposed Alignment cuts through the middle of larger APNs, including property owned by Vie-Del. If this Proposed Alignment is adopted, it would cut through the biggest industrial site north of downtown Fresno and severely restrict the job generating activities that could utilize this site at its current size and state of development. These impacts negatively affect the economic development in and fiscal sustainability of the City. In particular, the current facility is very unique as it is one of the few manufacturing facilities left in Fresno. Most other large commercial facilities in the City are dedicated to storage and warehousing. With the turnaround of the economy, Vie-Del intends to further develop and expand the facility and market it to additional outside manufacturing businesses.

The Proposed Alignment would dramatically adversely impact current and future activities on the Property. In particular, the impacts of the Proposed Alignment are much greater than those illustrated in Exhibit "A." In addition to the roadway, there would be landscaping and zoning setbacks which would further destroy the site and its current use as a manufacturing facility. Among other concerns Vie-Del has are that in response to the Proposed Alignment, Vie-Del would have to create new traffic access, circulation and parking on the site, all of which would diminish the site's utility. The Proposed Alignment also completely wipes out a 50,000 square-foot building. All of this would adversely impact current manufacturing at the site and the site's potential for additional manufacturing and commercial activity.

City staff should be fully aware that the exercise of relocating the route of North Golden State Boulevard should only occur if and when the HST is built. We strongly request

that the City include in its analysis that if the HST is not constructed, then the currently North Golden State Boulevard orientation would not change.

Furthermore, the Proposed Alignment should not be implemented and included in the 2035 General Plan Update. As noted above, it has a significant potential to cause harm to the area. Moreover, drainage in the area is already an issue and will become a greater concern. The Proposed Alignment indisputably causes a greater public impact than the North Golden State Boulevard alignment adopted by the CHSRA in the Final EIR/EIS. In addition, although not necessarily an environmental issue, the CHSRA is supposed to cover the costs of realigning North Golden State Boulevard. If the City changes that realignment, the costs for construction will have to come out of the City's budget and the local taxpayer's pockets. In this regard, the overall costs of cutting though Vie-Del's unique, large industrial parcel are significantly higher than pursuing the adopted HST plan.

B. Evaluation of the Proposed Alignment in the Master EIR

We request that the City of Fresno adopt the findings of the CHSRA and the HST Final EIR/EIS and incorporate the new North Golden State Boulevard alignment as it is shown in Exhibit "A" into the City's 2035 General Plan. However, if the City still plans to evaluate the Proposed Alignment, at least the following must be adequately addressed in the Master EIR: (1) a comparison between the North Golden State Boulevard alignment as proposed and adopted by the CHSRA, and the Proposed Alignment, especially as to which alignment has the greatest public impact; (2) an analysis of the effect of reducing the size of the largest industrial site in north Fresno and its affect on the economic development and fiscal sustainability of the City; (3) an analysis of the impacts the Proposed Alignment will have on drainage in the area described above; (4) public safety; (5) costs associated with the project; (6) traffic impacts; (7) the setback and zoning impacts that will affect the use of the facility; and (8) all other analyses required by the California Environmental Quality Act ("CEQA").

Although it is appropriate to evaluate alternatives as part of the CEQA analysis, we believe that on a basic analysis of the two alternatives, the City should reject the Proposed Alternative and not include it in the draft Master EIR that is released for public comment. We also strongly request the City analyze the comparative impacts and costs of these two routes. The costs should include the contribution, or lack thereof, from the CHSRA for construction of the new North Golden State Boulevard. Of course, the CHSRA cannot provide funding for a road that it did not authorize and did not analyze as part of its own CEQA/NEPA analysis.

IV.
CONCLUSION

Vie-Del strongly urges the City of Fresno to use the North Golden State Boulevard alignment, between Veterans Boulevard and the Herndon Canal, as it was adopted by the CHSRA and as identified in Exhibit "A," attached hereto. As evaluated in the CHSRA Final

EIR/EIS, this alignment causes the least public impact. However, if the City decides to proceed with evaluating the Proposed Alignment in the 2035 General Plan Update Master EIR, we strongly request that the City fully analyze all the impacts the Proposed Alignment will have on the Property and the dramatically adverse affect it will have on the City by destroying such a unique parcel. We also expect the City to fully address the increased cost this Proposed Alignment will have on the City and its residents.

Thank you for your consideration.

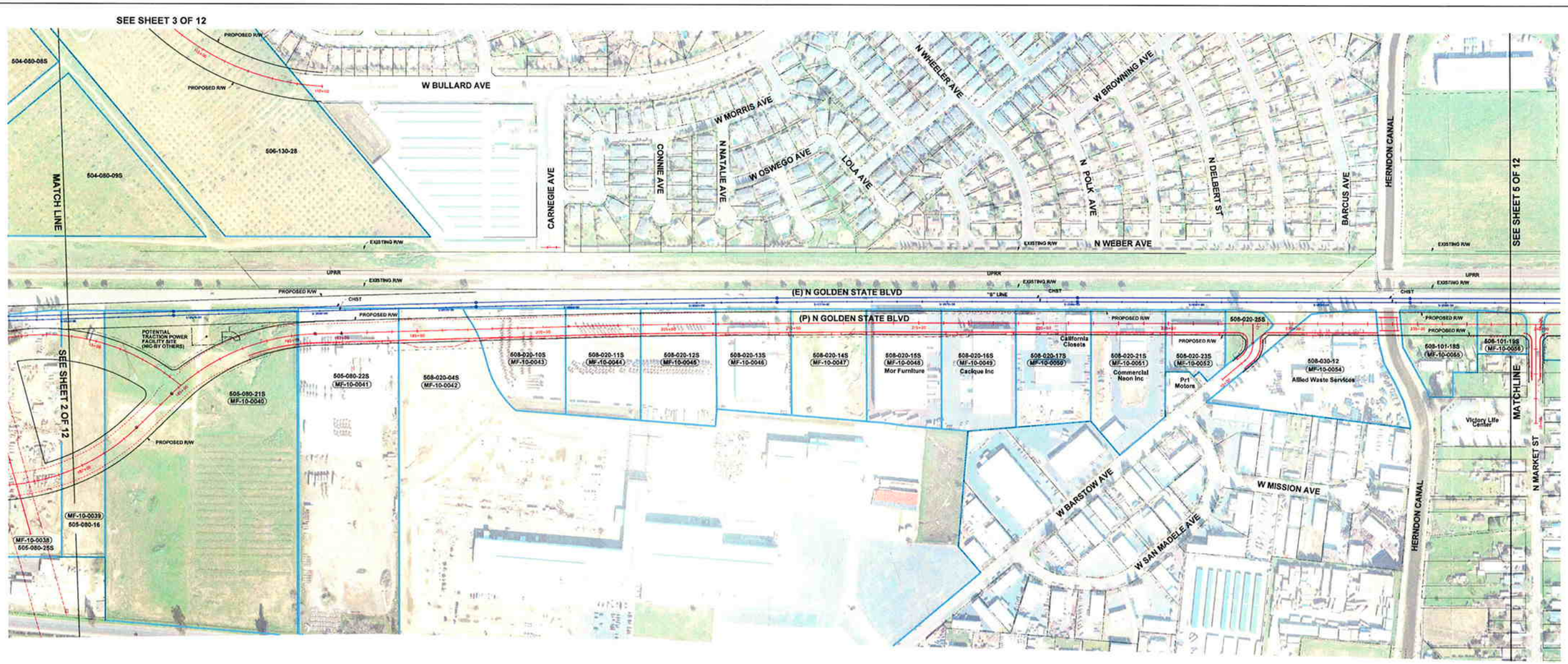
Very truly yours,

Lauren Layne for

Robert D. Wilkinson
BAKER MANOCK & JENSEN, PC

LDL:LDL
Attachments
cc: Ms. Dianne S. Nury, Vie-Del Company
Mr. Dirk Poeschel

EXHIBIT A



Legend

- Impacted Parcel
- Proposed Drainage Basin
- Caltrans R/W (Access Prohibited)
- Caltrans R/W (Relinquished)
- Proposed R/W
- Existing R/W

2-24-12
30% DESIGN
SUBJECT TO CHANGE

AECOM
Technical Services, Inc.
2020 L Street, Suite 300
Sacramento, CA 95811

CALIFORNIA HIGH-SPEED RAIL AUTHORITY

CALIFORNIA HIGH-SPEED TRAIN PROJECT
SIERRA SUBDIVISION - PACKAGE 1A & 1B
RIGHT-OF-WAY EXHIBIT
4 OF 12
FEBRUARY 2012

WILD, CARTER & TIPTON
A Professional Corporation
ATTORNEYS AT LAW
Founded in 1893

246 WEST SHAW AVENUE
FRESNO, CALIFORNIA 93704
Telephone: (559) 224-2131

BRUCE M. BROWN

Our File No.: DB2-05718
Email: bbrown@wctlaw.com
Direct Fax: 559-229-7295

December 6, 2012

Mr. Keith Bergthold
City of Fresno Development & Resource
Management Administration
2600 Fresno Street, Room 3065
Fresno, California 93721

Re: Comments by Landowner to the City of Fresno General Plan Updates
Address: 5631 and 5661 N. Golden State Blvd., Fresno, CA 93722
Owner: We Be Jammin' LP
Issue: "Lawson ByPass"

Dear Mr. Bergthold:

Please be informed that this law firm represents the above-referenced Owner and its manager, John Brelsford. The following are my clients' comments/concerns regarding the City of Fresno General Plan ("General Plan") Updates:

My clients have two (2) properties located on Golden State Boulevard, north of Barstow Avenue and south of the new alignment for Veterans Boulevard. My clients' properties are comprised with two (2) buildings (one approximately 48,000 square feet in area and the other approximately 75,400 square feet in area). The two (2) buildings are leased to tenants for use as industrial warehouse and related business uses. These properties have historically been fully leased at market rents. However, some time ago the High Speed Rail ("HSR") Authority designated a portion of each property and a portion of each building within the footprint design and construction area for the HSR and the relocation of Golden State Boulevard. That decision, by the HSR Authority, has depressed rental values because no tenant with a long term business plan (i.e. longer than one year) has any interest in moving into a building that may require an immediate relocation.

At this point, the HSR Authority has severely and irreparably damaged the industrial warehouse market in the City of Fresno along the HSR route. The HSR Authority has stated that it is purchasing the properties along this route and at the very least has made verbal statements to the effect that the owners will be fairly and adequately compensated for their losses attributed to the HSR. If the HSR Authority's statements are true, then some, if not most, of the economic problems for the individual owners will over time be mitigated.

Now, the City of Fresno, in its updated General Plan, is proposing an action that will further depress property value for a number of properties along the HSR corridor. The proposed action by the City of Fresno is the redesign of Golden State Boulevard north of Barstow Avenue to the proposed Veterans Boulevard and further north ("Lawson ByPass") which separates Golden State Boulevard from the HSR.

If this redesign becomes part of the undated General Plan, my clients' properties and other similarly situated properties (i.e., property designed to be leased to tenants) will be placed in quasi-permanent limbo status because:

(a) The HSR Authority will now (i.e. under the redesign) elect not to purchase my clients buildings, however, the HSR Authority will be taking the land in front of my clients' building, making access to the front of the buildings impossible.

(b) The Utilities - Electrical, gas, water, sewer and drainage from my clients' buildings are serviced from the existing Golden State Boulevard (i.e. east of the building) and will have to be redesigned to be serviced from the west side of the building.

Therefore, any potential tenant will be dealing with future issues of no access to the front of the building, a redesign of all utilities and a redesign of the entire building for future use. In other words, the buildings will not have any use to a long term tenant.

In regard to the HSR, the only certainty is that some ± $6 billion dollars are available to be spent on a project that may ultimately cost $150 to $200 billion dollars, or more, to complete. The initial funding could be used to purchase our clients' properties, however, in view of the redesign under the General Plan, this will not take place. This outcome is unreasonable considering that the HSR Authority, with its initial funding, and without the Lawson ByPass design will take/purchase my clients' buildings and that purchase will resolve the reduced rent and losses sustained by my clients and the future losses.

Specific issues/concerns if the HSR does move forward and Golden State Boulevard is realigned include:

1. The proposed western bypass of Golden State Boulevard north of Barstow is outside of the project footprint per the HSR Final Environmental Impact Report/Statement for the Merced to Fresno section (Appendix 2-B - Page 078). This is problematic, as it is assumed that the HSR will necessitate and fund the realignment of Golden State Boulevard. Given that the Final EIR for the Merced to Fresno section has been completed, moving Golden State Boulevard outside of the project footprint creates the potential need for additional environmental review, which may be a concern for the HSR Authority and the City.

2. Existing buildings on Golden State Boulevard are currently designed to face east, both from a functionality and utility design point of view. Redesigning these buildings to now face west would be costly and time consuming, with no certainty that the changes would result in these properties retaining their economic value.

3. The inconsistency between the General Plan's western bypass of Golden State Boulevard and the HSR's planned realignment create uncertainty for potential users/tenants moving forward. This would have a significant negative impact on the ability to lease these buildings at market rents.

Specific issues/concerns if the HSR does NOT move forward and Golden State Boulevard is not realigned include:

1. If the HSR does not move forward, there would be no need to realign Golden State Boulevard. Given that the current land use diagram shows a western bypass of Golden State Boulevard, the plan would not be consistent with the actual street alignment. In the meantime, the ability to continue using the buildings as they are being used today would be put into question, which would necessarily and negatively affect the ability to lease existing buildings.

2. The western bypass of Golden State Boulevard would impact the design of the Veterans Boulevard overpass. If the HSR does not move forward and Golden State Boulevard is not realigned, then the design of Veterans Boulevard at Golden State Boulevard may not work with the existing alignment of the roadway.

We provide this information as our public comments to the General Plan, Master Environmental Impact Report ("Master EIR") and respectfully request that our comments be carefully reviewed in light of the scope and economic issues that will be evaluated in the Master EIR.

Very truly yours,

Bruce M. Brown

Read, approved and agreed:

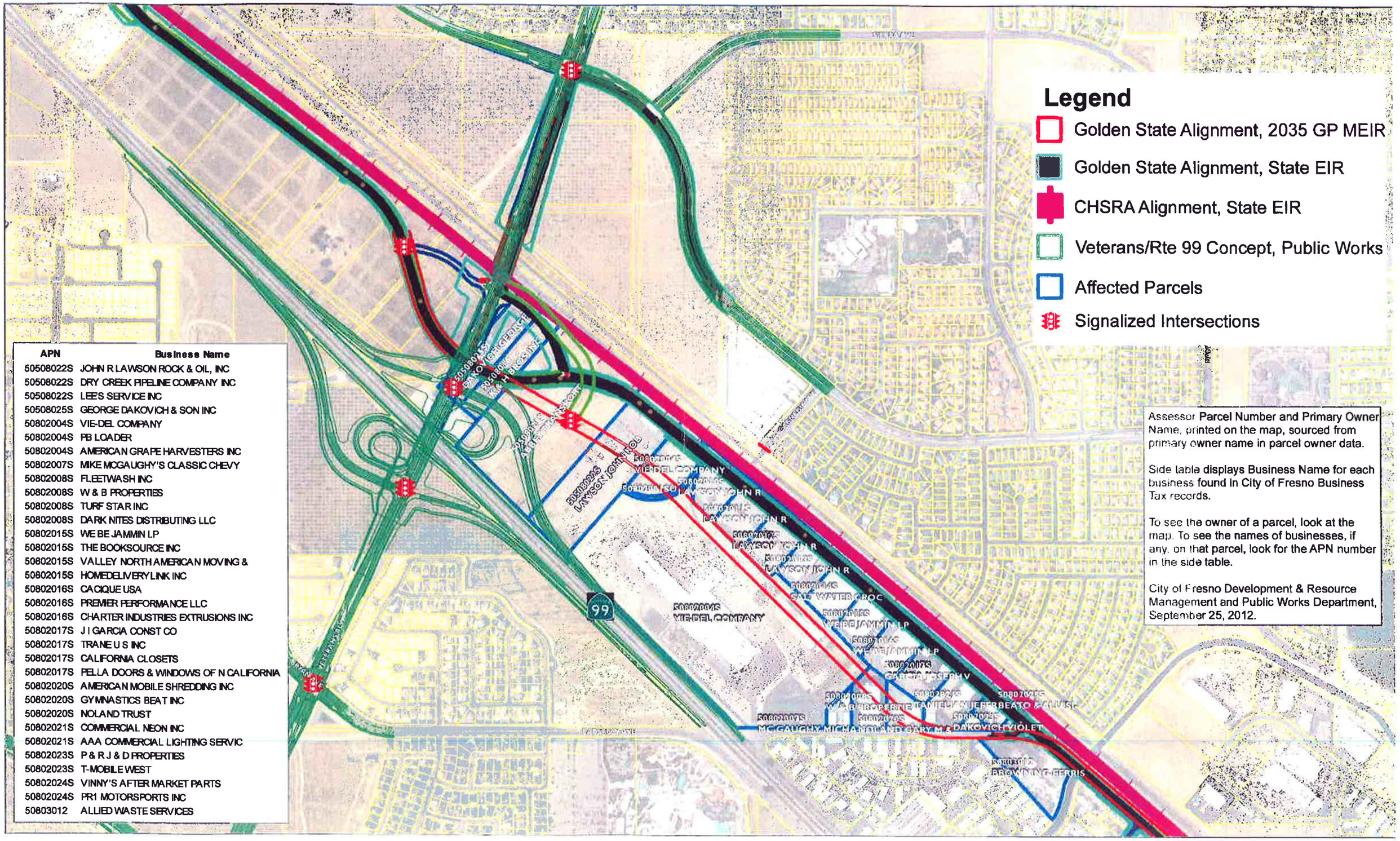
WE BE JAMMIN' LP

By: _____
John Brelsford, Manager

BMB:ift
Via Electronic and First-Class Mail
cc: We Be Jammin' LP (Via Electronic and First-Class Mail)
Ashley Swearengin, Mayor-City of Fresno(Via Electronic and First-Class Mail)
Mark Scott, City Manager-City of Fresno (Via Electronic and First-Class Mail)
Steve Brandau, Councilman-City of Fresno (Via Electronic and First-Class Mail)

EXHIBIT B

GOLDEN STATE AND WEST BARSTOW BUSINESSES AND OWNERS



APN	Business Name
50508022S	JOHN R LAWSON ROCK & OIL, INC
50508022S	DRY CREEK PIPELINE COMPANY INC
50508022S	LEE'S SERVICE INC
50508025S	GEORGE DAKOVICH & SON INC
50802004S	VIE-DEL COMPANY
50802004S	PB LOADER
50802004S	AMERICAN GRAPE HARVESTERS INC
50802007S	MIKE MCGAUGHY'S CLASSIC CHEVY
50802008S	FLEETWASH INC
50802008S	W & B PROPERTIES
50802008S	TURF STAR INC
50802008S	DARK NITES DISTRIBUTING LLC
50802015S	WE BE JAMMIN LP
50802015S	THE BOOKSOURCE INC
50802015S	VALLEY NORTH AMERICAN MOVING &
50802015S	HOMEDELIVERY LINK INC
50802016S	CACIQUE USA
50802016S	PREMIER PERFORMANCE LLC
50802016S	CHARTER INDUSTRIES EXTRUSIONS INC
50802017S	J I GARCIA CONST CO
50802017S	TRANE U S INC
50802017S	CALIFORNIA CLOSETS
50802017S	PELLA DOORS & WINDOWS OF N CALIFORNIA
50802020S	AMERICAN MOBILE SHREDDING INC
50802020S	GYMNASTICS BEAT INC
50802020S	NOLAND TRUST
50802021S	COMMERCIAL NEON INC
50802021S	AAA COMMERCIAL LIGHTING SERVIC
50802023S	P & R J & D PROPERTIES
50802023S	T-MOBILE WEST
50802024S	VINNY'S AFTER MARKET PARTS
50802024S	PR1 MOTORSPORTS INC
50803012	ALLIED WASTE SERVICES

Assessor Parcel Number and Primary Owner Name, printed on the map, sourced from primary owner name in parcel owner data.

Side table displays Business Name for each business found in City of Fresno Business Tax records.

To see the owner of a parcel, look at the map. To see the names of businesses, if any, on that parcel, look for the APN number in the side table.

City of Fresno Development & Resource Management and Public Works Department, September 25, 2012.

Trai Her

From: Leland Parnagian [leland@fowlerpacking.com]
Sent: Thursday, December 06, 2012 5:49 PM
To: Keith Bergthold
Cc: Arakel A. Arisian (arakel@arisiandevelopment.com)
Subject: EIR - Buffer Evaluation

Keith,

Please accept this email as a request for an alternative evaluation within the EIR for the General Plan Update.

As stated in the Initial Study the EIR will be evaluating a "Buffer" of approximately 1/4 mile along the eastern planning area boundary. It is also stated that the band may be narrower if designed as part of a sub area master plan that achieves the goal of a buffer classification. Given the possibility that some landowners may seek a design that acheives this goal, I feel it would be appropriate to evaluate an alternative in which the band is narrower (maybe 100ft wide). I would suggest that the alternative land use in the remainder buffer area should be evaluated by continuing the adjacent land use that is designated to the west.

We look forward to continuing to work with you on the General Plan Update. Please let me know if you have any questions.

Sincerely,

Leland

FowlerPacking
Leland Parnagian
8570 S. Cedar Ave
Fresno, CA 93725
Ph. 559-834-5911
Cell 559-281-8455
Fax 559-834-5272
www.fowlerpacking.com

PARGA PARTNERS

8570 S CEDAR AVENUE
FRESNO, CA 93725
TEL (559) 834-5911
FAX (559) 834-5272

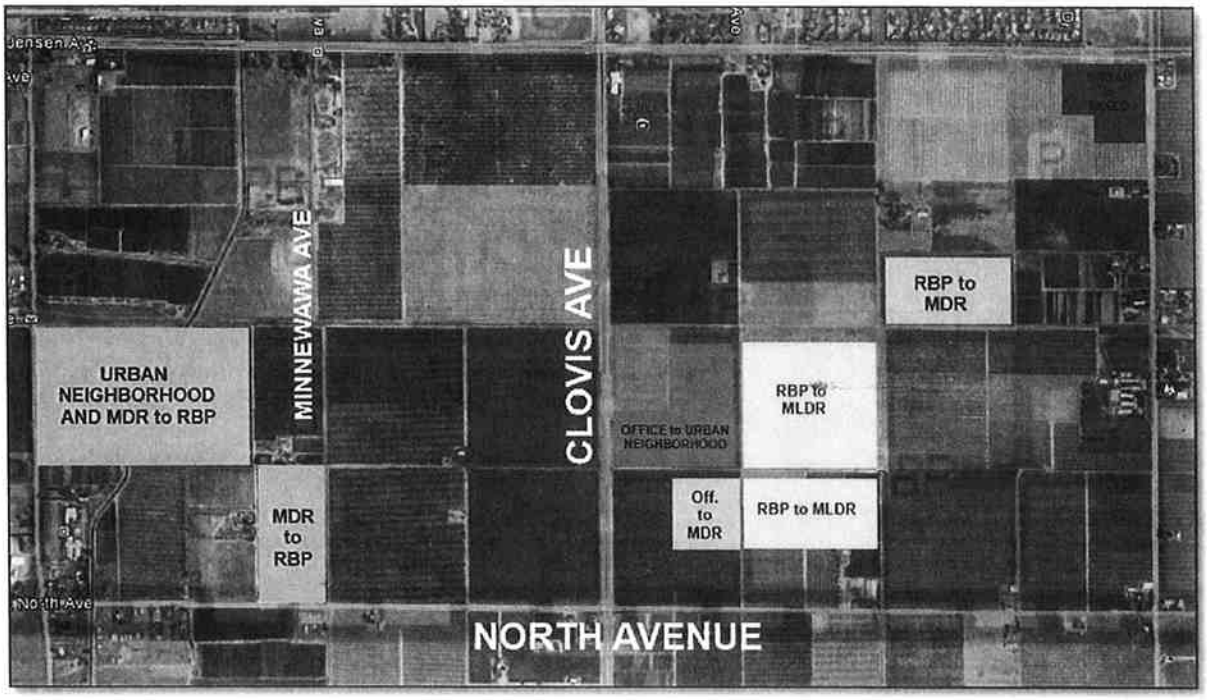
December 6, 2012

Keith Bergthold
City of Fresno
2600 Fresno Street
Fresno, CA 93721

Re: Fresno General Plan EIR Notice of Preparation Comments

Dear Mr. Bergthold:

As you know, we have been working on the planning for our College Park – Academic Village concept in in the South SEGA planning area. In an effort to move forward with those efforts and to maintain some flexibility moving forward, we request that the EIR evaluate some alternative land uses on Parga Partners properties as shown and described below:



To summarize, in addition to the land uses proposed in the draft Land Use Map/Diagram provided by the City, we request that you also evaluate the alternative land use designations we are considering for these parcels:

Assessor Parcel Number	Alternative Land to Evaluate
316-040-77	Regional Business Park
316-040-66	Regional Business Park
316-040-63	Regional Business Park
316-040-17S	Regional Business Park
316-180-09	Regional Business Park
316-051-18	Urban Neighborhood (partial designation per map diagram above)
316-051-20	Medium Density Residential (partial designation per map diagram above)
316-051-21	Medium Low Density Residential (partial designation per map diagram above)
316 -051-09	Medium Density Residential (partial designation per map diagram above)
316-051-07	Corridor Mixed Use (partial designation per map diagram above)

In evaluating these alternative uses, we hope to continue working with you to refine the land uses in this area and create a plan that meets the goals and objectives of the General Plan and our vision for College Park - Academic Village in southeast Fresno.

Sincerely,

Leland D Parnagian

MEMORANDUM

To: Keith Bergthold

From: P-R Farms Planning Team

Date: December 6, 2012

Subject: General Plan Update Land Uses & EIR NOP Comments

In response to the Notice of Preparation for the Fresno General Plan Environmental Impact Report, we request that the possibility of a mixed use designation for the northwest corner of Shepherd and Willow (APN 568-010-20) be evaluated. The parcel is currently shown with a Commercial land use, but we would like to explore the possibility of changing the designation to the Corridor/Center Mixed Use or Neighborhood Mixed Use, as introduced in the draft City of Fresno General Plan Update.

Given that these land uses designations are new to the City of Fresno, we would like more time and information to better understand the requirements and policies concerning these mixed use land uses. For that reason, we request that the environmental review consider the possibility of a Commercial land use on the northwest corner of Shepherd and Willow, as well as the mixed use designations mentioned above. That would allow us to continue discussions with you and your staff on the particulars of the proposed mixed use categories with the intent of determining a preferred land use in the near future.

We look forward to learning more about the mixed use land uses and discussing the alternatives for this property. Thank you

Allen Matkins

Allen Matkins Leck Gamble Mallory & Natsis LLP
Attorneys at Law
515 South Figueroa, 9th Floor | Los Angeles, CA 90071-3309
Telephone: 213.622.5555 | Facsimile: 213.620.8816
www.allenmatkins.com

Patrick A. Perry
E-mail: pperry@allenmatkins.com
Direct Dial: 213.955.5504 File Number: 110045-00136/LA946616.01

Via Electronic and First Class Mail

December 6, 2012

Mr. Keith Bergthold
City of Fresno
2600 Fresno Street, Room 3065
Fresno, California 93721

Re: Notice of Preparation for General Plan and Development Code Update

Dear Mr. Bergthold:

This firm represents the McCaffrey Group in connection with its review of the Notice of Preparation ("NOP") and Initial Study ("IS") for the City of Fresno General Plan and Development Code Update. As you are aware, the McCaffrey Group has been supportive of the City's General Plan and Development Code Update and submitted correspondence to Mark Scott in April of this year supporting the Planning Commission's approval of proposed Alternative A. Notwithstanding such continuing support, the McCaffrey Group has concerns regarding the process and the significant cumulative impacts of the project from a regional planning perspective. We have reviewed the NOP and the IS and have the following comments regarding the scope and analysis of the Master Environmental Impact Report ("MEIR") proposed to be prepared in connection with the General Plan and Development Code Update.

A. The Project Description is Incomplete.

Section 15063 of the State CEQA Guidelines requires an initial study to consider all phases of project planning, implementation, and operation. Among other things, an initial study is required to contain the following elements:

1. A description of the project including the location of the project;

2. An identification of the environmental setting;

3. An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to indicate that there is some evidence to support the entries;

4. A discussion of ways to mitigate the significant effects identified, if any;

5. An examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls;

Here, the IS loosely describes the proposed project as an update to the City's General Plan and Development Code, but information regarding specific revisions to the General Plan and Development Code is fragmentary at best. By way of example, the IS bifurcates the project area into two parts, described as (1) the Planning Area excluding the Downtown Planning Area, and (2) the Planning Area exclusive to the Downtown Planning Area. The IS provides no explanation or justification for this bifurcation, which would conceivably allow revisions to one portion of the Planning Area without corresponding revisions to the other, leading to a lack of integration and potential segmentation of the project in violation of CEQA.

The IS further provides that the Development Code Update will only apply to the Downtown Planning Area "if updates have not otherwise been made at the time of approval." There is no explanation as to the nature or scope of any proposed updates to the Development Code for the Downtown Planning Area other than those discussed in the IS, nor is there any discussion as to whether such updates to the Development Code for the Downtown Planning Area would be consistent with the updates described in the IS for the remainder of the Planning Area, or what level of environmental review would be undertaken for the approval of such updates under CEQA. This could lead to the anomalous result that revisions to the General Plan and/or Development Code could be made for only the Downtown Planning Area and not the remainder of the Planning Area, or vice-versa, without any corresponding analysis of the impacts such revisions may have on the portion of the Planning Area for which revisions are not adopted. The MEIR must therefore either combine the two portions of the Planning Area into a single analysis or explain how separate consideration and approval of revisions to the General Plan and Development Code for the two portions of the Planning Area can be integrated for purpose of comprehensive analysis.

B. The Goals of the Proposed Project Are Inconsistent and Contradictory.

In addition to the foregoing defects, the IS fails to clearly identify a consistent scope of analysis for the MEIR. The IS purports to rely on the Preferred Draft General Plan Alternative ("Preferred Alternative") for purposes of analysis in the MEIR; however, the IS does not describe the Preferred Alternative in detail. Instead, the City has prepared a Review Draft of the 2035 General Plan, dated August 2012 (the "Review Draft"), for initiation purposes only, which may or may not correspond to the Preferred Alternative. To the extent that the Review Draft represents the Preferred Alternative, the projected land use patterns set forth therein fall short of the goals described in the IS.

The IS describes historic growth in Fresno as primarily suburban style development that relies heavily on the automobile for mobility, resulting in sprawl. The land use policies proposed as

part of the General Plan and Development Code Update purportedly address this condition by encouraging infill development and revitalization of the Downtown Planning Area, older neighborhoods, and along established major street corridors, as well as the development of compact and complete communities in Growth Areas located on the outer areas of the Planning Area.

Review of the diagrams and tables set forth in the IS reveals, however, that the land use patterns proposed as part of the General Plan and Development Code Update will increase allowable density in certain areas but may otherwise do little to change overall patterns of development within the majority of the Planning Area. According to the IS, the most significant increase will occur in residential and mixed use development, while the acreage allocated to industrial development and open space will be reduced. Much of the increase in residential and mixed use development is proposed to be accommodated through the shift of acreage presently designated for "other" uses in the Southeast Growth Area ("SEGA"), which has been included in other land use designations, but which currently consists of unincorporated areas of prime farm land that lacks infrastructure and public utility services, concerns that have been raised by the Fresno County Local Agency Formation Commission in connection with the City's draft Specific Plan for SEGA.

According to the Review Draft, a minimum of only 45 percent of new development will occur in proximity to transit corridors, and up to 55 percent of new development will continue to occur outside of targeted growth areas. According to the Planned Land Use diagram attached as Exhibit 4 to the IS, most of the new high density residential and mixed use development will occur in the Downtown Planning Area and along Blackstone Avenue and Shaw Avenue, yet the IS fails to identify whether the necessary transportation and other infrastructure is in place to support such density or what the secondary impacts of the development of such additional infrastructure may be if required. According to the IS, the projected jobs/housing balance will remain roughly comparable to the existing jobs/housing balance, which will contribute, along with increased density within the overall Planning Area, to increased traffic congestion City-wide. The IS provides only a peremptory acknowledgement of potentially significant impacts on transportation and traffic resulting from the proposed General Plan and Development Code Update, without identifying any specific characteristics of such impacts or discussing potential mitigation measures as CEQA requires. The MEIR must therefore specifically analyze the potentially significant impacts that will result from the combination of increased density along existing transportation corridors without a corresponding adjustment to the jobs/housing balance, which will inevitably cause unacceptable levels of traffic congestion within the Planning Area absent effective mitigations.

C. The IS Fails to Consider Regional Planning Approaches.

The Council of Fresno County Governments ("Fresno COG") is moving forward with the preparation of the Regional Transportation Plan ("RTP") and Sustainable Communities Strategy ("SCS") pursuant to the requirements of SB 375 in order to coordinate regional growth. According

to the schedule set forth in the IS, the draft MEIR will be completed and circulated for public review prior to completion of the RTP and SCS. The IS and Review Draft only discuss SB 375 in connection with its possible effect on the Housing Element of the General Plan, which is not proposed to be updated at this time. Failure to coordinate revisions to the General Plan with regional approaches to transportation and planning issues could frustrate the effective implementation of policies designed to achieve reductions in greenhouse gasses and other pollutants throughout the region. The MEIR should accordingly reflect careful coordination with the efforts of Fresno COG and the Councils of Governments of surrounding areas as a means to achieve regional goals of traffic reduction and enhancement of air quality.

Your careful attention to these issues is greatly appreciated. Please call with any questions or if I can provide additional information with regard to this matter.

Very truly yours,

Patrick A. Perry

PAP

cc: Mayor Ashley Swearingen
Council President Clint Olivier
Councilmember Oliver Baines III
Councilmember Andreas Borgeas
Councilmember Lee Brand
Councilmember Sal Quintero
Councilmember Larry Westerlund
Councilmember Blong Xiong
Mr. Mark Scott
The Fresno County Board of Supervisors
The Fresno County Local Agency Formation Commission

FRIANT RANCH L.P.

December 6, 2012

Mr. Keith Bergthold
Assistant Director
CITY OF FRESNO
2600 Fresno Street, Room 3065
Fresno, CA 93721

Re: **City of Fresno General Plan and Development Code Update**
Master Environmental Impact Report Notice of Preparation & Scope

Dear Mr. Bergthold:

This letter contains comments by Friant Ranch, L.P. on the Notice of Preparation and Scope for the City of Fresno General Plan and Development Code Update (hereafter "Proposed Project") Master Environmental Impact Report. It expands on the oral comments I presented on behalf of Friant Ranch, L.P. at the Tuesday, November 27, 2012 NOP scoping meeting, regarding the scope and content of the environmental issues to be evaluated in the City of Fresno Master Environmental Impact Report (hereafter "MEIR").

The Proposed Project, involves a huge expansion of urban growth within the City Sphere of Influence in an area currently zoned as prime agricultural use without available public services. With past development approvals in Fresno County, the City itself has asserted that this type of expansion violates fundamental principles of the County and City General Plans and the Memorandums of Understanding (MOU) between the County and Cities. The City of Fresno contended that these documents direct development to urbanized areas which have available service capacity to accommodate growth and focus on preserving agricultural land and environmental resources. The Proposed Project completely contradicts the position the City of Fresno's has taken toward neighboring development projects, ignoring its own proclamation of what constitutes smart growth principles. The inconsistency with the City's application of these policies broadens the scope of its Proposed Project's significant environmental impacts, which will require more comprehensive analysis and significant mitigation. The Proposed Project rezones several thousands of acres of prime agricultural land to residential and commercial use. The scope of the MEIR should evaluate Proposed Project alternatives that could reduce or eliminate the conversion of prime agricultural land, unique farmland and farmland of statewide importance. The MEIR needs to address all significant environmental impacts and mitigation measures which reduce these impacts to less than significant. In addition, the MEIR should analyze and mitigate the long term economic impacts of the permanent loss of thousands of acres of prime farmland, which is a primary economic driver of the Fresno County economy.

In the event a significant and unavoidable impact to prime agricultural land occurs, CEQA requires that all feasible mitigation measures be adopted for mitigation.

Accordingly, the MEIR must analyze any available feasible mitigation measures to reduce agricultural impacts.

In accordance with the City's allegations made in other forums, the MEIR must include grazing land as a category of farmland worthy of conservation and analyze or mitigate potential adverse impacts to grazing. The MEIR needs to provide information on how the Proposed Project could adversely affect supply of grazing land, particularly winter grazing land.

The Proposed Project will have significant growth-inducing impacts due to the expansion of public services, particularly in the South East Growth Area. This includes the fiscal and environmental impacts of storm water detention & percolation, wastewater treatment and water supply facilities and services. The impacts of this future growth should be analyzed in the MEIR including impacts to the existing aged water distribution and wastewater systems as a result of the proposed new growth, development and infrastructure. The MEIR water supply analysis must show a reasonable likelihood of adequate water being available to meet the Proposed Project and cumulative demand in the short-term and long-term and dry year conditions.

Potential significant impacts from the Proposed Project may result in the degradation of water quality and result in violations of water quality or water discharge standards. The MEIR must address the water quality standards and waste discharge requirements and determine the potential for impacts from future growth and development. In addition, the Proposed Project may substantially deplete groundwater supplies or interfere substantially with groundwater recharge resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level. This would diminish the production rate of pre-existing nearby wells, which could drop to a level which would not support existing land uses, such as farming activity. Increased impervious surfaces associated with development could also reduce the potential for groundwater recharge. The MEIR must analyze these significant impacts and propose feasible mitigation measures.

The MEIR should evaluate, as a standard of significance for air quality impacts, whether the implementation of the proposed land use changes associated with the General Plan and Development Code Update may significantly alter long-term local and regional air quality conditions. The proposed growth has the potential to expose sensitive receptors and increase pollutant concentrations. Mitigation measures should be recommended to reduce potential significant air quality impacts to sensitive receptors. Under CEQA, the MEIR must also disclose the human health related effects of the Proposed Project's air pollution impacts. (CEQA Guidelines section 15126.2(a). The MEIR should disclose and determine the significance of TAC impacts, and of human health risks due to exposure to Project-related air emissions.

The MEIR should also identify construction impacts related to a number of criteria pollutants, as well as particulate matter (PM10) and Fine Particulate Matter (PM2.5). The MEIR must provide analysis of PM2.5 impacts. The MEIR's discussion of construction and operational air emissions should identify any significant impact in violation of SJVAPCD emissions standards. The MEIR should set out the federal and

state ambient (concentration) thresholds for various pollutants as well as the emissions thresholds for CO, ROG, NOx, PM1o or PM 2.5. The MEIR must also determine, on the basis of substantial evidence, that no additional feasible mitigation measures would further reduce or avoid the Project's air quality impacts which remain significant after imposition of the MEIR's recommended mitigation measures.

Finally, the MEIR must disclose and determine the significance of the Project's total air emissions, in years when Project construction emissions overlap with Project operational emissions.

There are known and potential sensitive biological resources within the City of Fresno and its Sphere of Influence. The San Joaquin River corridor represents suitable habitat for numerous plant, wildlife, and avian species, including several special status species. Based on habitat requirements, special status species that occur, or could potentially occur in the San Joaquin River corridor include valley elderberry longhorn beetle, California red-legged frog, burrowing owl, San Joaquin kit fox, San Joaquin pocket mouse, and Swainson's hawk. These as well as other biological resources could be significantly affected under the proposed General Plan and Development Code Update. The MEIR must analyze the potential for impacts to sensitive habitats and species. Mitigation measures should be recommended to reduce potential significant impacts and biological impacts should be mitigated to less than significant.

Future development under the proposed General Plan and Development Code Update may significantly affect existing wetland areas. These potential impacts may occur along existing drainages within the General Plan Area as well as along the San Joaquin River, which borders the northern portion of the City of Fresno. Potential impacts to wetland resources should be discussed in the MEIR, and mitigation measures should be provided to a fully mitigated standard of no net loss of wetlands.

For vernal pools and the species they support (vernal pool fairy shrimp), the MEIR should explain why it is infeasible to design the Proposed Project to avoid impacts to all vernal pools. Preservation of existing vernal pools is not mitigation for filling pools. Creation and restoration are the only mitigations under CEQA. The MEIR should contain any standards for creation and restoration.

The MEIR must evaluate whether the Proposed Project's effects on the uplands and watersheds that support "preserved" vernal pools will have an adverse impact on these pools. Similarly, the MEIR should analyze whether the Grazing Management Plans and Open Space Access Plan required by mitigations will adversely affect the preserved pools. The MEIR should also properly analyze the impacts of storm water runoff on vernal pools. Storm water run-off may result in over-inundation of vernal pools or contamination from urban run-off. All these indirect impacts should be analyzed and mitigated. The mitigation measures should require the development of a Drainage Plan to address the impacts of storm water runoff on resources.

The population and housing section of the MEIR also needs to demonstrate that there is actual demand for housing to support a conclusion that the City's projections for growth that impacts prime agricultural land is necessary. The MEIR should also include analysis of impacts related to high density infill growth envisioned by the Proposed Project to existing and approved neighboring projects to be built in Fresno County, the City of Clovis and Madera County. The MEIR should also disclose and determine the significance of the impacts on existing regional and local recreational facilities from the increased use by new residents who would be introduced by the Proposed Project.

Since it is commonly known that overall population growth and development in California and the San Joaquin Valley will lead to future power shortfalls unless there are major gains in energy conservation and alternative energy development, the MEIR must reconcile the long-term energy supply outlook for the state and region, and needs to provide mitigation in the form of higher standards for conservation and alternative energy programs, built into every component of the Proposed Project growth areas.

The MEIR needs to discuss the numerous laws and regulations on greenhouse gas (GHG) impacts and analysis including: (1) Compliance with the latest state CEQA Guidelines amendments on greenhouse gas analysis adopted by the State Resources Agency; (2) the proposed regulations of the San Joaquin Valley Air Pollution Control District on addressing and mitigating GHG impacts from development. SJVAPCD has developed these regulations and include guidance on how to address GHG impacts under CEQA; (3) the AB 32 Seeping Plan which includes reductions from land use development; (4) SB 375 which requires the adoption of regional targets for GHG reductions from land use and transportation and the development of regional plans to achieve these reduction targets; (5) information developed by the State Attorney General's Office on the analysis and mitigation of GHG emissions under CEQA; and (6) the recent determination by the US Environmental Protection Agency that COz threatens public health and the environment due to its impacts on climate change. The MEIR should discuss these important regulatory developments and apply these regulations and guidance in its analysis of GHGs and evaluate and consider all feasible mitigation measures to reduce the impacts.

The MEIR should analyze and reach a conclusion on the significance of the impacts of global warming on the Project for other issues besides water. The MEIR should analyze the potential global warming impacts due to flooding and increased temperature (especially as it relates to increasing the likelihood of violations of air quality standards). Even if the MEIR finds that the impact on greenhouse gases is significant and unavoidable, it should establish a significance threshold on which to base this determination. Under the proposed SJVAPCD Guidance, the recommended standard of significance is a 29% reduction.

Since the Proposed Project's impact on agricultural resources is cumulatively considerable, there must be mitigation analyzed and adopted to address this significant impact (see discussion of mitigation of agricultural impacts above). The Project's significant conflicts with land use and other policies create a cumulatively considerable impact. As discussed above, the Proposed Project violates the fundamental policies that

guide City planning, including preserving agricultural land, directing development to areas with public services in place, and protecting environmental resources.

The discussion of cumulative utilities/service systems impacts should analyze the City claims to have adequate surface water supplies for the Proposed Project growth areas and discussion of the West's finite water supply, which will likely be drastically reduced by factors including climate change. In addition, the proposed General Plan and Development Code Updates may result in development that could substantially reduce groundwater supplies and increase impervious surfaces that could reduce the potential for groundwater recharge. The MEIR should address these issues and provide mitigation measures to reduce potential impacts. Given the existing water crisis and the lack of new supplies, the Proposed Project's demand will be cumulatively considerable.

We appreciate the opportunity to participate in the City of Fresno Master Environmental Impact Report NOP scoping process. If you have any questions or comments, please contact us at (559) 224 0871.

Sincerely,

FRIANT RANCH L.P.

Dennis Bacopulos
Operating Manager
7110 N. Fresno Street #340
Fresno, CA 93720

cc: Bryan N. Wagner, Esq.

A.4 - Scoping Meeting Sign-In Sheet

City of Fresno
City of Fresno General Plan and Development Code Update

Date: November 27, 2012, 6:00 pm **Event:** Scoping Meeting for Environmental Impact Report

THANK YOU FOR YOUR PARTICIPATION!

Name	Street Address	City	Zip	Phone Number
Diane Yenson	6289 N Hanford Ave	Fresno	93722	503-689-7607
Bryan Medina	3397 E. Fairmont	Fresno	93726	559-285.4953
Lauren Layne	5260 N. Palm Ave., Ste. 421	Fresno	93704	559.432-5400
Jose Luis Barraza	4243 E Thomas	Fresno	93702	761 5230
Ashley Werner	2115 Kern St., Ste 370	Fresno	93721	559-441-8721
Al Solis	906 "N" St #100	"	"	709-0805
Jeff Roberts	1396 W. Herndon #101 Fresno	Fresno	93711	436-0900
Joan Heisdorf	Fr	Fresno	93720	478-9214
Robert Merrill	8540 N. Colfax	Fresno	93720	434-8046
Vince Correll	282 A E Barstow	F	93710	439-8404

City of Fresno
City of Fresno General Plan and Development Code Update

Date: November 27, 2012, 6:00 pm **Event**: Scoping Meeting for Environmental Impact Report

THANK YOU FOR YOUR PARTICIPATION!

Name	Street Address	City	Zip	Phone Number
Demmis Bacopulos	7110 N Fresno #340	Fresno	93720	559-224 0871
Mike Wells				
Eric VonBerg	9663 N. 10th St.	Fresno	93720	559-349-5505

A.5 - Transcript of Meeting

INITIAL STUDY
GENERAL PLAN AND DEVELOPMENT CODE UPDATE
SCOPING MEETING

Tuesday, November 27, 2012
6:00 p.m.
City Of Fresno Council Chambers
2600 Fresno Street
Fresno, CA 93721

ATTENDEES:

Mike Houlihan, Michael Brandman Associates
Keith Bergthold, Development & Resource Management, Assist. Planning Director/Secretary
Trai Her, Staff

(This verbatim transcript of the 11-27-12 Scoping Meeting was prepared at the request of Keith Bergthold, Assistant Planning Director/Secretary of Development & Resource Management, City of Fresno.)

MR. HOULIHAN: Okay, I'm going to go ahead and get started. Thank you very much for attending this Scoping Meeting for the General Plan and Development Code Update. This is a process where over the last couple years there has been the development of the General Plan and the Development Code, and what we're doing is assessing the potential effects of the project, which includes the updates of both the General Plan and the Development Code.

Since we do have a small group here, for those of you who currently lives within the city limits, as opposed to outside the city limits – okay. And then those that live within the county but within the Sphere of influence – okay. And then outside the county -- outside the city and outside the sphere of influence. Okay.

Well, I'm going to go ahead and get started. Again, this is the Scoping Meeting. The outline that I'm going to cover includes describing what the purpose of this meeting is, describing the project. In describing the project that's going to be – there's a lot going on, so there's a number of slides that I will be going through to describe what it is that we are evaluating, which has been developed by the City during the process of the General Plan development and the Development Code Update.

Yes?

MR. BERGTHOLD: I think everyone's interested to know who you are, sir.

MR. HOULIHAN: Oh, okay. By the way, I'm Mike Houlihan with Michael Brandman Associates. We're currently preparing the Environmental Impact Report under contract with the City.

AUDIENCE MEMBER: Where are you from?

MR. HOULIHAN: I'm from Irvine.

AUDIENCE MEMBER: Okay.

MR. HOULIHAN: And then I also have a couple of associates here, Dave Mitchell and then Jay (indiscernible).

Okay, also I'll describe the CEQA document we are preparing, the potential environmental issues that we are addressing. Again, these are a preliminary list. That's why you're here, so that you can provide some input. I'll describe the CEQA process and then also the schedule.

First, the purpose of the Scoping Meeting, again, to describe the project, explain the CEQA process, identify the issues, and then record the public comments. The proposed project, three different items here: the Planning Area I'm going to describe, the General Plan Update, and then the Development Code Update.

First, the Planning Area. There is areas within the city that's part of the Planning Area, areas outside the city but within the sphere of influence, and then areas that are – there is an area to the north that's outside the city, outside the sphere of influence, however, it's an area that both the County and City have agreed that the City would include as part of their plan for the City Planning Area. And this is a map depicting those three areas. The purple – first of all, the brown, the darker brown is the area within the city; the purple is the area outside the city but within the sphere of influence; and the white in the northern part is the area we described.

First of all, the General Plan Update, what's the purpose of this? It's to set policies and programs to guide the physical development for future development. The general plans are required to have seven elements, and the project includes a comprehensive update of the currently approved 2025 General Plan.

This slide gives you an idea of what the required elements are by the State of California, those elements that the City has within their current General Plan and elements that the City is proposing as part of the General Plan Update. As you can see, many of the elements – almost all the elements are very similar to the current 2025 General Plan. However, there are a couple of issue areas, the Historic and the Healthy Communities that is by itself a new element.

Now, as part of the General Plan Update, there will be amendments and also repeals of existing specific plans and community plans within the city. The purpose of this is so that the goals and policies within those plans have been incorporated within the update. And this is a list of those that are amending and those that are being repealed, and on the next slide is a continuation of that list. And you'll notice the top two, you'll see it's repealed and also amended. In those two community plans, there may be portions of it repealed and portions of it amended. That's why they're listed on both sides. Okay, also part of the General Plan Update, there is a greenhouse gas reduction plan that will be prepared.

The proposed Land Use Diagram, which showed – you have looked and seen over on the side, I'll show it up here, and then the buildout of the Planning Area. Now, the purpose of our environmental evaluation is to evaluate what the buildout impacts will be from the implementations of the General Plan Update. So if all the land uses that are identified on this map are built out, what are the potential effects that will happen? And what we're doing is evaluating and comparing it to existing development.

The inset shows the area Downtown. And there's been a generalization – a part generalization and part more specific land uses that are identified for Downtown. And as many of you know, there's currently a Downtown planning process that is occurring, and the purpose of including this is to make sure there are – there's consistency between the two plans, between the General Plan and the Downtown Plan.

Now, the Planning Area is divided into two parts -- I'll show some tables and so forth -- the Planning Area that's outside the Downtown area and then the Downtown area. First, the area outside the Downtown area. What this shows are the land use categories and how they are modified. For example, on this is residential. There are some modifications to these in allowance of densities by type of use. And here's land use categories for Commercial. As you can see, many of these are similar, but there are – have been changes, and then that's what's being proposed as part of the General Plan Update. Again, the purpose of me going through this is at least for you to understand, what is the project that we are evaluating and what the potential effects will be.

This shows Industrial, Mixed Use and Other uses. As you can see, the area outside of Downtown, there is no Mixed Uses currently within the 2025 General Plan. However, under the General Plan Update there is going to be these three, Corridor Center Mixed Use, a Regional Mixed Use and Neighborhood Mixed Use.

AUDIENCE MEMBER: Could you say that again?

MR. HOULIHAN: Currently, in the area outside of the Downtown area, there is no Mixed Uses

that are proposed within the 2025 General Plan. But this General Plan Update, as the City has gone through the update process and defining the General Plan land uses, there are three land use categories that have been developed for the areas outside of Downtown that are Mixed Use, and the three that are listed there are the three land use categories.

AUDIENCE MEMBER: Do you have these charts for us to take?

MR. HOULIHAN: Uh --

AUDIENCE MEMBER: Because I can't find them in the booklet.

MR. HOULIHAN: No. These charts actually are ones that are included in the project description in the Initial Study. Now, they aren't specific – Okay. There are – these specific slides are not in there, because I had to divide up the tables in order to present it, but each of the tables are located in that project description.

Now, for the Downtown area – for the Downtown area, for Residential, there is one designation of Residential, and that designation is "Neighborhoods." Under the 2025 General Plan, as you can see, there is a number of Residential community – or Residential categories.

AUDIENCE MEMBER: Would making some of the old high rise buildings into condominiums, is that included as Residential?

MR. HOULIHAN: Mixed Use. And we haven't got to mixed use yet for Downtown. Commercial, as you can see, there is no stand-alone Commercial designations. You'll see under Mixed Use the Commercial is joined with Residential and Office to create this Mixed Use designation.

AUDIENCE MEMBER: Okay, now I'm going to ask you, no stand-alone Commercial use is to be allowed in Downtown?

MR. HOULIHAN: That's – that's not what I said.

AUDIENCE MEMBER: Okay. What do you mean?

MR. HOULIHAN: The designation which allows a mixed use of uses. Doesn't mean that you can't just solely develop an office or solely develop a commercial development. The designation allows a multiple use. That's all that that mixed use designation identifies.

AUDIENCE MEMBER: So you added Mixed Use to singular Mixed Uses, which has been the case for years, right?

MR. HOULIHAN: For Downtown --

AUDIENCE MEMBER: For years they've been able to have Commercial and for years you've been

able to have Office, right?

MR. HOULIHAN: No – when – the mixed use I'm talking about is residential and non-residential.

AUDIENCE MEMBER: You can do that now. Today.

MR. HOULIHAN: Yes, and that's why there's Commercial Mixed Use I and Commercial Mixed Use II under the 2025 General Plan. So there's a change in the amount and type of mixed uses that are being proposed for Downtown. And then we have industrial. Again, the Special District actually includes both light and heavy industrial uses. And then Other uses, Open Space and Public Facility. Again, there's two designations of Public Facilities within the 2025 General Plan for Downtown.

Moving on, for the 2025 General Plan compared to the General Plan Update. This is important so that there's an understanding how the planning has changed for the city and the sphere area. Again, the next slide will compare acreages that are planned under both General Plans.

Under here you'll see for Residential there's an increase in acreage. That would make sense; there's going to be an increase – there's planned to be an increase in population, so it would go hand in hand that there's going to be an increase in Residential. Commercial, there's a slight increase. Then there are some reductions, in Industrial, in Open Space because of a categorical -- how we're categorizing what open space is, and then there's Other. Other includes from streets to different right-of-ways and so forth, that aren't specifically one of the other uses.

I want to identify the last row, which is the population at buildout. As you can see, for the 2025 General Plan, if that 2025 General Plan was built out, there would be about 790,000 people. Under the current General Plan Update there's about 970,000. So it's just around 200,000 additional persons that are being planned and changed.

Yes?

AUDIENCE MEMBER: I don't know what's the protocol here, I came in late. I don't want to interrupt you with a question and answer session, but it seems phenomenal that there's a one-fourth reduction in industrial acreage allotted. I don't understand that, even though it can be thrown in with wide open space or something. I can't comprehend one-fourth.

MR. HOULIHAN: Okay, we'll go through a question and answer so that I can at least provide a mike to those people, because the meeting is being recorded, so at least we can record the questions, okay?

Going on, for the Development Code Update, it's a comprehensive update of

the City's regulation of land use through zoning and the subdivision process and ordinance. That will include the revisions to the zone districts. As identified in the Initial Study, the – this Development Code Update is to incorporate contemporary planning and business practices and procedures. One of the benefits of going through this process is to go through a streamlining of entitlement process, and I'll explain that a little bit more as I identify the type of environmental document that is being prepared. Also, other advantages, there's providing incentives for development.

For the Downtown area, the existing zoning is being retained, although there is a correspondence between the proposed General Plan language that's for Downtown and how they fit into the existing zones. As I mentioned before, the Downtown area is going through a different planning process that will end up going through a proposed zone change at that time. Also, the Development Code Update, as I mentioned, is being refined through the community plan and specific plan process for Downtown. Now, as far as the zone districts or the zone district revisions, I'm going to go through those areas that are outside the Downtown and those that are within.

Those that are outside the Downtown, this particular table identifies a correspondence from existing to what's being proposed, and you'll see in some categories there's no corresponding current district as opposed to what's being proposed. And as we go through this, there's some proposed --- or some existing that don't correspond to a proposed district.

These are Residential. As you can see, for example, the Mobile Home Single Family. There were two different, Trailer Park and Mobile Home, and now there's just Mobile Home Park designation. These are the Commercial districts. Again, this is a correspondence between what's the existing zone as opposed to the proposed zone. And then it goes through Employment districts. Same thing. And then continue with Employment, and then it gets into Mixed Use. As you can see, for the zoning there was no Mixed Use zoning that was outside the Downtown area. Then we have Open Space, Park and so forth. The Park designation becomes part of the – Keith, part of the Public Facility, so that's one of the reasons why Open Space has reduced, reduced in that other slide, because it was part of Open Space previously, but now it's part of Public Facilities. And then there's currently and what's being proposed, the overlay districts. Many of them will remain.

Now, the zone districts for the Downtown Planning Area, this is what I was explaining, where you have existing land uses that are being proposed – or existing land uses – actually, they're not. They're the planned land uses, on the left-hand side. On the right-hand side are the existing zoning categories that will remain in effect until at which time the Downtown project ends up

being approved and it's modified. If it doesn't, these won't stay in effect. And again, this is still the Downtown area. As you can see, Neighborhoods is a catch-all for all the – all of the Residential categories.

Now, after I've described both the General Plan Update and the Development Code Update, now, what is it that we are evaluating as part of -- what's our project? As I mentioned, future development within the Planning Area is what we are evaluating, so we are taking a look at what the existing development is and looking at what the proposed development is, and what is that difference or incremental increase between the two. So you'll see on this slide, which is actually in that project description, but it's split up into two or three slides here, you'll see that there's Residential, Commercial, Mixed Use, Open Space and so forth that we are evaluating as what the incremental increase is.

Now, these numbers, I realize that these numbers show that they're pretty specific, but the City is going through a process to ensure that there's a job-housing balance, so they may end up being modified some to make sure that we don't – the City doesn't have too much employment or too many residences. So they're – it's just being reviewed and potentially modified, so when the Draft EIR comes out, this incremental development may end up providing some modifications to it. But again, as you can see, the numbers are pretty large. The non-residential categories, actually, for the square footage is million square feet, and those are specific areas where we – there needs to be a review to make sure that they correspond to the proposed residential needs.

Now, at the bottom – now, again, this is the population. The number in the middle is the number you saw before for the General Plan Update, which is 970,000 people at buildout of the entire Planning Area. Currently, there's just under 550,000, just under that, and so what we're evaluating is this increase of 425,000 people.

Now, the CEQA document that we are evaluating – that we are preparing, it's a Master EIR, and a Master EIR is one of the types of EIRs that are allowed by the State, and Fresno currently has a Master EIR for their 2025 General Plan. The advantages of using the Master EIR, they allow streamlining for later environmental evaluations. The streamlining can only occur if the potential effects of these future projects have been adequately discussed within the Master EIR. Now, if the effects have not been, then additional environmental documentation would have to be prepared, either an MND or one of the types of EIRs that are listed above.

Now, the last bullet, the adequacy of the Master EIR findings, needs to be evaluated once – at least once every five years. That's to make sure that the – the environmental effects are still appropriately evaluated -- or identified.

AUDIENCE MEMBER: Is that State law?

MR. HOULIHAN: Yes, under State law.

AUDIENCE MEMBER: New State law or --

MR. HOULIHAN: No, it's been around since 1993 when Master EIR --

AUDIENCE MEMBER: Okay.

MR. HOULIHAN: -- came in as an allowed type of EIR.

Here's a list of environmental – potential environmental issues. As you can see, all but one of the issue areas listed within the CEQA checklist are listed here. There's only one that is not, that's mineral resources. That -- mineral resources within the city is located along the San Joaquin River. That area is not actually being proposed to be changed under the current update, so therefore, there is no potential effect as a result of this project. So that's why it's been removed.

Now, the next set of slides identifies what are the specific issues that we are evaluating underneath these general categories. Now, I want you to take a look at these because if there is some subset of these issues that you want to bring forward, please write them down or remember them and then we'll discuss what additional issues that you want addressed or you would like to see addressed in the Master EIR.

So first, the Aesthetics. We're looking at scenic vistas, scenic resources, visual character and light and glare. Again, this is the increase of these areas as a result of this incremental development within the entire Planning Area.

Agriculture is farmland conversion. Under farmland conversion, in the 20 – or 2002 General Plan EIR for the 2025 General Plan, most – not all, but most of the Agriculture was actually overridden, but is identified as overridden. It was identified as significant impact with the development of the 2025 General Plan and there was some areas that were left identified still as Agriculture. That remaining area is going to be identified as being removed as Agriculture as a designation and therefore it's a potential effect on agriculture. It doesn't mean that agriculture can't still remain in those locations, but there is a potential that it could be converted to an urban use.

Going on to Air Quality, looking at short-term and long-term emissions, sensitive receptors, and then also the odors.

Biological Resources, there's a number of resources within the Planning Area that will be evaluated. These are general categories.

Cultural Resources, a big, hot issue, obviously, is Historical, looking at

structures, places and districts and what are the potential effects. Then archeological, paleontological and if there are any (indiscernible).

Geology and Soils, there's a listing of different geotechnical constraints that we will be evaluating.

Greenhouse Gas Emissions. As I mentioned before, there's a greenhouse gas reduction plan that we're preparing.

Hazards and Hazardous Materials, anywhere from potential hazardous materials that are existing or generated as a result of future uses or handling of hazardous materials. And then also hazards relating to the airports. And then wildland fires.

Hydrology and Water Quality. We are coordinating with the Fresno Metropolitan Flood Control District in assessing the potential effects on the current basins. Again, we're looking at full buildout of the city and what that entails and what are the – what additional facilities that might be needed to accommodate that future development.

Land Use Planning. We'll be looking at, although it hasn't been determined yet, but we'll be looking at whether or not the proposed project, these proposed land uses are going to physically divide an established community. And then we'll be looking at if there's a conflict with existing applicable plans.

Noise, from short term to long term. Vibration. Vibration will primarily be during construction, if there's some type of vibratory construction equipment that may need to be used, and then also aircraft noise.

We'll be looking at Population and Housing, from inducement of the growth to potential displacement of existing housing if it's located in an area that's proposed for a different use.

Public Facilities. Again, this is a laundry list of the current public services that are being offered within the Planning Area. And Recreation.

And then Transportation. Obviously, this is a big issue because we have a substantial growth that we're looking at given that this future buildout is not going to happen in 20 years, it's not going to happen in 40 years. It will happen sometime in the future. However, we're having to evaluate buildout because that is the plan that is being proposed. Right now there is no projected end date of full buildout of the city. Obviously, it will depend on economics and other issues. So the Transportation, we'll be looking at automobile and truck and bicycle, pedestrian and transit. And then Utilities, from water, wastewater, storm drain, water supplies and landfills.

Okay, now going through the – oh, before I go off of the environmental

issues, just so that everyone understands, yes, we're evaluating all these environmental issues, but if we're identifying them as a potentially significant impact, we are identifying potential measures or policies in order to reduce -- potentially reduce those potential significant impacts to less than significant. There may be some that can be reduced. There'll be others that might not be able to reduce, and if those areas cannot be reduced, then the City will have to determine that -- maybe a modification to their plan, or they might have to prepare a Statement of Overriding Consideration for that specific issue, or for a change of policy.

Now, going through the CEQA process, we begin with the scoping process. As everyone saw that we prepared a Notice of Preparation, this is the Scoping Meeting. The next process is preparing the Draft Master EIR, and once that is prepared it will be reviewed by the public, the public will provide comments, and we'll also have a hearing. Again, the hearing is to provide comments, another forum to provide comments.

After we receive the comments, then we'll be making – or we will be responding to those comments, and we'll make some revisions to the EIR and create a Final Master EIR. That will be available for public review, and then it will be going to the Planning Commission and City Council for a decision on the EIR.

Now, the schedule. Our scoping began in September because one of our meetings that we had early on was with Caltrans in order to move along our traffic evaluation. So that's primarily what started in September, and then at the beginning of November we sent out the Notice of Preparation, and that was part of the scoping process. The scoping process we've identified as ending when the public review period ends for the Notice of Preparation, and then we'll go through Draft Master EIR preparation. We began that back in September, creating existing conditions and kind of waiting for comments to make sure that we're headed in the right direction and covering the issues that are raised during the Notice of Preparation and this public Scoping Meeting. And then the public review draft is expected to go out – and this is an estimate – in March. And we're anticipating – State law identifies 45 days, but the City has identified that they're looking at a 60-day review period in order to provide additional time, because it will be a – many issues that will be evaluated. And then the public meeting for the Draft EIR is anticipated in April currently.

AUDIENCE MEMBER: What kind of meeting is that?

MR. HOULIHAN: That is again to -- as I mentioned before --

AUDIENCE MEMBER: An informational meeting?

MR. HOULIHAN: Information and a forum for comments, similar – it's comments that can be

made orally.

AUDIENCE MEMBER: Isn't that before there's a General Plan Meeting.

MR. HOULIHAN: This is for the EIR. Oh, oh, oh --

AUDIENCE MEMBER: But the project that the EIR is for is the General Plan and the General Plan, I think, the way I understand it, the hearing for that is late in 2015.

MR. HOULIHAN: That is, I believe, approval hearings, correct?

AUDIENCE MEMBER: How can you have a hearing on EIR before you get a project?

MR. HOULIHAN: Oh. The hearing that I'm referring to is the hearing to receive comments on the Draft EIR.

AUDIENCE MEMBER: Okay.

MR. HOULIHAN: It isn't to --

AUDIENCE MEMBER: For public comment.

MR. HOULIHAN: Yeah, public comment.

AUDIENCE MEMBER: All right.

MR. HOULIHAN: Meeting. Although I called it a hearing.

AUDIENCE MEMBER: Yeah. Okay.

MR. HOULIHAN: And then the Final Master EIR expected to be completed around July, and then those hearings are anticipated in August and September. Again, months could change some as we go through this process, depending on how quickly forward we go through this process.

Okay, this is the last slide. I know it's been a lot of slides. Public comments on the scope of this Master EIR. I wanted to make sure there were different forums. As you saw in the public notice, you can provide comments by email, or by written letter to Keith Bergthold, and then we're also identifying that you can fill out comment cards at this meeting if that is your choice. Again, the public review period for the Notice of Preparation ends December 6th, I think. December 6th.

So at this time what we'll do is, I'm going to pass the mike around for those that want to provide comments on the issues that are being evaluated, if there's any specific issues. If there is a question regarding the project, we will attempt to respond regarding at least what we presented as the project components.

So would anyone like to start?

RECORDING SEC'TRY: Could you ask them to give their name, please?

MR. HOULIHAN: Yes. I'll have you give their -- your name before I give this to you.

ASHLEY WERNER: Hi, I'm Ashley Warner with California Rural Legal Assistance. I just have a quick process-related question that was kind of (indiscernible). So I'm just wondering how does the fact that the details of the General Plan and Development Code, the fact that those are still being worked out and in progress impact your Master EIR creation process.

MR. HOULIHAN: Okay. As far as the – any modifications that occur in the General Plan Update or the Development Code Update, we're having to make some revisions to our evaluation, so as we go through this process, if there are revisions that result in changes to the environmental – potential environmental impacts, we're having to make these revisions. Again, we're not trying to get too far ahead in the impact evaluation. As I mentioned, we started in September, but that was more of defining the existing conditions. We haven't – we're just at the beginning of trying to identify potential impacts.

VINCE CORRELL: Vince Correll. Where do you deal with the transmission of fluids and electricity?

MR. HOULIHAN: Normally I won't respond to every question, but I will respond to some of them.

As far as electricity, that will be part of the Public Services. It's one of the areas that we're dealing with electricity and natural gas with PG&E in evaluating the (indiscernible).

As far as fluids, I'm assuming that's water and wastewater? That will be under our Utilities and Services, and we have an engineer that is evaluating both the potential impacts to the existing facilities for both sewer and water, and as far as water, also looking at water (indiscernible).

JOSE BARRAZA: I'm certainly not sure how it's going to all turn out in the General Plan, but I'm a little curious because I'm kind of thrown off by the fact that --

AUDIENCE MEMBER: What's your name?

JOSE BARRAZA: Oh, my name is Jose Luis Barraza. Curious, because you have very distinctively put the Downtown Plan area separate from the General Plan. In past plans I think they were —well, other plans were processing both periods but they werent' distinctly placed out of – is that something new? And also, they're both turning at the same time and they have – they're going through an EIR – an EIR process themselves, and as well as they're utilizing the concepts of the Codes that are being proposed here. So are

these all moving and being costly as well?

MR. HOULIHAN: Why there is two different processes?

AUDIENCE MEMBER: (Indiscernible) if you have to or --

MR. HOULIHAN: First of all, one is the General Plan and one's an accommodation of a community plan and specific plan, so there are different levels of housing. Your question as to why they are separated, it is twofold. One is there's a substantial number of uses Downtown, and you put it at the same scale and you wouldn't be able to see what's actually being proposed Downtown. That's why it was separated and enlarged. The other reason is because there is a Downtown planning process going on that covers that (indiscernible).

Now, when the Downtown goes through their process, they're going to have to go through a General Plan land use (indiscernible), and as I mentioned for zoning, the zoning that is being identified under the Development Code for the city is the existing zoning. And what's the corresponding existing zoning? When the Downtown plan goes through, they're going to have to go through a zone change in order to convert those into the zoning classifications that the County (indiscernible).

AUDIENCE MEMBER: Does that mean that they're not going to do that for the rest of the city?

MR. HOULIHAN: There's – for the rest of the city there's zoning districts that are being proposed. Those are the ones that I (indiscernible).

JEFF ROBERTS: Can I ask a question?

MR. HOULIHAN: Yeah.

JEFF ROBERTS: I'm Jeff Roberts from Granville Homes. I was going to ask – make some comments but I'll just keep it simple. I guess it's a yes or no answer. Is the City going to rezone property consistent with this new General Plan designation if it's approved?

MR. HOULIHAN: Yes.

JEFF ROBERTS: Yes.

MR. HOULIHAN: As long as -- There's specific zoning that is being proposed for each parcel, and those zoning classifications are the ones that I identified up on the screen. Now, I didn't give you a map that shows the zone districts. That will – that should be --

MR. BERGTHOLD: We'll eventually have one of those.

MR. HOULIHAN: Yeah.

JEFF ROBERTS: But the City's going to do the zoning?

MR. HOULIHAN: The City -- it's part of the Development Code.

JEFF ROBERTS: Yes or no?

MR. BERGTHOLD: It's more than yes or no. We're still trying to figure out the strategy on what the City would initiate versus what it would leave alone, and I think I've mentioned that in a number of our workshops and other meetings, that we're trying to determine where these key areas would be to go in and shape City rezoning and which areas we would just leave alone.

DAVID WELLS: So in other words, you can buy a piece of property now and it will -- the zoning can be changed three years from now before you build on it?

MR. BERGTHOLD: I think I'm going to need you to ask questions after you've said who you are.

DAVID WELLS: I'm – I'm sorry. David Wells. My name's David Wells. So I've been a resident for 45 years here in Fresno, and I'm trying to understand what's going on here as best as I can, and I'm not particularly stupid. I might be a little stupid. But I – you're – it sounds like doublespeak to me. Are you saying that you can buy a piece of property now and three years from now, when the City finally figures out what they're going to do with all of this that's going on, that the City will come in and relabel the zoning at the City's desire? Is that what you're saying here?

MR. BERGTHOLD: Hey, thanks for the question. I think that the best way to present this is to do a little bit of a trip through history. I think Jeff Roberts among others will appreciate this.

When the last General Plan was adopted, the City initiated no rezoning to bring the zoning and land use into conformance. Developers and property owners had to do that, right? You know any other way that they (indiscernible) now? So we proposed – actually, we'd love to rezone the whole city, but it's very expensive to do that and we're trying to figure out a way to bring the most and the most strategic parts of it into conformance with the new General Plan as quickly as possible after the Plan's adopted. We just have not decided what that means and what the expense is going to be. So I'm punting the ball down the road just a little bit to decide that, to tell you what that strategy is going to be, because we haven't agreed to it yet, the City Manager, the Mayor and the City Council. So our intent would be, with the caveat that we haven't decided yet, to rezone strategic areas so that they would incentivize development. So think about it this way, Dave: If we decide to rezone parts of the Blackstone Corridor to allow the mixed use district to be active, and we go in and rezone that and we also perhaps even do some infrastructure investment, that would be an incentive for developers to come into that area. And if it's not reasonable to go through

all these classifications and rezoning themselves, at their expense and their times. We just haven't decided exactly where those areas are where we would propose rezoning by initiating –- (indiscernible) by the City.

DAVID WELLS: I still don't understand your answer. Are you trying to say that --

PAUL NEGRETE: (Indiscernible)

DAVID WELLS: Yeah. I still don't understand your answer. My question is, if I buy a piece of property, three years from now when all of this process is through, could there be a possibility that the City comes and relabels and rezones the property that I bought? And that's yes or no.

MR. HOULIHAN: I'll give you an example. If you --

DAVID WELLS: I would prefer a yes or no and then you can --

MR. HOULIHAN: Okay. Yes. I'll give you an example. If you purchase a piece of property that has a current development on it but the General Plan is a different General Plan designation, there's an inconsistency between the General Plan and the zoning. What the City is trying to do is make sure that there is consistency between the General Plan and the zoning designations, because if they're inconsistent you'd have a non-conforming use. So --

DAVID WELLS: I understand that, but, I mean, theoretically, it was zoned that way in the first place because the City wanted it that way in the first place.

MR. HOULIHAN: Right, in certain circumstances they are. There's certain areas that they're not matching up. That's why the City wants to come through to make sure that they – the land use is matching up with the General Plan zoning. That's one of the purposes of going through this update. As Keith mentioned, in 2002 they only updated the General Plan, they didn't update the zoning, so as development occurs they had to go ahead and make revisions to the General – or to the zoning in order to develop what they wanted to develop. So actually, in certain areas the City -- instead of having the developer incur those expenses, the City is incurring those expenses through that and increasing the incentives by changing that zoning, because otherwise you'd have to go through – if you purchased the property, you'd have to go through a change.

DAVID WELLS: In other words, if I buy a piece of property, I better know what the City's got in mind for the future of that piece of property regardless of what the zoning is today.

MR. HOULIHAN: Yes, specifically the General Plan. You have to know the General Plan and zoning.

PAUL NEGRETE: What's going to happen to the existing sovereign entities when the zoning changes, whether it's a business or any other type of activity that has to be

zoned off of that? Are they going to have to close?

MR. HOULIHAN: No, under State law, they can continue operating, even if there is a change of zoning. That's a State law.

ROBERT MERRILL: Yeah, Robert Merrill. Is there a – is there – maybe I can clarify if I'm understanding correctly, and that is that part of – since the old Plan, the zoning did not conform necessarily to the old General Plan, and what you're going to try and do in this interim period at some point in time – I think that's what Keith was talking about -- is that the City's trying to figure out exactly how to go about making those changes from the old zoning that was out of – not necessarily tied to a general plan, and under the new General Plan you're going to try and make the zoning tied to the Plan, but that transition period is what we're talking about here, and the City is still trying to figure out whether or not – how it's going to go about this, how much it's going to fund the (indiscernible) involved to put the new designations in place. And that's going to be over the time period of this transition.

MR. BERGTHOLD: Yeah. We're not trying to doublespeak, and I appreciate your question, Bob, to the point. You have to look at the Land Use Diagram, and maybe we all need to have a little breakout here on Land Use Diagram 101. Most of the city doesn't change. If you look at the Land Use Diagram, most of the city's not changing. We're doing some major land use recommendations, recommending changes on the corridors, Blackstone, Shaw, Ventura, Kings Canyon, California. There's a lot of changes Downtown, but I think they're very subtle, and more nuanced because they're going to be related to form-based coding. And then there are some significant changes in the southeast, where we're getting a whole new growth area next to giving a plan designation next to the plan designation, never been done in the 2002 plan, which is white on the map. And there are some pretty significant changes proposed in the west area, west of 99, to help that area be more connected to the city and the bus transit routes and the same with southwest Fresno. But the majority of the city doesn't change. If you look at the Land Use Diagram -- we have this on our website as well -- there's one that has a transparency, and a lot of the city just doesn't change. So the focus here, we're just trying to figure out, you know, where you bring – we're trying to be more consistent. We're also trying to be proactive on this to help the community build what's desired by the General Plan. The best way for me to put this is we're still trying to define what, and as soon as that's confirmed and we evaluate the what, etcetera, then we're going to get into the how. And we're just a little bit ahead of the how on some of these pieces.

DARIUS ASSEMI: Darius Assemi. Are you – I guess it's a question for Keith. Are you looking at a specific plan west of 99 as part of this kind of this plan update? And then a more detail question is, when are we going to take a look at the

street widths and connectivity within the residential neighborhoods? Street widths, connectivity within the residential neighborhoods.

MR. BERGTHOLD: Well, I think we've provided some very specific land use guidance in the General Plan for west of 99. And we -- just to describe it, the Shaw Avenue Corridor west of 99 is a fairly specific layout of land uses. There certainly needs to be some master planning. The areas east of Grantland, at least over to Polk between roughly Gettysburg and Clinton, are very specific, boasting some quarter-mile streets and some other things. Just so you know, we are working with a group that includes the Building Industry Association and others and we're trying to get some pro bono help from some large design firms to come in and help us do some illustratives and scenarios for the west area.

DARIUS ASSEMI: (Indiscernible)?

MR. BERGTHOLD: A number of things, and trying to see what a – one of the euphemisms that we use for the plan and the labels is a complete neighborhood. We'd like to see some alternative designs for a complete neighborhood that the building industry has some input into so we can have some feasible alternatives once the Plan's adopted, so we are trying to do that. Street widths and a number of those things, we'll get into the real details in the Code and subdivision ordinance. And there are meetings and (indiscernible) taking up that (indiscernible) that meet once a week, and I don't know – when do we get into subdivision ordinance, probably in January?

MR. HOULIHAN: I would probably think after that.

MR. BERGTHOLD: Okay, so maybe February. So we've got --

MR. HOULIHAN: (Indiscernible)

MR. BERGTHOLD: So when you think about this, we've got all these overlapping things -- just to maybe answer another question and sort of give it some perspective, we're trying to have a comprehensive hearing draft of the General Plan be available so that will be out on the street for comments and it will be -- at about the same time that we're trying to get the Draft EIR out on the street as well, and so we'll have a lot of input and discussion about the draft plan, and the Code will follow quickly after that, and we're looking for all these things to merge sometime around September.

DAVID WELLS: The present – David Wells, EVA-Knows Company. In the present study of the Downtown, the planners said that Downtown was being used as at 6% economic efficiency in some of the meetings, and that's a tremendous amount of burden on the taxpayers over the years, past, present and future. And so when the City decides to endorse the passing of the High Speed Rail right through the center of town, with the High Speed Rail's own statistics of over 200 trains in a 24-hour period – that's one in every four minutes,

especially with the four-hour silent period for maintenance in the 24-hour period for the trains -- -what is the City going to do in the Environmental Impact Report? Are they going to file a Statement of Overriding Consideration to allow that kind of noise to go through Downtown? And I know they're talking about underground passway of the rails, but the High Speed Rail Authority is not going to pay for that, even though they may have alluded to that to the City. I've spoken to them directly about this and that the City's going to be responsible for paying for all the digging of the underground, below-grade-level track through the city, and they told me that specifically, that their responsibility ended at the railroad where the skirt comes in from Kerman, and the rest of it is on the City to mitigate the noise. And there won't be enough mitigation of the noise with an underground passage or below-grade passage of the rails, because approximately only about eight of those trains are going to stop in Fresno and be going at lower speed. All the rest of them are going to zip through at 200+ miles an hour, and there's approximately, according to their numbers, 200 to 225 trains in a 24-hour period, and those numbers have been reinforced by a court battle with outside consultants from I think Davis and Berkeley coming in and trying to argue that the numbers were false or mis – how shall I say, misleading in a upward direction, that those numbers were argued whether or not they were valid or not or whether they were just overestimated in order to get passage on it. And they seemed to come out of the argument that it was valid numbers. What is the City going to do with that kind of noise pollution in downtown Fresno with regards to the Environmental Impact Report?

MR. HOULIHAN: I'm assuming you're asking what environmental impact has to say about that.

DAVID WELLS: Yeah.

MR. HOULIHAN: I'm glad you brought up High Speed Rail. The High Speed Rail is classified under the Environmental Impact Report as a, what we call, related project or a cumulative project, so it is not part of the General Plan case or the Development Code case. So we are treating it as not part of the project, but we are evaluating it under cumulative. And therefore, we'll have to evaluate, as you had mentioned, noise and what the project's contribution will be to noise to cumulative. Obviously, as you mentioned, the High Speed Rail will have noise implications. So I just want to make sure that you understand, it's not part of this project, but we will be evaluating it as a cumulative project. As an example, other cumulative projects we'll be looking at are, for example, development -- future development that may occur in Madera, and providing traffic into the city, across it. And there's other development, outside the Planning Area that may end up providing traffic inside the city. So I know that this goes through the city, but because they are going through their own environmental impact report and it truly is a separate project, it is not at this time -- I guess it's not identified as a

part of the General Plan Update.

DAVID WELLS: So in other words, the City is just going to close their eyes, ignore the noise and let it happen at supersonic speeds through Downtown.

MR. HOULIHAN: I don't think that's the case. They're going through a separate environmental --

DAVID WELLS: Who's the "they"?

MR. HOULIHAN: High Speed Rail.

DAVID WELLS: Sure. Of course they're going through a separate EIR.

MR. HOULIHAN: Now, as far as any other environmental impact reports or – I don't know – Keith, do you know what subsequent environmental evaluations that would have to be done?

MR. BERGTHOLD: Not that I know of, and – well, the Fresno-Bakersfield section has not been certified yet. Only the Fresno-Madera.

MR. HOULIHAN: So what he mentioned was that the Fresno to Bakersfield – right?

MR. BERGTHOLD: Has not been.

MR. HOULIHAN: --has not been certified yet with the environmental impact report, but the other one has?

MR. BERGTHOLD: The Fresno to Merced, yeah, has been certified.

MR. HOULIHAN: Will there need to be further evaluation on that --

MR. BERGTHOLD: I can't answer that question.

MR. HOULIHAN: Yeah. Again, it's a separate planning process than what we are going through.

DAVID WELLS: That may be, but the City makes its own plans about the city and whether or not to allow a high speed rail to go through, so, I mean, what's the object here of having an EIR if it doesn't even consider factors that are massively affecting the Downtown and the city of Fresno and the taxpayers that pay taxes in the city of Fresno?

MR. HOULIHAN: Yeah, but --

DAVID WELLS: This sounds like idiocy to me.

MR. HOULIHAN: As far as how the City is addressing the potential effects of what the High Speed Rail will do, it is incorporating that project as a cumulative analysis. So it is being evaluated as part of the Master EIR. It's just not being

evaluated as the project. It's evaluating it as one of the projects in a cumulative scenario.

PAUL NEGRETE: So that goes to the next question, then. So that goes to the next question, is that again we're talking about intrusive noise when we started this section of the conversation. So is that going to also be considered as a separate project for noise? And then you always have to consider as a total effect of the overall plan.

MR. BERGTHOLD: Could we have your name, please?

PAUL NEGRETE: Paul Negrete.

MR. HOULIHAN: As far as the cumulative effect of noise, which would include High Speed Rail and would include noise generated from full buildout of the city and the sphere of influence, that needs to be evaluated in the Master EIR as a cumulative evaluation, and you will need to determine what level of significance that will be, okay? Quite obviously, everyone probably knows what level of significance it is, but again, as far as identifying specific measures, those measures are going to be in High Speed Rail.

PAUL NEGRETE: Is the – is the public going to have – Paul Negrete. Is the public going to have the opportunity to make comments or recommendations as to the significance or perceptive impact of the variables, in this particular case noise, or is it just going to be made by our representatives?

MR. HOULIHAN: With the High Speed Rail, that goes through a State-mandated environmental impact report process so it's required to have public hearings. Or I guess the one portion, it went through public hearings. I don't know if you attended those or not, but the second portion, from Fresno to Bakersfield, it hasn't been certified yet, so I presume there's more public hearings, so . . . I realize that we're kind of getting off on a tangent here --

AUDIENCE MEMBER: (Indiscernible).

MR. HOULIHAN: Well, no, no, just because I've identified it as not part of this project, but we are evaluating it as a cumulative evaluation.

DAVID WELLS: Again, to a common, ordinary citizen, that's doublespeak and "cumulative" means nothing. What you're saying is the Master EIR -- which it says right up there in the heading, public comments on the scope of the Master EIR, and you're basically saying, No, we're not going to do anything about it under the Master EIR. And so you're offing it and kicking the can down the road by saying, Oh, you gotta go to the High Speed Rail people and their EIR to have anything said about what's happening within the city limits of our own city under our own Master EIR.

The second question is, is the City commenting on this with the High Speed Rail's EIR? Are they saying anything? Is there any input about it? And certainly, if there is, if it's – if the City's making a favorable comment on the factor of noise through the city to the High Speed Rail's EIR, then somebody's been bought off, because you'd have to be a fool and an idiot to make a favorable comment about 200 trains screaming through downtown Fresno. So the question is, yes or no, is the City registering any kind of comment whatsoever regarding noise and the noise factor on the High Speed Rail's EIR?

MR. HOULIHAN: As far as the answer to that, I'm not part of that process so I'm not sure, but I will check into it.

DAVID WELLS: Thank you. That was a good last phrase answer.

PAUL NEGRETE: (Indiscernible) that you're checking (indiscernible). Oh, when will your last statement effective and how will we (indiscernible) be able to check into it?

MR. HOULIHAN: Well, we will be identifying those comments that were raised during the Notice of Preparation and also this meeting, and then we'll provide a table within the EIR to identify where you can see the response. If that's to something specific, we'll try to identify the direct answers, yes or no or just trying to (indiscernible) so that – again, this process is to make sure that we are investigating the environmental issues that are of concern of the city. Noise is a concern. Noise from the High Speed Rail obviously is a concern. The High Speed Rail will be part of the noise evaluation. I realize a distinction has been made how it's being evaluated. But it is being evaluated.

JEFF ROBERTS: Mike, I'm going to sit down because I have some notes to go through, so I'm going to accept the microphone down here.

I'm Jeff Roberts from Granville Homes and I appreciate the opportunity to comment here tonight. I looked through the entire draft of what you did and agree I think the boxes of your initial study have been checked in the right places, and the ones that have been checked (indiscernible) as well. I need to start by making a couple comments. Granville Homes has been an active participant in the General Plan Update process since the beginning, and I guess it's a year and a half or two years. We've attended a lot of meetings. We've attended workshops. We've provided comments, and by reference, we've submitted a couple letters, both to the Planning Commission and to the Staff before that that should reference some changes that we would like to see in the land use pattern in that map that's over against the wall. To date, we haven't seen any of those changes, so I have to assume they're not going to be made. Therefore, my comments are based on a map released in August, I think August 9th, and our comments

are all still relative to that. So I've got -- I need to preface what I'm going to say because of what hasn't happened with the map. But we are concerned, real concerned about some of the comments we're making. We have a lot of projects in the city of Fresno. We are basically all in, this is where all our eggs are, in this basket, and we are in every corner of this community, and are developing in six out of seven council districts, including Downtown. We're going to use every opportunity we can from now on to comment on the General Plan Update and the EIR and any component that might be out in public, because so far we don't think our comments have hit the map. Therefore, we need to start with that.

I would suggest that you consider in your scope and EIR study that you look at some, if not at least one more alternative that was considered in the General Plan Update process before you were hired, in the committee – there was a committee that actually worked for over a year to come up with a draft (indiscernible) Alternative D. Alternative D is a little different than Alternative A Modified, that the Council look at. But what you have coming up for the next few months is a change in the council makeup which could result in some different philosophies in terms of land use and zoning and future growth patterns for the city.

I say this only because 10 years ago this is exactly what happened. The Staff, under a different Director's leadership, spent years working on a general plan update, got to the point of public hearing, and it was literally thrown out the window and started over because a couple new council members opened (indiscernible). That resulted in the 2025 Plan. Here we are again with the same type of situation. I think it would be prudent of you and of the City to Alternative D or other alternatives in the original EIR process.

In terms of land use designations, I'm seeing this quite differently than I think the Staff. The land use designations that are in place today, it's my understanding that the Downtown, a lot of those are going to remain, but in the rest of the community we're going to change them. As far as I'm concerned, the zoning ordinance and General Plan designations are not broken. There – I don't think there's been a case of a developer coming to town, a qualified developer with a viable project, that hasn't been able to figure out with them how to make that work and how to get that project done. And to go through and change all this (indiscernible), all the land use designations I think is going to create some wholesale non-conforming use issues that owners are going to find confusing and lenders are going to find quite confusing. And I think when somebody goes to rebuild a house that's had a fire or add onto a place that was – used to be zoned this and is now zoned that, they're going to find that it's pretty difficult to get a loan to go forward and process this, typically. So I'm worried about that, and I'm worried about the environmental impacts of approval of a new zoning

ordinance that has never been tried at all in the past.

I asked that question about whether the City's going to zone a (indiscernible) plan or not. I asked that question five years ago, when I was on the Housing Element Update Study. I asked it 10 years ago when I was also on the same study. And the answer was, Yes, we're going to get to it, but it hasn't happened, so I'm a little skeptical that the City will zone subject to the General Plan. And because of that I'm going to reiterate this comment about non-consistency, inconsistency that's going to occur.

I realize it's more economical to do the plan update and the rezoning at the same time, it's easier to do under one environmental study, but I'm guessing that it might be more appropriate to do two. You do the Plan first, come back and then do a code that matches that plan after you've all had a chance to look and see what happens.

I've got some specific comments about your codes since you're (indiscernible) and I notice that, like you mentioned, there's some zoning districts that don't exist today that are going to exist in the future, and there's some that exist today that are going to go away. I don't see how we're going to rectify that situation, and it's making me rather nervous. I'm going to be specific. We have about 70 acres of CM zone at the corner of Clinton and Fowler. By looking at your matrix, CM zoning won't exist anymore. CM zoning is a great Mixed Use District that allows Commercial and Industrial to coexist. It's a great job center zoning, but without it we don't know what's going to replace it, and we need to know the environment effects on us and probably the most successful shopping area in Fresno for tax base, that's called West Shaw Avenue. Most of West Shaw is zoned CM. I don't know how we're going to look at the environmental impacts of taking that zoning away or making it non-performing.

There is no corresponding zone district for Rural Residential. Much of the SEGA area, much of the west area are zoned RR today, and what are you going to tell those folks that are zoned RR that are in the county? What's going to happen – I don't quite understand the mechanics. Same thing with agricultural land.

Now some specific comments. And I'm wrapping up here.

You have an error on page 62. You talk about Big Dry Creek Dam is less than a mile north of the sphere of influence of the city of Fresno. That isn't accurate, and I'm not sure what you're referring to, but it's – it as nothing -- dry creek dam isn't anywhere near the city of Fresno. It sounds like it's out of another document.

I think you need to assess very closely these environmental impacts you're removing, historic structures or structures that aren't classified as historic that might be in a potential historic district. It's a big issue. I know your

firm is familiar with it. I wanted to hit that.

In terms of open space, I didn't see any reference to maintenance of open space, and one of the issues the City is facing, certainly that you're aware, is that it's hard to maintain our green space. And there is going to be a lot of new districts formed that someone's going to have to be aware of (indiscernible) policy issue of whether or not we can afford it, stand-alone CODs or master CODs, what we're going to do.

In terms of annexation policy, there's policies proposed in your General Plan that take away or would oppose the ability for property owners like us to petition to annex to the City of Fresno, which is allowed by the State law. You need to look at the environmental effects of taking away what's allowed by State law. I don't think you can do it. You're the (indiscernible).

Mr. Assemi mentioned small streets. Small streets are going to be very necessary to achieve the densities the Staff is proposing, or infill densities, yet without the ability to create the small streets we have no other alternative than to build up, which is, in this town, uneconomic to go over about three stories with surface parking. So I don't know how you're going to rectify that.

Sound issues is mentioned. As far as I know, this is the only community in the state that requires sound attenuation to be at the 60 db level as opposed to 65. That results in every builder having to struggle to figure out how to create outdoor (indiscernible) areas that meet your standard -- or the City's standard. My suggestion is to pull back that standard, make it consistent with the rest of the state at 65 db. I think you will find a lot more creative development patterns result out of that and a lot less sound problems.

And last but not least, agricultural mitigation. You suggest some kind of mitigation measures for the conversion of ag land. We don't have that here in this city, we don't have that in this county. And I don't know what you have in mind, but it's not something we're anxious to see come.

With that, thank you very much.

MR. HOULIHAN: Any others?

JOSE LUIS BARRAZA: Yeah, I do. Jose Barraza. Back in the '60's, the '70's, really, when they were putting in the highways and byways here in Fresno, they basically stated that the noise, the impact of the noise, because of past experiences of places like L.A. and San Francisco, they were allowed to learn how to deal with the situation, and they put up a lot of areas where they were – they lowered the freeways to those (indiscernible) where they built 18-foot walls. Basically, they said they knew what they were doing, how they did it, and they built it, based on the experiences of -- or past bad experiences that

were done in L.A. and San Francisco. Now we're faced today with additional lines of freeway going through the intersections on 180 between Cedar and 41, because of traffic jams in that area, and that would increase the noise, and certainly, with all the walls that we have and the mounds, it doesn't stop the noise. It clearly can be heard around those neighborhoods. So that's a consideration to take into consideration.

The other thing, trucks. Diesels. I recommended in the past that we have the old 99 freeway that could connect right into the city through Van Ness right into the industrial district, and we can force these, by law, trucks to use those streets before they get into the city. That will also help in two ways, the congestion as well as noise.

DENNIS KOPLIS: Good evening. My name is Dennis Koplis, and I am with Prime Ranch, and I certainly can appreciate the complexity of the City's process for an undertaking of such magnitude. The project seen in the scope as represented in Section 2, the sphere of influence that's included as part of the Cedar Grove area includes potential impacts to 10,000 acres of prime farm ag land, approximately 3,000 acres of unique farmland, 2500 acres of farmland of statewide importance, and another 7,000, approximately, acres of farmland of local importance. As a representative for a ranching and farming family that's been in the Valley for over a hundred years, we have great concern with both the impact to this prime ag land and the fact that the original sphere of influence on which it was based was approved way back in 2006, a time when housing demand was at a historic high. We believe that demand has fundamentally changed today and that your population and housing analysis would demonstrate that. So we'd like to have you consider as part of your environmental analysis the conclusion of the Master EIR the environmentally preferred alternatives which would reduce the impact to prime, unique and statewide importance farmland.

Part of this is based on the fact that the City has always taken a position in this General Plan that growth should occur where services are available, and clearly in the southeast area of this General Plan Update there are no services. There aren't for wastewater, and there's a number of important aspects of development that need to be considered.

Accordingly, as you look at water supply, water storage and other components, we would also like to specifically request that the Master EIR include in its water supply analysis a focus on dry area scenarios. We also believe that the EIR analysis should include a specific fiscal impact study on the cost of the infrastructure in expansion areas where no services exist.

Regarding Air Quality, I know that the scoping for the traffic study is probably a separate meeting, but we believe that is just what you describe under potential scenario that you have excluded construction traffic impacts to surrounding municipalities for any kind of construction

employment commute.

We also believe under Biological Resources in Section 2 you reference that there would be some impact to water quality and hydrology. We'd like to suggest that the Master EIR also include specific hydro-geomorphic analysis of any impact to ground water, any wastewater affluent percolation and any potential impact or anti-degradation it might have on surrounding rivers contiguous to the city of Fresno, and particularly aquatic studies that demonstrate that the impacts would not affect salmon that would be restored to the San Joaquin River.

So we at Prime Ranch, we appreciate you allowing us to participate in your process and look forward to being an active participant through the EIR and subsequent approval processes, and we appreciate being (indiscernible) tonight. Thank you.

MR. HOULIHAN: Thank you. Anyone else?

Hearing none, I do want to thank you very much for attending and thank you for your comments. As I mentioned, we will be gathering the comments and will include it – we'll make sure everyone understands where our responses to your comments are, in addition to the comments that you might make in the NOP through written or email. So --

JEFF ROBERTS: Mike?

MR. HOULIHAN: Yes.

JEFF ROBERTS: Are the comments that we've made in the previous workshops – this is Jeff Roberts, Granville Homes. Are the comments we've made at previous workshops included in comments you have seen already or that you will get? The reason I ask, there's two letters with 22 examples that --

MR. HOULIHAN: I would suggest you submit those as part of this NOP comment period.

JEFF ROBERTS: Okay.

MR. HOULIHAN: It is a different process. I know it's generally the same process, but we're in the environmental process. Submit the same (indiscernible).

JEFF ROBERTS: That's fine. Thank you.

DENNIS KOPLIS: Dennis Koplis, Prime Ranch. You mentioned earlier regarding the cumulative impacts that would be analyzed that there was no timeline for buildout, so how can you establish a cumulative impact baseline and going forth snapshot?

MR. HOULIHAN: Okay, as for cumulative, obviously one of the components of cumulative is your project, and your project – or this project is the Planning Area, which

includes the city, the sphere and that area to the north, and full buildout within the Planning Area. Now, other development or cumulative projects would include those known projects that are occurring, and again, it depends on the issue area. For example, for traffic. We're looking at full buildout, so sometime in the future, but we have to rely on some level of cumulative traffic. So for example, the Fresno COG has their 2035 RTP, so we'll be using that information along with our full buildout information.

So it depends on the issue area. But again -- and also, as I mentioned, the High Speed Rail would be falling under the cumulative projects.

JEFF ROBERTS: The population projection I think was 970,000 –

MR. HOULIHAN: Name?

JEFF ROBERTS: Jeff Roberts. 970,000, and today, under the current 2025 General Plan, it's 790,000. I know State Department of Finance did the 790. Who did the 970? And is that (indiscernible) the 970, or --

MR. HOULIHAN: No. Basically, as the Planning Department went through their analysis, they were focusing on 790 for 2035.

JEFF ROBERTS: 790?

MR. HOULIHAN: 790 for 2035. And I think that – or 750, 790 --

AUDIENCE MEMBER: That was – the 790 was the 2025.

MR. HOULIHAN: Right. But now they're looking at – because of economic times, they're looking at 2035 for that level of development.

MR. HOULIHAN: Well, how did we get to 970? 970 is occurring because we told Planning Department that, You have to look at whole buildout of your city, you can't look at partial, partial development of your city, when we're identifying different land uses. So when they were going through that process and were identifying them all, under certain assumptions there's going to be much more development that's going to occur, resulting in a greater population.

JEFF ROBERTS: But the 970 has nothing to do with 2035.

MR. HOULIHAN: No, definitely. Not even – it's only – the 790 is part of the 970 --

JEFF ROBERTS: I follow that. Okay.

MR. HOULIHAN: Yes. And again, it's future buildout of the entire city, so at some time in the future, we're – the City is not identifying it's going to happen in 2050, 2060, 2070. It's going to be – this is our – this is their plan, and under the

assumptions of buildout of that plan there will be a population of 970,000.

JEFF ROBERTS: Well, I have a dumb question. Why do they call it the 2035 plan?

MR. HOULIHAN: You'll notice in the – you'll notice on the Notice of Preparation there is no reference to 2035.

JEFF ROBERTS: I didn't notice that.

MR. HOULIHAN: Yeah. There's no reference to 2035. The – I don't know if you want to address this or not, regarding 2035 and what the General Plan will be. Is that proposed to be changed?

MR. BERGTHOLD: When we do the Alternatives Analysis and we're evaluating what we've (indiscernible), we were instructed, because we were painting land use on every piece of ground inside the sphere in order to calculate buildout, and so based on those land uses and some midpoint assessments and density that would occur, etcera, for population of household, that's what it came out to.

JEFF ROBERTS: Keith, the 790 --

MR. BERGTHOLD: 790 is 2025. Remember, we were actually looking at 760 or 770 when we were going the analysis. But that didn't use up all the land in the sphere, as we indicated.

JEFF ROBERTS: No, because you grew the sphere, right? (Indiscernible)

MR. BERGTHOLD: No, we only – In the Alternatives Analysis, Alternative A allocated 1,500 units, and we used up all the land in the west area and we used up all the land in the southwest area. In B we got closer, still didn't use it all up. I think we did allocate 2600 units in SEGA. C, low enough densities to use up the entire sphere, had to add some. D, added a little bit, pretty much close to all the sphere. E, I think, was a lot more sphere. But the idea was there was a lot of land left over in Alternative A, Alternative A and I guess B.

This calculation, since we painted all the land uses in SEGA, it's like 41,500 -- you know, 41,000 units, if you used all the land that's designated with pretty close to average densities with those density uses. So that's where this number starts to grow, because you're doing a buildout calculation, not a (indiscernible) for years. I don't know what the ultimate horizon of SEGA will be, and it all depends on the market, the population growth, all those things.

DAVID WELLS: I would assume, though, that even though you don't know – by the way David Wells, EVA-Knows. Even though you don't know, there should, seems to me, be some trend line based on past population history growth and – or past population growth history, if you want to phrase it that way, and that curve could be fitted to – just to the year 2035. So my question is,

has that been done? And then whether or not it has or has not been done, if we go on your figures of approximately developing a full growth capacity within the city boundaries and the sphere of influence, it almost doubles the population of the city, yet when you look under transportation, under the document that's been release so far as the Master EIR, there is absolutely no mention of public rapid transit. It's just bus rapid transit. And there's no mention of overhead suspended rapid transit that could possibly handle that kind of population load within the city boundaries, because if we increase the population load within the city boundaries based on your figures, we're going to have traffic gridlocked up the kazoo. And yet we have 19th century projection of the transportation section of the Master EIR, with absolutely no mention whatsoever of PRT. And so my comment is I suggest you incorporate PRT and form the citizens' committee that such a thing even exists and that they should research it and incorporate it into both the Master Plan and the Master EIR, because certainly we're all out to, figuratively speaking, lower air pollution and how are you going to do it when you're doubling the population and using present day methods to transport people.

One other addition to that: The City's projecting $500 million be spent for expansion of bus rapid transit in the next 10 years. If we're going to make that kind of corporate investment, we ought to be making it in a PRT, not to rapid transport people at 200 to 250 miles an hour and of course, two or three miles from Downtown to, let's say Fresno State and those kinds of transportation streams instead of bus rapid transit and just widening the lanes and trying to have separate lanes for buses and separate lanes for cars and segregate things out that way to try to increase the speed of logistical transportation of the population within the city of Fresno.

So I urge the City to look into being a project leader in transportation, not a project follower, and incorporate that in their economic benefits to the city, where we can be a leader and utilize $500 million, or some portion of that, for PRT and incorporate PRT into our overall planning strategy so that we can be product leaders and manufacturers of that kind of equipment right here in the city. Thank you.

MR. HOULIHAN: Thank you for your comment.

Any others? All right, hearing none, again, I want to thank you for coming out and identifying potential issues associated with the General Plan and the Development Code Update. As I mentioned in our schedule, the next review by the public will be the Draft EIR, and it will be around March, so just keep an eye out on – keep on taking a look at the City's website. We'll also be publicly notifying the paper similar to this one being notified. And I want to thank you.

Appendix B: Air Quality

B.1 - Criteria Pollutant Modeling

City of Fresno General Plan

Criteria Pollutants: Summary

Year 2010

Prepared by FirstCarbon Solutions

	Data			
City Information				
Population	495,000	City	Planning Area Population	545,000
Employment	183,825	City	Planning Area Employment	209,261
County Information				
Population	930,000			

	ROG	NOx	PM10	PM2.5	CO	SO2
Emissions (tons/year)						
Motor vehicles	721	5541	157	144	13091	0
Electricity	0	300	0	0	0	211
Natural gas	86	760	59	59	495	5
Stationary, area	554	507	238	na	203	89
Offroad	1743	3881	278	278	9943	7
Total	**3105**	**10989**	**732**	**482**	**23731**	**312**
Emissions (tons/day)						
Motor vehicles	2.0	15.2	0.4	0.4	35.9	0.0
Electricity	0.0	0.8	0.0	0.0	0.0	0.6
Natural gas	0.2	2.1	0.2	0.2	1.4	0.0
Stationary, area	1.5	1.4	0.7	na	0.6	0.2
Offroad	4.8	10.6	0.8	0.8	27.2	0.02
Total	**8.5**	**30.1**	**2.0**	**1.3**	**65.0**	**0.9**

Sources:
- Population for the City: Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.
-Employment: - U.S. Census Bureau. 2011 American Community Survey 1-Year Estimates
Website:
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%
- Emissions: refer to subsequent spreadsheets
- Emissions for stationary, area: California Air Resources Board, CEIDARS 2.5, data is from the year 2010. Note that SO2 emissions for this category represent SOx emissions; SO2 emissions were not available.
www.arb.ca.gov/app/emsinv/facinfo/faccrit.php?dd=y&grp=1&sort=FacilityNameA&dbyr=2010&ab_=&dis_=&co_=10&fname_=&city_=Fresno&fzip_=&fsic_=&facid_=&all_fac=C&displayit=Pollutant&CERR=&showpol=&showpol2=

City of Fresno General Plan
Criteria Pollutants: Energy
Year 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Electricity

Emission Factors (lbs/MWh)		*(lbs/kWh)*
NOx	0.2002	0.0002002
SO2	0.1409	0.0001409

		Emissions Per capita (kWh/person or employee/year)	Emissions (tons/year)	
	(kWh/year)		NOx	SO2
Residential	1,422,450,000	2,610	142.4	100.2
Non-Residentia	1,570,085,283	7,503	157.2	110.6
			0	0.0
Total	**2,992,535,283**		**299.6**	**210.8**

Natural Gas

			Natural Gas Emission Factors					
			ROG	NOx	PM10	PM2.5	CO	SO2
	lb/MMBTU	Residential	0.01078	0.09216	0.00745	0.00745	0.03922	0.00059
		Nonresidential	0.01078	0.09804	0.00745	0.00745	0.08235	0.00059
	lb/therm	Residential	0.0011	0.0092	0.0007	0.0007	0.0039	0.0001
		Nonresidential	0.0011	0.0098	0.0007	0.0007	0.0082	0.0001

		Per capita (therms/person or employee/year)	Emissions (tons/year)					
	(therms/year)		ROG	NOx	PM10	PM2.5	CO	SO2
Residential	75,210,000	138	41	347	28	28	147	2
Non Residential	84,332,183	403	45	413	31	31	347	2
Total	**159,542,183**		**86**	**760**	**59**	**59**	**495**	**5**

Sources:

Electricity and natural gas usage: requested information from PG&E, 2012.

Usage: per capita usage multiplied by the population (for residential) or employees (for commercial)

Emission factors for electricity NOx and SO2 electricity emission factors from Environmental Protection Agency, eGRID2012, state total annual total output emission rate for California (data is from year 2009).

Emission factors for natural gas: CalEEMod Appendix D, Table 8.2, August 2013. 1 therm = 0.1 MMBTU

City of Fresno General Plan

Criteria Pollutants: Offroad

Year 2010

Prepared by FirstCarbon Solutions

Note: yellow shaded cells are data entry cells

Fresno County Emissions (tons/day) (from Offroad 2007)	**ROG Evaporative**	**ROG Exhaust**	**CO**	**NOx**	**SO2**	**PM**
Agricultural Equipment	0.32	1.88	11.97	10.99	0.01	0.66
Airport Ground Support Equipment	0.00	0.01	0.20	0.07	0.00	0.00
Construction and Mining Equipment	0.03	0.86	4.64	6.01	0.01	0.37
Dredging	0.00	0.00	0.00	0.00	0.00	0.00
Entertainment Equipment	0.00	0.00	0.00	0.01	0.00	0.00
Industrial Equipment	0.02	0.09	2.74	0.60	0.00	0.02
Lawn and Garden Equipment	0.85	0.95	11.29	0.25	0.00	0.03
Light Commercial Equipment	0.16	0.33	7.61	0.65	0.00	0.07
Logging Equipment	0.00	0.05	0.29	0.12	0.00	0.01
Military Tactical Support Equip	0.00	0.00	0.02	0.04	0.00	0.00
Oil Drilling	0.00	0.00	0.00	0.00	0.00	0.00
Other Portable Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Pleasure Craft	0.55	1.17	7.20	0.38	0.00	0.17
Railyard Operations	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Equipment	0.38	1.10	3.88	0.05	0.01	0.02
Transport Refrigeration Units	0.00	0.21	1.34	0.81	0.00	0.06
Total	2.32	6.65	51.18	19.98	0.04	1.43
Percent Fresno County/Fresno City Population		**0.53**				
City of Fresno Emissions (tons/day)						
Agricultural Equipment	0.17	1.0	6.4	5.9	0.01	0.35
Airport Ground Support Equipment	0.00	0.0	0.1	0.0	0.00	0.00
Construction and Mining Equipment	0.02	0.5	2.5	3.2	0.00	0.20
Dredging	0.00	0.0	0.0	0.0	0.00	0.00
Entertainment Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Industrial Equipment	0.01	0.0	1.5	0.3	0.00	0.01
Lawn and Garden Equipment	0.45	0.5	6.0	0.1	0.00	0.02
Light Commercial Equipment	0.09	0.2	4.0	0.3	0.00	0.04
Logging Equipment	0.00	0.0	0.2	0.1	0.00	0.00
Military Tactical Support Equip	0.00	0.0	0.0	0.0	0.00	0.00
Oil Drilling	0.00	0.0	0.0	0.0	0.00	0.00
Other Portable Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Pleasure Craft	0.29	0.6	3.8	0.2	0.00	0.09
Railyard Operations	0.00	0.0	0.0	0.0	0.00	0.00
Recreational Equipment	0.20	0.6	2.1	0.0	0.01	0.01
Transport Refrigeration Units	0.00	0.1	0.7	0.4	0.00	0.03
Total	1.24	3.5	27.2	10.6	0.02	0.76

Sources:

- County of Fresno emissions from OFFROAD2007, annual, all days, all equipment, for the year assessed
- City of Fresno emissions based on the percent of the City's population compared with the County's population.

Note: PM refers to total particulate matter.

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2010
Prepared by FirstCarbon Solutions

Vehicle Miles Traveled

Vehicle miles traveled / day	9,162,734	Source: Fehr and Peers. 2013
Vehicle miles traveled / year	3,344,397,910	Source: VMT per day * 365 days/year
Annual VMT Growth Rate	2.48%	

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method
Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.53%	0.10%
LDT1	6.25%	0.01%
LDT2	16.43%	0.01%
LHD1	2.91%	1.81%
LHD2	0.28%	0.48%
MCY	0.67%	0.00%
MDV	18.58%	0.01%
MH	0.16%	0.04%
OBUS	0.11%	0.11%
SBUS	0.02%	0.06%
T6	0.22%	1.31%
T7	0.04%	6.68%
UBUS	0.06%	0.14%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.5%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.2%	LDA, MCY
DSL	Heavy duty	8.3%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.3%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2010
Prepared by FirstCarbon Solutions

VMT/day by Vehicle Class and speed

GAS	**Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA		778	226524	6144	36720	141289	137261	870141	388675	418195	212105	809974	740970	51	0	0
LDT1		112	32536	883	5274	20294	19715	124980	55826	60066	30465	116338	106427	7	0	0
LDT2		294	85491	2319	13858	53323	51803	328396	146688	157829	80050	305689	279646	19	0	0
LHD1		52	15159	411	2457	9455	9186	58231	26011	27986	14194	54205	49587	3	0	0
LHD2		5	1482	40	240	924	898	5692	2542	2735	1387	5298	4847	0	0	0
MCY		12	3463	94	561	2160	2098	13301	5941	6392	3242	12381	11326	1	0	0
MDV		332	96692	2623	15674	60309	58590	371420	165906	178506	90537	345737	316283	22	0	0
MH		3	808	22	131	504	489	3103	1386	1491	756	2888	2642	0	0	0
OBUS		2	556	15	90	347	337	2137	954	1027	521	1989	1820	0	0	0
SBUS		0	119	3	19	74	72	458	204	220	112	426	390	0	0	0
T6		4	1124	30	182	701	681	4317	1928	2075	1052	4019	3676	0	0	0
T7		1	191	5	31	119	115	732	327	352	178	681	623	0	0	0
UBUS		1	292	8	47	182	177	1123	502	540	274	1046	957	0	0	0

DSL	**Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**			
LDA		2	524	14	85	327	318	2014	900	968	491	1875	1715	0	0	0
LDT1		0	32	1	5	20	19	123	55	59	30	114	105	0	0	0
LDT2		0	33	1	5	21	20	126	56	61	31	118	108	0	0	0
LHD1		32	9392	255	1522	5858	5691	36078	16115	17339	8794	33584	30723	2	0	0
LHD2		9	2518	68	408	1571	1526	9673	4321	4649	2358	9004	8237	1	0	0
MCY		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV		0	74	2	12	46	45	285	127	137	69	265	242	0	0	0
MH		1	190	5	31	119	115	730	326	351	178	680	622	0	0	0
OBUS		2	559	15	91	349	339	2147	959	1032	523	1998	1828	0	0	0
SBUS		1	321	9	52	200	195	1234	551	593	301	1148	1051	0	0	0
T6		23	6794	184	1101	4238	4117	26099	11658	12543	6362	24294	22224	2	0	0
T7		119	34752	943	5633	21676	21058	133493	59629	64157	32540	124262	113676	8	0	0
UBUS		2	721	20	117	450	437	2769	1237	1331	675	2578	2358	0	0	0

Summary of Emissions

	ROG	NOx	PM10	PM2.5	CO
Tons/year	721.5	5541.1	157.1	144.3	13090.8
Tons/day	2.0	15.2	0.4	0.4	35.9

EMFAC2011 Emission Rates
Region Type: County
Region: Fresno
Calendar Year: 2010
Season: Annual
Vehicle Classification: EMFAC2007 Categories

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2010, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUN (gms/mile)	TOG_RUN (gms/mile)	CO_RUNE (gms/mile)	NOX_RUN (gms/mile)	CO2_RUN (gms/mile)	CO2_RUN (gms/mile)	PM10_RUI (gms/mile)	PM2_5_RUNE (gms/mile)	Percent of Total VMT
Fresno	2010	LDA	GAS	5	693	0.473719	0.647616	6.013806	0.405805	1118.514	1112.611	0.021139	0.019266	0.003%
Fresno	2010	LDA	DSL	5	2	0.315158	0.358786	1.985075	1.528535	403.7055	399.4013	0.23886	0.219751	0.000%
Fresno	2010	LDA	GAS	10	1884	0.316679	0.429584	5.006039	0.349903	835.4951	831.0829	0.013659	0.012432	0.008%
Fresno	2010	LDA	DSL	10	4	0.278361	0.316896	1.641576	1.386954	388.7439	384.8583	0.210985	0.194106	0.000%
Fresno	2010	LDA	GAS	15	1788	0.22321	0.300022	4.30175	0.31162	645.4031	641.9937	0.009301	0.008453	0.008%
Fresno	2010	LDA	DSL	15	4	0.220827	0.251397	1.161926	1.174959	366.2465	362.9904	0.16739	0.153999	0.000%
Fresno	2010	LDA	GAS	20	464306	0.163687	0.218159	3.690806	0.284757	511.1007	508.403	0.006669	0.006053	2.031%
Fresno	2010	LDA	DSL	20	1075	0.179136	0.203935	0.860898	1.031712	351.0896	348.2577	0.135793	0.12493	0.005%
Fresno	2010	LDA	GAS	25	56285	0.127022	0.168005	3.29416	0.264283	424.0742	421.8358	0.005032	0.004562	0.246%
Fresno	2010	LDA	DSL	25	130	0.148592	0.169162	0.667506	0.937272	341.2432	338.6868	0.112638	0.103627	0.001%
Fresno	2010	LDA	GAS	30	172555	0.103291	0.135727	2.984569	0.249506	364.9975	363.0709	0.003994	0.003616	0.755%
Fresno	2010	LDA	DSL	30	399	0.126034	0.143481	0.541432	0.881434	335.4805	333.0853	0.095533	0.087891	0.002%
Fresno	2010	LDA	GAS	35	672123	0.088076	0.115096	2.749604	0.239272	326.3132	324.5907	0.003333	0.003014	2.940%
Fresno	2010	LDA	DSL	35	1556	0.109314	0.124447	0.459272	0.857956	333.1208	330.7916	0.082851	0.076223	0.007%
Fresno	2010	LDA	GAS	40	1261393	0.07875	0.102362	2.563874	0.233866	302.0902	300.4958	0.002923	0.00264	5.518%
Fresno	2010	LDA	DSL	40	2920	0.09696	0.110382	0.407299	0.864757	333.8938	331.543	0.073475	0.067597	0.013%
Fresno	2010	LDA	GAS	45	1084869	0.07377	0.0955	2.436194	0.231406	290.7675	289.2328	0.002693	0.002431	4.746%
Fresno	2010	LDA	DSL	45	2511	0.087959	0.100136	0.377573	0.902013	337.8877	335.4252	0.066639	0.061307	0.011%
Fresno	2010	LDA	GAS	50	1492167	0.07248	0.0935	2.360946	0.232542	290.464	288.9308	0.002608	0.002352	6.527%
Fresno	2010	LDA	DSL	50	3454	0.081625	0.092925	0.365865	0.974143	345.5654	342.888	0.061818	0.056873	0.015%
Fresno	2010	LDA	GAS	55	1064211	0.074719	0.096089	2.344398	0.237338	301.1561	299.5666	0.002654	0.002391	4.655%
Fresno	2010	LDA	DSL	55	2464	0.077506	0.088235	0.370617	1.089412	357.8557	354.8345	0.058669	0.053976	0.011%
Fresno	2010	LDA	GAS	60	1286323	0.080702	0.103536	2.393994	0.245793	323.8133	322.1042	0.00284	0.002556	5.627%
Fresno	2010	LDA	DSL	60	2978	0.075336	0.085765	0.392574	1.261741	376.3426	372.804	0.056986	0.052427	0.013%
Fresno	2010	LDA	GAS	65	1270026	0.091466	0.117158	2.546217	0.258242	361.8198	359.9101	0.003195	0.002874	5.556%
Fresno	2010	LDA	DSL	65	2940	0.075008	0.085392	0.434961	1.513477	403.6083	399.3068	0.056681	0.052146	0.013%
Fresno	2010	LDA	GAS	70	1123104	0.099084	0.126865	2.670764	0.266125	387.8204	385.7734	0.003453	0.003106	4.913%
Fresno	2010	LDA	DSL	70	2600	0.076579	0.08718	0.504265	1.880701	443.8351	438.408	0.057782	0.05316	0.011%
Fresno	2010	LDT1	GAS	5	100	1.132501	1.433878	14.99644	1.034119	1283.311	1276.592	0.041061	0.037206	0.000%
Fresno	2010	LDT1	DSL	5	0	0.438342	0.499024	2.576501	1.724466	396.8267	393.6736	0.371727	0.341989	0.000%
Fresno	2010	LDT1	GAS	10	271	0.769761	0.970579	12.07732	0.868702	957.843	952.8216	0.027208	0.024624	0.001%
Fresno	2010	LDT1	DSL	10	0	0.387244	0.440851	2.129046	1.563581	388.0641	385.2177	0.328418	0.302144	0.000%
Fresno	2010	LDT1	GAS	15	257	0.551191	0.690994	10.10202	0.759172	739.6339	735.7542	0.018948	0.017129	0.001%
Fresno	2010	LDT1	DSL	15	0	0.30729	0.349829	1.504465	1.322828	374.888	372.5028	0.260634	0.239784	0.000%
Fresno	2010	LDT1	GAS	20	66689	0.410276	0.51209	8.523036	0.686058	586.3047	583.234	0.013852	0.012507	0.292%
Fresno	2010	LDT1	DSL	20	65	0.249305	0.283818	1.112731	1.160302	366.0111	363.9366	0.211462	0.194545	0.000%
Fresno	2010	LDT1	GAS	25	8084	0.321756	0.399696	7.491839	0.632137	486.4452	483.8973	0.010618	0.009577	0.035%
Fresno	2010	LDT1	DSL	25	8	0.20679	0.235417	0.86128	1.053278	360.2443	358.3716	0.175399	0.161367	0.000%
Fresno	2010	LDT1	GAS	30	24784	0.263696	0.326235	6.723855	0.595245	418.682	416.489	0.008529	0.007684	0.108%
Fresno	2010	LDT1	DSL	30	24	0.175366	0.199643	0.697541	0.990106	356.8692	355.1146	0.148736	0.136837	0.000%
Fresno	2010	LDT1	GAS	35	96538	0.225989	0.27857	6.16914	0.571556	374.2772	372.3165	0.007174	0.006456	0.422%
Fresno	2010	LDT1	DSL	35	95	0.152049	0.173098	0.591002	0.963678	355.4872	353.781	0.128944	0.118629	0.000%
Fresno	2010	LDT1	GAS	40	181176	0.2027	0.248909	5.768551	0.561544	346.5539	344.739	0.006317	0.005678	0.793%
Fresno	2010	LDT1	DSL	40	178	0.134791	0.15345	0.523768	0.971624	355.94	354.2179	0.114287	0.105144	0.001%
Fresno	2010	LDT1	GAS	45	155822	0.189969	0.232538	5.52474	0.560244	333.5584	331.8114	0.005823	0.005228	0.682%
Fresno	2010	LDT1	DSL	45	153	0.12218	0.139093	0.485491	1.014163	358.2791	356.4752	0.103565	0.09528	0.001%
Fresno	2010	LDT1	GAS	50	214323	0.186374	0.227413	5.429547	0.56955	333.2055	331.4604	0.00562	0.005039	0.938%
Fresno	2010	LDT1	DSL	50	210	0.113249	0.128927	0.470663	1.096346	362.7757	360.8144	0.095957	0.088281	0.001%
Fresno	2010	LDT1	GAS	55	152854	0.191521	0.232935	5.500717	0.590131	345.4664	343.657	0.00568	0.005087	0.669%
Fresno	2010	LDT1	DSL	55	150	0.107357	0.122219	0.477257	1.227619	369.9739	367.7606	0.090913	0.08364	0.001%
Fresno	2010	LDT1	GAS	60	184757	0.205885	0.249678	5.76508	0.622966	371.4858	369.5403	0.006016	0.005381	0.808%
Fresno	2010	LDT1	DSL	60	181	0.104106	0.118518	0.506249	1.423896	380.8011	378.2089	0.088088	0.081041	0.001%
Fresno	2010	LDT1	GAS	65	182416	0.231884	0.280458	6.31876	0.670102	415.0622	412.8884	0.006682	0.005969	0.798%
Fresno	2010	LDT1	DSL	65	179	0.103303	0.117604	0.561849	1.710725	396.7698	393.6186	0.087306	0.080321	0.001%
Fresno	2010	LDT1	GAS	70	161313	0.250282	0.30238	6.736026	0.700109	444.8773	442.5473	0.00717	0.006401	0.706%
Fresno	2010	LDT1	DSL	70	158	0.104947	0.119475	0.652523	2.129362	420.3295	416.3538	0.088542	0.081459	0.001%
Fresno	2010	LDT2	GAS	5	262	0.625814	0.847316	8.195464	0.840548	1532.895	1523.219	0.021911	0.019929	0.001%
Fresno	2010	LDT2	DSL	5	0	0.378609	0.431021	2.199627	1.78331	393.5546	388.3213	0.305262	0.280841	0.000%
Fresno	2010	LDT2	GAS	10	711	0.419818	0.56456	6.84675	0.71057	1144.663	1137.432	0.014262	0.012953	0.003%
Fresno	2010	LDT2	DSL	10	0	0.334455	0.380754	1.818073	1.617082	383.7657	379.0414	0.269684	0.248109	0.000%
Fresno	2010	LDT2	GAS	15	675	0.296638	0.395639	5.893058	0.621836	884.0941	878.5073	0.009776	0.008867	0.003%
Fresno	2010	LDT2	DSL	15	0	0.265379	0.302117	1.285418	1.368315	369.0464	365.0875	0.21401	0.196889	0.000%
Fresno	2010	LDT2	GAS	20	175232	0.217725	0.288384	5.066147	0.559712	700.4028	695.9809	0.00705	0.006386	0.767%
Fresno	2010	LDT2	DSL	20	67	0.215296	0.245101	0.951268	1.20036	359.1298	355.6866	0.17363	0.159739	0.000%
Fresno	2010	LDT2	GAS	25	21242	0.169027	0.222387	4.520616	0.512587	581.1299	577.4609	0.005344	0.004835	0.093%
Fresno	2010	LDT2	DSL	25	8	0.178582	0.203304	0.736721	1.089745	352.6877	349.5794	0.144019	0.132498	0.000%
Fresno	2010	LDT2	GAS	30	65123	0.137368	0.179711	4.092945	0.478578	500.1753	497.0174	0.004257	0.003846	0.285%
Fresno	2010	LDT2	DSL	30	25	0.151452	0.172418	0.596961	1.02444	348.9173	346.0051	0.122131	0.112361	0.000%
Fresno	2010	LDT2	GAS	35	253663	0.116954	0.152273	3.766244	0.454958	447.1494	444.326	0.00356	0.003213	1.110%
Fresno	2010	LDT2	DSL	35	98	0.131328	0.149508	0.505978	0.997102	347.3734	344.5415	0.105888	0.097417	0.000%
Fresno	2010	LDT2	GAS	40	476057	0.10429	0.135153	3.506925	0.442049	413.9853	411.3718	0.003125	0.002817	2.082%
Fresno	2010	LDT2	DSL	40	183	0.116439	0.132558	0.448517	1.005285	347.8792	345.021	0.093862	0.086353	0.001%
Fresno	2010	LDT2	GAS	45	409436	0.09736	0.125724	3.325375	0.436029	398.4657	395.9501	0.002879	0.002593	1.791%
Fresno	2010	LDT2	DSL	45	158	0.105569	0.120183	0.415753	1.04921	350.4922	347.4982	0.085072	0.078266	0.001%
Fresno	2010	LDT2	GAS	50	563153	0.095252	0.12261	3.213317	0.438213	398.0474	395.5344	0.002784	0.002505	2.463%
Fresno	2010	LDT2	DSL	50	217	0.097884	0.111434	0.402991	1.134095	355.5155	352.2602	0.078842	0.072535	0.001%
Fresno	2010	LDT2	GAS	55	401639	0.09771	0.125409	3.177572	0.448886	412.6976	410.0921	0.002827	0.00254	1.757%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUN (gms/mile)	TOG_RUN (gms/mile)	CO_RUNE (gms/mile)	NOX_RUN (gms/mile)	CO2_RUN (gms/mile)	CO2_RUN (gms/mile)	PM10_RUI (gms/mile)	PM2_5_RUNE (gms/mile)	Percent of Total VMT
Fresno	2010	LDT2	DSL	55	155	0.092834	0.105685	0.408502	1.269691	363.5566	359.8832	0.074725	0.068747	0.001%
Fresno	2010	LDT2	GAS	60	485466	0.104955	0.134403	3.226357	0.468381	443.7603	440.9588	0.003014	0.002706	2.124%
Fresno	2010	LDT2	DSL	60	187	0.090082	0.102552	0.433116	1.47243	375.652	371.3496	0.07244	0.066645	0.001%
Fresno	2010	LDT2	GAS	65	479315	0.118267	0.151199	3.403768	0.497881	495.8329	492.7026	0.003376	0.003028	2.097%
Fresno	2010	LDT2	DSL	65	185	0.089471	0.101857	0.48042	1.768687	393.491	388.261	0.07185	0.066102	0.001%
Fresno	2010	LDT2	GAS	70	423866	0.127738	0.163233	3.552543	0.516944	531.4582	528.1029	0.00364	0.003264	1.854%
Fresno	2010	LDT2	DSL	70	163	0.091021	0.103621	0.557629	2.201057	419.8101	413.2115	0.072947	0.067111	0.001%
Fresno	2010	LHD1	GAS	5	18900	1.119728	1.263346	13.6886	0.600971	2513.497	2513.497	0.014039	0.012886	0.083%
Fresno	2010	LHD1	DSL	5	7256	0.552168	0.628607	3.41806	7.945278	526.8559	526.8559	0.131846	0.121298	0.032%
Fresno	2010	LHD1	GAS	10	49284	0.902304	1.017217	11.08009	0.615281	2036.128	2036.128	0.011305	0.010377	0.216%
Fresno	2010	LHD1	DSL	10	24129	0.487896	0.555438	2.822183	7.202077	526.8559	526.8559	0.116499	0.107179	0.106%
Fresno	2010	LHD1	GAS	15	112226	0.604898	0.68185	7.592763	0.644295	1392.43	1392.43	0.007563	0.006942	0.491%
Fresno	2010	LHD1	DSL	15	52256	0.387263	0.440873	1.990748	6.088929	526.8559	526.8559	0.09247	0.085072	0.229%
Fresno	2010	LHD1	GAS	20	129676	0.42025	0.474505	5.476568	0.67707	1006.069	1006.069	0.005274	0.004841	0.567%
Fresno	2010	LHD1	DSL	20	57290	0.314223	0.357722	1.46963	5.32527	526.8559	526.8559	0.07503	0.069027	0.251%
Fresno	2010	LHD1	GAS	25	99891	0.302385	0.342938	4.163959	0.716141	768.0121	768.0121	0.003833	0.003519	0.437%
Fresno	2010	LHD1	DSL	25	61315	0.26063	0.29671	1.135429	4.84246	526.8559	526.8559	0.062233	0.057254	0.268%
Fresno	2010	LHD1	GAS	30	88336	0.229343	0.25983	3.357139	0.74613	619.4336	619.4336	0.002905	0.002666	0.386%
Fresno	2010	LHD1	DSL	30	51758	0.220987	0.251579	0.918063	4.543455	526.8559	526.8559	0.052767	0.048546	0.226%
Fresno	2010	LHD1	GAS	35	33008	0.1783	0.203428	2.844356	0.791531	527.8465	527.8465	0.002294	0.002106	0.144%
Fresno	2010	LHD1	DSL	35	27315	0.191541	0.218057	0.776864	4.438616	526.8559	526.8559	0.045736	0.042077	0.119%
Fresno	2010	LHD1	GAS	40	9743	0.142593	0.166274	2.549789	0.841004	475.2332	475.2332	0.001888	0.001733	0.043%
Fresno	2010	LHD1	DSL	40	14995	0.169712	0.193206	0.687984	4.488619	526.8558	526.8558	0.040524	0.037282	0.066%
Fresno	2010	LHD1	GAS	45	11995	0.123574	0.143688	2.434486	0.860013	452.0558	452.0558	0.001621	0.001488	0.052%
Fresno	2010	LHD1	DSL	45	16184	0.153715	0.174995	0.637635	4.681519	526.8559	526.8559	0.036704	0.033768	0.071%
Fresno	2010	LHD1	GAS	50	88567	0.114086	0.130291	2.472159	0.865886	454.3217	454.3217	0.00145	0.001331	0.387%
Fresno	2010	LHD1	DSL	50	62493	0.142324	0.162026	0.61848	5.059813	526.8559	526.8559	0.033984	0.031265	0.273%
Fresno	2010	LHD1	GAS	55	24360	0.102022	0.118976	2.588025	0.937637	482.4155	482.4155	0.001352	0.001241	0.107%
Fresno	2010	LHD1	DSL	55	37634	0.134707	0.153355	0.627828	5.697898	526.8559	526.8559	0.032165	0.029592	0.165%
Fresno	2010	LHD2	GAS	5	1847	1.250143	1.402799	18.51986	0.601436	2513.497	2513.497	0.016448	0.01456	0.008%
Fresno	2010	LHD2	DSL	5	1945	0.538806	0.613394	3.316497	7.814862	527.2187	527.2187	0.129228	0.11889	0.009%
Fresno	2010	LHD2	GAS	10	4817	1.006476	1.128566	14.95135	0.615761	2036.128	2036.128	0.013246	0.011725	0.021%
Fresno	2010	LHD2	DSL	10	6469	0.476089	0.541996	2.738325	7.08386	527.2186	527.2186	0.114186	0.105051	0.028%
Fresno	2010	LHD2	GAS	15	10969	0.673621	0.75532	10.24834	0.644792	1392.43	1392.43	0.008861	0.007844	0.048%
Fresno	2010	LHD2	DSL	15	14011	0.377891	0.430203	1.931596	5.988984	527.2186	527.2186	0.090634	0.083383	0.061%
Fresno	2010	LHD2	GAS	20	12675	0.469182	0.526852	7.403805	0.677596	1006.069	1006.069	0.006179	0.00547	0.055%
Fresno	2010	LHD2	DSL	20	15360	0.306619	0.349065	1.425962	5.237859	527.2186	527.2186	0.07354	0.067657	0.067%
Fresno	2010	LHD2	GAS	25	9764	0.340323	0.38358	5.670006	0.716704	768.0121	768.0121	0.004491	0.003976	0.043%
Fresno	2010	LHD2	DSL	25	16439	0.254323	0.28953	1.101691	4.762974	527.2186	527.2186	0.060997	0.056118	0.072%
Fresno	2010	LHD2	GAS	30	8634	0.257948	0.290459	4.56418	0.746719	619.4336	619.4336	0.003403	0.003012	0.038%
Fresno	2010	LHD2	DSL	30	13877	0.215639	0.24549	0.890784	4.468878	527.2187	527.2187	0.051719	0.047582	0.061%
Fresno	2010	LHD2	GAS	35	3226	0.203126	0.23006	3.914444	0.792165	527.8465	527.8465	0.002688	0.002379	0.014%
Fresno	2010	LHD2	DSL	35	7323	0.186906	0.21278	0.753781	4.365759	527.2186	527.2186	0.044828	0.041242	0.032%
Fresno	2010	LHD2	GAS	40	952	0.164911	0.19041	3.565722	0.841677	475.2331	475.2331	0.002213	0.001959	0.004%
Fresno	2010	LHD2	DSL	40	4020	0.165605	0.18853	0.667542	4.414942	527.2187	527.2187	0.039719	0.036542	0.018%
Fresno	2010	LHD2	GAS	45	1172	0.141366	0.162946	3.364621	0.8607	452.0558	452.0558	0.001899	0.001681	0.005%
Fresno	2010	LHD2	DSL	45	4339	0.149995	0.17076	0.618688	4.604675	527.2187	527.2187	0.035975	0.033097	0.019%
Fresno	2010	LHD2	GAS	50	8657	0.127904	0.145165	3.36128	0.866553	454.3218	454.3218	0.001698	0.001503	0.038%
Fresno	2010	LHD2	DSL	50	16755	0.138879	0.158105	0.600103	4.97676	527.2186	527.2186	0.033309	0.030644	0.073%
Fresno	2010	LHD2	GAS	55	2381	0.11803	0.136287	3.620512	0.938387	482.4155	482.4155	0.001584	0.001402	0.010%
Fresno	2010	LHD2	DSL	55	10090	0.131447	0.149644	0.609172	5.60437	527.2186	527.2186	0.031527	0.029004	0.044%
Fresno	2010	MCY	GAS	5	11	5.263854	5.712044	36.81104	1.129801	240.289	240.289	0.002723	0.002134	0.000%
Fresno	2010	MCY	GAS	10	29	4.566911	4.955851	32.86126	1.121677	220.4904	220.4904	0.002401	0.00188	0.000%
Fresno	2010	MCY	GAS	15	27	3.633634	3.942838	27.85817	1.133846	188.6723	188.6723	0.001931	0.001511	0.000%
Fresno	2010	MCY	GAS	20	7097	3.060907	3.319227	24.82211	1.166894	164.9112	164.9112	0.001627	0.001272	0.031%
Fresno	2010	MCY	GAS	25	860	2.684545	2.910724	23.17442	1.194965	147.2241	147.2241	0.001435	0.001122	0.004%
Fresno	2010	MCY	GAS	30	2638	2.466921	2.67436	22.6587	1.22769	134.2695	134.2695	0.001325	0.001035	0.012%
Fresno	2010	MCY	GAS	35	10274	2.372595	2.571838	23.21786	1.262942	125.1564	125.1564	0.001281	0.001001	0.045%
Fresno	2010	MCY	GAS	40	19281	2.398824	2.599877	25.06835	1.306405	119.3292	119.3292	0.001297	0.001013	0.084%
Fresno	2010	MCY	GAS	45	16583	2.533457	2.745555	28.37718	1.349635	116.5065	116.5065	0.001374	0.001073	0.073%
Fresno	2010	MCY	GAS	50	22809	2.804623	3.039267	33.86364	1.397014	116.6596	116.6596	0.001524	0.00119	0.100%
Fresno	2010	MCY	GAS	55	16267	3.255004	3.527297	42.66525	1.448951	120.0332	120.0332	0.00177	0.001382	0.071%
Fresno	2010	MCY	GAS	60	19662	3.95891	4.289933	56.68928	1.505917	127.2131	127.2131	0.002152	0.001679	0.086%
Fresno	2010	MCY	GAS	65	19413	5.038854	5.460437	79.46613	1.565646	139.2657	139.2657	0.002738	0.002137	0.085%
Fresno	2010	MCY	GAS	70	17167	6.717132	7.279423	117.4443	1.630763	157.991	157.991	0.003647	0.002847	0.075%
Fresno	2010	MDV	GAS	5	296	0.642465	0.924443	8.303255	1.015716	1926.063	1919.588	0.018679	0.017136	0.001%
Fresno	2010	MDV	DSL	5	0	0.187108	0.21301	1.214961	0.887598	452.6251	448.2801	0.156747	0.144207	0.000%
Fresno	2010	MDV	GAS	10	804	0.426771	0.609586	7.004279	0.854856	1438.318	1433.48	0.012099	0.01109	0.004%
Fresno	2010	MDV	DSL	10	1	0.16508	0.187933	1.008852	0.809562	422.1461	418.2237	0.138344	0.127276	0.000%
Fresno	2010	MDV	GAS	15	763	0.298403	0.422291	6.072969	0.744834	1110.926	1107.187	0.008255	0.007561	0.003%
Fresno	2010	MDV	DSL	15	1	0.130766	0.148868	0.720464	0.692183	376.3157	373.0287	0.10964	0.100868	0.000%
Fresno	2010	MDV	GAS	20	198189	0.215173	0.30332	5.242805	0.667343	880.0553	877.0964	0.005928	0.005425	0.867%
Fresno	2010	MDV	DSL	20	152	0.10601	0.120686	0.538825	0.612322	345.4391	342.5803	0.088902	0.08179	0.001%
Fresno	2010	MDV	GAS	25	24025	0.165369	0.231485	4.696372	0.608696	730.1915	727.7363	0.004477	0.004094	0.105%
Fresno	2010	MDV	DSL	25	18	0.087948	0.100123	0.421586	0.559215	325.3804	322.7998	0.073751	0.067851	0.000%
Fresno	2010	MDV	GAS	30	73655	0.133127	0.185319	4.26204	0.566228	628.4714	626.3583	0.003554	0.003247	0.322%
Fresno	2010	MDV	DSL	30	56	0.074668	0.085005	0.344685	0.527425	313.6409	311.223	0.062595	0.057588	0.000%
Fresno	2010	MDV	GAS	35	286896	0.11244	0.155788	3.925781	0.536595	561.8468	559.9576	0.002963	0.002706	1.255%
Fresno	2010	MDV	DSL	35	220	0.064883	0.073865	0.294147	0.513576	308.8339	306.4827	0.054359	0.05001	0.001%
Fresno	2010	MDV	GAS	40	538426	0.099406	0.137167	3.652654	0.520056	520.1709	518.4221	0.002595	0.002368	2.355%
Fresno	2010	MDV	DSL	40	413	0.057718	0.065708	0.261765	0.516542	310.4087	308.0356	0.048311	0.044446	0.002%
Fresno	2010	MDV	GAS	45	463076	0.092185	0.126821	3.456548	0.512089	500.671	498.9877	0.002386	0.002176	2.026%
Fresno	2010	MDV	DSL	45	355	0.052585	0.059865	0.24279	0.53634	318.5448	316.0589	0.043953	0.040437	0.002%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUN (gms/mile)	TOG_RUN (gms/mile)	CO_RUNE (gms/mile)	NOX_RUN (gms/mile)	CO2_RUN (gms/mile)	CO2_RUN (gms/mile)	PM10_RUI (gms/mile)	PM2_5_RUNE (gms/mile)	Percent of Total VMT
Fresno	2010	MDV	GAS	50	636932	0.089666	0.123034	3.32791	0.514233	500.1459	498.4643	0.002304	0.002099	2.786%
Fresno	2010	MDV	DSL	50	488	0.049097	0.055893	0.234683	0.575306	334.1854	331.4827	0.040956	0.03768	0.002%
Fresno	2010	MDV	GAS	55	454258	0.091526	0.125289	3.273209	0.526864	518.5542	516.8107	0.002337	0.002128	1.987%
Fresno	2010	MDV	DSL	55	348	0.047021	0.05353	0.236502	0.637796	359.2226	356.1727	0.039116	0.035987	0.002%
Fresno	2010	MDV	GAS	60	549067	0.097858	0.133784	3.29931	0.550423	557.582	555.7074	0.00249	0.002266	2.402%
Fresno	2010	MDV	DSL	60	421	0.046261	0.052665	0.248679	0.731145	396.883	393.3109	0.038335	0.035269	0.002%
Fresno	2010	MDV	GAS	65	542110	0.109959	0.150185	3.449953	0.586494	623.0131	620.9184	0.002789	0.002537	2.371%
Fresno	2010	MDV	DSL	65	415	0.046856	0.053342	0.273125	0.867109	452.427	448.0847	0.038618	0.035529	0.002%
Fresno	2010	MDV	GAS	70	479397	0.118637	0.162044	3.582735	0.609929	667.7772	665.5319	0.003008	0.002736	2.097%
Fresno	2010	MDV	DSL	70	367	0.049018	0.055804	0.313699	1.064652	534.3749	528.8963	0.040093	0.036886	0.002%
Fresno	2010	MH	GAS	5	307	2.949594	3.338667	65.82074	1.376379	2513.497	2513.497	0.030638	0.026809	0.001%
Fresno	2010	MH	DSL	5	67	1.901179	2.164366	2.744605	21.57166	2376.968	2376.968	0.756269	0.695767	0.000%
Fresno	2010	MH	GAS	10	1543	2.377957	2.689007	53.31679	1.412517	2036.128	2036.128	0.024672	0.021589	0.007%
Fresno	2010	MH	DSL	10	334	1.451301	1.652209	2.327127	17.99075	2158.294	2158.294	0.633612	0.582923	0.001%
Fresno	2010	MH	GAS	15	1949	1.589054	1.794653	36.4459	1.471076	1392.43	1392.43	0.016505	0.014442	0.009%
Fresno	2010	MH	DSL	15	451	0.762592	0.86816	1.649441	12.66363	1772.14	1772.14	0.433957	0.399241	0.002%
Fresno	2010	MH	GAS	20	2021	1.106966	1.251766	26.34747	1.540277	1006.069	1006.069	0.01151	0.010071	0.009%
Fresno	2010	MH	DSL	20	479	0.355281	0.404464	1.18145	9.824493	1454.246	1454.246	0.295182	0.271568	0.002%
Fresno	2010	MH	GAS	25	2252	0.804585	0.909782	20.12336	1.608152	768.0122	768.0122	0.008366	0.00732	0.010%
Fresno	2010	MH	DSL	25	499	0.254258	0.289456	0.969675	9.064951	1304.378	1304.378	0.239469	0.220311	0.002%
Fresno	2010	MH	GAS	30	2547	0.610504	0.689745	16.21265	1.683413	619.4336	619.4336	0.006339	0.005547	0.011%
Fresno	2010	MH	DSL	30	599	0.208877	0.237792	0.83348	8.644159	1224.352	1224.352	0.208593	0.191905	0.003%
Fresno	2010	MH	GAS	35	3165	0.482031	0.545509	13.83442	1.758306	527.8466	527.8466	0.005006	0.004381	0.014%
Fresno	2010	MH	DSL	35	707	0.173161	0.197132	0.721233	8.320145	1157.94	1157.94	0.188211	0.173154	0.003%
Fresno	2010	MH	GAS	40	3940	0.396206	0.449888	12.48758	1.833245	475.2332	475.2332	0.004121	0.003606	0.017%
Fresno	2010	MH	DSL	40	877	0.147111	0.167476	0.632935	8.089561	1105.143	1105.143	0.178322	0.164056	0.004%
Fresno	2010	MH	GAS	45	3593	0.340606	0.385273	11.85505	1.895005	452.0559	452.0559	0.003537	0.003095	0.016%
Fresno	2010	MH	DSL	45	718	0.130726	0.148823	0.568585	7.937673	1065.96	1065.96	0.178927	0.164613	0.003%
Fresno	2010	MH	GAS	50	3497	0.304482	0.345951	11.92599	1.987504	454.3218	454.3218	0.003163	0.002768	0.015%
Fresno	2010	MH	DSL	50	804	0.124008	0.141175	0.528183	7.897996	1040.392	1040.392	0.190026	0.174824	0.004%
Fresno	2010	MH	GAS	55	4573	0.280527	0.323846	12.70202	2.072001	482.4155	482.4155	0.00295	0.002581	0.020%
Fresno	2010	MH	DSL	55	1178	0.126956	0.144531	0.51173	7.952515	1028.437	1028.437	0.211618	0.194689	0.005%
Fresno	2010	MH	GAS	60	5278	0.268924	0.314705	14.23283	2.136231	541.2092	541.2092	0.002867	0.002508	0.023%
Fresno	2010	MH	DSL	60	1416	0.139569	0.158891	0.519225	8.089416	1030.098	1030.098	0.243704	0.224208	0.006%
Fresno	2010	MH	GAS	65	825	0.273433	0.316851	16.80001	2.17341	641.4979	641.4979	0.002904	0.002541	0.004%
Fresno	2010	MH	DSL	65	223	0.161849	0.184254	0.550668	8.294609	1045.372	1045.372	0.286284	0.263381	0.001%
Fresno	2010	OBUS	GAS	5	211	1.869584	2.176377	25.82501	1.645658	2513.497	2513.497	0.008655	0.007888	0.001%
Fresno	2010	OBUS	DSL	5	143	7.119099	8.104552	10.18423	33.62749	3052.646	3052.646	1.807118	1.662549	0.001%
Fresno	2010	OBUS	GAS	10	1062	1.507141	1.751703	20.91309	1.688657	2036.129	2036.129	0.00697	0.006352	0.005%
Fresno	2010	OBUS	DSL	10	660	4.152014	4.726752	7.140153	23.0103	2459.322	2459.322	1.263264	1.162203	0.003%
Fresno	2010	OBUS	GAS	15	1342	1.013503	1.174963	14.33739	1.760348	1392.43	1392.43	0.004663	0.004249	0.006%
Fresno	2010	OBUS	DSL	15	869	2.163774	2.463293	5.044173	16.17782	2001.778	2001.778	0.862523	0.793521	0.004%
Fresno	2010	OBUS	GAS	20	1392	0.705566	0.819598	10.36151	1.843222	1006.069	1006.069	0.003251	0.002963	0.006%
Fresno	2010	OBUS	DSL	20	1157	0.936872	1.066557	3.847899	13.07014	1695.254	1695.254	0.569785	0.524203	0.005%
Fresno	2010	OBUS	GAS	25	1551	0.513149	0.595993	7.913537	1.924709	768.0123	768.0123	0.002363	0.002154	0.007%
Fresno	2010	OBUS	DSL	25	1201	0.765988	0.872019	3.279866	12.3216	1580.117	1580.117	0.484046	0.445322	0.005%
Fresno	2010	OBUS	GAS	30	1754	0.388559	0.450807	6.372238	2.013757	619.4336	619.4336	0.001791	0.001632	0.008%
Fresno	2010	OBUS	DSL	30	1673	0.644586	0.733812	2.939425	12.12568	1537.773	1537.773	0.422241	0.388462	0.007%
Fresno	2010	OBUS	GAS	35	2179	0.3058	0.355799	5.426915	2.102646	527.8466	527.8466	0.001414	0.001289	0.010%
Fresno	2010	OBUS	DSL	35	2467	0.548879	0.624857	2.67186	12.14565	1519.451	1519.451	0.380588	0.350141	0.011%
Fresno	2010	OBUS	GAS	40	2713	0.250289	0.292885	4.885712	2.191758	475.2333	475.2333	0.001164	0.001061	0.012%
Fresno	2010	OBUS	DSL	40	2636	0.455942	0.519055	2.240561	11.46306	1410.01	1410.01	0.357156	0.328583	0.012%
Fresno	2010	OBUS	GAS	45	2474	0.216349	0.251498	4.650894	2.266582	452.0559	452.0559	0.000999	0.000911	0.011%
Fresno	2010	OBUS	DSL	45	2945	0.421451	0.479789	2.138087	11.85456	1434.262	1434.262	0.359987	0.331188	0.013%
Fresno	2010	OBUS	GAS	50	2408	0.191241	0.224166	4.657175	2.37389	454.3218	454.3218	0.000894	0.000814	0.011%
Fresno	2010	OBUS	DSL	50	3146	0.403427	0.459271	1.956748	11.68815	1390.378	1390.378	0.382954	0.352318	0.014%
Fresno	2010	OBUS	GAS	55	3149	0.17359	0.209109	4.939507	2.473261	482.4155	482.4155	0.000833	0.000759	0.014%
Fresno	2010	OBUS	DSL	55	4126	0.416414	0.474056	1.8471	11.532	1350.209	1350.209	0.426975	0.392817	0.018%
Fresno	2010	OBUS	GAS	60	3634	0.165493	0.203865	5.546108	2.55094	541.2092	541.2092	0.00081	0.000738	0.016%
Fresno	2010	OBUS	DSL	60	2801	0.41531	0.472799	1.542664	10.16756	1175.028	1175.028	0.471458	0.433741	0.012%
Fresno	2010	OBUS	GAS	65	568	0.171334	0.207267	6.598753	2.599766	641.498	641.498	0.00082	0.000748	0.002%
Fresno	2010	OBUS	DSL	65	727	0.547712	0.623528	1.965608	11.89305	1355.226	1355.226	0.582307	0.535722	0.003%
Fresno	2010	SBUS	GAS	5	52	14.22309	15.32779	215.1643	2.774119	2513.497	2513.497	0.077647	0.064354	0.000%
Fresno	2010	SBUS	DSL	5	140	6.124599	6.97239	7.194972	31.58025	2638.698	2638.698	1.985671	1.826818	0.001%
Fresno	2010	SBUS	GAS	10	182	11.43754	12.32357	173.8789	2.830782	2036.128	2036.128	0.062528	0.051823	0.001%
Fresno	2010	SBUS	DSL	10	490	3.790703	4.315426	5.620014	21.97648	2179.77	2179.77	1.406593	1.294065	0.002%
Fresno	2010	SBUS	GAS	15	363	7.651493	8.244232	118.9091	2.970731	1392.43	1392.43	0.04183	0.034669	0.002%
Fresno	2010	SBUS	DSL	15	979	2.080442	2.368425	4.339335	15.50096	1789.78	1789.78	0.962744	0.885725	0.004%
Fresno	2010	SBUS	GAS	20	493	5.334808	5.747967	85.89319	3.109103	1006.068	1006.068	0.029169	0.024175	0.002%
Fresno	2010	SBUS	DSL	20	1329	0.851198	0.969024	3.264842	11.89138	1411.959	1411.959	0.621884	0.572133	0.006%
Fresno	2010	SBUS	GAS	25	779	3.878677	4.179199	65.59636	3.251671	768.0121	768.0121	0.021202	0.017573	0.003%
Fresno	2010	SBUS	DSL	25	2098	0.706817	0.804657	2.770772	11.35059	1317.389	1317.389	0.529347	0.486999	0.009%
Fresno	2010	SBUS	GAS	30	934	2.93942	3.167261	52.92608	3.394206	619.4336	619.4336	0.016064	0.013314	0.004%
Fresno	2010	SBUS	DSL	30	2518	0.588101	0.669508	2.343178	10.91574	1236.569	1236.569	0.455382	0.418952	0.011%
Fresno	2010	SBUS	GAS	35	959	2.324651	2.505293	45.20621	3.550775	527.8465	527.8465	0.012687	0.010515	0.004%
Fresno	2010	SBUS	DSL	35	2584	0.495051	0.563578	1.982061	10.58684	1169.498	1169.498	0.399991	0.367991	0.011%
Fresno	2010	SBUS	GAS	40	647	1.915512	2.064612	40.76438	3.703077	475.2332	475.2332	0.010445	0.008657	0.003%
Fresno	2010	SBUS	DSL	40	1744	0.427667	0.486866	1.68742	10.36387	1116.177	1116.177	0.363172	0.334118	0.008%
Fresno	2010	SBUS	GAS	45	311	1.644513	1.772628	38.80693	3.850295	452.0558	452.0558	0.008963	0.007429	0.001%
Fresno	2010	SBUS	DSL	45	837	0.385948	0.439372	1.459256	10.24685	1076.605	1076.605	0.344926	0.317332	0.004%
Fresno	2010	SBUS	GAS	50	156	1.468592	1.582656	38.89156	3.96942	454.3218	454.3218	0.008017	0.006645	0.001%
Fresno	2010	SBUS	DSL	50	419	0.369895	0.421097	1.297568	10.23577	1050.783	1050.783	0.345252	0.317632	0.002%
Fresno	2010	SBUS	GAS	55	231	1.379859	1.488548	41.84439	4.218404	482.4155	482.4155	0.007475	0.006196	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUN (gms/mile)	TOG_RUN (gms/mile)	CO_RUNE (gms/mile)	NOX_RUN (gms/mile)	CO2_RUN (gms/mile)	CO2_RUN (gms/mile)	PM10_RUI (gms/mile)	PM2_5_RUNE (gms/mile)	Percent of Total VMT
Fresno	2010	SBUS	DSL	55	624	0.379507	0.43204	1.202357	10.33063	1038.71	1038.71	0.364151	0.335019	0.003%
Fresno	2010	SBUS	GAS	60	129	1.33873	1.443843	46.80278	4.336967	541.2091	541.2091	0.007265	0.006022	0.001%
Fresno	2010	SBUS	DSL	60	347	0.414786	0.472202	1.173623	10.53143	1040.386	1040.386	0.401623	0.369493	0.002%
Fresno	2010	T6	GAS	5	427	4.886914	5.431472	72.33104	2.311706	2513.497	2513.497	0.029133	0.025279	0.002%
Fresno	2010	T6	DSL	5	2401	4.991503	5.682447	6.629171	26.86086	2610.342	2610.342	1.395743	1.284083	0.011%
Fresno	2010	T6	GAS	10	2146	3.938927	4.373519	58.5946	2.372206	2036.128	2036.128	0.023461	0.020356	0.009%
Fresno	2010	T6	DSL	10	11950	2.979432	3.391856	4.836761	18.7068	2156.347	2156.347	0.976438	0.898323	0.052%
Fresno	2010	T6	GAS	15	2711	2.637487	2.924598	40.03148	2.472126	1392.43	1392.43	0.015695	0.013618	0.012%
Fresno	2010	T6	DSL	15	16128	1.5546	1.769794	3.451914	13.14548	1770.547	1770.547	0.656131	0.603641	0.071%
Fresno	2010	T6	GAS	20	2812	1.837457	2.039901	28.93853	2.588477	1006.068	1006.068	0.010944	0.009496	0.012%
Fresno	2010	T6	DSL	20	17104	0.628745	0.715778	2.36456	9.921869	1396.786	1396.786	0.411976	0.379018	0.075%
Fresno	2010	T6	GAS	25	3134	1.335822	1.482893	22.10035	2.702786	768.0121	768.0121	0.007955	0.006903	0.014%
Fresno	2010	T6	DSL	25	17813	0.513237	0.584282	2.015239	9.396474	1303.232	1303.232	0.34674	0.319001	0.078%
Fresno	2010	T6	GAS	30	3543	1.0126	1.123275	17.81123	2.828319	619.4337	619.4337	0.006027	0.00523	0.015%
Fresno	2010	T6	DSL	30	21419	0.418796	0.476767	1.717693	8.965749	1223.281	1223.281	0.297377	0.273587	0.094%
Fresno	2010	T6	GAS	35	4403	0.798902	0.887638	15.20095	2.953488	527.8466	527.8466	0.00476	0.00413	0.019%
Fresno	2010	T6	DSL	35	25256	0.34542	0.393234	1.471921	8.629694	1156.931	1156.931	0.263886	0.242775	0.110%
Fresno	2010	T6	GAS	40	5482	0.656127	0.731473	13.72216	3.078888	475.2332	475.2332	0.003919	0.0034	0.024%
Fresno	2010	T6	DSL	40	31351	0.293109	0.333683	1.277924	8.388308	1104.182	1104.182	0.246267	0.226565	0.137%
Fresno	2010	T6	GAS	45	4999	0.564706	0.627112	13.02432	3.183541	452.0558	452.0558	0.003363	0.002918	0.022%
Fresno	2010	T6	DSL	45	25673	0.261865	0.298113	1.135701	8.241593	1065.036	1065.036	0.24452	0.224958	0.112%
Fresno	2010	T6	GAS	50	4865	0.503212	0.561472	13.11296	3.335821	454.3218	454.3218	0.003008	0.00261	0.021%
Fresno	2010	T6	DSL	50	28732	0.251686	0.286525	1.045253	8.189547	1039.491	1039.491	0.258645	0.237954	0.126%
Fresno	2010	T6	GAS	55	6363	0.462749	0.524744	13.97076	3.476178	482.4155	482.4155	0.002805	0.002434	0.028%
Fresno	2010	T6	DSL	55	42104	0.262572	0.298918	1.006579	8.232171	1027.548	1027.548	0.288643	0.265552	0.184%
Fresno	2010	T6	GAS	60	7343	0.44416	0.510431	15.65118	3.584885	541.2093	541.2093	0.002726	0.002365	0.032%
Fresno	2010	T6	DSL	60	50595	0.294524	0.335293	1.01968	8.369465	1029.206	1029.206	0.334513	0.307752	0.221%
Fresno	2010	T6	GAS	65	1147	0.453541	0.515933	18.45706	3.651432	641.4979	641.4979	0.002762	0.002396	0.005%
Fresno	2010	T6	DSL	65	7962	0.347542	0.39565	1.084555	8.601429	1044.466	1044.466	0.396255	0.364555	0.035%
Fresno	2010	T7	GAS	5	30	10.10109	11.18483	213.8881	5.341404	2513.497	2513.497	0.012688	0.010423	0.000%
Fresno	2010	T7	DSL	5	5509	8.671375	9.8717	14.73977	39.69063	4023.995	4023.995	1.613592	1.484505	0.024%
Fresno	2010	T7	GAS	10	149	8.139534	8.994206	172.6754	5.443564	2036.128	2036.128	0.010218	0.008394	0.001%
Fresno	2010	T7	DSL	10	21043	5.112951	5.820706	10.30398	28.20319	3324.135	3324.135	1.163183	1.070128	0.092%
Fresno	2010	T7	GAS	15	163	5.438447	6.018095	118.1861	5.703023	1392.43	1392.43	0.006836	0.005615	0.001%
Fresno	2010	T7	DSL	15	25736	2.62686	2.99048	6.999065	20.19142	2729.403	2729.403	0.816468	0.75115	0.113%
Fresno	2010	T7	GAS	20	278	3.795965	4.200693	85.58074	6.010552	1006.069	1006.069	0.004767	0.003916	0.001%
Fresno	2010	T7	DSL	20	63851	1.049299	1.194547	4.505185	15.20597	2152.426	2152.426	0.544112	0.500583	0.279%
Fresno	2010	T7	GAS	25	363	2.755666	3.051671	65.24409	6.25278	768.0121	768.0121	0.003465	0.002846	0.002%
Fresno	2010	T7	DSL	25	58129	0.88807	1.011	3.964165	14.19851	2009.009	2009.009	0.474968	0.436971	0.254%
Fresno	2010	T7	GAS	30	662	2.089525	2.311487	52.61572	6.506866	619.4336	619.4336	0.002625	0.002156	0.003%
Fresno	2010	T7	DSL	30	98137	0.733771	0.835342	3.457725	13.33725	1885.759	1885.759	0.422913	0.38908	0.429%
Fresno	2010	T7	GAS	35	1178	1.649041	1.825611	44.85696	6.761536	527.8465	527.8465	0.002073	0.001703	0.005%
Fresno	2010	T7	DSL	35	176552	0.611535	0.696186	3.047774	12.64679	1783.476	1783.476	0.392208	0.360832	0.772%
Fresno	2010	T7	GAS	40	1026	1.356378	1.502895	40.36036	7.035071	475.2332	475.2332	0.001707	0.001402	0.004%
Fresno	2010	T7	DSL	40	166614	0.521362	0.593531	2.73431	12.12712	1702.162	1702.162	0.382854	0.352225	0.729%
Fresno	2010	T7	GAS	45	1086	1.163981	1.291228	38.4999	7.349101	452.0559	452.0559	0.001465	0.001203	0.005%
Fresno	2010	T7	DSL	45	233270	0.463252	0.527377	2.517335	11.77824	1641.815	1641.815	0.394849	0.363261	1.020%
Fresno	2010	T7	GAS	50	1136	1.038757	1.154695	38.63434	7.611029	454.3217	454.3217	0.00131	0.001076	0.005%
Fresno	2010	T7	DSL	50	242595	0.437206	0.497725	2.396849	11.60016	1602.436	1602.436	0.428196	0.39394	1.061%
Fresno	2010	T7	GAS	55	1668	0.968466	1.075906	40.99081	7.832789	482.4156	482.4156	0.001222	0.001003	0.007%
Fresno	2010	T7	DSL	55	295829	0.443222	0.504575	2.372851	11.59286	1584.025	1584.025	0.482892	0.444261	1.294%
Fresno	2010	T7	GAS	60	412	0.937286	1.046957	46.05582	8.148454	541.2092	541.2092	0.001187	0.000975	0.002%
Fresno	2010	T7	DSL	60	90120	0.481302	0.547925	2.445342	11.75636	1586.582	1586.582	0.558939	0.514224	0.394%
Fresno	2010	T7	GAS	65	221	0.952648	1.060445	54.55183	8.44676	641.4979	641.4979	0.001203	0.000988	0.001%
Fresno	2010	T7	DSL	65	49361	0.551444	0.627777	2.61432	12.09064	1610.106	1610.106	0.656336	0.603829	0.216%
Fresno	2010	UBUS	GAS	5	127	3.949649	4.31115	41.84211	2.72709	2513.497	2513.497	0.00661	0.005768	0.001%
Fresno	2010	UBUS	DSL	5	314	1.707368	1.943725	10.86901	29.60937	2569.782	2569.782	0.79796	0.734123	0.001%
Fresno	2010	UBUS	GAS	10	457	3.180581	3.471692	33.89537	2.796209	2036.128	2036.128	0.005323	0.004645	0.002%
Fresno	2010	UBUS	DSL	10	1126	1.447848	1.648278	8.558417	25.73471	2569.782	2569.782	0.67667	0.622536	0.005%
Fresno	2010	UBUS	GAS	15	914	2.127748	2.322495	23.17973	2.934449	1392.43	1392.43	0.003561	0.003107	0.004%
Fresno	2010	UBUS	DSL	15	2253	1.068844	1.216808	5.550651	20.183	2569.782	2569.782	0.499538	0.459575	0.010%
Fresno	2010	UBUS	GAS	20	1206	1.483737	1.61954	16.74799	3.072689	1006.069	1006.069	0.002483	0.002167	0.005%
Fresno	2010	UBUS	DSL	20	2973	0.817159	0.930281	3.82254	16.64052	2569.781	2569.781	0.381909	0.351357	0.013%
Fresno	2010	UBUS	GAS	25	1816	1.078492	1.177204	12.78507	3.210928	768.0121	768.0121	0.001805	0.001575	0.008%
Fresno	2010	UBUS	DSL	25	4478	0.646992	0.736557	2.795233	14.42324	2569.782	2569.782	0.30238	0.278189	0.020%
Fresno	2010	UBUS	GAS	30	2273	0.817147	0.891939	10.31169	3.349168	619.4337	619.4337	0.001368	0.001193	0.010%
Fresno	2010	UBUS	DSL	30	5604	0.530507	0.603947	2.170408	13.14236	2569.782	2569.782	0.247939	0.228104	0.025%
Fresno	2010	UBUS	GAS	35	2228	0.645367	0.704436	8.787046	3.487408	527.8465	527.8465	0.00108	0.000942	0.010%
Fresno	2010	UBUS	DSL	35	5492	0.450489	0.512852	1.789463	12.58922	2569.782	2569.782	0.210542	0.193698	0.024%
Fresno	2010	UBUS	GAS	40	1606	0.531296	0.579924	7.911193	3.625648	475.2331	475.2331	0.000889	0.000776	0.007%
Fresno	2010	UBUS	DSL	40	3959	0.396166	0.451009	1.566612	12.67765	2569.782	2569.782	0.185153	0.170341	0.017%
Fresno	2010	UBUS	GAS	45	700	0.455921	0.49765	7.52536	3.763886	452.0558	452.0558	0.000763	0.000666	0.003%
Fresno	2010	UBUS	DSL	45	1726	0.360803	0.410751	1.456324	13.42127	2569.782	2569.782	0.168626	0.155136	0.008%
Fresno	2010	UBUS	GAS	50	356	0.407817	0.445144	7.563081	3.902126	454.3218	454.3218	0.000683	0.000596	0.002%
Fresno	2010	UBUS	DSL	50	877	0.340302	0.387411	1.437514	14.93699	2569.781	2569.781	0.159044	0.146321	0.004%
Fresno	2010	UBUS	GAS	55	441	0.380246	0.415049	8.030756	4.040366	482.4155	482.4155	0.000636	0.000555	0.002%
Fresno	2010	UBUS	DSL	55	1087	0.332398	0.378413	1.50669	17.47622	2569.781	2569.781	0.15535	0.142922	0.005%
Fresno	2010	UBUS	GAS	60	722	0.369562	0.403387	9.009493	4.178605	541.2092	541.2092	0.000618	0.00054	0.003%
Fresno	2010	UBUS	DSL	60	1779	0.336243	0.38279	1.676847	21.49544	2569.781	2569.781	0.157147	0.144575	0.008%

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2010
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.474	0.317	0.223	0.164	0.127	0.103	0.088	0.079	0.074	0.072	0.075	0.081	0.091	0.099	0.000
	LDT1	1.133	0.770	0.551	0.410	0.322	0.264	0.226	0.203	0.190	0.186	0.192	0.206	0.232	0.250	0.000
	LDT2	0.626	0.420	0.297	0.218	0.169	0.137	0.117	0.104	0.097	0.095	0.098	0.105	0.118	0.128	0.000
	LHD1	1.120	0.902	0.605	0.420	0.302	0.229	0.178	0.143	0.124	0.114	0.102	0.000	0.000	0.000	0.000
	LHD2	1.250	1.006	0.674	0.469	0.340	0.258	0.203	0.165	0.141	0.128	0.118	0.000	0.000	0.000	0.000
	MCY	5.264	4.567	3.634	3.061	2.685	2.467	2.373	2.399	2.533	2.805	3.255	3.959	5.039	6.717	0.000
	MDV	0.642	0.427	0.298	0.215	0.165	0.133	0.112	0.099	0.092	0.090	0.092	0.098	0.110	0.119	0.000
	MH	2.950	2.378	1.589	1.107	0.805	0.611	0.482	0.396	0.341	0.304	0.281	0.269	0.273	0.000	0.000
	OBUS	1.870	1.507	1.014	0.706	0.513	0.389	0.306	0.250	0.216	0.191	0.174	0.165	0.171	0.000	0.000
	SBUS	14.223	11.438	7.651	5.335	3.879	2.939	2.325	1.916	1.645	1.469	1.380	1.339	0.000	0.000	0.000
	T6	4.887	3.939	2.637	1.837	1.336	1.013	0.799	0.656	0.565	0.503	0.463	0.444	0.454	0.000	0.000
	T7	10.101	8.140	5.438	3.796	2.756	2.090	1.649	1.356	1.164	1.039	0.968	0.937	0.953	0.000	0.000
	UBUS	3.950	3.181	2.128	1.484	1.078	0.817	0.645	0.531	0.456	0.408	0.380	0.370	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.315	0.278	0.221	0.179	0.149	0.126	0.109	0.097	0.088	0.082	0.078	0.075	0.075	0.077	0.000
	LDT1	0.438	0.387	0.307	0.249	0.207	0.175	0.152	0.135	0.122	0.113	0.107	0.104	0.103	0.105	0.000
	LDT2	0.379	0.334	0.265	0.215	0.179	0.151	0.131	0.116	0.106	0.098	0.093	0.090	0.089	0.091	0.000
	LHD1	0.552	0.488	0.387	0.314	0.261	0.221	0.192	0.170	0.154	0.142	0.135	0.000	0.000	0.000	0.000
	LHD2	0.539	0.476	0.378	0.307	0.254	0.216	0.187	0.166	0.150	0.139	0.131	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.187	0.165	0.131	0.106	0.088	0.075	0.065	0.058	0.053	0.049	0.047	0.046	0.047	0.049	0.000
	MH	1.901	1.451	0.763	0.355	0.254	0.209	0.173	0.147	0.131	0.124	0.127	0.140	0.162	0.000	0.000
	OBUS	7.119	4.152	2.164	0.937	0.766	0.645	0.549	0.456	0.421	0.403	0.416	0.415	0.548	0.000	0.000
	SBUS	6.125	3.791	2.080	0.851	0.707	0.588	0.495	0.428	0.386	0.370	0.380	0.415	0.000	0.000	0.000
	T6	4.992	2.979	1.555	0.629	0.513	0.419	0.345	0.293	0.262	0.252	0.263	0.295	0.348	0.000	0.000
	T7	8.671	5.113	2.627	1.049	0.888	0.734	0.612	0.521	0.463	0.437	0.443	0.481	0.551	0.000	0.000
	UBUS	1.707	1.448	1.069	0.817	0.647	0.531	0.450	0.396	0.361	0.340	0.332	0.336	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2010
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.1	28.8	0.6	2.4	7.2	5.7	30.8	12.3	12.4	6.2	24.3	24.0	0.0	0.0	0.0	**154.7**
LDT1	0.1	10.1	0.2	0.9	2.6	2.1	11.3	4.5	4.6	2.3	8.9	8.8	0.0	0.0	0.0	**56.4**
LDT2	0.1	14.4	0.3	1.2	3.6	2.9	15.4	6.1	6.2	3.1	12.0	11.8	0.0	0.0	0.0	**77.0**
LHD1	0.0	5.5	0.1	0.4	1.1	0.8	4.2	1.5	1.4	0.7	2.2	0.0	0.0	0.0	0.0	**17.9**
LHD2	0.0	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**2.0**
MCY	0.0	6.3	0.1	0.7	2.3	2.1	12.7	5.7	6.5	3.7	16.2	18.0	0.0	0.0	0.0	**74.3**
MDV	0.1	16.6	0.3	1.4	4.0	3.1	16.8	6.6	6.6	3.3	12.7	12.4	0.0	0.0	0.0	**83.8**
MH	0.0	0.8	0.0	0.1	0.2	0.1	0.6	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.9**
OBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.2**
SBUS	0.0	0.5	0.0	0.0	0.1	0.1	0.4	0.2	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**2.0**
T6	0.0	1.8	0.0	0.1	0.4	0.3	1.4	0.5	0.5	0.2	0.7	0.7	0.0	0.0	0.0	**6.6**
T7	0.0	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.2	0.0	0.0	0.0	**2.3**
UBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	**1.4**
Total	**0.4**	**86.7**	**1.7**	**7.3**	**22.0**	**17.5**	**95.1**	**38.2**	**39.0**	**19.7**	**78.5**	**76.7**	**0.0**	**0.0**	**0.0**	**482.7**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.4**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	1.8	0.0	0.2	0.6	0.5	2.8	1.1	1.1	0.5	1.8	0.0	0.0	0.0	0.0	**10.5**
LHD2	0.0	0.5	0.0	0.1	0.2	0.1	0.7	0.3	0.3	0.1	0.5	0.0	0.0	0.0	0.0	**2.7**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
OBUS	0.0	0.9	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.7**
SBUS	0.0	0.5	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**1.4**
T6	0.0	8.1	0.1	0.3	0.9	0.7	3.6	1.4	1.3	0.6	2.6	2.6	0.0	0.0	0.0	**22.3**
T7	0.4	71.3	1.0	2.4	7.7	6.2	32.8	12.5	11.9	5.7	22.1	22.0	0.0	0.0	0.0	**196.0**
UBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.3**
Total	**0.5**	**83.8**	**1.2**	**3.0**	**9.7**	**7.8**	**41.3**	**15.8**	**15.1**	**7.2**	**27.9**	**25.5**	**0.0**	**0.0**	**0.0**	**238.8**

Total Emissions (tons/year) ***721.5***
Total Emissions (tons/day) ***2.0***

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2010
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.406	0.350	0.312	0.285	0.264	0.250	0.239	0.234	0.231	0.233	0.237	0.246	0.258	0.266	0.000
	LDT1	1.034	0.869	0.759	0.686	0.632	0.595	0.572	0.562	0.560	0.570	0.590	0.623	0.670	0.700	0.000
	LDT2	0.841	0.711	0.622	0.560	0.513	0.479	0.455	0.442	0.436	0.438	0.449	0.468	0.498	0.517	0.000
	LHD1	0.601	0.615	0.644	0.677	0.716	0.746	0.792	0.841	0.860	0.866	0.938	0.000	0.000	0.000	0.000
	LHD2	0.601	0.616	0.645	0.678	0.717	0.747	0.792	0.842	0.861	0.867	0.938	0.000	0.000	0.000	0.000
	MCY	1.130	1.122	1.134	1.167	1.195	1.228	1.263	1.306	1.350	1.397	1.449	1.506	1.566	1.631	0.000
	MDV	1.016	0.855	0.745	0.667	0.609	0.566	0.537	0.520	0.512	0.514	0.527	0.550	0.586	0.610	0.000
	MH	1.376	1.413	1.471	1.540	1.608	1.683	1.758	1.833	1.895	1.988	2.072	2.136	2.173	0.000	0.000
	OBUS	1.646	1.689	1.760	1.843	1.925	2.014	2.103	2.192	2.267	2.374	2.473	2.551	2.600	0.000	0.000
	SBUS	2.774	2.831	2.971	3.109	3.252	3.394	3.551	3.703	3.850	3.969	4.218	4.337	0.000	0.000	0.000
	T6	2.312	2.372	2.472	2.588	2.703	2.828	2.953	3.079	3.184	3.336	3.476	3.585	3.651	0.000	0.000
	T7	5.341	5.444	5.703	6.011	6.253	6.507	6.762	7.035	7.349	7.611	7.833	8.148	8.447	0.000	0.000
	UBUS	2.727	2.796	2.934	3.073	3.211	3.349	3.487	3.626	3.764	3.902	4.040	4.179	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	1.529	1.387	1.175	1.032	0.937	0.881	0.858	0.865	0.902	0.974	1.089	1.262	1.513	1.881	0.000
	LDT1	1.724	1.564	1.323	1.160	1.053	0.990	0.964	0.972	1.014	1.096	1.228	1.424	1.711	2.129	0.000
	LDT2	1.783	1.617	1.368	1.200	1.090	1.024	0.997	1.005	1.049	1.134	1.270	1.472	1.769	2.201	0.000
	LHD1	7.945	7.202	6.089	5.325	4.842	4.543	4.439	4.489	4.682	5.060	5.698	0.000	0.000	0.000	0.000
	LHD2	7.815	7.084	5.989	5.238	4.763	4.469	4.366	4.415	4.605	4.977	5.604	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.888	0.810	0.692	0.612	0.559	0.527	0.514	0.517	0.536	0.575	0.638	0.731	0.867	1.065	0.000
	MH	21.572	17.991	12.664	9.824	9.065	8.644	8.320	8.090	7.938	7.898	7.953	8.089	8.295	0.000	0.000
	OBUS	33.627	23.010	16.178	13.070	12.322	12.126	12.146	11.463	11.855	11.688	11.532	10.168	11.893	0.000	0.000
	SBUS	31.580	21.976	15.501	11.891	11.351	10.916	10.587	10.364	10.247	10.236	10.331	10.531	0.000	0.000	0.000
	T6	26.861	18.707	13.145	9.922	9.396	8.966	8.630	8.388	8.242	8.190	8.232	8.369	8.601	0.000	0.000
	T7	39.691	28.203	20.191	15.206	14.199	13.337	12.647	12.127	11.778	11.600	11.593	11.756	12.091	0.000	0.000
	UBUS	29.609	25.735	20.183	16.641	14.423	13.142	12.589	12.678	13.421	14.937	17.476	21.495	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2010
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.1	31.8	0.8	4.2	15.0	13.8	83.6	36.5	38.9	19.8	77.2	73.1	0.0	0.0	0.0	**394.7**
LDT1	0.0	11.3	0.3	1.5	5.2	4.7	28.7	12.6	13.5	7.0	27.6	26.6	0.0	0.0	0.0	**138.9**
LDT2	0.1	24.4	0.6	3.1	11.0	10.0	60.0	26.0	27.6	14.1	55.1	52.6	0.0	0.0	0.0	**284.5**
LHD1	0.0	3.7	0.1	0.7	2.7	2.8	18.5	8.8	9.7	4.9	20.4	0.0	0.0	0.0	0.0	**72.3**
LHD2	0.0	0.4	0.0	0.1	0.3	0.3	1.8	0.9	0.9	0.5	2.0	0.0	0.0	0.0	0.0	**7.1**
MCY	0.0	1.6	0.0	0.3	1.0	1.0	6.7	3.1	3.5	1.8	7.2	6.8	0.0	0.0	0.0	**33.1**
MDV	0.1	33.2	0.8	4.2	14.7	13.3	80.0	34.6	36.7	18.7	73.1	69.9	0.0	0.0	0.0	**379.5**
MH	0.0	0.5	0.0	0.1	0.3	0.3	2.2	1.0	1.1	0.6	2.4	2.3	0.0	0.0	0.0	**10.8**
OBUS	0.0	0.4	0.0	0.1	0.3	0.3	1.8	0.8	0.9	0.5	2.0	1.9	0.0	0.0	0.0	**8.9**
SBUS	0.0	0.1	0.0	0.0	0.1	0.1	0.7	0.3	0.3	0.2	0.7	0.7	0.0	0.0	0.0	**3.2**
T6	0.0	1.1	0.0	0.2	0.8	0.8	5.1	2.4	2.7	1.4	5.6	5.3	0.0	0.0	0.0	**25.3**
T7	0.0	0.4	0.0	0.1	0.3	0.3	2.0	0.9	1.0	0.5	2.1	2.0	0.0	0.0	0.0	**9.8**
UBUS	0.0	0.3	0.0	0.1	0.2	0.2	1.6	0.7	0.8	0.4	1.7	1.6	0.0	0.0	0.0	**7.7**
Total	**0.4**	**109.2**	**2.6**	**14.5**	**51.9**	**47.8**	**292.7**	**128.7**	**137.7**	**70.4**	**277.1**	**242.8**	**0.0**	**0.0**	**0.0**	**1,375.9**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.3	0.0	0.0	0.1	0.1	0.7	0.3	0.4	0.2	0.8	0.9	0.0	0.0	0.0	**3.8**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
LHD1	0.1	27.2	0.6	3.3	11.4	10.4	64.3	29.0	32.6	17.9	76.8	0.0	0.0	0.0	0.0	**273.5**
LHD2	0.0	7.2	0.2	0.9	3.0	2.7	17.0	7.7	8.6	4.7	20.3	0.0	0.0	0.0	0.0	**72.1**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
MH	0.0	1.4	0.0	0.1	0.4	0.4	2.4	1.1	1.1	0.6	2.2	2.0	0.0	0.0	0.0	**11.7**
OBUS	0.0	5.2	0.1	0.5	1.7	1.6	10.5	4.4	4.9	2.5	9.3	7.5	0.0	0.0	0.0	**48.1**
SBUS	0.0	2.8	0.1	0.2	0.9	0.9	5.2	2.3	2.4	1.2	4.8	4.4	0.0	0.0	0.0	**25.3**
T6	0.3	51.0	1.0	4.4	16.0	14.8	90.4	39.3	41.5	20.9	80.3	74.7	0.0	0.0	0.0	**434.5**
T7	1.9	393.5	7.6	34.4	123.6	112.8	677.8	290.3	303.4	151.6	578.4	536.6	0.0	0.0	0.0	**3,211.9**
UBUS	0.0	7.4	0.2	0.8	2.6	2.3	14.0	6.3	7.2	4.0	18.1	20.3	0.0	0.0	0.0	**83.3**
Total	**2.4**	**496.0**	**9.7**	**44.6**	**159.8**	**146.0**	**882.5**	**380.7**	**402.2**	**203.6**	**791.0**	**646.6**	**0.0**	**0.0**	**0.0**	**4,165.2**

Total Emissions (tons/year) ***5,541.1***
Total Emissions (tons/day) ***15.2***

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2010
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0211	0.0137	0.0093	0.0067	0.0050	0.0040	0.0033	0.0029	0.0027	0.0026	0.0027	0.0028	0.0032	0.0035	0.0000
	LDT1	0.0411	0.0272	0.0189	0.0139	0.0106	0.0085	0.0072	0.0063	0.0058	0.0056	0.0057	0.0060	0.0067	0.0072	0.0000
	LDT2	0.0219	0.0143	0.0098	0.0070	0.0053	0.0043	0.0036	0.0031	0.0029	0.0028	0.0028	0.0030	0.0034	0.0036	0.0000
	LHD1	0.0140	0.0113	0.0076	0.0053	0.0038	0.0029	0.0023	0.0019	0.0016	0.0014	0.0014	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0164	0.0132	0.0089	0.0062	0.0045	0.0034	0.0027	0.0022	0.0019	0.0017	0.0016	0.0000	0.0000	0.0000	0.0000
	MCY	0.0027	0.0024	0.0019	0.0016	0.0014	0.0013	0.0013	0.0013	0.0014	0.0015	0.0018	0.0022	0.0027	0.0036	0.0000
	MDV	0.0187	0.0121	0.0083	0.0059	0.0045	0.0036	0.0030	0.0026	0.0024	0.0023	0.0023	0.0025	0.0028	0.0030	0.0000
	MH	0.0306	0.0247	0.0165	0.0115	0.0084	0.0063	0.0050	0.0041	0.0035	0.0032	0.0029	0.0029	0.0029	0.0000	0.0000
	OBUS	0.0087	0.0070	0.0047	0.0033	0.0024	0.0018	0.0014	0.0012	0.0010	0.0009	0.0008	0.0008	0.0008	0.0000	0.0000
	SBUS	0.0776	0.0625	0.0418	0.0292	0.0212	0.0161	0.0127	0.0104	0.0090	0.0080	0.0075	0.0073	0.0000	0.0000	0.0000
	T6	0.0291	0.0235	0.0157	0.0109	0.0080	0.0060	0.0048	0.0039	0.0034	0.0030	0.0028	0.0027	0.0028	0.0000	0.0000
	T7	0.0127	0.0102	0.0068	0.0048	0.0035	0.0026	0.0021	0.0017	0.0015	0.0013	0.0012	0.0012	0.0012	0.0000	0.0000
	UBUS	0.0066	0.0053	0.0036	0.0025	0.0018	0.0014	0.0011	0.0009	0.0008	0.0007	0.0006	0.0006	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.2389	0.2110	0.1674	0.1358	0.1126	0.0955	0.0829	0.0735	0.0666	0.0618	0.0587	0.0570	0.0567	0.0578	0.0000
	LDT1	0.3717	0.3284	0.2606	0.2115	0.1754	0.1487	0.1289	0.1143	0.1036	0.0960	0.0909	0.0881	0.0873	0.0885	0.0000
	LDT2	0.3053	0.2697	0.2140	0.1736	0.1440	0.1221	0.1059	0.0939	0.0851	0.0788	0.0747	0.0724	0.0718	0.0729	0.0000
	LHD1	0.1318	0.1165	0.0925	0.0750	0.0622	0.0528	0.0457	0.0405	0.0367	0.0340	0.0322	0.0000	0.0000	0.0000	0.0000
	LHD2	0.1292	0.1142	0.0906	0.0735	0.0610	0.0517	0.0448	0.0397	0.0360	0.0333	0.0315	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.1567	0.1383	0.1096	0.0889	0.0738	0.0626	0.0544	0.0483	0.0440	0.0410	0.0391	0.0383	0.0386	0.0401	0.0000
	MH	0.7563	0.6336	0.4340	0.2952	0.2395	0.2086	0.1882	0.1783	0.1789	0.1900	0.2116	0.2437	0.2863	0.0000	0.0000
	OBUS	1.8071	1.2633	0.8625	0.5698	0.4840	0.4222	0.3806	0.3572	0.3600	0.3830	0.4270	0.4715	0.5823	0.0000	0.0000
	SBUS	1.9857	1.4066	0.9627	0.6219	0.5293	0.4554	0.4000	0.3632	0.3449	0.3453	0.3642	0.4016	0.0000	0.0000	0.0000
	T6	1.3957	0.9764	0.6561	0.4120	0.3467	0.2974	0.2639	0.2463	0.2445	0.2586	0.2886	0.3345	0.3963	0.0000	0.0000
	T7	1.6136	1.1632	0.8165	0.5441	0.4750	0.4229	0.3922	0.3829	0.3948	0.4282	0.4829	0.5589	0.6563	0.0000	0.0000
	UBUS	0.7980	0.6767	0.4995	0.3819	0.3024	0.2479	0.2105	0.1852	0.1686	0.1590	0.1554	0.1571	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2010
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.007	1.2	0.0	0.1	0.3	0.2	1.2	0.5	0.5	0.2	0.9	0.8	0.0	0.0	0.0	**5.9**
LDT1	0.002	0.4	0.0	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.8**
LDT2	0.003	0.5	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.4**
LHD1	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.002	0.5	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.2**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.014**	**2.7**	**0.0**	**0.2**	**0.6**	**0.5**	**2.5**	**1.0**	**1.0**	**0.5**	**1.9**	**1.8**	**0.0**	**0.0**	**0.0**	**12.6**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.002	0.4	0.0	0.0	0.1	0.1	0.7	0.3	0.3	0.1	0.4	0.0	0.0	0.0	0.0	**2.5**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	**0.7**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
OBUS	0.001	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.8**
SBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**1.0**
T6	0.013	2.7	0.0	0.2	0.6	0.5	2.8	1.2	1.2	0.7	2.8	3.0	0.0	0.0	0.0	**15.6**
T7	0.077	16.2	0.3	1.2	4.1	3.6	21.0	9.2	10.2	5.6	24.1	25.5	0.0	0.0	0.0	**121.1**
UBUS	0.001	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	**1.1**
Total	**0.1**	**20.2**	**0.4**	**1.5**	**5.1**	**4.4**	**25.5**	**11.0**	**12.1**	**6.6**	**28.2**	**29.3**	**0.0**	**0.0**	**0.0**	**144.5**

Total Emissions (tons/year) ***157.1***
Total Emissions (tons/day) ***0.4***

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2010
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0193	0.0124	0.0085	0.0061	0.0046	0.0036	0.0030	0.0026	0.0024	0.0024	0.0024	0.0026	0.0029	0.0031	0.0000
	LDT1	0.0372	0.0246	0.0171	0.0125	0.0096	0.0077	0.0065	0.0057	0.0052	0.0050	0.0051	0.0054	0.0060	0.0064	0.0000
	LDT2	0.0199	0.0130	0.0089	0.0064	0.0048	0.0038	0.0032	0.0028	0.0026	0.0025	0.0025	0.0027	0.0030	0.0033	0.0000
	LHD1	0.0129	0.0104	0.0069	0.0048	0.0035	0.0027	0.0021	0.0017	0.0015	0.0013	0.0012	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0146	0.0117	0.0078	0.0055	0.0040	0.0030	0.0024	0.0020	0.0017	0.0015	0.0014	0.0000	0.0000	0.0000	0.0000
	MCY	0.0021	0.0019	0.0015	0.0013	0.0011	0.0010	0.0010	0.0010	0.0011	0.0012	0.0014	0.0017	0.0021	0.0028	0.0000
	MDV	0.0171	0.0111	0.0076	0.0054	0.0041	0.0032	0.0027	0.0024	0.0022	0.0021	0.0021	0.0023	0.0025	0.0027	0.0000
	MH	0.0268	0.0216	0.0144	0.0101	0.0073	0.0055	0.0044	0.0036	0.0031	0.0028	0.0026	0.0025	0.0025	0.0000	0.0000
	OBUS	0.0079	0.0064	0.0042	0.0030	0.0022	0.0016	0.0013	0.0011	0.0009	0.0008	0.0008	0.0007	0.0007	0.0000	0.0000
	SBUS	0.0644	0.0518	0.0347	0.0242	0.0176	0.0133	0.0105	0.0087	0.0074	0.0066	0.0062	0.0060	0.0000	0.0000	0.0000
	T6	0.0253	0.0204	0.0136	0.0095	0.0069	0.0052	0.0041	0.0034	0.0029	0.0026	0.0024	0.0024	0.0024	0.0000	0.0000
	T7	0.0104	0.0084	0.0056	0.0039	0.0028	0.0022	0.0017	0.0014	0.0012	0.0011	0.0010	0.0010	0.0010	0.0000	0.0000
	UBUS	0.0058	0.0046	0.0031	0.0022	0.0016	0.0012	0.0009	0.0008	0.0007	0.0006	0.0006	0.0005	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.2198	0.1941	0.1540	0.1249	0.1036	0.0879	0.0762	0.0676	0.0613	0.0569	0.0540	0.0524	0.0521	0.0532	0.0000
	LDT1	0.3420	0.3021	0.2398	0.1945	0.1614	0.1368	0.1186	0.1051	0.0953	0.0883	0.0836	0.0810	0.0803	0.0815	0.0000
	LDT2	0.2808	0.2481	0.1969	0.1597	0.1325	0.1124	0.0974	0.0864	0.0783	0.0725	0.0687	0.0666	0.0661	0.0671	0.0000
	LHD1	0.1213	0.1072	0.0851	0.0690	0.0573	0.0485	0.0421	0.0373	0.0338	0.0313	0.0296	0.0000	0.0000	0.0000	0.0000
	LHD2	0.1189	0.1051	0.0834	0.0677	0.0561	0.0476	0.0412	0.0365	0.0331	0.0306	0.0290	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.1442	0.1273	0.1009	0.0818	0.0679	0.0576	0.0500	0.0444	0.0404	0.0377	0.0360	0.0353	0.0355	0.0369	0.0000
	MH	0.6958	0.5829	0.3992	0.2716	0.2203	0.1919	0.1732	0.1641	0.1646	0.1748	0.1947	0.2242	0.2634	0.0000	0.0000
	OBUS	1.6625	1.1622	0.7935	0.5242	0.4453	0.3885	0.3501	0.3286	0.3312	0.3523	0.3928	0.4337	0.5357	0.0000	0.0000
	SBUS	1.8268	1.2941	0.8857	0.5721	0.4870	0.4190	0.3680	0.3341	0.3173	0.3176	0.3350	0.3695	0.0000	0.0000	0.0000
	T6	1.2841	0.8983	0.6036	0.3790	0.3190	0.2736	0.2428	0.2266	0.2250	0.2380	0.2656	0.3078	0.3646	0.0000	0.0000
	T7	1.4845	1.0701	0.7512	0.5006	0.4370	0.3891	0.3608	0.3522	0.3633	0.3939	0.4443	0.5142	0.6038	0.0000	0.0000
	UBUS	0.7341	0.6225	0.4596	0.3514	0.2782	0.2281	0.1937	0.1703	0.1551	0.1463	0.1429	0.1446	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2010
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.006	1.1	0.0	0.1	0.3	0.2	1.1	0.4	0.4	0.2	0.8	0.8	0.0	0.0	0.0	**5.3**
LDT1	0.002	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.6**
LDT2	0.002	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.1**
LHD1	0.000	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.002	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.013**	**2.4**	**0.0**	**0.2**	**0.6**	**0.4**	**2.3**	**0.9**	**0.9**	**0.4**	**1.7**	**1.6**	**0.0**	**0.0**	**0.0**	**11.4**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.002	0.4	0.0	0.0	0.1	0.1	0.6	0.2	0.2	0.1	0.4	0.0	0.0	0.0	0.0	**2.3**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	**0.6**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
OBUS	0.001	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.7**
SBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**0.9**
T6	0.012	2.5	0.0	0.2	0.5	0.5	2.5	1.1	1.1	0.6	2.6	2.7	0.0	0.0	0.0	**14.4**
T7	0.071	14.9	0.3	1.1	3.8	3.3	19.3	8.4	9.4	5.1	22.2	23.5	0.0	0.0	0.0	**111.4**
UBUS	0.001	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
Total	**0.088**	**18.6**	**0.4**	**1.4**	**4.7**	**4.0**	**23.5**	**10.1**	**11.1**	**6.1**	**26.0**	**26.9**	**0.0**	**0.0**	**0.0**	**132.9**

Total Emissions (tons/year)	***144.3***
Total Emissions (tons/day)	***0.4***

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2010
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	6.0	5.0	4.3	3.7	3.3	3.0	2.7	2.6	2.4	2.4	2.3	2.4	2.5	2.7	0.0
	LDT1	15.0	12.1	10.1	8.5	7.5	6.7	6.2	5.8	5.5	5.4	5.5	5.8	6.3	6.7	0.0
	LDT2	8.2	6.8	5.9	5.1	4.5	4.1	3.8	3.5	3.3	3.2	3.2	3.2	3.4	3.6	0.0
	LHD1	13.7	11.1	7.6	5.5	4.2	3.4	2.8	2.5	2.4	2.5	2.6	0.0	0.0	0.0	0.0
	LHD2	18.5	15.0	10.2	7.4	5.7	4.6	3.9	3.6	3.4	3.4	3.6	0.0	0.0	0.0	0.0
	MCY	36.8	32.9	27.9	24.8	23.2	22.7	23.2	25.1	28.4	33.9	42.7	56.7	79.5	117.4	0.0
	MDV	8.3	7.0	6.1	5.2	4.7	4.3	3.9	3.7	3.5	3.3	3.3	3.3	3.4	3.6	0.0
	MH	65.8	53.3	36.4	26.3	20.1	16.2	13.8	12.5	11.9	11.9	12.7	14.2	16.8	0.0	0.0
	OBUS	25.8	20.9	14.3	10.4	7.9	6.4	5.4	4.9	4.7	4.7	4.9	5.5	6.6	0.0	0.0
	SBUS	215.2	173.9	118.9	85.9	65.6	52.9	45.2	40.8	38.8	38.9	41.8	46.8	0.0	0.0	0.0
	T6	72.3	58.6	40.0	28.9	22.1	17.8	15.2	13.7	13.0	13.1	14.0	15.7	18.5	0.0	0.0
	T7	213.9	172.7	118.2	85.6	65.2	52.6	44.9	40.4	38.5	38.6	41.0	46.1	54.6	0.0	0.0
	UBUS	41.8	33.9	23.2	16.7	12.8	10.3	8.8	7.9	7.5	7.6	8.0	9.0	0.0	0.0	0.0

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	2.0	1.6	1.2	0.9	0.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.0
	LDT1	2.6	2.1	1.5	1.1	0.9	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.0
	LDT2	2.2	1.8	1.3	1.0	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.0
	LHD1	3.4	2.8	2.0	1.5	1.1	0.9	0.8	0.7	0.6	0.6	0.6	0.0	0.0	0.0	0.0
	LHD2	3.3	2.7	1.9	1.4	1.1	0.9	0.8	0.7	0.6	0.6	0.6	0.0	0.0	0.0	0.0
	MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MDV	1.2	1.0	0.7	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.0
	MH	2.7	2.3	1.6	1.2	1.0	0.8	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.0	0.0
	OBUS	10.2	7.1	5.0	3.8	3.3	2.9	2.7	2.2	2.1	2.0	1.8	1.5	2.0	0.0	0.0
	SBUS	7.2	5.6	4.3	3.3	2.8	2.3	2.0	1.7	1.5	1.3	1.2	1.2	0.0	0.0	0.0
	T6	6.6	4.8	3.5	2.4	2.0	1.7	1.5	1.3	1.1	1.0	1.0	1.0	1.1	0.0	0.0
	T7	14.7	10.3	7.0	4.5	4.0	3.5	3.0	2.7	2.5	2.4	2.4	2.4	2.6	0.0	0.0
	UBUS	10.9	8.6	5.6	3.8	2.8	2.2	1.8	1.6	1.5	1.4	1.5	1.7	0.0	0.0	0.0

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2010
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	1.9	455.3	10.6	54.4	186.9	164.5	960.6	400.1	409.0	201.1	762.4	712.2	0.1	0.0	0.0	**4,319.0**
LDT1	0.7	157.8	3.6	18.0	61.0	53.2	309.6	129.3	133.2	66.4	256.9	246.3	0.0	0.0	0.0	**1,436.1**
LDT2	1.0	235.0	5.5	28.2	96.8	85.1	496.6	206.5	210.7	103.3	390.0	362.2	0.0	0.0	0.0	**2,221.0**
LHD1	0.3	67.4	1.3	5.4	15.8	12.4	66.5	26.6	27.4	14.1	56.3	0.0	0.0	0.0	0.0	**293.5**
LHD2	0.0	8.9	0.2	0.7	2.1	1.6	8.9	3.6	3.7	1.9	7.7	0.0	0.0	0.0	0.0	**39.4**
MCY	0.2	45.7	1.1	5.6	20.1	19.1	124.0	59.8	72.8	44.1	212.1	257.8	0.0	0.0	0.0	**862.3**
MDV	1.1	271.9	6.4	33.0	113.7	100.3	585.4	243.3	247.7	121.0	454.4	419.0	0.0	0.0	0.0	**2,597.2**
MH	0.1	17.3	0.3	1.4	4.1	3.2	17.2	6.9	7.1	3.6	14.7	15.1	0.0	0.0	0.0	**91.1**
OBUS	0.0	4.7	0.1	0.4	1.1	0.9	4.7	1.9	1.9	1.0	3.9	4.1	0.0	0.0	0.0	**24.5**
SBUS	0.0	8.3	0.2	0.7	2.0	1.5	8.3	3.3	3.4	1.7	7.2	7.3	0.0	0.0	0.0	**44.0**
T6	0.1	26.4	0.5	2.1	6.2	4.9	26.3	10.6	10.9	5.5	22.5	23.1	0.0	0.0	0.0	**139.3**
T7	0.1	13.2	0.2	1.1	3.1	2.4	13.2	5.3	5.4	2.8	11.2	11.5	0.0	0.0	0.0	**69.6**
UBUS	0.0	4.0	0.1	0.3	0.9	0.7	4.0	1.6	1.6	0.8	3.4	3.5	0.0	0.0	0.0	**20.9**
Total	**5.4**	**1,315.9**	**29.9**	**151.3**	**513.8**	**449.8**	**2,625.3**	**1,099.0**	**1,135.0**	**567.2**	**2,202.8**	**2,062.1**	**0.2**	**0.0**	**0.0**	**12,157.8**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.3	0.0	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.8**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LHD1	0.0	10.6	0.2	0.9	2.7	2.1	11.3	4.5	4.4	2.2	8.5	0.0	0.0	0.0	0.0	**47.4**
LHD2	0.0	2.8	0.1	0.2	0.7	0.5	2.9	1.2	1.2	0.6	2.2	0.0	0.0	0.0	0.0	**12.3**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
MH	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
OBUS	0.0	1.6	0.0	0.1	0.5	0.4	2.3	0.9	0.9	0.4	1.5	1.1	0.0	0.0	0.0	**9.7**
SBUS	0.0	0.7	0.0	0.1	0.2	0.2	1.0	0.4	0.3	0.2	0.6	0.5	0.0	0.0	0.0	**4.1**
T6	0.1	13.2	0.3	1.0	3.4	2.8	15.4	6.0	5.7	2.7	9.8	9.1	0.0	0.0	0.0	**69.5**
T7	0.7	143.8	2.6	10.2	34.5	29.2	163.4	65.5	64.8	31.3	118.4	111.6	0.0	0.0	0.0	**776.0**
UBUS	0.0	2.5	0.0	0.2	0.5	0.4	2.0	0.8	0.8	0.4	1.6	1.6	0.0	0.0	0.0	**10.7**
Total	**0.8**	**175.8**	**3.3**	**12.8**	**42.6**	**35.8**	**198.9**	**79.3**	**78.4**	**37.8**	**143.0**	**124.4**	**0.0**	**0.0**	**0.0**	**933.0**

Total Emissions (tons/year) ***13,090.8***
Tons/day 35.865

City of Fresno General Plan

Criteria Pollutants: Summary

Year 2020

Prepared by FirstCarbon Solutions

	Data
City Information	
Population	649,200
Employment	240,014
County Information	
Population	1,082,000

	ROG	NOx	PM10	PM2.5	CO	SO2
Emissions (tons/year)						
Motor vehicles	311	2407	46	42	5948	0
Electricity	0	350	0	0	0	246
Natural gas	100	887	69	69	574	5
Stationary, area	554	507	238	na	203	89
Offroad	1488	2268	182	182	10972	10
Total	**2453**	**6418**	**536**	**294**	**17697**	**350**
Emissions (tons/day)						
Motor vehicles	0.9	6.6	0.1	0.1	16.3	0.0
Electricity	0.0	1.0	0.0	0.0	0.0	0.7
Natural gas	0.3	2.4	0.2	0.2	1.6	0.0
Stationary, area	1.5	1.4	0.7	na	0.6	0.2
Offroad	4.1	6.2	0.5	0.5	30.1	0.03
Total	**6.7**	**17.6**	**1.5**	**0.8**	**48.5**	**1.0**

Sources:
- Population for the City: Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.
-Employment: Took the 2010 population and 2010 employment and cross multiplied with the 2020 population and the 2020 employment number (our X).
- Emissions: refer to subsequent spreadsheets.
- Emissions for stationary, area: California Air Resources Board, CEIDARS 2.5, data is from the year 2010. Note that SO2 emissions for this category represent SOx emissions; SO2 emissions were not available.
www.arb.ca.gov/app/emsinv/facinfo/faccrit.php?dd=y&grp=1&sort=FacilityNameA&dbyr=2010&ab_=&dis_=&co_=10&fname_=&city_=Fresno&fzip_=&fsic_=&facid_=&all_fac=C&displayit=Pollutant&CERR=&showpol=&showpol2=

City of Fresno General Plan
Criteria Pollutants: Energy
Year 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Electricity

Emission Factors (lbs/MWh)		*(lbs/kWh)*
NOx	0.2002	0.0002002
SO2	0.1409	0.0001409

	Usage (kWh/year)	Emissions Per capita (kWh/person or employee/year)	Emissions (tons/year) NOx	SO2
Residential	1,694,412,000	2,610	169.6	119.4
Commercial	1,800,825,042	7,503	180.3	126.9
Industrial	not available			
Total	**3,495,237,042**		**349.9**	**246.2**

Natural Gas

		Natural Gas Emission Factors ROG	NOx	PM10	PM2.5	CO	SO2
lb/MMBTU	Residential	0.01078	0.09216	0.00745	0.00745	0.03922	0.00059
	Nonresidential	0.01078	0.09804	0.00745	0.00745	0.08235	0.00059
lb/therm	Residential	0.0011	0.0092	0.0007	0.0007	0.0039	0.0001
	Nonresidential	0.0011	0.0098	0.0007	0.0007	0.0082	0.0001

	Usage (therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) ROG	NOx	PM10	PM2.5	CO	SO2
Residential	89,589,600	138	48	413	33	33	176	3
Commercial	96,725,642	403	52	474	36	36	398	3
Industrial	not available							
Total	**186,315,242**		**100**	**887**	**69**	**69**	**574**	**5**

Sources:

Per capita energy usage: See the spreadsheet calculations for 2010. Residential rates are based on population and commercial are based on employees.

Usage: per capita usage multiplied by the population (for residential) or employees (for commercial)

Emission factors for electricity NOx and SO2 electricity emission factors from Environmental Protection Agency, eGRID2012, state total annual total output emission rate for California (data is from year 2009).

Emission factors for natural gas: CalEEMod Appendix D, Table 8.2, August 2013. 1 therm = 0.1 MMBTU

City of Fresno General Plan

Criteria Pollutants: Offroad

Year 2020

Prepared by FirstCarbon Solutions

Note: yellow shaded cells are data entry cells

Fresno County Emissions (tons/day) (from Offroad 2007)	ROG Evaporative	ROG Exhaust	CO	NOx	SO2	PM
Agricultural Equipment	0.12	0.78	9.82	4.98	0.01	0.25
Airport Ground Support Equipment	0.00	0.01	0.23	0.04	0.00	0.00
Construction and Mining Equipment	0.01	0.52	4.43	3.04	0.01	0.16
Dredging	0.00	0.00	0.00	0.00	0.00	0.00
Entertainment Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Equipment	0.02	0.04	2.58	0.30	0.00	0.01
Lawn and Garden Equipment	0.53	0.95	12.06	0.25	0.00	0.03
Light Commercial Equipment	0.07	0.19	6.46	0.35	0.00	0.04
Logging Equipment	0.00	0.04	0.29	0.04	0.00	0.00
Military Tactical Support Equip	0.00	0.00	0.02	0.02	0.00	0.00
Oil Drilling	0.00	0.00	0.00	0.00	0.00	0.00
Other Portable Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Pleasure Craft	0.67	0.83	7.38	0.41	0.00	0.29
Railyard Operations	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Equipment	0.48	1.41	5.21	0.07	0.02	0.03
Transport Refrigeration Units	0.00	0.12	1.63	0.86	0.00	0.01
Total	1.91	4.88	50.10	10.36	0.04	0.83
Percent Fresno County/Fresno City Population		**0.60**				
City of Fresno Emissions (tons/day)						
Agricultural Equipment	0.07	0.5	5.9	3.0	0.01	0.15
Airport Ground Support Equipment	0.00	0.0	0.1	0.0	0.00	0.00
Construction and Mining Equipment	0.01	0.3	2.7	1.8	0.00	0.10
Dredging	0.00	0.0	0.0	0.0	0.00	0.00
Entertainment Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Industrial Equipment	0.01	0.0	1.5	0.2	0.00	0.01
Lawn and Garden Equipment	0.32	0.6	7.2	0.1	0.00	0.02
Light Commercial Equipment	0.04	0.1	3.9	0.2	0.00	0.03
Logging Equipment	0.00	0.0	0.2	0.0	0.00	0.00
Military Tactical Support Equip	0.00	0.0	0.0	0.0	0.00	0.00
Oil Drilling	0.00	0.0	0.0	0.0	0.00	0.00
Other Portable Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Pleasure Craft	0.40	0.5	4.4	0.2	0.00	0.17
Railyard Operations	0.00	0.0	0.0	0.0	0.00	0.00
Recreational Equipment	0.29	0.8	3.1	0.0	0.01	0.02
Transport Refrigeration Units	0.00	0.1	1.0	0.5	0.00	0.01
Total	1.15	2.9	30.1	6.2	0.03	0.50

Sources:

- County of Fresno emissions from OFFROAD2007, annual, all days, all equipment, for the year assessed
- City of Fresno emissions based on the percent of the City's population compared with the County's population.

Note: PM refers to total particulate matter.

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2020
Prepared by FirstCarbon Solutions

Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,195,062,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2020
Prepared by FirstCarbon Solutions

VMT/day by Vehicle Class and speed

GAS	**Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA		979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1		143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2		366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1		60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2		6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY		15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV		381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH		3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS		2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS		0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6		7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7		1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS		1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL	**Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**			
LDA		3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1		0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2		0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1		36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2		10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV		0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH		1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS		3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS		1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6		37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7		185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS		3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

EMFAC2011 Emission Rates
Region Type: County
Region: Fresno
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2007 Categories

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1098	0.094	0.161	1.582	0.137	1129.595	765.503	0.011	0.010	0.004%
Fresno	2020	LDA	DSL	5	3	0.050	0.057	0.374	0.495	487.081	329.765	0.035	0.032	0.000%
Fresno	2020	LDA	GAS	10	19368	0.060	0.102	1.398	0.120	834.780	565.727	0.007	0.007	0.068%
Fresno	2020	LDA	DSL	10	54	0.044	0.050	0.320	0.460	443.707	301.292	0.031	0.028	0.000%
Fresno	2020	LDA	GAS	15	9051	0.040	0.069	1.249	0.106	640.941	434.371	0.005	0.004	0.032%
Fresno	2020	LDA	DSL	15	25	0.034	0.039	0.244	0.405	378.486	258.478	0.024	0.022	0.000%
Fresno	2020	LDA	GAS	20	570962	0.029	0.049	1.137	0.094	513.964	348.309	0.003	0.003	2.019%
Fresno	2020	LDA	DSL	20	1581	0.028	0.032	0.194	0.366	334.546	229.633	0.019	0.018	0.006%
Fresno	2020	LDA	GAS	25	115652	0.022	0.037	1.050	0.086	428.385	290.303	0.002	0.002	0.409%
Fresno	2020	LDA	DSL	25	320	0.023	0.026	0.160	0.340	306.000	210.895	0.016	0.015	0.001%
Fresno	2020	LDA	GAS	30	266830	0.017	0.029	0.956	0.080	367.605	249.119	0.002	0.002	0.943%
Fresno	2020	LDA	DSL	30	739	0.020	0.022	0.137	0.323	289.294	199.928	0.014	0.013	0.003%
Fresno	2020	LDA	GAS	35	920286	0.014	0.024	0.880	0.075	328.240	222.443	0.002	0.001	3.254%
Fresno	2020	LDA	DSL	35	2549	0.017	0.020	0.121	0.315	282.453	195.437	0.012	0.011	0.009%
Fresno	2020	LDA	GAS	40	1530954	0.012	0.021	0.812	0.073	303.705	205.819	0.001	0.001	5.413%
Fresno	2020	LDA	DSL	40	4240	0.016	0.018	0.110	0.315	284.694	196.909	0.011	0.010	0.015%
Fresno	2020	LDA	GAS	45	1340676	0.011	0.019	0.756	0.071	292.239	198.049	0.001	0.001	4.740%
Fresno	2020	LDA	DSL	45	3713	0.015	0.017	0.102	0.323	296.273	204.509	0.010	0.010	0.013%
Fresno	2020	LDA	GAS	50	1834855	0.011	0.018	0.711	0.070	292.103	197.956	0.001	0.001	6.487%
Fresno	2020	LDA	DSL	50	5081	0.015	0.017	0.097	0.339	318.531	219.120	0.010	0.009	0.018%
Fresno	2020	LDA	GAS	55	1221758	0.011	0.019	0.672	0.071	302.896	205.270	0.001	0.001	4.319%
Fresno	2020	LDA	DSL	55	3383	0.015	0.017	0.095	0.366	354.161	242.510	0.010	0.009	0.012%
Fresno	2020	LDA	GAS	60	1512184	0.012	0.020	0.641	0.073	325.755	220.762	0.001	0.001	5.346%
Fresno	2020	LDA	DSL	60	4188	0.016	0.018	0.096	0.405	407.755	277.692	0.011	0.010	0.015%
Fresno	2020	LDA	GAS	65	1544869	0.014	0.023	0.619	0.076	363.732	246.499	0.002	0.001	5.462%
Fresno	2020	LDA	DSL	65	4278	0.018	0.021	0.100	0.462	486.799	329.580	0.012	0.011	0.015%
Fresno	2020	LDA	GAS	70	1451954	0.015	0.024	0.613	0.078	390.013	264.308	0.002	0.002	5.133%
Fresno	2020	LDA	DSL	70	4021	0.022	0.025	0.108	0.543	603.418	406.135	0.014	0.013	0.014%
Fresno	2020	LDT1	GAS	5	160	0.231	0.351	3.960	0.377	1304.797	925.652	0.019	0.017	0.001%
Fresno	2020	LDT1	DSL	5	0	0.089	0.101	0.535	0.559	486.454	323.971	0.070	0.064	0.000%
Fresno	2020	LDT1	GAS	10	2829	0.152	0.230	3.408	0.318	964.453	684.236	0.012	0.011	0.010%
Fresno	2020	LDT1	DSL	10	4	0.078	0.089	0.454	0.520	444.130	296.952	0.061	0.056	0.000%
Fresno	2020	LDT1	GAS	15	1322	0.105	0.158	2.980	0.275	740.614	525.449	0.008	0.008	0.005%
Fresno	2020	LDT1	DSL	15	2	0.061	0.070	0.340	0.458	380.487	256.323	0.048	0.045	0.000%
Fresno	2020	LDT1	GAS	20	83407	0.076	0.115	2.662	0.240	593.771	421.249	0.006	0.005	0.295%
Fresno	2020	LDT1	DSL	20	111	0.050	0.056	0.267	0.414	337.611	228.951	0.039	0.036	0.000%
Fresno	2020	LDT1	GAS	25	16895	0.059	0.088	2.422	0.216	494.765	350.988	0.004	0.004	0.060%
Fresno	2020	LDT1	DSL	25	22	0.041	0.047	0.218	0.384	309.756	211.169	0.033	0.030	0.000%
Fresno	2020	LDT1	GAS	30	38979	0.047	0.070	2.188	0.199	424.638	301.251	0.003	0.003	0.138%
Fresno	2020	LDT1	DSL	30	52	0.035	0.040	0.185	0.365	293.454	200.762	0.028	0.025	0.000%
Fresno	2020	LDT1	GAS	35	134437	0.039	0.058	2.005	0.188	379.177	269.001	0.003	0.003	0.475%
Fresno	2020	LDT1	DSL	35	178	0.031	0.035	0.162	0.356	286.779	196.500	0.024	0.022	0.001%
Fresno	2020	LDT1	GAS	40	223645	0.034	0.051	1.849	0.181	350.876	248.930	0.003	0.002	0.791%
Fresno	2020	LDT1	DSL	40	296	0.028	0.032	0.146	0.356	288.966	197.897	0.022	0.020	0.001%
Fresno	2020	LDT1	GAS	45	195849	0.031	0.046	1.729	0.178	337.631	239.533	0.002	0.002	0.692%
Fresno	2020	LDT1	DSL	45	260	0.026	0.029	0.136	0.365	300.264	205.109	0.020	0.018	0.001%
Fresno	2020	LDT1	GAS	50	268040	0.030	0.044	1.636	0.179	337.461	239.410	0.002	0.002	0.948%
Fresno	2020	LDT1	DSL	50	355	0.025	0.028	0.130	0.383	321.983	218.975	0.019	0.017	0.001%
Fresno	2020	LDT1	GAS	55	178477	0.030	0.045	1.566	0.185	349.925	248.252	0.002	0.002	0.631%
Fresno	2020	LDT1	DSL	55	237	0.025	0.028	0.128	0.413	356.751	241.170	0.019	0.017	0.001%
Fresno	2020	LDT1	GAS	60	220903	0.032	0.047	1.518	0.194	376.343	266.996	0.002	0.002	0.781%
Fresno	2020	LDT1	DSL	60	293	0.026	0.029	0.130	0.458	409.048	274.556	0.019	0.017	0.001%
Fresno	2020	LDT1	GAS	65	225678	0.035	0.052	1.500	0.210	420.222	298.126	0.003	0.002	0.798%
Fresno	2020	LDT1	DSL	65	299	0.028	0.032	0.137	0.522	486.179	323.796	0.020	0.018	0.001%
Fresno	2020	LDT1	GAS	70	212105	0.037	0.055	1.505	0.219	450.568	319.653	0.003	0.003	0.750%
Fresno	2020	LDT1	DSL	70	281	0.032	0.036	0.151	0.613	599.976	396.443	0.022	0.020	0.001%
Fresno	2020	LDT2	GAS	5	410	0.131	0.221	2.189	0.234	1536.029	1143.767	0.012	0.011	0.001%
Fresno	2020	LDT2	DSL	5	0	0.060	0.069	0.427	0.598	483.636	352.950	0.041	0.038	0.000%
Fresno	2020	LDT2	GAS	10	7240	0.084	0.141	1.931	0.202	1135.276	845.371	0.007	0.007	0.026%
Fresno	2020	LDT2	DSL	10	3	0.053	0.060	0.365	0.555	441.459	322.998	0.036	0.033	0.000%
Fresno	2020	LDT2	GAS	15	3384	0.057	0.095	1.722	0.177	871.738	649.139	0.005	0.005	0.012%
Fresno	2020	LDT2	DSL	15	2	0.041	0.047	0.278	0.489	378.039	277.960	0.028	0.026	0.000%
Fresno	2020	LDT2	GAS	20	213438	0.041	0.068	1.564	0.157	698.954	520.466	0.004	0.003	0.755%
Fresno	2020	LDT2	DSL	20	100	0.033	0.038	0.221	0.441	335.312	247.618	0.023	0.021	0.000%
Fresno	2020	LDT2	GAS	25	43233	0.031	0.051	1.441	0.142	582.476	433.722	0.003	0.002	0.153%
Fresno	2020	LDT2	DSL	25	20	0.028	0.031	0.183	0.409	307.556	227.906	0.019	0.017	0.000%
Fresno	2020	LDT2	GAS	30	99747	0.024	0.040	1.311	0.132	499.883	372.227	0.002	0.002	0.353%
Fresno	2020	LDT2	DSL	30	47	0.024	0.027	0.157	0.389	291.311	216.370	0.016	0.015	0.000%
Fresno	2020	LDT2	GAS	35	344023	0.020	0.033	1.207	0.124	446.361	332.374	0.002	0.002	1.216%
Fresno	2020	LDT2	DSL	35	162	0.021	0.024	0.138	0.379	284.658	211.646	0.014	0.013	0.001%
Fresno	2020	LDT2	GAS	40	572304	0.018	0.029	1.113	0.119	413.026	307.555	0.001	0.001	2.023%
Fresno	2020	LDT2	DSL	40	269	0.019	0.022	0.126	0.379	286.838	213.193	0.013	0.012	0.001%
Fresno	2020	LDT2	GAS	45	501174	0.016	0.026	1.037	0.117	397.434	295.945	0.001	0.001	1.772%
Fresno	2020	LDT2	DSL	45	236	0.018	0.020	0.117	0.389	298.097	221.189	0.012	0.011	0.001%
Fresno	2020	LDT2	GAS	50	685909	0.015	0.025	0.974	0.116	397.240	295.799	0.001	0.001	2.425%
Fresno	2020	LDT2	DSL	50	323	0.018	0.020	0.111	0.409	319.740	236.559	0.012	0.011	0.001%
Fresno	2020	LDT2	GAS	55	456720	0.016	0.026	0.921	0.118	411.914	306.726	0.001	0.001	1.615%
Fresno	2020	LDT2	DSL	55	215	0.018	0.020	0.109	0.441	354.386	261.163	0.012	0.011	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2020	LDT2	GAS	60	565287	0.017	0.027	0.878	0.122	443.008	329.880	0.001	0.001	1.999%
Fresno	2020	LDT2	DSL	60	266	0.019	0.022	0.110	0.490	406.500	298.172	0.012	0.011	0.001%
Fresno	2020	LDT2	GAS	65	577506	0.019	0.031	0.848	0.128	494.657	368.340	0.002	0.001	2.042%
Fresno	2020	LDT2	DSL	65	272	0.021	0.024	0.115	0.559	483.361	352.755	0.013	0.012	0.001%
Fresno	2020	LDT2	GAS	70	542772	0.020	0.033	0.840	0.132	530.386	394.944	0.002	0.002	1.919%
Fresno	2020	LDT2	DSL	70	255	0.025	0.029	0.124	0.659	596.760	433.285	0.015	0.014	0.001%
Fresno	2020	LHD1	GAS	5	21384	0.375	0.446	4.549	0.272	2513.497	2262.147	0.005	0.005	0.076%
Fresno	2020	LHD1	DSL	5	8074	0.375	0.426	2.919	4.000	521.440	469.296	0.084	0.078	0.029%
Fresno	2020	LHD1	GAS	10	55761	0.302	0.359	3.685	0.278	2036.128	1832.515	0.004	0.004	0.197%
Fresno	2020	LHD1	DSL	10	26849	0.331	0.377	2.410	3.626	521.440	469.296	0.075	0.069	0.095%
Fresno	2020	LHD1	GAS	15	126976	0.203	0.241	2.525	0.291	1392.430	1253.187	0.003	0.003	0.449%
Fresno	2020	LHD1	DSL	15	58148	0.263	0.299	1.700	3.065	521.440	469.296	0.059	0.054	0.206%
Fresno	2020	LHD1	GAS	20	146720	0.141	0.167	1.820	0.306	1006.069	905.462	0.002	0.002	0.519%
Fresno	2020	LHD1	DSL	20	63749	0.213	0.243	1.255	2.681	521.440	469.296	0.048	0.044	0.225%
Fresno	2020	LHD1	GAS	25	113020	0.101	0.121	1.381	0.324	768.012	691.211	0.001	0.001	0.400%
Fresno	2020	LHD1	DSL	25	68228	0.177	0.201	0.970	2.438	521.440	469.296	0.040	0.037	0.241%
Fresno	2020	LHD1	GAS	30	99946	0.077	0.092	1.114	0.337	619.434	557.490	0.001	0.001	0.353%
Fresno	2020	LHD1	DSL	30	57593	0.150	0.171	0.784	2.287	521.440	469.296	0.034	0.031	0.204%
Fresno	2020	LHD1	GAS	35	37346	0.060	0.072	0.941	0.358	527.846	475.062	0.001	0.001	0.132%
Fresno	2020	LHD1	DSL	35	30394	0.130	0.148	0.663	2.235	521.440	469.296	0.029	0.027	0.107%
Fresno	2020	LHD1	GAS	40	11024	0.047	0.058	0.839	0.380	475.233	427.710	0.001	0.001	0.039%
Fresno	2020	LHD1	DSL	40	16685	0.115	0.131	0.588	2.260	521.440	469.296	0.026	0.024	0.059%
Fresno	2020	LHD1	GAS	45	13571	0.041	0.051	0.804	0.389	452.056	406.850	0.001	0.001	0.048%
Fresno	2020	LHD1	DSL	45	18009	0.104	0.119	0.545	2.357	521.440	469.296	0.023	0.022	0.064%
Fresno	2020	LHD1	GAS	50	100208	0.038	0.046	0.820	0.392	454.322	408.890	0.001	0.001	0.354%
Fresno	2020	LHD1	DSL	50	69538	0.097	0.110	0.528	2.547	521.440	469.296	0.022	0.020	0.246%
Fresno	2020	LHD1	GAS	55	27562	0.034	0.042	0.852	0.424	482.415	434.174	0.001	0.000	0.097%
Fresno	2020	LHD1	DSL	55	41877	0.091	0.104	0.536	2.869	521.440	469.296	0.021	0.019	0.148%
Fresno	2020	LHD2	GAS	5	2186	0.176	0.229	2.419	0.209	2513.497	2262.148	0.004	0.004	0.008%
Fresno	2020	LHD2	DSL	5	2166	0.350	0.399	2.780	3.777	521.326	469.193	0.080	0.074	0.008%
Fresno	2020	LHD2	GAS	10	5700	0.142	0.185	1.959	0.214	2036.128	1832.515	0.003	0.003	0.020%
Fresno	2020	LHD2	DSL	10	7203	0.310	0.352	2.295	3.424	521.325	469.193	0.071	0.065	0.025%
Fresno	2020	LHD2	GAS	15	12980	0.095	0.124	1.342	0.224	1392.430	1253.187	0.002	0.002	0.046%
Fresno	2020	LHD2	DSL	15	15599	0.246	0.280	1.619	2.895	521.325	469.193	0.056	0.052	0.055%
Fresno	2020	LHD2	GAS	20	14998	0.066	0.086	0.968	0.236	1006.068	905.462	0.001	0.001	0.053%
Fresno	2020	LHD2	DSL	20	17102	0.199	0.227	1.195	2.532	521.326	469.193	0.046	0.042	0.060%
Fresno	2020	LHD2	GAS	25	11553	0.048	0.062	0.735	0.249	768.012	691.211	0.001	0.001	0.041%
Fresno	2020	LHD2	DSL	25	18303	0.165	0.188	0.923	2.302	521.325	469.193	0.038	0.035	0.065%
Fresno	2020	LHD2	GAS	30	10217	0.036	0.047	0.593	0.260	619.434	557.490	0.001	0.001	0.036%
Fresno	2020	LHD2	DSL	30	15450	0.140	0.160	0.747	2.160	521.325	469.193	0.032	0.029	0.055%
Fresno	2020	LHD2	GAS	35	3818	0.028	0.037	0.501	0.275	527.847	475.062	0.001	0.001	0.013%
Fresno	2020	LHD2	DSL	35	8154	0.122	0.138	0.632	2.110	521.325	469.193	0.028	0.026	0.029%
Fresno	2020	LHD2	GAS	40	1127	0.022	0.030	0.447	0.292	475.233	427.710	0.001	0.000	0.004%
Fresno	2020	LHD2	DSL	40	4476	0.108	0.123	0.559	2.134	521.326	469.193	0.025	0.023	0.016%
Fresno	2020	LHD2	GAS	45	1387	0.019	0.026	0.428	0.299	452.056	406.850	0.000	0.000	0.005%
Fresno	2020	LHD2	DSL	45	4831	0.098	0.111	0.519	2.226	521.326	469.193	0.022	0.021	0.017%
Fresno	2020	LHD2	GAS	50	10244	0.018	0.024	0.436	0.301	454.322	408.890	0.000	0.000	0.036%
Fresno	2020	LHD2	DSL	50	18655	0.090	0.103	0.503	2.406	521.326	469.193	0.021	0.019	0.066%
Fresno	2020	LHD2	GAS	55	2818	0.016	0.022	0.454	0.326	482.415	434.174	0.000	0.000	0.010%
Fresno	2020	LHD2	DSL	55	11234	0.085	0.097	0.511	2.709	521.326	469.193	0.020	0.018	0.040%
Fresno	2020	MCY	GAS	5	17	4.776	5.222	25.297	1.225	263.610	237.249	0.001	0.001	0.000%
Fresno	2020	MCY	GAS	10	294	4.145	4.531	23.259	1.206	239.987	215.988	0.001	0.000	0.001%
Fresno	2020	MCY	GAS	15	138	3.234	3.534	20.126	1.170	203.310	182.979	0.000	0.000	0.000%
Fresno	2020	MCY	GAS	20	8680	2.640	2.882	17.908	1.138	177.288	159.559	0.000	0.000	0.031%
Fresno	2020	MCY	GAS	25	1758	2.270	2.478	16.658	1.123	159.112	143.201	0.000	0.000	0.006%
Fresno	2020	MCY	GAS	30	4057	2.058	2.246	16.090	1.127	147.004	132.304	0.000	0.000	0.014%
Fresno	2020	MCY	GAS	35	13991	1.958	2.136	16.133	1.137	139.896	125.906	0.000	0.000	0.049%
Fresno	2020	MCY	GAS	40	23275	1.959	2.136	16.876	1.159	137.249	123.524	0.000	0.000	0.082%
Fresno	2020	MCY	GAS	45	20382	2.055	2.241	18.449	1.187	138.977	125.079	0.000	0.000	0.072%
Fresno	2020	MCY	GAS	50	27895	2.263	2.468	21.206	1.223	145.449	130.904	0.000	0.000	0.099%
Fresno	2020	MCY	GAS	55	18574	2.619	2.856	25.780	1.270	157.575	141.818	0.000	0.000	0.066%
Fresno	2020	MCY	GAS	60	22990	3.182	3.470	33.188	1.328	177.005	159.304	0.000	0.000	0.081%
Fresno	2020	MCY	GAS	65	23487	4.060	4.427	45.384	1.399	206.487	185.838	0.001	0.000	0.083%
Fresno	2020	MCY	GAS	70	22074	5.434	5.927	65.781	1.482	250.516	225.464	0.001	0.001	0.078%
Fresno	2020	MDV	GAS	5	427	0.277	0.430	3.830	0.458	1956.688	1525.973	0.013	0.012	0.002%
Fresno	2020	MDV	DSL	5	0	0.061	0.070	0.403	0.473	490.289	377.109	0.048	0.044	0.000%
Fresno	2020	MDV	GAS	10	7543	0.179	0.276	3.325	0.393	1446.236	1127.907	0.009	0.008	0.027%
Fresno	2020	MDV	DSL	10	6	0.054	0.061	0.345	0.441	446.290	343.749	0.042	0.039	0.000%
Fresno	2020	MDV	GAS	15	3525	0.122	0.187	2.933	0.344	1110.541	866.114	0.006	0.005	0.012%
Fresno	2020	MDV	DSL	15	3	0.042	0.048	0.262	0.391	380.129	293.587	0.033	0.030	0.000%
Fresno	2020	MDV	GAS	20	222363	0.088	0.134	2.641	0.303	890.394	694.407	0.004	0.004	0.786%
Fresno	2020	MDV	DSL	20	173	0.034	0.039	0.209	0.354	335.555	259.792	0.027	0.024	0.001%
Fresno	2020	MDV	GAS	25	45041	0.067	0.102	2.421	0.274	741.978	578.643	0.003	0.003	0.159%
Fresno	2020	MDV	DSL	25	35	0.028	0.032	0.173	0.329	306.599	237.837	0.022	0.020	0.000%
Fresno	2020	MDV	GAS	30	103918	0.053	0.080	2.199	0.255	636.786	496.616	0.002	0.002	0.367%
Fresno	2020	MDV	DSL	30	81	0.024	0.027	0.148	0.314	289.652	224.988	0.019	0.017	0.000%
Fresno	2020	MDV	GAS	35	358409	0.044	0.067	2.023	0.241	568.609	443.447	0.002	0.002	1.267%
Fresno	2020	MDV	DSL	35	280	0.021	0.024	0.130	0.306	282.712	219.727	0.017	0.015	0.001%
Fresno	2020	MDV	GAS	40	596236	0.039	0.058	1.869	0.232	526.155	410.343	0.002	0.002	2.108%
Fresno	2020	MDV	DSL	40	465	0.019	0.022	0.118	0.306	284.986	221.451	0.015	0.014	0.002%
Fresno	2020	MDV	GAS	45	522132	0.035	0.053	1.748	0.227	506.293	394.853	0.002	0.001	1.846%
Fresno	2020	MDV	DSL	45	407	0.018	0.021	0.110	0.312	296.731	230.356	0.014	0.013	0.001%
Fresno	2020	MDV	GAS	50	714592	0.034	0.052	1.654	0.227	506.042	394.656	0.002	0.001	2.526%
Fresno	2020	MDV	DSL	50	558	0.018	0.020	0.105	0.327	319.310	247.475	0.013	0.012	0.002%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	GAS	55	475819	0.035	0.052	1.582	0.231	524.734	409.233	0.002	0.001	1.682%
Fresno	2020	MDV	DSL	55	371	0.018	0.020	0.103	0.351	355.453	274.878	0.013	0.012	0.001%
Fresno	2020	MDV	GAS	60	588926	0.037	0.056	1.533	0.240	564.346	440.127	0.002	0.002	2.082%
Fresno	2020	MDV	DSL	60	460	0.019	0.022	0.104	0.387	409.820	316.098	0.014	0.013	0.002%
Fresno	2020	MDV	GAS	65	601656	0.042	0.063	1.516	0.255	630.143	491.442	0.002	0.002	2.127%
Fresno	2020	MDV	DSL	65	469	0.021	0.024	0.108	0.438	490.003	376.892	0.015	0.014	0.002%
Fresno	2020	MDV	GAS	70	565469	0.045	0.068	1.524	0.265	675.655	526.934	0.002	0.002	1.999%
Fresno	2020	MDV	DSL	70	441	0.025	0.028	0.117	0.511	608.303	466.585	0.018	0.016	0.002%
Fresno	2020	MH	GAS	5	376	0.381	0.496	7.969	0.418	2513.497	2262.148	0.007	0.006	0.001%
Fresno	2020	MH	DSL	5	75	1.550	1.765	2.437	16.025	2390.067	2151.060	0.434	0.400	0.000%
Fresno	2020	MH	GAS	10	1890	0.307	0.399	6.452	0.429	2036.128	1832.515	0.005	0.005	0.007%
Fresno	2020	MH	DSL	10	371	1.173	1.335	2.005	13.487	2170.188	1953.169	0.365	0.336	0.001%
Fresno	2020	MH	GAS	15	2387	0.207	0.268	4.430	0.447	1392.430	1253.187	0.004	0.003	0.008%
Fresno	2020	MH	DSL	15	501	0.604	0.687	1.326	9.644	1781.907	1603.716	0.253	0.232	0.002%
Fresno	2020	MH	GAS	20	2476	0.144	0.187	3.202	0.468	1006.069	905.462	0.003	0.002	0.009%
Fresno	2020	MH	DSL	20	532	0.281	0.320	0.893	7.477	1462.260	1316.034	0.174	0.160	0.002%
Fresno	2020	MH	GAS	25	2759	0.105	0.136	2.446	0.489	768.012	691.211	0.002	0.002	0.010%
Fresno	2020	MH	DSL	25	554	0.206	0.235	0.737	6.780	1311.566	1180.410	0.143	0.131	0.002%
Fresno	2020	MH	GAS	30	3119	0.079	0.103	1.968	0.512	619.434	557.490	0.001	0.001	0.011%
Fresno	2020	MH	DSL	30	666	0.171	0.195	0.652	6.369	1231.099	1107.989	0.126	0.116	0.002%
Fresno	2020	MH	GAS	35	3877	0.062	0.081	1.675	0.534	527.847	475.062	0.001	0.001	0.014%
Fresno	2020	MH	DSL	35	785	0.143	0.163	0.583	6.042	1164.322	1047.889	0.116	0.106	0.003%
Fresno	2020	MH	GAS	40	4826	0.051	0.067	1.507	0.557	475.233	427.710	0.001	0.001	0.017%
Fresno	2020	MH	DSL	40	975	0.122	0.139	0.532	5.798	1111.233	1000.110	0.112	0.103	0.003%
Fresno	2020	MH	GAS	45	4401	0.044	0.057	1.436	0.576	452.056	406.850	0.001	0.001	0.016%
Fresno	2020	MH	DSL	45	798	0.108	0.123	0.499	5.626	1071.835	964.651	0.115	0.106	0.003%
Fresno	2020	MH	GAS	50	4283	0.039	0.051	1.434	0.604	454.322	408.890	0.001	0.001	0.015%
Fresno	2020	MH	DSL	50	893	0.101	0.115	0.483	5.549	1046.125	941.513	0.125	0.115	0.003%
Fresno	2020	MH	GAS	55	5602	0.035	0.048	1.519	0.629	482.416	434.174	0.001	0.001	0.020%
Fresno	2020	MH	DSL	55	1309	0.100	0.114	0.484	5.555	1034.105	930.695	0.141	0.130	0.005%
Fresno	2020	MH	GAS	60	6464	0.034	0.046	1.707	0.649	541.209	487.088	0.001	0.001	0.023%
Fresno	2020	MH	DSL	60	1573	0.107	0.121	0.503	5.635	1035.774	932.197	0.164	0.151	0.006%
Fresno	2020	MH	GAS	65	1010	0.035	0.047	2.037	0.661	641.498	577.348	0.001	0.001	0.004%
Fresno	2020	MH	DSL	65	248	0.120	0.137	0.539	5.781	1051.133	946.020	0.194	0.178	0.001%
Fresno	2020	OBUS	GAS	5	223	0.633	0.755	8.526	0.605	2513.497	2262.148	0.003	0.002	0.001%
Fresno	2020	OBUS	DSL	5	189	1.608	1.831	2.973	10.090	3023.779	2721.401	0.079	0.072	0.001%
Fresno	2020	OBUS	GAS	10	1122	0.510	0.607	6.903	0.621	2036.128	1832.515	0.002	0.002	0.004%
Fresno	2020	OBUS	DSL	10	874	0.899	1.023	1.776	7.291	2435.175	2191.657	0.066	0.061	0.003%
Fresno	2020	OBUS	GAS	15	1417	0.343	0.408	4.737	0.647	1392.430	1253.187	0.001	0.001	0.005%
Fresno	2020	OBUS	DSL	15	1150	0.450	0.512	1.026	5.323	1981.851	1783.666	0.055	0.051	0.004%
Fresno	2020	OBUS	GAS	20	1470	0.239	0.284	3.423	0.677	1006.069	905.462	0.001	0.001	0.005%
Fresno	2020	OBUS	DSL	20	1536	0.216	0.246	0.645	4.177	1680.002	1512.002	0.048	0.044	0.005%
Fresno	2020	OBUS	GAS	25	1638	0.174	0.207	2.615	0.707	768.012	691.211	0.001	0.001	0.006%
Fresno	2020	OBUS	DSL	25	1593	0.188	0.214	0.603	3.802	1565.883	1409.294	0.045	0.041	0.006%
Fresno	2020	OBUS	GAS	30	1852	0.132	0.156	2.105	0.740	619.434	557.490	0.001	0.001	0.007%
Fresno	2020	OBUS	DSL	30	2223	0.173	0.197	0.613	3.549	1524.477	1372.029	0.045	0.042	0.008%
Fresno	2020	OBUS	GAS	35	2302	0.104	0.123	1.792	0.773	527.847	475.062	0.000	0.000	0.008%
Fresno	2020	OBUS	DSL	35	3281	0.161	0.183	0.642	3.347	1506.803	1356.123	0.048	0.044	0.012%
Fresno	2020	OBUS	GAS	40	2865	0.085	0.102	1.612	0.805	475.233	427.710	0.000	0.000	0.010%
Fresno	2020	OBUS	DSL	40	3503	0.134	0.153	0.604	3.092	1398.002	1258.201	0.050	0.046	0.012%
Fresno	2020	OBUS	GAS	45	2613	0.073	0.087	1.536	0.833	452.056	406.850	0.000	0.000	0.009%
Fresno	2020	OBUS	DSL	45	3920	0.129	0.147	0.669	2.998	1422.507	1280.256	0.057	0.053	0.014%
Fresno	2020	OBUS	GAS	50	2543	0.065	0.078	1.535	0.872	454.322	408.890	0.000	0.000	0.009%
Fresno	2020	OBUS	DSL	50	4186	0.115	0.130	0.680	2.891	1378.940	1241.046	0.064	0.059	0.015%
Fresno	2020	OBUS	GAS	55	3326	0.059	0.072	1.626	0.909	482.416	434.174	0.000	0.000	0.012%
Fresno	2020	OBUS	DSL	55	5487	0.102	0.117	0.690	2.837	1338.974	1205.076	0.072	0.066	0.019%
Fresno	2020	OBUS	GAS	60	3838	0.056	0.071	1.827	0.937	541.209	487.088	0.000	0.000	0.014%
Fresno	2020	OBUS	DSL	60	3711	0.078	0.089	0.559	2.741	1163.509	1047.158	0.073	0.067	0.013%
Fresno	2020	OBUS	GAS	65	600	0.058	0.072	2.179	0.955	641.498	577.348	0.000	0.000	0.002%
Fresno	2020	OBUS	DSL	65	966	0.094	0.107	0.772	2.936	1343.842	1209.458	0.095	0.088	0.003%
Fresno	2020	SBUS	GAS	5	58	5.033	5.476	52.641	1.402	2513.497	2262.147	0.022	0.020	0.000%
Fresno	2020	SBUS	DSL	5	154	1.310	1.491	1.990	25.323	2632.233	2369.010	0.231	0.213	0.001%
Fresno	2020	SBUS	GAS	10	203	4.067	4.423	42.717	1.431	2036.128	1832.515	0.018	0.016	0.001%
Fresno	2020	SBUS	DSL	10	538	0.769	0.876	1.349	17.377	2174.430	1956.987	0.161	0.149	0.002%
Fresno	2020	SBUS	GAS	15	407	2.721	2.959	29.212	1.502	1392.430	1253.187	0.012	0.011	0.001%
Fresno	2020	SBUS	DSL	15	1077	0.393	0.448	0.880	12.021	1785.396	1606.856	0.108	0.100	0.004%
Fresno	2020	SBUS	GAS	20	552	1.898	2.064	21.110	1.572	1006.069	905.462	0.008	0.008	0.002%
Fresno	2020	SBUS	DSL	20	1462	0.162	0.185	0.548	9.026	1408.500	1267.650	0.068	0.062	0.005%
Fresno	2020	SBUS	GAS	25	872	1.379	1.499	16.111	1.644	768.012	691.211	0.006	0.006	0.003%
Fresno	2020	SBUS	DSL	25	2307	0.135	0.154	0.482	8.630	1314.162	1182.746	0.057	0.052	0.008%
Fresno	2020	SBUS	GAS	30	1046	1.044	1.135	12.990	1.716	619.434	557.490	0.005	0.004	0.004%
Fresno	2020	SBUS	DSL	30	2768	0.113	0.129	0.428	8.310	1233.539	1110.186	0.049	0.045	0.010%
Fresno	2020	SBUS	GAS	35	1073	0.822	0.894	11.051	1.795	527.847	475.062	0.004	0.003	0.004%
Fresno	2020	SBUS	DSL	35	2841	0.095	0.108	0.385	8.066	1166.633	1049.970	0.044	0.040	0.010%
Fresno	2020	SBUS	GAS	40	725	0.675	0.735	9.939	1.872	475.233	427.710	0.003	0.003	0.003%
Fresno	2020	SBUS	DSL	40	1918	0.081	0.092	0.354	7.899	1113.442	1002.098	0.041	0.038	0.007%
Fresno	2020	SBUS	GAS	45	348	0.579	0.630	9.449	1.946	452.056	406.850	0.003	0.002	0.001%
Fresno	2020	SBUS	DSL	45	920	0.072	0.082	0.334	7.808	1073.967	966.571	0.042	0.039	0.003%
Fresno	2020	SBUS	GAS	50	174	0.520	0.565	9.515	2.006	454.322	408.890	0.002	0.002	0.001%
Fresno	2020	SBUS	DSL	50	461	0.067	0.077	0.325	7.792	1048.208	943.387	0.045	0.042	0.002%
Fresno	2020	SBUS	GAS	55	259	0.476	0.518	10.008	2.130	482.415	434.174	0.002	0.002	0.001%
Fresno	2020	SBUS	DSL	55	686	0.067	0.076	0.328	7.854	1036.165	932.548	0.052	0.047	0.002%
Fresno	2020	SBUS	GAS	60	144	0.464	0.506	11.253	2.191	541.209	487.088	0.002	0.002	0.001%
Fresno	2020	SBUS	DSL	60	382	0.071	0.081	0.342	7.991	1037.837	934.054	0.061	0.056	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2020	T6	GAS	5	758	0.553	0.654	7.169	0.405	2513.497	2262.148	0.003	0.003	0.003%
Fresno	2020	T6	DSL	5	3782	1.354	1.542	2.345	7.377	2577.874	2320.086	0.088	0.081	0.013%
Fresno	2020	T6	GAS	10	3809	0.445	0.526	5.805	0.416	2036.128	1832.515	0.003	0.002	0.013%
Fresno	2020	T6	DSL	10	18826	0.790	0.899	1.478	5.439	2129.525	1916.573	0.074	0.068	0.067%
Fresno	2020	T6	GAS	15	4812	0.300	0.354	3.983	0.433	1392.430	1253.187	0.002	0.002	0.017%
Fresno	2020	T6	DSL	15	25408	0.403	0.458	0.874	4.024	1748.525	1573.672	0.062	0.057	0.090%
Fresno	2020	T6	GAS	20	4991	0.209	0.247	2.878	0.453	1006.069	905.462	0.001	0.001	0.018%
Fresno	2020	T6	DSL	20	26946	0.172	0.196	0.486	3.039	1379.412	1241.471	0.052	0.048	0.095%
Fresno	2020	T6	GAS	25	5561	0.152	0.179	2.199	0.474	768.012	691.211	0.001	0.001	0.020%
Fresno	2020	T6	DSL	25	28064	0.150	0.170	0.454	2.760	1287.022	1158.320	0.048	0.044	0.099%
Fresno	2020	T6	GAS	30	6288	0.115	0.136	1.770	0.495	619.434	557.490	0.001	0.001	0.022%
Fresno	2020	T6	DSL	30	33744	0.130	0.148	0.430	2.523	1208.065	1087.259	0.047	0.043	0.119%
Fresno	2020	T6	GAS	35	7815	0.090	0.107	1.507	0.517	527.847	475.062	0.001	0.000	0.028%
Fresno	2020	T6	DSL	35	39789	0.113	0.128	0.414	2.329	1142.540	1028.286	0.047	0.044	0.141%
Fresno	2020	T6	GAS	40	9729	0.074	0.088	1.356	0.539	475.233	427.710	0.000	0.000	0.034%
Fresno	2020	T6	DSL	40	49392	0.098	0.112	0.407	2.177	1090.448	981.403	0.050	0.046	0.175%
Fresno	2020	T6	GAS	45	8872	0.064	0.076	1.291	0.558	452.056	406.850	0.000	0.000	0.031%
Fresno	2020	T6	DSL	45	40445	0.087	0.099	0.408	2.067	1051.788	946.610	0.054	0.050	0.143%
Fresno	2020	T6	GAS	50	8634	0.057	0.067	1.291	0.584	454.322	408.890	0.000	0.000	0.031%
Fresno	2020	T6	DSL	50	45265	0.078	0.089	0.418	2.000	1026.561	923.905	0.061	0.056	0.160%
Fresno	2020	T6	GAS	55	11293	0.052	0.063	1.368	0.609	482.416	434.174	0.000	0.000	0.040%
Fresno	2020	T6	DSL	55	66331	0.072	0.082	0.436	1.976	1014.767	913.290	0.069	0.064	0.235%
Fresno	2020	T6	GAS	60	13031	0.050	0.061	1.537	0.628	541.209	487.088	0.000	0.000	0.046%
Fresno	2020	T6	DSL	60	79708	0.069	0.079	0.463	1.994	1016.405	914.764	0.080	0.074	0.282%
Fresno	2020	T6	GAS	65	2036	0.051	0.062	1.832	0.640	641.498	577.348	0.000	0.000	0.007%
Fresno	2020	T6	DSL	65	12544	0.069	0.078	0.498	2.054	1031.475	928.327	0.092	0.085	0.044%
Fresno	2020	T7	GAS	5	45	3.376	4.096	125.625	3.585	2513.497	2262.147	0.002	0.002	0.000%
Fresno	2020	T7	DSL	5	8397	2.686	3.058	5.318	10.865	3977.808	3580.027	0.097	0.089	0.030%
Fresno	2020	T7	GAS	10	221	2.741	3.305	101.997	3.655	2036.128	1832.515	0.001	0.001	0.001%
Fresno	2020	T7	DSL	10	32076	1.564	1.780	3.329	8.059	3285.980	2957.382	0.084	0.078	0.113%
Fresno	2020	T7	GAS	15	241	1.829	2.214	69.829	3.829	1392.430	1253.187	0.001	0.001	0.001%
Fresno	2020	T7	DSL	15	39229	0.795	0.905	1.946	5.993	2698.075	2428.267	0.073	0.068	0.139%
Fresno	2020	T7	GAS	20	411	1.271	1.539	50.310	4.035	1006.069	905.462	0.001	0.001	0.001%
Fresno	2020	T7	DSL	20	97100	0.330	0.375	1.032	4.638	2129.583	1916.625	0.061	0.057	0.343%
Fresno	2020	T7	GAS	25	537	0.924	1.122	38.485	4.198	768.012	691.211	0.000	0.000	0.002%
Fresno	2020	T7	DSL	25	88605	0.297	0.338	1.002	4.093	1985.950	1787.355	0.060	0.055	0.313%
Fresno	2020	T7	GAS	30	980	0.703	0.850	31.074	4.369	619.434	557.490	0.000	0.000	0.003%
Fresno	2020	T7	DSL	30	149590	0.259	0.294	0.956	3.725	1864.114	1677.703	0.059	0.054	0.529%
Fresno	2020	T7	GAS	35	1743	0.555	0.673	26.510	4.541	527.847	475.062	0.000	0.000	0.006%
Fresno	2020	T7	DSL	35	269115	0.225	0.256	0.927	3.423	1763.006	1586.705	0.060	0.055	0.951%
Fresno	2020	T7	GAS	40	1520	0.456	0.554	23.856	4.724	475.233	427.710	0.000	0.000	0.005%
Fresno	2020	T7	DSL	40	253967	0.197	0.224	0.917	3.186	1682.624	1514.362	0.064	0.059	0.898%
Fresno	2020	T7	GAS	45	1608	0.389	0.474	22.636	4.934	452.056	406.850	0.000	0.000	0.006%
Fresno	2020	T7	DSL	45	355570	0.174	0.198	0.925	3.013	1622.970	1460.673	0.070	0.064	1.257%
Fresno	2020	T7	GAS	50	1682	0.346	0.424	22.756	5.110	454.322	408.890	0.000	0.000	0.006%
Fresno	2020	T7	DSL	50	369784	0.156	0.177	0.951	2.906	1584.043	1425.639	0.079	0.072	1.307%
Fresno	2020	T7	GAS	55	2470	0.324	0.397	24.233	5.260	482.416	434.174	0.000	0.000	0.009%
Fresno	2020	T7	DSL	55	450929	0.143	0.163	0.996	2.864	1565.844	1409.259	0.090	0.083	1.594%
Fresno	2020	T7	GAS	60	609	0.310	0.385	27.122	5.471	541.209	487.088	0.000	0.000	0.002%
Fresno	2020	T7	DSL	60	137369	0.136	0.154	1.059	2.887	1568.371	1411.534	0.103	0.095	0.486%
Fresno	2020	T7	GAS	65	327	0.316	0.389	32.082	5.670	641.498	577.348	0.000	0.000	0.001%
Fresno	2020	T7	DSL	65	75240	0.133	0.152	1.139	2.976	1591.625	1432.463	0.119	0.110	0.266%
Fresno	2020	UBUS	GAS	5	143	3.116	3.396	28.870	2.332	2513.497	2262.147	0.003	0.003	0.001%
Fresno	2020	UBUS	DSL	5	351	1.272	1.448	8.235	20.888	2440.865	2196.778	0.604	0.555	0.001%
Fresno	2020	UBUS	GAS	10	512	2.509	2.735	23.387	2.392	2036.128	1832.515	0.003	0.002	0.002%
Fresno	2020	UBUS	DSL	10	1261	1.079	1.228	6.485	18.155	2440.864	2196.778	0.512	0.471	0.004%
Fresno	2020	UBUS	GAS	15	1023	1.678	1.830	15.993	2.510	1392.430	1253.187	0.002	0.002	0.004%
Fresno	2020	UBUS	DSL	15	2522	0.796	0.907	4.206	14.238	2440.864	2196.778	0.378	0.348	0.009%
Fresno	2020	UBUS	GAS	20	1350	1.170	1.276	11.556	2.628	1006.069	905.462	0.001	0.001	0.005%
Fresno	2020	UBUS	DSL	20	3328	0.609	0.693	2.896	11.739	2440.865	2196.778	0.289	0.266	0.012%
Fresno	2020	UBUS	GAS	25	2033	0.851	0.927	8.821	2.746	768.012	691.211	0.001	0.001	0.007%
Fresno	2020	UBUS	DSL	25	5012	0.482	0.549	2.118	10.175	2440.865	2196.778	0.229	0.210	0.018%
Fresno	2020	UBUS	GAS	30	2545	0.645	0.703	7.115	2.864	619.434	557.490	0.001	0.001	0.009%
Fresno	2020	UBUS	DSL	30	6273	0.395	0.450	1.644	9.271	2440.864	2196.778	0.188	0.173	0.022%
Fresno	2020	UBUS	GAS	35	2494	0.509	0.555	6.063	2.983	527.847	475.062	0.001	0.000	0.009%
Fresno	2020	UBUS	DSL	35	6148	0.336	0.382	1.356	8.881	2440.864	2196.778	0.159	0.147	0.022%
Fresno	2020	UBUS	GAS	40	1798	0.419	0.457	5.459	3.101	475.233	427.710	0.000	0.000	0.006%
Fresno	2020	UBUS	DSL	40	4432	0.295	0.336	1.187	8.944	2440.865	2196.778	0.140	0.129	0.016%
Fresno	2020	UBUS	GAS	45	784	0.360	0.392	5.192	3.219	452.056	406.850	0.000	0.000	0.003%
Fresno	2020	UBUS	DSL	45	1932	0.269	0.306	1.103	9.468	2440.864	2196.778	0.128	0.117	0.007%
Fresno	2020	UBUS	GAS	50	398	0.322	0.351	5.218	3.337	454.322	408.890	0.000	0.000	0.001%
Fresno	2020	UBUS	DSL	50	982	0.254	0.289	1.089	10.537	2440.865	2196.778	0.120	0.111	0.003%
Fresno	2020	UBUS	GAS	55	494	0.300	0.327	5.541	3.456	482.416	434.174	0.000	0.000	0.002%
Fresno	2020	UBUS	DSL	55	1217	0.248	0.282	1.142	12.329	2440.864	2196.778	0.118	0.108	0.004%
Fresno	2020	UBUS	GAS	60	808	0.292	0.318	6.216	3.574	541.209	487.088	0.000	0.000	0.003%
Fresno	2020	UBUS	DSL	60	1992	0.251	0.285	1.271	15.164	2440.864	2196.778	0.119	0.109	0.007%

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2020
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.094	0.060	0.040	0.029	0.022	0.017	0.014	0.012	0.011	0.011	0.011	0.012	0.014	0.015	0.000
	LDT1	0.231	0.152	0.105	0.076	0.059	0.047	0.039	0.034	0.031	0.030	0.030	0.032	0.035	0.037	0.000
	LDT2	0.131	0.084	0.057	0.041	0.031	0.024	0.020	0.018	0.016	0.015	0.016	0.017	0.019	0.020	0.000
	LHD1	0.375	0.302	0.203	0.141	0.101	0.077	0.060	0.047	0.041	0.038	0.034	0.000	0.000	0.000	0.000
	LHD2	0.176	0.142	0.095	0.066	0.048	0.036	0.028	0.022	0.019	0.018	0.016	0.000	0.000	0.000	0.000
	MCY	4.776	4.145	3.234	2.640	2.270	2.058	1.958	1.959	2.055	2.263	2.619	3.182	4.060	5.434	0.000
	MDV	0.277	0.179	0.122	0.088	0.067	0.053	0.044	0.039	0.035	0.034	0.035	0.037	0.042	0.045	0.000
	MH	0.381	0.307	0.207	0.144	0.105	0.079	0.062	0.051	0.044	0.039	0.035	0.034	0.035	0.000	0.000
	OBUS	0.633	0.510	0.343	0.239	0.174	0.132	0.104	0.085	0.073	0.065	0.059	0.056	0.058	0.000	0.000
	SBUS	5.033	4.067	2.721	1.898	1.379	1.044	0.822	0.675	0.579	0.520	0.476	0.464	0.000	0.000	0.000
	T6	0.553	0.445	0.300	0.209	0.152	0.115	0.090	0.074	0.064	0.057	0.052	0.050	0.051	0.000	0.000
	T7	3.376	2.741	1.829	1.271	0.924	0.703	0.555	0.456	0.389	0.346	0.324	0.310	0.316	0.000	0.000
	UBUS	3.116	2.509	1.678	1.170	0.851	0.645	0.509	0.419	0.360	0.322	0.300	0.292	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.050	0.044	0.034	0.028	0.023	0.020	0.017	0.016	0.015	0.015	0.015	0.016	0.018	0.022	0.000
	LDT1	0.089	0.078	0.061	0.050	0.041	0.035	0.031	0.028	0.026	0.025	0.025	0.026	0.028	0.032	0.000
	LDT2	0.060	0.053	0.041	0.033	0.028	0.024	0.021	0.019	0.018	0.018	0.018	0.019	0.021	0.025	0.000
	LHD1	0.375	0.331	0.263	0.213	0.177	0.150	0.130	0.115	0.104	0.097	0.091	0.000	0.000	0.000	0.000
	LHD2	0.350	0.310	0.246	0.199	0.165	0.140	0.122	0.108	0.098	0.090	0.085	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.061	0.054	0.042	0.034	0.028	0.024	0.021	0.019	0.018	0.018	0.018	0.019	0.021	0.025	0.000
	MH	1.550	1.173	0.604	0.281	0.206	0.171	0.143	0.122	0.108	0.101	0.100	0.107	0.120	0.000	0.000
	OBUS	1.608	0.899	0.450	0.216	0.188	0.173	0.161	0.134	0.129	0.115	0.102	0.078	0.094	0.000	0.000
	SBUS	1.310	0.769	0.393	0.162	0.135	0.113	0.095	0.081	0.072	0.067	0.067	0.071	0.000	0.000	0.000
	T6	1.354	0.790	0.403	0.172	0.150	0.130	0.113	0.098	0.087	0.078	0.072	0.069	0.069	0.000	0.000
	T7	2.686	1.564	0.795	0.330	0.297	0.259	0.225	0.197	0.174	0.156	0.143	0.136	0.133	0.000	0.000
	UBUS	1.272	1.079	0.796	0.609	0.482	0.395	0.336	0.295	0.269	0.254	0.248	0.251	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2020
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	6.9	0.1	0.5	1.6	1.2	6.2	2.4	2.4	1.2	4.6	4.5	0.0	0.0	0.0	**31.6**
LDT1	0.0	2.5	0.0	0.2	0.6	0.5	2.5	1.0	1.0	0.5	1.8	1.7	0.0	0.0	0.0	**12.3**
LDT2	0.0	3.6	0.1	0.3	0.8	0.6	3.3	1.3	1.3	0.6	2.4	2.3	0.0	0.0	0.0	**16.6**
LHD1	0.0	2.1	0.0	0.2	0.4	0.3	1.6	0.6	0.5	0.2	0.8	0.0	0.0	0.0	0.0	**6.9**
LHD2	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
MCY	0.0	7.2	0.2	0.7	2.5	2.2	13.1	5.8	6.6	3.7	16.3	18.1	0.0	0.0	0.0	**76.3**
MDV	0.0	8.0	0.1	0.6	1.9	1.4	7.6	2.9	2.9	1.4	5.5	5.4	0.0	0.0	0.0	**37.9**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.5**
OBUS	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.5**
SBUS	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.8**
T6	0.0	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	**1.3**
T7	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.2**
UBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.2**
Total	**0.2**	**31.8**	**0.6**	**2.7**	**8.1**	**6.5**	**35.5**	**14.5**	**15.1**	**7.8**	**32.1**	**32.6**	**0.0**	**0.0**	**0.0**	**187.5**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	1.4	0.0	0.1	0.5	0.4	2.1	0.8	0.8	0.4	1.4	0.0	0.0	0.0	0.0	**8.0**
LHD2	0.0	0.4	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**2.0**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
OBUS	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
SBUS	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
T6	0.0	3.4	0.0	0.1	0.4	0.3	1.9	0.7	0.7	0.3	1.1	1.0	0.0	0.0	0.0	**10.1**
T7	0.2	33.7	0.5	1.2	4.0	3.4	18.6	7.3	6.9	3.1	11.0	9.6	0.0	0.0	0.0	**99.5**
UBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.0**
Total	**0.2**	**39.8**	**0.6**	**1.5**	**5.2**	**4.3**	**23.9**	**9.4**	**8.9**	**4.1**	**14.4**	**11.0**	**0.0**	**0.0**	**0.0**	**123.2**

Total Emissions (tons/year) ***310.7***
Total Emissions (tons/day) ***0.9***

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2020
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.137	0.120	0.106	0.094	0.086	0.080	0.075	0.073	0.071	0.070	0.071	0.073	0.076	0.078	0.000
	LDT1	0.377	0.318	0.275	0.240	0.216	0.199	0.188	0.181	0.178	0.179	0.185	0.194	0.210	0.219	0.000
	LDT2	0.234	0.202	0.177	0.157	0.142	0.132	0.124	0.119	0.117	0.116	0.118	0.122	0.128	0.132	0.000
	LHD1	0.272	0.278	0.291	0.306	0.324	0.337	0.358	0.380	0.389	0.392	0.424	0.000	0.000	0.000	0.000
	LHD2	0.209	0.214	0.224	0.236	0.249	0.260	0.275	0.292	0.299	0.301	0.326	0.000	0.000	0.000	0.000
	MCY	1.225	1.206	1.170	1.138	1.123	1.127	1.137	1.159	1.187	1.223	1.270	1.328	1.399	1.482	0.000
	MDV	0.458	0.393	0.344	0.303	0.274	0.255	0.241	0.232	0.227	0.227	0.231	0.240	0.255	0.265	0.000
	MH	0.418	0.429	0.447	0.468	0.489	0.512	0.534	0.557	0.576	0.604	0.629	0.649	0.661	0.000	0.000
	OBUS	0.605	0.621	0.647	0.677	0.707	0.740	0.773	0.805	0.833	0.872	0.909	0.937	0.955	0.000	0.000
	SBUS	1.402	1.431	1.502	1.572	1.644	1.716	1.795	1.872	1.946	2.006	2.130	2.191	0.000	0.000	0.000
	T6	0.405	0.416	0.433	0.453	0.474	0.495	0.517	0.539	0.558	0.584	0.609	0.628	0.640	0.000	0.000
	T7	3.585	3.655	3.829	4.035	4.198	4.369	4.541	4.724	4.934	5.110	5.260	5.471	5.670	0.000	0.000
	UBUS	2.332	2.392	2.510	2.628	2.746	2.864	2.983	3.101	3.219	3.337	3.456	3.574	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.495	0.460	0.405	0.366	0.340	0.323	0.315	0.315	0.323	0.339	0.366	0.405	0.462	0.543	0.000
	LDT1	0.559	0.520	0.458	0.414	0.384	0.365	0.356	0.356	0.365	0.383	0.413	0.458	0.522	0.613	0.000
	LDT2	0.598	0.555	0.489	0.441	0.409	0.389	0.379	0.379	0.389	0.409	0.441	0.490	0.559	0.659	0.000
	LHD1	4.000	3.626	3.065	2.681	2.438	2.287	2.235	2.260	2.357	2.547	2.869	0.000	0.000	0.000	0.000
	LHD2	3.777	3.424	2.895	2.532	2.302	2.160	2.110	2.134	2.226	2.406	2.709	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.473	0.441	0.391	0.354	0.329	0.314	0.306	0.306	0.312	0.327	0.351	0.387	0.438	0.511	0.000
	MH	16.025	13.487	9.644	7.477	6.780	6.369	6.042	5.798	5.626	5.549	5.555	5.635	5.781	0.000	0.000
	OBUS	10.090	7.291	5.323	4.177	3.802	3.549	3.347	3.092	2.998	2.891	2.837	2.741	2.936	0.000	0.000
	SBUS	25.323	17.377	12.021	9.026	8.630	8.310	8.066	7.899	7.808	7.792	7.854	7.991	0.000	0.000	0.000
	T6	7.377	5.439	4.024	3.039	2.760	2.523	2.329	2.177	2.067	2.000	1.976	1.994	2.054	0.000	0.000
	T7	10.865	8.059	5.993	4.638	4.093	3.725	3.423	3.186	3.013	2.906	2.864	2.887	2.976	0.000	0.000
	UBUS	20.888	18.155	14.238	11.739	10.175	9.271	8.881	8.944	9.468	10.537	12.329	15.164	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2020
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.1	13.7	0.3	1.7	6.1	5.5	33.1	14.2	14.9	7.5	29.0	27.2	0.0	0.0	0.0	**153.3**
LDT1	0.0	5.3	0.1	0.6	2.2	2.0	12.1	5.2	5.5	2.8	11.0	10.6	0.0	0.0	0.0	**57.6**
LDT2	0.0	8.6	0.2	1.1	3.8	3.4	20.4	8.8	9.2	4.6	18.0	17.0	0.0	0.0	0.0	**95.1**
LHD1	0.0	1.9	0.1	0.3	1.4	1.4	9.6	4.6	5.0	2.6	10.6	0.0	0.0	0.0	0.0	**37.5**
LHD2	0.0	0.2	0.0	0.0	0.1	0.1	0.8	0.4	0.4	0.2	0.8	0.0	0.0	0.0	0.0	**2.9**
MCY	0.0	2.1	0.1	0.3	1.2	1.2	7.6	3.5	3.8	2.0	7.9	7.6	0.0	0.0	0.0	**37.2**
MDV	0.1	17.5	0.4	2.2	7.6	6.9	41.1	17.7	18.7	9.5	36.8	35.0	0.0	0.0	0.0	**193.5**
MH	0.0	0.2	0.0	0.0	0.1	0.1	0.8	0.4	0.4	0.2	0.9	0.9	0.0	0.0	0.0	**4.1**
OBUS	0.0	0.1	0.0	0.0	0.1	0.1	0.7	0.3	0.4	0.2	0.8	0.7	0.0	0.0	0.0	**3.5**
SBUS	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**1.9**
T6	0.0	0.3	0.0	0.1	0.2	0.2	1.6	0.8	0.8	0.4	1.8	1.7	0.0	0.0	0.0	**8.0**
T7	0.0	0.4	0.0	0.1	0.3	0.3	2.0	0.9	1.0	0.5	2.2	2.1	0.0	0.0	0.0	**9.9**
UBUS	0.0	0.3	0.0	0.1	0.2	0.2	1.5	0.7	0.8	0.4	1.6	1.6	0.0	0.0	0.0	**7.5**
Total	**0.2**	**50.8**	**1.2**	**6.6**	**23.6**	**21.6**	**131.7**	**57.6**	**61.2**	**31.1**	**121.7**	**104.6**	**0.0**	**0.0**	**0.0**	**611.9**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.0**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LHD1	0.1	15.4	0.4	1.8	6.5	5.9	36.5	16.5	18.5	10.1	43.6	0.0	0.0	0.0	0.0	**155.3**
LHD2	0.0	3.9	0.1	0.5	1.6	1.5	9.3	4.2	4.7	2.6	11.1	0.0	0.0	0.0	0.0	**39.4**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
MH	0.0	1.2	0.0	0.1	0.4	0.3	2.0	0.9	0.9	0.4	1.7	1.6	0.0	0.0	0.0	**9.5**
OBUS	0.0	2.2	0.0	0.2	0.7	0.6	3.9	1.6	1.7	0.8	3.1	2.7	0.0	0.0	0.0	**17.6**
SBUS	0.0	2.5	0.0	0.2	0.8	0.7	4.5	1.9	2.1	1.0	4.0	3.8	0.0	0.0	0.0	**21.6**
T6	0.1	23.7	0.5	2.1	7.5	6.7	39.0	16.3	16.6	8.2	30.8	28.4	0.0	0.0	0.0	**179.8**
T7	0.8	173.7	3.5	16.2	55.0	48.7	283.5	117.8	119.9	58.7	220.8	203.6	0.0	0.0	0.0	**1,302.3**
UBUS	0.0	6.0	0.1	0.6	2.1	1.8	11.2	5.0	5.7	3.2	14.5	16.3	0.0	0.0	0.0	**66.7**
Total	**1.0**	**228.8**	**4.7**	**21.8**	**74.7**	**66.3**	**390.2**	**164.4**	**170.4**	**85.2**	**330.1**	**256.9**	**0.0**	**0.0**	**0.0**	**1,794.6**

Total Emissions (tons/year) ***2,406.6***
Total Emissions (tons/day) ***6.6***

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2020
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	1.6	1.4	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.0
	LDT1	4.0	3.4	3.0	2.7	2.4	2.2	2.0	1.8	1.7	1.6	1.6	1.5	1.5	1.5	0.0
	LDT2	2.2	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.0
	LHD1	4.5	3.7	2.5	1.8	1.4	1.1	0.9	0.8	0.8	0.8	0.9	0.0	0.0	0.0	0.0
	LHD2	2.4	2.0	1.3	1.0	0.7	0.6	0.5	0.4	0.4	0.4	0.5	0.0	0.0	0.0	0.0
	MCY	25.3	23.3	20.1	17.9	16.7	16.1	16.1	16.9	18.4	21.2	25.8	33.2	45.4	65.8	0.0
	MDV	3.8	3.3	2.9	2.6	2.4	2.2	2.0	1.9	1.7	1.7	1.6	1.5	1.5	1.5	0.0
	MH	8.0	6.5	4.4	3.2	2.4	2.0	1.7	1.5	1.4	1.4	1.5	1.7	2.0	0.0	0.0
	OBUS	8.5	6.9	4.7	3.4	2.6	2.1	1.8	1.6	1.5	1.5	1.6	1.8	2.2	0.0	0.0
	SBUS	52.6	42.7	29.2	21.1	16.1	13.0	11.1	9.9	9.4	9.5	10.0	11.3	0.0	0.0	0.0
	T6	7.2	5.8	4.0	2.9	2.2	1.8	1.5	1.4	1.3	1.3	1.4	1.5	1.8	0.0	0.0
	T7	125.6	102.0	69.8	50.3	38.5	31.1	26.5	23.9	22.6	22.8	24.2	27.1	32.1	0.0	0.0
	UBUS	28.9	23.4	16.0	11.6	8.8	7.1	6.1	5.5	5.2	5.2	5.5	6.2	0.0	0.0	0.0

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LDT1	0.5	0.5	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.0
	LDT2	0.4	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LHD1	2.9	2.4	1.7	1.3	1.0	0.8	0.7	0.6	0.5	0.5	0.5	0.0	0.0	0.0	0.0
	LHD2	2.8	2.3	1.6	1.2	0.9	0.7	0.6	0.6	0.5	0.5	0.5	0.0	0.0	0.0	0.0
	MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MDV	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	MH	2.4	2.0	1.3	0.9	0.7	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0
	OBUS	3.0	1.8	1.0	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.8	0.0	0.0
	SBUS	2.0	1.3	0.9	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.0	0.0	0.0
	T6	2.3	1.5	0.9	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.0	0.0
	T7	5.3	3.3	1.9	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.1	1.1	0.0	0.0
	UBUS	8.2	6.5	4.2	2.9	2.1	1.6	1.4	1.2	1.1	1.1	1.1	1.3	0.0	0.0	0.0

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2020
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.6	159.8	3.9	21.1	74.9	66.2	386.6	159.3	159.7	76.1	274.8	239.6	0.0	0.0	0.0	**1,622.5**
LDT1	0.2	56.9	1.4	7.2	25.2	22.1	128.6	53.0	53.3	25.6	93.5	83.0	0.0	0.0	0.0	**550.1**
LDT2	0.3	82.5	2.0	10.8	38.4	34.0	198.1	81.6	81.8	39.0	140.8	122.8	0.0	0.0	0.0	**832.2**
LHD1	0.1	25.7	0.5	2.1	6.0	4.7	25.2	10.1	10.4	5.4	21.3	0.0	0.0	0.0	0.0	**111.4**
LHD2	0.0	1.4	0.0	0.1	0.3	0.3	1.4	0.5	0.6	0.3	1.2	0.0	0.0	0.0	0.0	**6.1**
MCY	0.2	40.4	0.9	5.0	18.1	16.9	107.7	50.3	59.2	34.5	160.2	188.7	0.0	0.0	0.0	**682.3**
MDV	0.6	148.0	3.5	19.1	67.2	59.3	346.0	142.8	143.7	69.0	251.9	223.3	0.0	0.0	0.0	**1,474.5**
MH	0.0	2.6	0.0	0.2	0.6	0.5	2.6	1.0	1.1	0.5	2.2	2.2	0.0	0.0	0.0	**13.6**
OBUS	0.0	1.7	0.0	0.1	0.4	0.3	1.6	0.7	0.7	0.3	1.4	1.4	0.0	0.0	0.0	**8.7**
SBUS	0.0	2.3	0.0	0.2	0.5	0.4	2.3	0.9	0.9	0.5	1.9	2.0	0.0	0.0	0.0	**12.1**
T6	0.0	4.7	0.1	0.4	1.1	0.9	4.7	1.9	1.9	1.0	4.0	4.1	0.0	0.0	0.0	**24.7**
T7	0.0	11.7	0.2	0.9	2.8	2.2	11.7	4.7	4.8	2.4	9.9	10.2	0.0	0.0	0.0	**61.6**
UBUS	0.0	3.1	0.1	0.2	0.7	0.6	3.1	1.2	1.3	0.7	2.6	2.7	0.0	0.0	0.0	**16.4**
Total	**2.1**	**540.9**	**12.7**	**67.5**	**236.3**	**208.4**	**1,219.8**	**508.1**	**519.3**	**255.2**	**965.8**	**879.9**	**0.1**	**0.0**	**0.0**	**5,416.1**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.7**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	10.3	0.2	0.9	2.6	2.0	10.8	4.3	4.3	2.1	8.2	0.0	0.0	0.0	0.0	**45.6**
LHD2	0.0	2.6	0.1	0.2	0.7	0.5	2.8	1.1	1.1	0.5	2.1	0.0	0.0	0.0	0.0	**11.7**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MH	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
OBUS	0.0	0.5	0.0	0.0	0.1	0.1	0.7	0.3	0.4	0.2	0.7	0.6	0.0	0.0	0.0	**3.7**
SBUS	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**1.1**
T6	0.0	6.4	0.1	0.3	1.2	1.1	6.9	3.0	3.3	1.7	6.8	6.6	0.0	0.0	0.0	**37.6**
T7	0.4	71.8	1.1	3.6	13.5	12.5	76.8	33.9	36.8	19.2	76.8	74.7	0.0	0.0	0.0	**421.0**
UBUS	0.0	2.1	0.0	0.2	0.4	0.3	1.7	0.7	0.7	0.3	1.3	1.4	0.0	0.0	0.0	**9.2**
Total	**0.5**	**94.3**	**1.5**	**5.3**	**18.6**	**16.7**	**100.4**	**43.6**	**46.8**	**24.2**	**96.3**	**83.6**	**0.0**	**0.0**	**0.0**	**531.7**

Total Emissions (tons/year) ***5,947.9***
Tons/day ***16.3***

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2020
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0113	0.0071	0.0048	0.0034	0.0025	0.0020	0.0016	0.0014	0.0013	0.0012	0.0013	0.0014	0.0015	0.0017	0.0000
	LDT1	0.0185	0.0120	0.0082	0.0059	0.0044	0.0035	0.0029	0.0025	0.0023	0.0022	0.0022	0.0024	0.0026	0.0028	0.0000
	LDT2	0.0118	0.0075	0.0050	0.0035	0.0026	0.0021	0.0017	0.0015	0.0014	0.0013	0.0013	0.0014	0.0016	0.0017	0.0000
	LHD1	0.0054	0.0043	0.0029	0.0020	0.0015	0.0011	0.0009	0.0007	0.0006	0.0006	0.0005	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0038	0.0031	0.0020	0.0014	0.0010	0.0008	0.0006	0.0005	0.0004	0.0004	0.0004	0.0000	0.0000	0.0000	0.0000
	MCY	0.0006	0.0005	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0005	0.0007	0.0000
	MDV	0.0134	0.0085	0.0057	0.0041	0.0030	0.0024	0.0020	0.0017	0.0016	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	MH	0.0067	0.0054	0.0036	0.0025	0.0018	0.0014	0.0011	0.0009	0.0008	0.0007	0.0006	0.0006	0.0006	0.0000	0.0000
	OBUS	0.0026	0.0021	0.0014	0.0010	0.0007	0.0005	0.0004	0.0004	0.0003	0.0003	0.0003	0.0002	0.0003	0.0000	0.0000
	SBUS	0.0225	0.0181	0.0121	0.0084	0.0061	0.0046	0.0037	0.0030	0.0026	0.0023	0.0022	0.0021	0.0000	0.0000	0.0000
	T6	0.0033	0.0026	0.0018	0.0012	0.0009	0.0007	0.0005	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0000	0.0000
	T7	0.0017	0.0013	0.0009	0.0006	0.0005	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000
	UBUS	0.0033	0.0026	0.0018	0.0012	0.0009	0.0007	0.0005	0.0004	0.0004	0.0003	0.0003	0.0003	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0350	0.0306	0.0240	0.0193	0.0161	0.0137	0.0121	0.0110	0.0103	0.0101	0.0102	0.0108	0.0120	0.0142	0.0000
	LDT1	0.0698	0.0614	0.0484	0.0392	0.0325	0.0277	0.0242	0.0217	0.0200	0.0190	0.0186	0.0189	0.0200	0.0221	0.0000
	LDT2	0.0411	0.0360	0.0283	0.0228	0.0190	0.0162	0.0142	0.0129	0.0120	0.0116	0.0117	0.0122	0.0134	0.0155	0.0000
	LHD1	0.0844	0.0745	0.0592	0.0480	0.0398	0.0338	0.0293	0.0259	0.0235	0.0217	0.0206	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0801	0.0708	0.0562	0.0456	0.0378	0.0321	0.0278	0.0246	0.0223	0.0206	0.0195	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0478	0.0419	0.0329	0.0266	0.0221	0.0189	0.0166	0.0150	0.0140	0.0135	0.0135	0.0140	0.0153	0.0176	0.0000
	MH	0.4343	0.3653	0.2527	0.1742	0.1426	0.1258	0.1155	0.1120	0.1150	0.1247	0.1410	0.1640	0.1936	0.0000	0.0000
	OBUS	0.0787	0.0658	0.0550	0.0481	0.0450	0.0453	0.0480	0.0497	0.0574	0.0642	0.0722	0.0730	0.0953	0.0000	0.0000
	SBUS	0.2312	0.1615	0.1082	0.0677	0.0569	0.0489	0.0438	0.0415	0.0420	0.0453	0.0515	0.0605	0.0000	0.0000	0.0000
	T6	0.0879	0.0737	0.0620	0.0516	0.0482	0.0468	0.0474	0.0499	0.0545	0.0610	0.0695	0.0800	0.0924	0.0000	0.0000
	T7	0.0969	0.0843	0.0734	0.0615	0.0597	0.0585	0.0599	0.0636	0.0699	0.0786	0.0897	0.1033	0.1194	0.0000	0.0000
	UBUS	0.6035	0.5118	0.3778	0.2889	0.2287	0.1875	0.1592	0.1400	0.1275	0.1203	0.1175	0.1189	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2020
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.004	0.8	0.0	0.1	0.2	0.1	0.7	0.3	0.3	0.1	0.5	0.5	0.0	0.0	0.0	**3.6**
LDT1	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
LDT2	0.002	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.4**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.002	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.7**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.009**	**1.8**	**0.0**	**0.1**	**0.4**	**0.3**	**1.5**	**0.6**	**0.6**	**0.3**	**1.1**	**1.1**	**0.0**	**0.0**	**0.0**	**7.8**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.8**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.5**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
T6	0.001	0.3	0.0	0.0	0.1	0.1	0.8	0.4	0.4	0.2	1.1	1.1	0.0	0.0	0.0	**4.7**
T7	0.007	1.8	0.0	0.2	0.8	0.8	5.0	2.4	2.8	1.6	6.9	7.3	0.0	0.0	0.0	**29.5**
UBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
Total	**0.0**	**2.8**	**0.1**	**0.3**	**1.1**	**1.1**	**6.7**	**3.1**	**3.6**	**2.0**	**8.7**	**8.7**	**0.0**	**0.0**	**0.0**	**38.2**

Total Emissions (tons/year) ***46.0***
Total Emissions (tons/day) ***0.1***

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2020
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0105	0.0066	0.0044	0.0031	0.0023	0.0018	0.0015	0.0013	0.0012	0.0012	0.0012	0.0013	0.0014	0.0015	0.0000
	LDT1	0.0172	0.0111	0.0076	0.0054	0.0041	0.0032	0.0027	0.0023	0.0021	0.0021	0.0021	0.0022	0.0024	0.0026	0.0000
	LDT2	0.0110	0.0069	0.0046	0.0033	0.0024	0.0019	0.0016	0.0014	0.0013	0.0012	0.0012	0.0013	0.0015	0.0016	0.0000
	LHD1	0.0050	0.0040	0.0027	0.0019	0.0014	0.0010	0.0008	0.0007	0.0006	0.0005	0.0005	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0035	0.0028	0.0019	0.0013	0.0010	0.0007	0.0006	0.0005	0.0004	0.0004	0.0003	0.0000	0.0000	0.0000	0.0000
	MCY	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0006	0.0000
	MDV	0.0124	0.0079	0.0053	0.0037	0.0028	0.0022	0.0018	0.0016	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	MH	0.0062	0.0050	0.0033	0.0023	0.0017	0.0013	0.0010	0.0008	0.0007	0.0006	0.0006	0.0006	0.0006	0.0000	0.0000
	OBUS	0.0024	0.0020	0.0013	0.0009	0.0007	0.0005	0.0004	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0000	0.0000
	SBUS	0.0204	0.0164	0.0110	0.0077	0.0056	0.0042	0.0033	0.0027	0.0024	0.0021	0.0020	0.0019	0.0000	0.0000	0.0000
	T6	0.0030	0.0024	0.0016	0.0011	0.0008	0.0006	0.0005	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0000	0.0000
	T7	0.0015	0.0012	0.0008	0.0006	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0030	0.0024	0.0016	0.0011	0.0008	0.0006	0.0005	0.0004	0.0004	0.0003	0.0003	0.0003	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0322	0.0282	0.0221	0.0178	0.0148	0.0126	0.0111	0.0101	0.0095	0.0093	0.0094	0.0099	0.0111	0.0130	0.0000
	LDT1	0.0642	0.0565	0.0446	0.0361	0.0299	0.0255	0.0223	0.0200	0.0184	0.0175	0.0171	0.0174	0.0184	0.0203	0.0000
	LDT2	0.0378	0.0331	0.0260	0.0210	0.0174	0.0149	0.0131	0.0118	0.0111	0.0107	0.0107	0.0112	0.0123	0.0142	0.0000
	LHD1	0.0776	0.0686	0.0544	0.0442	0.0366	0.0311	0.0269	0.0239	0.0216	0.0200	0.0189	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0737	0.0651	0.0517	0.0419	0.0348	0.0295	0.0256	0.0227	0.0205	0.0190	0.0180	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0440	0.0386	0.0303	0.0245	0.0203	0.0174	0.0152	0.0138	0.0128	0.0124	0.0124	0.0129	0.0141	0.0162	0.0000
	MH	0.3996	0.3360	0.2325	0.1602	0.1312	0.1157	0.1063	0.1030	0.1058	0.1147	0.1298	0.1509	0.1781	0.0000	0.0000
	OBUS	0.0724	0.0605	0.0506	0.0442	0.0414	0.0416	0.0441	0.0457	0.0528	0.0591	0.0664	0.0672	0.0876	0.0000	0.0000
	SBUS	0.2127	0.1486	0.0995	0.0622	0.0523	0.0450	0.0403	0.0381	0.0386	0.0417	0.0474	0.0557	0.0000	0.0000	0.0000
	T6	0.0809	0.0678	0.0570	0.0475	0.0444	0.0431	0.0436	0.0459	0.0501	0.0561	0.0639	0.0736	0.0851	0.0000	0.0000
	T7	0.0892	0.0776	0.0675	0.0566	0.0549	0.0539	0.0551	0.0586	0.0643	0.0723	0.0825	0.0950	0.1098	0.0000	0.0000
	UBUS	0.5553	0.4709	0.3476	0.2658	0.2104	0.1725	0.1465	0.1288	0.1173	0.1107	0.1081	0.1094	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2020
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.004	0.8	0.0	0.1	0.2	0.1	0.7	0.3	0.3	0.1	0.5	0.5	0.0	0.0	0.0	**3.4**
LDT1	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
LDT2	0.002	0.3	0.0	0.0	0.1	0.0	0.3	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**1.3**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.002	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.6**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.009**	**1.6**	**0.0**	**0.1**	**0.4**	**0.3**	**1.4**	**0.6**	**0.5**	**0.3**	**1.0**	**1.0**	**0.0**	**0.0**	**0.0**	**7.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.7**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.4**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
T6	0.001	0.3	0.0	0.0	0.1	0.1	0.7	0.3	0.4	0.2	1.0	1.0	0.0	0.0	0.0	**4.3**
T7	0.007	1.7	0.0	0.2	0.7	0.7	4.6	2.2	2.6	1.5	6.4	6.7	0.0	0.0	0.0	**27.2**
UBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
Total	**0.010**	**2.6**	**0.1**	**0.3**	**1.0**	**1.0**	**6.2**	**2.9**	**3.3**	**1.9**	**8.0**	**8.0**	**0.0**	**0.0**	**0.0**	**35.1**

Total Emissions (tons/year) ***42.4***
Total Emissions (tons/day) ***0.1***

City of Fresno General Plan

Criteria Pollutants: Summary

Year 2035

Prepared by FirstCarbon Solutions

	Data
City Information	
Population	780,600
Employment	294,822
County Information	
Population	1,301,000

	ROG	NOx	PM10	PM2.5	CO	SO2
Emissions (tons/year)						
Motor vehicles	306	1719	54	49	5100	0
Electricity	0	425	0	0	0	299
Natural gas	117	1032	81	81	681	6
Stationary, area	554	507	238	na	203	89
Offroad	1488	2268	182	182	10972	10
Total	**2465**	**5952**	**555**	**312**	**16955**	**404**
Emissions (tons/day)						
Motor vehicles	0.8	4.7	0.1	0.1	14.0	0.0
Electricity	0.0	1.2	0.0	0.0	0.0	0.8
Natural gas	0.3	2.8	0.2	0.2	1.9	0.0
Stationary, area	1.5	1.4	0.7	na	0.6	0.2
Offroad	4.1	6.2	0.5	0.5	30.1	0.03
Total	**6.8**	**16.3**	**1.5**	**0.9**	**46.5**	**1.1**

Sources:
- Population for the City: Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.
-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).
- Emissions: refer to subsequent spreadsheets.
- Emissions for stationary, area: California Air Resources Board, CEIDARS 2.5, data is from the year 2010. Note that SO2 emissions for this category represent SOx emissions; SO2 emissions were not available.
www.arb.ca.gov/app/emsinv/facinfo/faccrit.php?dd=y&grp=1&sort=FacilityNameA&dbyr=2010&ab_=&dis_=&co_=10&fname_=&city_=Fresno&fzip_=&fsic_=&facid_=&all_fac=C&displayit=Pollutant&CERR=&showpol=&showpol2=

City of Fresno General Plan

Criteria Pollutants: Energy

Year 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/MWh)		*(lbs/kWh)*
NOx	0.2002	0.0002002
SO2	0.1409	0.0001409

	Usage (kWh/year)	Emissions Per capita (kWh/person or employee/year)	Emissions (tons/year) NOx	SO2
Residential	2,037,366,000	2,610	203.9	143.5
Commercial	2,212,049,466	7,503	221.4	155.8
Industrial	not available			
Total	**4,249,415,466**		**425.4**	**299.4**

Natural Gas

		Natural Gas Emission Factors						
			ROG	NOx	PM10	PM2.5	CO	SO2
	lb/MMBTU	Residential	0.01078	0.09216	0.00745	0.00745	0.03922	0.00059
		Nonresidential	0.01078	0.09804	0.00745	0.00745	0.08235	0.00059
	lb/therm	Residential	0.0011	0.0092	0.0007	0.0007	0.0039	0.0001
		Nonresidential	0.0011	0.0098	0.0007	0.0007	0.0082	0.0001

	Usage (therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) ROG	NOx	PM10	PM2.5	CO	SO2
Residential	97,575,000	125	53	450	36	36	191	3
Commercial	118,813,266	403	64	582	44	44	489	3
Industrial	not available							
Total	**216,388,266**		**117**	**1,032**	**81**	**81**	**681**	**6**

Sources:

Per capita energy usage: See the spreadsheet calculations for 2010. Residential rates are based on population and commercial are based on employees.

Usage: per capita usage multiplied by the population (for residential) or employees (for commercial)

Emission factors for electricity NOx and SO2 electricity emission factors from Environmental Protection Agency, eGRID2012, state total annual total output emission rate for California (data is from year 2009).

Emission factors for natural gas: CalEEMod Appendix D, Table 8.2, August 2013. 1 therm = 0.1 MMBTU

City of Fresno General Plan

Criteria Pollutants: Offroad

Year 2035

Prepared by FirstCarbon Solutions

Note: yellow shaded cells are data entry cells

Fresno County Emissions (tons/day) (from Offroad 2007)	ROG Evaporative	ROG Exhaust	CO	NOx	SO2	PM
Agricultural Equipment	0.12	0.78	9.82	4.98	0.01	0.25
Airport Ground Support Equipment	0.00	0.01	0.23	0.04	0.00	0.00
Construction and Mining Equipment	0.01	0.52	4.43	3.04	0.01	0.16
Dredging	0.00	0.00	0.00	0.00	0.00	0.00
Entertainment Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Equipment	0.02	0.04	2.58	0.30	0.00	0.01
Lawn and Garden Equipment	0.53	0.95	12.06	0.25	0.00	0.03
Light Commercial Equipment	0.07	0.19	6.46	0.35	0.00	0.04
Logging Equipment	0.00	0.04	0.29	0.04	0.00	0.00
Military Tactical Support Equip	0.00	0.00	0.02	0.02	0.00	0.00
Oil Drilling	0.00	0.00	0.00	0.00	0.00	0.00
Other Portable Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Pleasure Craft	0.67	0.83	7.38	0.41	0.00	0.29
Railyard Operations	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Equipment	0.48	1.41	5.21	0.07	0.02	0.03
Transport Refrigeration Units	0.00	0.12	1.63	0.86	0.00	0.01
Total	1.91	4.88	50.10	10.36	0.04	0.83
Percent Fresno County/Fresno City Population		**0.60**				
City of Fresno Emissions (tons/day)						
Agricultural Equipment	0.07	0.5	5.9	3.0	0.01	0.15
Airport Ground Support Equipment	0.00	0.0	0.1	0.0	0.00	0.00
Construction and Mining Equipment	0.01	0.3	2.7	1.8	0.00	0.10
Dredging	0.00	0.0	0.0	0.0	0.00	0.00
Entertainment Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Industrial Equipment	0.01	0.0	1.5	0.2	0.00	0.01
Lawn and Garden Equipment	0.32	0.6	7.2	0.1	0.00	0.02
Light Commercial Equipment	0.04	0.1	3.9	0.2	0.00	0.03
Logging Equipment	0.00	0.0	0.2	0.0	0.00	0.00
Military Tactical Support Equip	0.00	0.0	0.0	0.0	0.00	0.00
Oil Drilling	0.00	0.0	0.0	0.0	0.00	0.00
Other Portable Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Pleasure Craft	0.40	0.5	4.4	0.2	0.00	0.17
Railyard Operations	0.00	0.0	0.0	0.0	0.00	0.00
Recreational Equipment	0.29	0.8	3.1	0.0	0.01	0.02
Transport Refrigeration Units	0.00	0.1	1.0	0.5	0.00	0.01
Total	1.15	2.9	30.1	6.2	0.03	0.50

Sources:

- County of Fresno emissions from OFFROAD2007, annual, all days, all equipment, for the year assessed
- City of Fresno emissions based on the percent of the City's population compared with the County's population.

Note: PM refers to total particulate matter.

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2035
Prepared by FirstCarbon Solutions

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

VMT/day by Vehicle Class and speed

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2035
Prepared by FirstCarbon Solutions

DSL \ Speed	5	10	15	20	25	30	35	40	45	50	55	60			
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

EMFAC2011 Emission Rates
Region Type: County
Region: Fresno
Calendar Year: 2035
Season: Annual
Vehicle Classification: EMFAC2007 Categories

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.61058	0.0661503	0.122367	1.1438369	0.105519	1132.07376	673.304157	0.013853	0.012854	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	0.0188755	0.021488	0.1206987	0.322311	503.980949	303.820128	0.011442	0.010527	0.000%
Fresno	2035	LDA	GAS	10	35638.706	0.04124	0.07626	1.0279769	0.092659	834.330412	496.221479	0.008718	0.008089	0.094%
Fresno	2035	LDA	DSL	10	95.10123	0.0160499	0.018272	0.1142073	0.306429	455.139526	274.429687	0.00973	0.008951	0.000%
Fresno	2035	LDA	GAS	15	21241.017	0.0276946	0.051197	0.9523351	0.081238	646.517456	384.518119	0.005787	0.00537	0.056%
Fresno	2035	LDA	DSL	15	56.681258	0.012068	0.013739	0.1031034	0.27962	381.698077	230.236122	0.007316	0.006731	0.000%
Fresno	2035	LDA	GAS	20	808500.65	0.0192603	0.03561	0.8610518	0.07266	514.415615	305.950589	0.004053	0.003761	2.136%
Fresno	2035	LDA	DSL	20	2157.469	0.0095589	0.010882	0.0938803	0.259701	332.219565	200.462311	0.005795	0.005332	0.006%
Fresno	2035	LDA	GAS	25	197184.91	0.0143388	0.0265	0.7989048	0.066217	428.337956	254.755245	0.002995	0.002778	0.521%
Fresno	2035	LDA	DSL	25	526.18429	0.0079752	0.009079	0.0860494	0.245193	300.076477	181.120132	0.004835	0.004448	0.001%
Fresno	2035	LDA	GAS	30	537842.7	0.0111563	0.020616	0.7330898	0.061379	368.21896	218.999388	0.002334	0.002165	1.421%
Fresno	2035	LDA	DSL	30	1435.2233	0.0070089	0.007979	0.0792994	0.235453	281.264321	169.799873	0.004249	0.003909	0.004%
Fresno	2035	LDA	GAS	35	1366088.4	0.0091514	0.016912	0.6739171	0.057744	328.478921	195.363966	0.001919	0.00178	3.608%
Fresno	2035	LDA	DSL	35	3645.382	0.0064893	0.007388	0.0734215	0.229856	273.56113	165.164459	0.003934	0.003619	0.010%
Fresno	2035	LDA	GAS	40	1943582.5	0.0078894	0.014581	0.6181806	0.055334	303.471949	180.491197	0.001664	0.001544	5.134%
Fresno	2035	LDA	DSL	40	5186.4142	0.0063315	0.007208	0.0682691	0.228203	276.084845	166.683111	0.003838	0.003531	0.014%
Fresno	2035	LDA	GAS	45	1929011.9	0.0072287	0.013361	0.5747455	0.053673	292.328918	173.863779	0.001523	0.001413	5.095%
Fresno	2035	LDA	DSL	45	5147.5324	0.0065121	0.007414	0.0637359	0.230226	289.122634	174.528631	0.003947	0.003631	0.014%
Fresno	2035	LDA	GAS	50	2232462.6	0.0069809	0.012904	0.5354171	0.052973	292.125802	173.742948	0.00147	0.001364	5.897%
Fresno	2035	LDA	DSL	50	5957.2848	0.0070634	0.008041	0.0597434	0.236193	314.18613	189.610649	0.004281	0.003938	0.016%
Fresno	2035	LDA	GAS	55	1665080.1	0.0071129	0.01315	0.5004716	0.053167	303.02659	180.226197	0.001497	0.001389	4.398%
Fresno	2035	LDA	DSL	55	4443.2357	0.0080823	0.009201	0.0562346	0.246416	354.307143	213.753563	0.004898	0.004506	0.012%
Fresno	2035	LDA	GAS	60	1897400.1	0.0076308	0.01411	0.4677985	0.054217	325.917054	193.840412	0.001608	0.001492	5.012%
Fresno	2035	LDA	DSL	60	5063.1773	0.0097593	0.01111	0.0531705	0.261473	414.65641	250.068876	0.005913	0.00544	0.013%
Fresno	2035	LDA	GAS	65	2035032.5	0.0086351	0.01597	0.4386353	0.05628	363.783005	216.361367	0.001822	0.001691	5.375%
Fresno	2035	LDA	DSL	65	5430.4465	0.0124383	0.01416	0.0505307	0.282274	503.663514	303.629111	0.007536	0.006933	0.014%
Fresno	2035	LDA	GAS	70	1953744	0.0093869	0.017362	0.4261377	0.057624	390.123335	232.027326	0.001979	0.001836	5.161%
Fresno	2035	LDA	DSL	70	5213.5296	0.0167349	0.019052	0.0483169	0.310021	634.981498	382.650018	0.010138	0.009327	0.014%
Fresno	2035	LDT1	GAS	5	102.50505	0.0781814	0.141973	1.3479236	0.122225	1314.76791	800.56989	0.013784	0.012789	0.000%
Fresno	2035	LDT1	DSL	5	0.1360064	0.021304	0.024253	0.1296125	0.371499	504.827175	301.829718	0.010898	0.010026	0.000%
Fresno	2035	LDT1	GAS	10	5289.7355	0.0489995	0.088828	1.2087702	0.106962	969.207598	590.161462	0.008682	0.008055	0.014%
Fresno	2035	LDT1	DSL	10	7.018562	0.018082	0.020585	0.1241136	0.353791	455.724636	272.471938	0.00925	0.00851	0.000%
Fresno	2035	LDT1	GAS	15	3152.7341	0.0330516	0.059827	1.1168612	0.093501	750.848605	457.196034	0.005769	0.005352	0.008%
Fresno	2035	LDT1	DSL	15	4.1831318	0.0135595	0.015437	0.1140363	0.323706	381.890427	228.327407	0.006936	0.006381	0.000%
Fresno	2035	LDT1	GAS	20	120003.09	0.0230579	0.041754	1.0085325	0.083475	597.522898	363.837256	0.004043	0.003751	0.317%
Fresno	2035	LDT1	DSL	20	159.22329	0.0107269	0.012212	0.1050606	0.301221	332.147383	198.586677	0.005487	0.005048	0.000%
Fresno	2035	LDT1	GAS	25	29267.508	0.0172317	0.031148	0.934299	0.075962	497.463371	302.908369	0.002989	0.002773	0.077%
Fresno	2035	LDT1	DSL	25	38.832909	0.0089525	0.010192	0.097053	0.284745	299.832425	179.265976	0.00458	0.004213	0.000%
Fresno	2035	LDT1	GAS	30	79830.22	0.0134396	0.024282	0.8567186	0.070363	427.662588	260.40672	0.002331	0.002163	0.211%
Fresno	2035	LDT1	DSL	30	105.92086	0.0078821	0.008973	0.0898981	0.273609	280.919663	167.958278	0.004032	0.003709	0.000%
Fresno	2035	LDT1	GAS	35	202764.03	0.0110382	0.019944	0.7872989	0.066188	381.527502	232.315209	0.001917	0.001779	0.536%
Fresno	2035	LDT1	DSL	35	269.03268	0.0073212	0.008335	0.0834959	0.267127	273.175322	163.328035	0.003745	0.003445	0.001%
Fresno	2035	LDT1	GAS	40	288479.58	0.009518	0.017205	0.7223129	0.063456	352.529789	214.659347	0.001663	0.001543	0.762%
Fresno	2035	LDT1	DSL	40	382.76239	0.0071738	0.008167	0.0777592	0.265083	275.712512	164.844988	0.00367	0.003376	0.001%
Fresno	2035	LDT1	GAS	45	286316.87	0.0087141	0.015757	0.6716524	0.061606	339.573191	206.769651	0.001521	0.001412	0.756%
Fresno	2035	LDT1	DSL	45	379.89286	0.0074158	0.008442	0.0726125	0.267152	288.820023	172.681802	0.003793	0.00349	0.001%
Fresno	2035	LDT1	GAS	50	331357.07	0.0084009	0.015197	0.6260151	0.060895	339.331167	206.622144	0.001468	0.001362	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	0.0080872	0.009207	0.0679898	0.273613	314.017531	187.74707	0.004137	0.003806	0.001%
Fresno	2035	LDT1	GAS	55	247142.36	0.0085378	0.015454	0.5856615	0.061253	351.985417	214.327261	0.001494	0.001386	0.653%
Fresno	2035	LDT1	DSL	55	327.91509	0.009304	0.010592	0.0638334	0.284763	354.353048	211.86316	0.004759	0.004379	0.001%
Fresno	2035	LDT1	GAS	60	281624.87	0.0091271	0.016538	0.5481625	0.062653	378.579994	230.521082	0.001604	0.001488	0.744%
Fresno	2035	LDT1	DSL	60	373.66739	0.0112923	0.012856	0.0600932	0.301159	415.025007	248.13815	0.005776	0.005314	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	0.0102875	0.018657	0.5149092	0.065297	422.572629	257.308816	0.001816	0.001685	0.798%
Fresno	2035	LDT1	DSL	65	400.77219	0.0144586	0.01646	0.0567251	0.323678	504.508047	301.638916	0.007396	0.006804	0.001%
Fresno	2035	LDT1	GAS	70	289987.78	0.0111589	0.020248	0.5007372	0.067016	453.157125	275.931745	0.001972	0.001829	0.766%
Fresno	2035	LDT1	DSL	70	384.76351	0.0195301	0.022234	0.0536906	0.35342	636.52822	380.57209	0.00999	0.009191	0.001%
Fresno	2035	LDT2	GAS	5	255.42307	0.0807862	0.148505	1.3373414	0.13084	1537.70722	1044.72707	0.013765	0.012772	0.001%
Fresno	2035	LDT2	DSL	5	0.1150683	0.0237373	0.027023	0.1586632	0.407101	502.581245	342.876199	0.012342	0.011355	0.000%
Fresno	2035	LDT2	GAS	10	13181.015	0.0504476	0.092662	1.2015065	0.114698	1133.51983	770.121871	0.008664	0.008039	0.035%
Fresno	2035	LDT2	DSL	10	5.9380597	0.0202214	0.023021	0.1483564	0.386317	454.171785	309.953162	0.010521	0.009679	0.000%
Fresno	2035	LDT2	GAS	15	7856.0134	0.0339175	0.062256	1.1120257	0.1004	878.167189	596.631776	0.005753	0.005338	0.021%
Fresno	2035	LDT2	DSL	15	3.5391415	0.0152463	0.017357	0.1315346	0.351462	381.379828	260.447709	0.00794	0.007305	0.000%
Fresno	2035	LDT2	GAS	20	299024.86	0.0236147	0.043346	1.0052878	0.089718	698.829778	474.789734	0.00403	0.003739	0.790%
Fresno	2035	LDT2	DSL	20	134.71098	0.0120917	0.013766	0.1182917	0.32573	332.338943	227.095244	0.0063	0.005796	0.000%
Fresno	2035	LDT2	GAS	25	72929.061	0.017598	0.032277	0.9321944	0.081698	581.815971	395.289098	0.002978	0.002763	0.193%
Fresno	2035	LDT2	DSL	25	32.854613	0.0100852	0.011481	0.1075137	0.307105	300.480123	205.428217	0.005254	0.004834	0.000%
Fresno	2035	LDT2	GAS	30	198921.7	0.0137025	0.025125	0.8552845	0.075703	500.176625	339.823036	0.002321	0.002154	0.525%
Fresno	2035	LDT2	DSL	30	89.614422	0.0088468	0.010071	0.0985277	0.294692	281.834348	192.747317	0.004606	0.004237	0.000%
Fresno	2035	LDT2	GAS	35	505249.38	0.011245	0.020619	0.7862275	0.071216	446.216101	303.162106	0.001908	0.001771	1.335%
Fresno	2035	LDT2	DSL	35	227.61531	0.0081642	0.009294	0.0909097	0.287659	274.19932	187.554772	0.004246	0.003906	0.001%
Fresno	2035	LDT2	GAS	40	718836.18	0.009696	0.017781	0.7213458	0.068263	412.295273	280.116489	0.001655	0.001536	1.899%
Fresno	2035	LDT2	DSL	40	323.83637	0.0079306	0.009028	0.0843821	0.285742	276.700724	189.255964	0.004117	0.003788	0.001%
Fresno	2035	LDT2	GAS	45	713447.17	0.0088818	0.01629	0.6706601	0.066243	397.143739	269.822318	0.001515	0.001405	1.885%
Fresno	2035	LDT2	DSL	45	321.40864	0.0081143	0.009238	0.0787589	0.288616	289.623184	198.044466	0.004205	0.003868	0.001%
Fresno	2035	LDT2	GAS	50	825678.75	0.0085729	0.015727	0.6248404	0.065431	396.861533	269.630532	0.001462	0.001356	2.181%
Fresno	2035	LDT2	DSL	50	371.96905	0.0087514	0.009963	0.0739148	0.296659	314.465023	214.939279	0.004525	0.004163	0.001%
Fresno	2035	LDT2	GAS	55	615831.76	0.0087281	0.016017	0.5841747	0.065744	411.662269	279.686188	0.001488	0.001381	1.627%
Fresno	2035	LDT2	DSL	55	277.43279	0.0099563	0.011335	0.0697703	0.310342	354.231181	241.984048	0.005137	0.004726	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	LDT2	GAS	60	701755.58	0.0093539	0.017174	0.5462385	0.067149	442.764966	300.817625	0.001599	0.001483	1.854%
Fresno	2035	LDT2	DSL	60	316.14156	0.011956	0.013611	0.0662844	0.330524	414.046697	282.664287	0.006156	0.005664	0.001%
Fresno	2035	LDT2	GAS	65	752659.03	0.0105725	0.01942	0.5124349	0.069848	494.215085	335.773267	0.001811	0.001681	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	0.015162	0.017261	0.0634572	0.358568	502.266607	342.662214	0.007792	0.007169	0.001%
Fresno	2035	LDT2	GAS	70	722594.3	0.0114854	0.021103	0.497949	0.071604	529.986613	360.07659	0.001967	0.001825	1.909%
Fresno	2035	LDT2	DSL	70	325.52944	0.0203114	0.023123	0.061339	0.396335	632.423233	431.181097	0.010422	0.009588	0.001%
Fresno	2035	LHD1	GAS	5	28730.834	0.0468288	0.078146	0.7368093	0.098011	2513.49712	2262.14741	0.001312	0.001217	0.076%
Fresno	2035	LHD1	DSL	5	10879.472	0.1901904	0.216519	2.3726665	1.447606	519.044	467.1396	0.052137	0.047966	0.029%
Fresno	2035	LHD1	GAS	10	74917.972	0.0377331	0.062942	0.5969772	0.100348	2036.12829	1832.51546	0.001056	0.00098	0.198%
Fresno	2035	LHD1	DSL	10	36179.207	0.1680524	0.191316	1.9590347	1.312197	519.043919	467.139527	0.046068	0.042383	0.096%
Fresno	2035	LHD1	GAS	15	170598.31	0.025285	0.042175	0.408915	0.105095	1392.42973	1253.18676	0.000707	0.000656	0.451%
Fresno	2035	LHD1	DSL	15	78353.787	0.1333898	0.151855	1.3818898	1.109385	519.04397	467.139573	0.036566	0.033641	0.207%
Fresno	2035	LHD1	GAS	20	197125.03	0.0175837	0.029353	0.2948783	0.110421	1006.06851	905.461657	0.000493	0.000457	0.521%
Fresno	2035	LHD1	DSL	20	85901.056	0.1082319	0.123215	1.0201524	0.970248	519.044027	467.139624	0.02967	0.027296	0.227%
Fresno	2035	LHD1	GAS	25	151847.06	0.012682	0.021216	0.2238341	0.116734	768.012023	691.21082	0.000358	0.000332	0.401%
Fresno	2035	LHD1	DSL	25	91937.051	0.0897722	0.1022	0.7881648	0.882282	519.044026	467.139624	0.024609	0.022641	0.243%
Fresno	2035	LHD1	GAS	30	134282.63	0.0096155	0.016078	0.1805654	0.121624	619.43358	557.490222	0.000271	0.000252	0.355%
Fresno	2035	LHD1	DSL	30	77606.52	0.0761173	0.086654	0.6372787	0.827804	519.043982	467.139584	0.020866	0.019197	0.205%
Fresno	2035	LHD1	GAS	35	50176.542	0.0075026	0.012588	0.1525298	0.128927	527.846459	475.061813	0.000214	0.000199	0.133%
Fresno	2035	LHD1	DSL	35	40955.973	0.065975	0.075108	0.539265	0.808703	519.043989	467.13959	0.018086	0.016639	0.108%
Fresno	2035	LHD1	GAS	40	14810.971	0.0060602	0.010275	0.1361152	0.136886	475.233144	427.70983	0.000176	0.000164	0.039%
Fresno	2035	LHD1	DSL	40	22483.492	0.0584561	0.066548	0.4775683	0.817813	519.044031	467.139628	0.016025	0.014743	0.059%
Fresno	2035	LHD1	GAS	45	18233.609	0.0052446	0.00888	0.1303835	0.140061	452.055829	406.850246	0.000151	0.00014	0.048%
Fresno	2035	LHD1	DSL	45	24267.079	0.0529462	0.060276	0.442618	0.852959	519.044071	467.139664	0.014514	0.013353	0.064%
Fresno	2035	LHD1	GAS	50	134634.42	0.0047971	0.008053	0.1328765	0.141188	454.321818	408.889636	0.000135	0.000126	0.356%
Fresno	2035	LHD1	DSL	50	93702.888	0.0490223	0.055809	0.4293219	0.921883	519.044016	467.139615	0.013438	0.012363	0.248%
Fresno	2035	LHD1	GAS	55	37030.824	0.0043361	0.007352	0.1381423	0.152612	482.415478	434.17393	0.000126	0.000117	0.098%
Fresno	2035	LHD1	DSL	55	56428.728	0.0463989	0.052822	0.4358102	1.03814	519.043992	467.139593	0.012719	0.011702	0.149%
Fresno	2035	LHD2	GAS	5	2869.2263	0.0352143	0.063946	0.5594356	0.076166	2513.49728	2262.14755	0.001034	0.000959	0.008%
Fresno	2035	LHD2	DSL	5	2868.0838	0.177619	0.202207	2.2585627	1.338565	519.107914	467.197122	0.049051	0.045127	0.008%
Fresno	2035	LHD2	GAS	10	7481.7397	0.0283664	0.051506	0.4532655	0.077982	2036.12823	1832.51541	0.000833	0.000773	0.020%
Fresno	2035	LHD2	DSL	10	9537.6864	0.1569443	0.178671	1.864823	1.213356	519.107918	467.197126	0.043341	0.039874	0.025%
Fresno	2035	LHD2	GAS	15	17036.93	0.0190077	0.034512	0.3104759	0.081671	1392.42956	1253.1866	0.000557	0.000517	0.045%
Fresno	2035	LHD2	DSL	15	20655.896	0.1245729	0.141818	1.3154333	1.02582	519.10791	467.197119	0.034402	0.03165	0.055%
Fresno	2035	LHD2	GAS	20	19686.039	0.0132258	0.024019	0.2238916	0.08581	1006.06851	905.461663	0.000388	0.00036	0.052%
Fresno	2035	LHD2	DSL	20	22645.534	0.1010778	0.11507	0.9710922	0.897164	519.107917	467.197126	0.027913	0.02568	0.060%
Fresno	2035	LHD2	GAS	25	15164.321	0.0095532	0.017359	0.16995	0.090715	768.01204	691.210836	0.000282	0.000262	0.040%
Fresno	2035	LHD2	DSL	25	24236.761	0.0838384	0.095444	0.7502612	0.815824	519.107974	467.197177	0.023153	0.0213	0.064%
Fresno	2035	LHD2	GAS	30	13410.236	0.0072407	0.013155	0.1370975	0.094516	619.433566	557.490209	0.000214	0.000198	0.035%
Fresno	2035	LHD2	DSL	30	20458.898	0.071086	0.080927	0.6066314	0.76545	519.107941	467.197147	0.019631	0.01806	0.054%
Fresno	2035	LHD2	GAS	35	5010.9181	0.005663	0.010298	0.115811	0.100191	527.84649	475.061841	0.000169	0.000157	0.013%
Fresno	2035	LHD2	DSL	35	10796.955	0.0616141	0.070144	0.5133312	0.747787	519.107889	467.1971	0.017015	0.015654	0.029%
Fresno	2035	LHD2	GAS	40	1479.1088	0.0046079	0.008402	0.1033479	0.106376	475.233142	427.709828	0.000139	0.000129	0.004%
Fresno	2035	LHD2	DSL	40	5927.1756	0.0545922	0.06215	0.4546015	0.756211	519.107876	467.197088	0.015076	0.01387	0.016%
Fresno	2035	LHD2	GAS	45	1820.913	0.003984	0.007262	0.098996	0.108844	452.055826	406.850243	0.000119	0.000111	0.005%
Fresno	2035	LHD2	DSL	45	6397.3717	0.0494465	0.056292	0.421332	0.78871	519.107898	467.197108	0.013655	0.012563	0.017%
Fresno	2035	LHD2	GAS	50	13445.368	0.0036222	0.006588	0.1008888	0.109719	454.321772	408.889595	0.000107	9.91E-05	0.036%
Fresno	2035	LHD2	DSL	50	24702.279	0.045782	0.05212	0.4086754	0.852442	519.107864	467.197078	0.012643	0.011632	0.065%
Fresno	2035	LHD2	GAS	55	3698.111	0.0032971	0.006012	0.104887	0.118597	482.415456	434.173911	9.95E-05	9.24E-05	0.010%
Fresno	2035	LHD2	DSL	55	14875.936	0.043332	0.049331	0.4148517	0.959942	519.107902	467.197112	0.011966	0.011009	0.039%
Fresno	2035	MCY	GAS	5	10.752747	4.7189475	5.165712	23.870843	1.236078	266.394097	239.754687	0.000467	0.000411	0.000%
Fresno	2035	MCY	GAS	10	554.89158	4.0924659	4.480206	22.084999	1.217711	242.30076	218.070684	0.000402	0.000353	0.001%
Fresno	2035	MCY	GAS	15	330.7208	3.1688185	3.467933	19.076397	1.162584	205.030744	184.52767	0.000309	0.000271	0.001%
Fresno	2035	MCY	GAS	20	12588.286	2.589213	2.830736	17.08271	1.135271	178.738769	160.864892	0.000251	0.000219	0.033%
Fresno	2035	MCY	GAS	25	3070.1522	2.2223167	2.429782	15.901695	1.116377	160.513437	144.462093	0.000214	0.000187	0.008%
Fresno	2035	MCY	GAS	30	8374.1638	2.0085029	2.195247	15.312538	1.114165	148.522673	133.670406	0.000192	0.000167	0.022%
Fresno	2035	MCY	GAS	35	21269.879	1.9075578	2.084042	15.2783	1.121996	141.675292	127.507762	0.000182	0.000158	0.056%
Fresno	2035	MCY	GAS	40	30261.417	1.9062373	2.081751	15.890486	1.142786	139.435532	125.491979	0.000181	0.000156	0.080%
Fresno	2035	MCY	GAS	45	30034.55	1.9966162	2.179985	17.238489	1.167142	141.742565	127.568309	0.000189	0.000163	0.079%
Fresno	2035	MCY	GAS	50	34759.25	2.1978531	2.399426	19.669568	1.20228	149.01587	134.114283	0.000207	0.000179	0.092%
Fresno	2035	MCY	GAS	55	25925.157	2.5415526	2.774636	23.714161	1.247993	162.250226	146.025203	0.00024	0.000207	0.068%
Fresno	2035	MCY	GAS	60	29542.357	3.0875112	3.370405	30.291061	1.306048	183.22816	164.905344	0.000291	0.000252	0.078%
Fresno	2035	MCY	GAS	65	31685.281	3.9413355	4.302831	41.189322	1.378654	214.9121	193.42089	0.000371	0.000321	0.084%
Fresno	2035	MCY	GAS	70	30419.625	5.2796836	5.764605	59.434256	1.464776	262.137322	235.92359	0.000499	0.000432	0.080%
Fresno	2035	MDV	GAS	5	262.23808	0.1100125	0.195436	1.7718606	0.179144	1969.99002	1370.33855	0.013475	0.012502	0.001%
Fresno	2035	MDV	DSL	5	0.204452	0.0191431	0.021793	0.1208349	0.327478	504.233051	348.357588	0.011581	0.010655	0.000%
Fresno	2035	MDV	GAS	10	13532.7	0.0690463	0.122328	1.5896758	0.156103	1452.2532	1010.20434	0.008486	0.007873	0.036%
Fresno	2035	MDV	DSL	10	10.550669	0.0162675	0.018519	0.1147625	0.311503	455.313852	314.587226	0.009842	0.009054	0.000%
Fresno	2035	MDV	GAS	15	8065.6207	0.0466288	0.082419	1.4692966	0.136006	1125.03783	782.583902	0.005638	0.005231	0.021%
Fresno	2035	MDV	DSL	15	6.2883017	0.0122206	0.013912	0.104181	0.284484	381.755387	263.807654	0.007394	0.006802	0.000%
Fresno	2035	MDV	GAS	20	307003.17	0.0324784	0.057548	1.3271621	0.121137	895.315834	622.79059	0.003951	0.003666	0.811%
Fresno	2035	MDV	DSL	20	239.35278	0.0096758	0.011015	0.0952165	0.264374	332.198042	229.596761	0.005854	0.005386	0.001%
Fresno	2035	MDV	GAS	25	74874.889	0.0243171	0.04294	1.2297065	0.110055	745.377168	518.48947	0.002921	0.00271	0.198%
Fresno	2035	MDV	DSL	25	58.375658	0.0080735	0.009191	0.0874931	0.2497	300.003773	207.372109	0.004885	0.004494	0.000%
Fresno	2035	MDV	GAS	30	204229.16	0.0189682	0.033481	1.1277553	0.101854	640.793851	445.741211	0.002277	0.002113	0.539%
Fresno	2035	MDV	DSL	30	159.22577	0.0070996	0.008082	0.0807626	0.239828	281.161644	194.364833	0.004295	0.003952	0.000%
Fresno	2035	MDV	GAS	35	518729.95	0.0155728	0.027505	1.0364591	0.095789	571.669908	397.658678	0.001873	0.001738	1.370%
Fresno	2035	MDV	DSL	35	404.42401	0.0065804	0.007491	0.0748519	0.234133	273.446191	189.03863	0.003981	0.003662	0.001%
Fresno	2035	MDV	GAS	40	738015.56	0.0134185	0.023729	0.9509382	0.091878	528.227829	367.441432	0.001625	0.001507	1.949%
Fresno	2035	MDV	DSL	40	575.3884	0.0064296	0.00732	0.0696347	0.232416	275.97394	190.783609	0.00389	0.003578	0.002%
Fresno	2035	MDV	GAS	45	732482.74	0.0122813	0.021731	0.8842086	0.089299	508.811884	353.935103	0.001486	0.001379	1.935%
Fresno	2035	MDV	DSL	45	571.07475	0.0066243	0.007541	0.0650156	0.234401	289.032509	199.798324	0.004007	0.003687	0.002%
Fresno	2035	MDV	GAS	50	847708.74	0.0118363	0.020956	0.824051	0.088433	508.448346	353.682037	0.001434	0.001331	2.239%
Fresno	2035	MDV	DSL	50	660.90994	0.0071982	0.008195	0.0609215	0.240351	314.135879	217.127918	0.004354	0.004006	0.002%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	GAS	55	632262.83	0.0120264	0.021305	0.7708121	0.089188	527.40799	366.870322	0.00146	0.001354	1.670%
Fresno	2035	MDV	DSL	55	492.93907	0.0082517	0.009394	0.0572662	0.250567	354.320834	244.868774	0.004991	0.004592	0.001%
Fresno	2035	MDV	GAS	60	720479.2	0.0128467	0.022792	0.7213014	0.091557	567.257667	394.590335	0.001567	0.001454	1.903%
Fresno	2035	MDV	DSL	60	561.71632	0.0099812	0.011363	0.0540983	0.265606	414.766203	286.595991	0.006037	0.005554	0.001%
Fresno	2035	MDV	GAS	65	772740.8	0.0144731	0.025705	0.6773478	0.095873	633.176731	440.444571	0.001775	0.001647	2.041%
Fresno	2035	MDV	DSL	65	602.4617	0.0127412	0.014505	0.0513011	0.286347	503.915118	348.138109	0.007705	0.007089	0.002%
Fresno	2035	MDV	GAS	70	741873.94	0.0156958	0.02789	0.6585872	0.098677	679.002269	472.320926	0.001927	0.001788	1.960%
Fresno	2035	MDV	DSL	70	578.39657	0.0171657	0.019542	0.0488944	0.313934	635.442336	438.935217	0.010381	0.00955	0.002%
Fresno	2035	MH	GAS	5	497.37529	0.0553148	0.09933	0.7610391	0.116409	2513.49733	2262.1476	0.001014	0.000941	0.001%
Fresno	2035	MH	DSL	5	100.05503	1.0506642	1.196111	1.8537301	10.40436	2409.45049	2168.50544	0.102742	0.094523	0.000%
Fresno	2035	MH	GAS	10	2500.3099	0.0445366	0.079952	0.6162304	0.119449	2036.12821	1832.51539	0.000817	0.000758	0.007%
Fresno	2035	MH	DSL	10	498.03629	0.7897955	0.89913	1.4655575	8.936126	2187.78829	1969.00946	0.089264	0.082123	0.001%
Fresno	2035	MH	GAS	15	3158.32	0.0299198	0.053672	0.4228694	0.124529	1392.42964	1253.18668	0.000546	0.000507	0.008%
Fresno	2035	MH	DSL	15	672.17609	0.4011829	0.45672	0.8767346	6.620523	1796.35774	1616.72197	0.066961	0.061604	0.002%
Fresno	2035	MH	GAS	20	3275.9536	0.0208567	0.037433	0.3055777	0.130392	1006.06861	905.461752	0.000381	0.000353	0.009%
Fresno	2035	MH	DSL	20	712.8672	0.1900703	0.216382	0.5379409	5.154415	1474.1187	1326.70683	0.05086	0.046792	0.002%
Fresno	2035	MH	GAS	25	3650.1697	0.0151682	0.027222	0.2333843	0.136157	768.012153	691.210938	0.000277	0.000257	0.010%
Fresno	2035	MH	DSL	25	742.42287	0.146569	0.166859	0.4562472	4.526696	1322.2031	1189.98279	0.044122	0.040592	0.002%
Fresno	2035	MH	GAS	30	4127.0368	0.0114739	0.020587	0.187889	0.142452	619.433653	557.490288	0.00021	0.000195	0.011%
Fresno	2035	MH	DSL	30	892.7034	0.1260962	0.143552	0.4275845	4.128248	1241.08342	1116.97508	0.041074	0.037788	0.002%
Fresno	2035	MH	GAS	35	5129.2808	0.0090439	0.01624	0.1599202	0.148736	527.846586	475.061927	0.000166	0.000154	0.014%
Fresno	2035	MH	DSL	35	1052.6149	0.1087305	0.123782	0.4078958	3.802662	1173.76427	1056.38785	0.040066	0.036861	0.003%
Fresno	2035	MH	GAS	40	6385.4256	0.0074294	0.013359	0.143859	0.155038	475.233226	427.709904	0.000136	0.000127	0.017%
Fresno	2035	MH	DSL	40	1306.6575	0.0944721	0.10755	0.3971811	3.548249	1120.24542	1008.22088	0.041098	0.03781	0.003%
Fresno	2035	MH	GAS	45	5823.0717	0.0063952	0.011482	0.1370593	0.160335	452.05586	406.850274	0.000117	0.000109	0.015%
Fresno	2035	MH	DSL	45	1069.9793	0.0833209	0.094855	0.3954404	3.358787	1080.52712	972.474412	0.044171	0.040637	0.003%
Fresno	2035	MH	GAS	50	5667.0456	0.0056801	0.010217	0.1370394	0.16791	454.32184	408.889656	0.000105	9.72E-05	0.015%
Fresno	2035	MH	DSL	50	1197.4807	0.0752769	0.085698	0.4026736	3.248634	1054.60923	949.148305	0.049283	0.045341	0.003%
Fresno	2035	MH	GAS	55	7411.9792	0.0052533	0.009506	0.1451595	0.174931	482.415536	434.173982	9.76E-05	9.06E-05	0.020%
Fresno	2035	MH	DSL	55	1754.7995	0.0703401	0.080078	0.4188808	3.209985	1042.49168	938.242513	0.056436	0.051921	0.005%
Fresno	2035	MH	GAS	60	8553.0862	0.0050896	0.009255	0.1630902	0.18043	541.209217	487.088295	9.49E-05	8.8E-05	0.023%
Fresno	2035	MH	DSL	60	2108.6858	0.0685105	0.077995	0.444062	3.238258	1044.17453	939.757077	0.065629	0.060379	0.006%
Fresno	2035	MH	GAS	65	1336.5278	0.0052101	0.009435	0.1945296	0.183905	641.497946	577.348151	9.61E-05	8.92E-05	0.004%
Fresno	2035	MH	DSL	65	331.84716	0.0697882	0.079449	0.4782171	3.327952	1059.65797	953.692172	0.076862	0.070713	0.001%
Fresno	2035	OBUS	GAS	5	300.94714	0.080701	0.127238	1.1942561	0.133115	2513.49723	2262.14751	0.001	0.000927	0.001%
Fresno	2035	OBUS	DSL	5	245.79146	1.5861841	1.80575	2.9797481	4.623698	3000.84531	2700.76078	0.05483	0.050444	0.001%
Fresno	2035	OBUS	GAS	10	1512.8638	0.0649959	0.102413	0.967016	0.136592	2036.12852	1832.51567	0.000805	0.000747	0.004%
Fresno	2035	OBUS	DSL	10	1133.6207	0.8871084	1.009905	1.7708363	3.395818	2416.37885	2174.74096	0.049207	0.04527	0.003%
Fresno	2035	OBUS	GAS	15	1911.0064	0.0436741	0.068748	0.6635853	0.1424	1392.42968	1253.18671	0.000539	0.0005	0.005%
Fresno	2035	OBUS	DSL	15	1492.4488	0.4445821	0.506123	1.0103201	2.534191	1966.4595	1769.81355	0.044572	0.041006	0.004%
Fresno	2035	OBUS	GAS	20	1982.183	0.0304376	0.047949	0.479526	0.149105	1006.06863	905.461765	0.000376	0.000348	0.005%
Fresno	2035	OBUS	DSL	20	1992.1444	0.2134666	0.243015	0.6250055	2.04657	1667.58305	1500.82475	0.04257	0.039164	0.005%
Fresno	2035	OBUS	GAS	25	2208.6102	0.0221363	0.03487	0.3662369	0.155698	768.012086	691.210878	0.000273	0.000253	0.006%
Fresno	2035	OBUS	DSL	25	2066.889	0.1862273	0.212006	0.5889262	1.833109	1554.29946	1398.86952	0.0406	0.037352	0.005%
Fresno	2035	OBUS	GAS	30	2497.1484	0.0167474	0.02637	0.2948437	0.162896	619.4336	557.49024	0.000207	0.000192	0.007%
Fresno	2035	OBUS	DSL	30	2883.156	0.1715128	0.195254	0.6018785	1.709603	1513.47471	1362.12724	0.041611	0.038282	0.008%
Fresno	2035	OBUS	GAS	35	3103.5765	0.0131973	0.020803	0.2509538	0.170082	527.846634	475.061971	0.000163	0.000152	0.008%
Fresno	2035	OBUS	DSL	35	4256.6836	0.1596004	0.181693	0.6328688	1.620436	1496.24306	1346.61875	0.044706	0.041129	0.011%
Fresno	2035	OBUS	GAS	40	3863.633	0.0108323	0.017113	0.2257499	0.177288	475.233178	427.70986	0.000134	0.000125	0.010%
Fresno	2035	OBUS	DSL	40	4543.6948	0.1340432	0.152598	0.599408	1.454882	1388.01842	1249.21658	0.046787	0.043044	0.012%
Fresno	2035	OBUS	GAS	45	3523.3691	0.0093333	0.014707	0.2150795	0.183345	452.055855	406.850269	0.000115	0.000107	0.009%
Fresno	2035	OBUS	DSL	45	5084.9367	0.127837	0.145533	0.6642423	1.433593	1412.70212	1271.43191	0.054142	0.049811	0.013%
Fresno	2035	OBUS	GAS	50	3428.9625	0.0082795	0.013089	0.2150483	0.192007	454.321799	408.889619	0.000103	9.58E-05	0.009%
Fresno	2035	OBUS	DSL	50	5430.6309	0.1132843	0.128966	0.6775239	1.364009	1369.39275	1232.45348	0.060719	0.055861	0.014%
Fresno	2035	OBUS	GAS	55	4484.7705	0.0076242	0.012182	0.2277906	0.200036	482.415543	434.173989	9.62E-05	8.93E-05	0.012%
Fresno	2035	OBUS	DSL	55	7117.4272	0.1009084	0.114876	0.6898339	1.315754	1329.59333	1196.63399	0.068347	0.062879	0.019%
Fresno	2035	OBUS	GAS	60	5175.2205	0.0073623	0.011865	0.2559284	0.206324	541.209208	487.088287	9.35E-05	8.68E-05	0.014%
Fresno	2035	OBUS	DSL	60	4814.1661	0.0766515	0.087262	0.5707986	1.16079	1154.53492	1039.08143	0.069619	0.064049	0.013%
Fresno	2035	OBUS	GAS	65	808.69374	0.0075559	0.012092	0.3052643	0.210298	641.497894	577.348105	9.48E-05	8.79E-05	0.002%
Fresno	2035	OBUS	DSL	65	1253.2168	0.0906658	0.103216	0.7737067	1.349263	1334.34751	1200.91276	0.089797	0.082614	0.003%
Fresno	2035	SBUS	GAS	5	77.848973	0.2742692	0.341615	3.8280772	0.333728	2513.49698	2262.14728	0.001744	0.001618	0.000%
Fresno	2035	SBUS	DSL	5	153.26155	2.281405	2.597206	4.0455771	12.3463	2617.43399	2355.69059	0.064331	0.059184	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	0.2214585	0.275662	3.1074489	0.340815	2036.12814	1832.51532	0.001404	0.001303	0.001%
Fresno	2035	SBUS	DSL	10	537.17386	1.3271759	1.510889	2.5203783	9.282154	2162.20503	1945.98453	0.059001	0.054281	0.001%
Fresno	2035	SBUS	GAS	15	545.71332	0.1481515	0.184413	2.1250646	0.357665	1392.42956	1253.1866	0.000939	0.000872	0.001%
Fresno	2035	SBUS	DSL	15	1074.3477	0.6744066	0.767761	1.4621548	6.983592	1775.35776	1597.82198	0.053848	0.04954	0.003%
Fresno	2035	SBUS	GAS	20	740.71711	0.1033393	0.128624	1.5357503	0.374355	1006.06849	905.461637	0.000655	0.000608	0.002%
Fresno	2035	SBUS	DSL	20	1458.2523	0.289941	0.330076	0.7928132	5.278572	1400.58068	1260.52261	0.04836	0.044491	0.004%
Fresno	2035	SBUS	GAS	25	1169.2717	0.0750802	0.093461	1.1719453	0.391468	768.012094	691.210884	0.000476	0.000442	0.003%
Fresno	2035	SBUS	DSL	25	2301.9493	0.2533325	0.2884	0.7484043	4.73246	1306.77308	1176.09577	0.046163	0.04247	0.006%
Fresno	2035	SBUS	GAS	30	1402.8186	0.0568627	0.07079	0.9449195	0.408577	619.43357	557.490213	0.000361	0.000335	0.004%
Fresno	2035	SBUS	DSL	30	2761.7339	0.2209174	0.251498	0.7173262	4.267068	1226.60413	1103.94372	0.045845	0.042178	0.007%
Fresno	2035	SBUS	GAS	35	1439.8169	0.0447923	0.055798	0.8035999	0.427096	527.846492	475.061843	0.000285	0.000264	0.004%
Fresno	2035	SBUS	DSL	35	2834.5724	0.1926958	0.219369	0.6995788	3.882397	1160.07385	1044.06646	0.047406	0.043614	0.007%
Fresno	2035	SBUS	GAS	40	971.95252	0.0368103	0.045873	0.7225244	0.445186	475.23313	427.709817	0.000235	0.000218	0.003%
Fresno	2035	SBUS	DSL	40	1913.4862	0.1686675	0.192015	0.6951622	3.578447	1107.18223	996.464003	0.050847	0.046779	0.005%
Fresno	2035	SBUS	GAS	45	466.31942	0.0315601	0.039339	0.6868198	0.462766	452.055804	406.850224	0.000201	0.000187	0.001%
Fresno	2035	SBUS	DSL	45	918.04463	0.1488326	0.169435	0.7040764	3.355217	1067.92926	961.136336	0.056167	0.051673	0.002%
Fresno	2035	SBUS	GAS	50	233.54692	0.0283194	0.035273	0.6919359	0.477523	454.321742	408.889568	0.00018	0.000167	0.001%
Fresno	2035	SBUS	DSL	50	459.78464	0.1331912	0.151628	0.7263213	3.212709	1042.31496	938.083461	0.063365	0.058296	0.001%
Fresno	2035	SBUS	GAS	55	347.6197	0.0260144	0.032517	0.7263802	0.505327	482.415402	434.173862	0.000168	0.000156	0.001%
Fresno	2035	SBUS	DSL	55	684.36005	0.1217431	0.138595	0.761897	3.15092	1030.33931	927.305381	0.072443	0.066648	0.002%
Fresno	2035	SBUS	GAS	60	193.46668	0.0253707	0.031686	0.8170587	0.520027	541.209093	487.088183	0.000163	0.000151	0.001%
Fresno	2035	SBUS	DSL	60	380.87851	0.1144885	0.130336	0.8108034	3.169853	1032.00233	928.802094	0.0834	0.076728	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	T6	GAS	5	973.52695	0.0689906	0.114074	1.0368676	0.120933	2513.49722	2262.1475	0.00101	0.000938	0.003%
Fresno	2035	T6	DSL	5	5137.5027	1.1013952	1.253855	1.9529146	3.412478	2559.93331	2303.93998	0.041772	0.03843	0.014%
Fresno	2035	T6	GAS	10	4893.9285	0.0555566	0.091818	0.8395749	0.124092	2036.12822	1832.5154	0.000814	0.000755	0.013%
Fresno	2035	T6	DSL	10	25572.553	0.6407234	0.729415	1.2167127	2.564287	2114.70497	1903.23447	0.038279	0.035216	0.068%
Fresno	2035	T6	GAS	15	6181.8708	0.0373232	0.061637	0.5761328	0.129369	1392.42958	1253.18662	0.000544	0.000505	0.016%
Fresno	2035	T6	DSL	15	34514.07	0.3255844	0.370653	0.7059038	1.928473	1736.35609	1562.72048	0.034911	0.032118	0.091%
Fresno	2035	T6	GAS	20	6412.1182	0.0260159	0.042989	0.4163303	0.13546	1006.0686	905.461738	0.00038	0.000352	0.017%
Fresno	2035	T6	DSL	20	36603.426	0.1399714	0.159347	0.3827906	1.457575	1369.81224	1232.83102	0.031334	0.028827	0.097%
Fresno	2035	T6	GAS	25	7144.5819	0.0189203	0.031263	0.3179713	0.141449	768.012142	691.210927	0.000276	0.000256	0.019%
Fresno	2035	T6	DSL	25	38121.017	0.1222948	0.139223	0.3613306	1.307178	1278.06544	1150.2589	0.029906	0.027513	0.101%
Fresno	2035	T6	GAS	30	8077.9677	0.014313	0.023643	0.2559869	0.147988	619.433656	557.49029	0.000209	0.000194	0.021%
Fresno	2035	T6	DSL	30	45837.434	0.1066437	0.121406	0.3463083	1.179023	1199.65767	1079.69191	0.029695	0.027319	0.121%
Fresno	2035	T6	GAS	35	10039.688	0.0112817	0.018651	0.2178811	0.154517	527.846622	475.06196	0.000165	0.000153	0.027%
Fresno	2035	T6	DSL	35	54048.372	0.0930181	0.105894	0.3377237	1.073112	1134.58895	1021.13006	0.030702	0.028246	0.143%
Fresno	2035	T6	GAS	40	12498.377	0.0092646	0.015342	0.1959988	0.161063	475.233217	427.709895	0.000136	0.000126	0.033%
Fresno	2035	T6	DSL	40	67092.64	0.0814181	0.092688	0.3355767	0.989443	1082.85927	974.573342	0.032927	0.030293	0.177%
Fresno	2035	T6	GAS	45	11397.666	0.0079779	0.013186	0.1867346	0.166567	452.055868	406.850281	0.000117	0.000108	0.030%
Fresno	2035	T6	DSL	45	54939.975	0.0718437	0.081789	0.3398673	0.928018	1044.46863	940.021765	0.03637	0.03346	0.145%
Fresno	2035	T6	GAS	50	11092.272	0.0070824	0.011734	0.1867075	0.174436	454.321814	408.889633	0.000104	9.68E-05	0.029%
Fresno	2035	T6	DSL	50	61486.767	0.0642948	0.073195	0.3505956	0.888836	1019.41703	917.475324	0.04103	0.037748	0.162%
Fresno	2035	T6	GAS	55	14507.68	0.0065376	0.010919	0.1977706	0.18173	482.415542	434.173988	9.73E-05	9.03E-05	0.038%
Fresno	2035	T6	DSL	55	90103.285	0.0587715	0.066907	0.3677616	0.871896	1007.70447	906.93402	0.046909	0.043156	0.238%
Fresno	2035	T6	GAS	60	16741.2	0.0063253	0.010633	0.2222001	0.187443	541.20927	487.088343	9.45E-05	8.77E-05	0.044%
Fresno	2035	T6	DSL	60	108274.2	0.0552737	0.062925	0.3913652	0.8772	1009.33095	908.397853	0.054005	0.049684	0.286%
Fresno	2035	T6	GAS	65	2616.0245	0.0064814	0.010838	0.2650342	0.191053	641.497958	577.348162	9.58E-05	8.89E-05	0.007%
Fresno	2035	T6	DSL	65	17039.28	0.0538015	0.061249	0.4214065	0.904747	1024.29647	921.866823	0.062318	0.057333	0.045%
Fresno	2035	T7	GAS	5	47.101317	2.5476473	3.222386	123.91413	3.559864	2513.49743	2262.14768	0.000946	0.000878	0.000%
Fresno	2035	T7	DSL	5	11173.315	2.4953132	2.840724	4.9860909	6.539606	3956.48963	3560.84066	0.075198	0.069182	0.030%
Fresno	2035	T7	GAS	10	230.20846	2.0717203	2.599449	100.61334	3.62884	2036.12818	1832.51536	0.000762	0.000707	0.001%
Fresno	2035	T7	DSL	10	42682.58	1.4516168	1.652555	3.1064068	4.914833	3268.36963	2941.53267	0.068927	0.063412	0.113%
Fresno	2035	T7	GAS	15	251.04595	1.3811242	1.741608	68.880559	3.802273	1392.42954	1253.18658	0.00051	0.000473	0.001%
Fresno	2035	T7	DSL	15	52201.144	0.7376411	0.839748	1.8022111	3.69664	2683.61478	2415.2533	0.062875	0.057845	0.138%
Fresno	2035	T7	GAS	20	429.03323	0.9595161	1.210978	49.625326	4.006074	1006.06856	905.461705	0.000356	0.00033	0.001%
Fresno	2035	T7	DSL	20	128970.49	0.3103818	0.353346	0.9563304	2.702748	2117.09827	1905.38845	0.054875	0.050485	0.341%
Fresno	2035	T7	GAS	25	559.91571	0.6976479	0.882258	37.961887	4.168442	768.012159	691.210943	0.000258	0.00024	0.001%
Fresno	2035	T7	DSL	25	117904.47	0.2770755	0.315429	0.9224851	2.505512	1975.3064	1777.77576	0.053873	0.049564	0.311%
Fresno	2035	T7	GAS	30	1022.5113	0.5311367	0.668991	30.651513	4.338359	619.433557	557.490202	0.000196	0.000182	0.003%
Fresno	2035	T7	DSL	30	199055.58	0.2416181	0.275064	0.8841482	2.259662	1854.12375	1668.71137	0.053497	0.049217	0.526%
Fresno	2035	T7	GAS	35	1818.6731	0.4189901	0.529092	26.149988	4.508745	527.846584	475.061926	0.000155	0.000143	0.005%
Fresno	2035	T7	DSL	35	358105.96	0.2107489	0.239922	0.8622455	2.056474	1753.55717	1578.20145	0.055313	0.050888	0.946%
Fresno	2035	T7	GAS	40	1585.3806	0.3437894	0.435473	23.532082	4.690899	475.233216	427.709894	0.000127	0.000118	0.004%
Fresno	2035	T7	DSL	40	337948	0.1844679	0.210003	0.8567768	1.895949	1673.60667	1506.246	0.059324	0.054578	0.893%
Fresno	2035	T7	GAS	45	1677.502	0.2929053	0.372855	22.327019	4.898946	452.055835	406.850251	0.000109	0.000101	0.004%
Fresno	2035	T7	DSL	45	473149.1	0.1627751	0.185307	0.8677424	1.778087	1614.27224	1452.84502	0.065527	0.060285	1.250%
Fresno	2035	T7	GAS	50	1755.142	0.2603694	0.333832	22.446469	5.073738	454.321872	408.889685	9.77E-05	9.07E-05	0.005%
Fresno	2035	T7	DSL	50	492063.44	0.1456706	0.165835	0.895142	1.702888	1575.55389	1417.9985	0.073925	0.068011	1.300%
Fresno	2035	T7	GAS	55	2576.419	0.2441222	0.312116	23.903883	5.223222	482.415493	434.173944	9.11E-05	8.45E-05	0.007%
Fresno	2035	T7	DSL	55	600041.24	0.1331542	0.151586	0.9389758	1.670351	1557.45162	1401.70645	0.084515	0.077754	1.585%
Fresno	2035	T7	GAS	60	635.8646	0.2323187	0.303095	26.752832	5.432343	541.209196	487.088277	8.86E-05	8.22E-05	0.002%
Fresno	2035	T7	DSL	60	182793.53	0.1252261	0.14256	0.9992437	1.680477	1559.96541	1403.96887	0.0973	0.089516	0.483%
Fresno	2035	T7	GAS	65	340.81023	0.2375011	0.306124	31.645132	5.629918	641.49795	577.348155	8.97E-05	8.32E-05	0.001%
Fresno	2035	T7	DSL	65	100119.68	0.1218862	0.138758	1.0759458	1.733266	1583.09529	1424.78576	0.112278	0.103296	0.264%
Fresno	2035	UBUS	GAS	5	191.16786	1.5441433	1.71055	19.076171	1.731738	2513.49709	2262.14738	0.001864	0.001729	0.001%
Fresno	2035	UBUS	DSL	5	471.24682	0.7751275	0.882431	5.7401873	11.71731	2299.61401	2069.65261	0.390966	0.359688	0.001%
Fresno	2035	UBUS	GAS	10	686.15946	1.2434709	1.377475	15.453184	1.77563	2036.12824	1832.51542	0.001501	0.001392	0.002%
Fresno	2035	UBUS	DSL	10	1691.4479	0.657308	0.748301	4.5199088	10.184	2299.61406	2069.65266	0.331539	0.305016	0.004%
Fresno	2035	UBUS	GAS	15	1372.319	0.8318581	0.921504	10.567837	1.863414	1392.42956	1253.18661	0.001004	0.000932	0.004%
Fresno	2035	UBUS	DSL	15	3382.8957	0.4852444	0.552418	2.9314344	7.987019	2299.61398	2069.65258	0.244752	0.225172	0.009%
Fresno	2035	UBUS	GAS	20	1810.9826	0.5800775	0.64259	7.6355517	1.951197	1006.06858	905.46172	0.0007	0.00065	0.005%
Fresno	2035	UBUS	DSL	20	4464.2431	0.3709816	0.422338	2.0187768	6.585153	2299.6139	2069.65251	0.187119	0.172149	0.012%
Fresno	2035	UBUS	GAS	25	2727.4697	0.4216442	0.467083	5.8288229	2.038981	768.012079	691.210871	0.000509	0.000472	0.007%
Fresno	2035	UBUS	DSL	25	6723.4701	0.2937276	0.334389	1.4762305	5.707709	2299.61415	2069.65273	0.148153	0.136301	0.018%
Fresno	2035	UBUS	GAS	30	3413.629	0.3194695	0.353898	4.7011878	2.126765	619.433576	557.490218	0.000386	0.000358	0.009%
Fresno	2035	UBUS	DSL	30	8414.9173	0.2408448	0.274186	1.1462454	5.200827	2299.61403	2069.65263	0.121479	0.111761	0.022%
Fresno	2035	UBUS	GAS	35	3345.3412	0.2523108	0.279501	4.0060879	2.214549	527.846502	475.061851	0.000305	0.000283	0.009%
Fresno	2035	UBUS	DSL	35	8246.5816	0.2045173	0.232829	0.9450588	4.981931	2299.61388	2069.65249	0.103156	0.094904	0.022%
Fresno	2035	UBUS	GAS	40	2411.6856	0.2077139	0.230099	3.6067795	2.302333	475.233167	427.70985	0.000251	0.000233	0.006%
Fresno	2035	UBUS	DSL	40	5945.0327	0.1798553	0.204753	0.827366	5.016928	2299.614	2069.6526	0.090717	0.08346	0.016%
Fresno	2035	UBUS	GAS	45	1051.3267	0.1782455	0.197454	3.4308752	2.390117	452.055845	406.85026	0.000215	0.0002	0.003%
Fresno	2035	UBUS	DSL	45	2591.6195	0.1638011	0.186477	0.7691201	5.311199	2299.61409	2069.65268	0.082619	0.07601	0.007%
Fresno	2035	UBUS	GAS	50	534.15117	0.1594391	0.176621	3.4480725	2.477901	454.321795	408.889615	0.000192	0.000179	0.001%
Fresno	2035	UBUS	DSL	50	1316.733	0.1544936	0.175881	0.7591863	5.911016	2299.61408	2069.65267	0.077925	0.071691	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	0.14866	0.164681	3.6612897	2.565685	482.415499	434.173949	0.000179	0.000166	0.002%
Fresno	2035	UBUS	DSL	55	1632.4828	0.1509053	0.171796	0.7957199	6.915863	2299.614	2069.6526	0.076115	0.070026	0.004%
Fresno	2035	UBUS	GAS	60	1083.9276	0.144483	0.160053	4.1075042	2.653469	541.209198	487.088279	0.000174	0.000162	0.003%
Fresno	2035	UBUS	DSL	60	2671.9837	0.1526508	0.173783	0.8855839	8.506392	2299.61403	2069.65263	0.076995	0.070836	0.007%

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2035
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.066	0.041	0.028	0.019	0.014	0.011	0.009	0.008	0.007	0.007	0.007	0.008	0.009	0.009	0.000
	LDT1	0.078	0.049	0.033	0.023	0.017	0.013	0.011	0.010	0.009	0.008	0.009	0.009	0.010	0.011	0.000
	LDT2	0.081	0.050	0.034	0.024	0.018	0.014	0.011	0.010	0.009	0.009	0.009	0.009	0.011	0.011	0.000
	LHD1	0.047	0.038	0.025	0.018	0.013	0.010	0.008	0.006	0.005	0.005	0.004	0.000	0.000	0.000	0.000
	LHD2	0.035	0.028	0.019	0.013	0.010	0.007	0.006	0.005	0.004	0.004	0.003	0.000	0.000	0.000	0.000
	MCY	4.719	4.092	3.169	2.589	2.222	2.009	1.908	1.906	1.997	2.198	2.542	3.088	3.941	5.280	0.000
	MDV	0.110	0.069	0.047	0.032	0.024	0.019	0.016	0.013	0.012	0.012	0.012	0.013	0.014	0.016	0.000
	MH	0.055	0.045	0.030	0.021	0.015	0.011	0.009	0.007	0.006	0.006	0.005	0.005	0.005	0.000	0.000
	OBUS	0.081	0.065	0.044	0.030	0.022	0.017	0.013	0.011	0.009	0.008	0.008	0.007	0.008	0.000	0.000
	SBUS	0.274	0.221	0.148	0.103	0.075	0.057	0.045	0.037	0.032	0.028	0.026	0.025	0.000	0.000	0.000
	T6	0.069	0.056	0.037	0.026	0.019	0.014	0.011	0.009	0.008	0.007	0.007	0.006	0.006	0.000	0.000
	T7	2.548	2.072	1.381	0.960	0.698	0.531	0.419	0.344	0.293	0.260	0.244	0.232	0.238	0.000	0.000
	UBUS	1.544	1.243	0.832	0.580	0.422	0.319	0.252	0.208	0.178	0.159	0.149	0.144	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.019	0.016	0.012	0.010	0.008	0.007	0.006	0.006	0.007	0.007	0.008	0.010	0.012	0.017	0.000
	LDT1	0.021	0.018	0.014	0.011	0.009	0.008	0.007	0.007	0.007	0.008	0.009	0.011	0.014	0.020	0.000
	LDT2	0.024	0.020	0.015	0.012	0.010	0.009	0.008	0.008	0.008	0.009	0.010	0.012	0.015	0.020	0.000
	LHD1	0.190	0.168	0.133	0.108	0.090	0.076	0.066	0.058	0.053	0.049	0.046	0.000	0.000	0.000	0.000
	LHD2	0.178	0.157	0.125	0.101	0.084	0.071	0.062	0.055	0.049	0.046	0.043	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.019	0.016	0.012	0.010	0.008	0.007	0.007	0.006	0.007	0.007	0.008	0.010	0.013	0.017	0.000
	MH	1.051	0.790	0.401	0.190	0.147	0.126	0.109	0.094	0.083	0.075	0.070	0.069	0.070	0.000	0.000
	OBUS	1.586	0.887	0.445	0.213	0.186	0.172	0.160	0.134	0.128	0.113	0.101	0.077	0.091	0.000	0.000
	SBUS	2.281	1.327	0.674	0.290	0.253	0.221	0.193	0.169	0.149	0.133	0.122	0.114	0.000	0.000	0.000
	T6	1.101	0.641	0.326	0.140	0.122	0.107	0.093	0.081	0.072	0.064	0.059	0.055	0.054	0.000	0.000
	T7	2.495	1.452	0.738	0.310	0.277	0.242	0.211	0.184	0.163	0.146	0.133	0.125	0.122	0.000	0.000
	UBUS	0.775	0.657	0.485	0.371	0.294	0.241	0.205	0.180	0.164	0.154	0.151	0.153	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2035
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	6.2	0.1	0.5	1.3	1.0	5.3	2.0	2.0	1.0	3.8	3.7	0.0	0.0	0.0	**27.0**
LDT1	0.0	1.1	0.0	0.1	0.2	0.2	0.9	0.4	0.4	0.2	0.7	0.7	0.0	0.0	0.0	**4.8**
LDT2	0.0	2.8	0.1	0.2	0.6	0.5	2.4	0.9	0.9	0.4	1.7	1.7	0.0	0.0	0.0	**12.3**
LHD1	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	**1.1**
LHD2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MCY	0.0	9.6	0.2	1.0	3.2	2.8	17.1	7.6	8.6	4.8	21.2	23.6	0.0	0.0	0.0	**99.9**
MDV	0.0	3.9	0.1	0.3	0.9	0.7	3.4	1.3	1.3	0.6	2.5	2.4	0.0	0.0	0.0	**17.3**
MH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
SBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
T6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
T7	0.0	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
UBUS	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.8**
Total	**0.1**	**24.5**	**0.5**	**2.1**	**6.5**	**5.3**	**29.9**	**12.5**	**13.4**	**7.2**	**30.3**	**32.3**	**0.0**	**0.0**	**0.0**	**164.6**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	0.9	0.0	0.1	0.3	0.3	1.4	0.6	0.5	0.3	0.9	0.0	0.0	0.0	0.0	**5.3**
LHD2	0.0	0.2	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	**1.3**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
OBUS	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.1**
SBUS	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.5**
T6	0.0	3.7	0.1	0.1	0.4	0.4	2.1	0.8	0.8	0.3	1.2	1.0	0.0	0.0	0.0	**10.9**
T7	0.2	40.6	0.6	1.4	4.8	4.1	22.6	8.8	8.4	3.8	13.3	11.4	0.0	0.0	0.0	**120.1**
UBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.6**
Total	**0.3**	**46.3**	**0.6**	**1.7**	**5.8**	**4.9**	**27.2**	**10.6**	**10.1**	**4.6**	**16.1**	**12.9**	**0.0**	**0.0**	**0.0**	**141.3**

Total Emissions (tons/year) ***306.0***
Total Emissions (tons/day) ***0.8***

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2035
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.106	0.093	0.081	0.073	0.066	0.061	0.058	0.055	0.054	0.053	0.053	0.054	0.056	0.058	0.000
	LDT1	0.122	0.107	0.094	0.083	0.076	0.070	0.066	0.063	0.062	0.061	0.061	0.063	0.065	0.067	0.000
	LDT2	0.131	0.115	0.100	0.090	0.082	0.076	0.071	0.068	0.066	0.065	0.066	0.067	0.070	0.072	0.000
	LHD1	0.098	0.100	0.105	0.110	0.117	0.122	0.129	0.137	0.140	0.141	0.153	0.000	0.000	0.000	0.000
	LHD2	0.076	0.078	0.082	0.086	0.091	0.095	0.100	0.106	0.109	0.110	0.119	0.000	0.000	0.000	0.000
	MCY	1.236	1.218	1.163	1.135	1.116	1.114	1.122	1.143	1.167	1.202	1.248	1.306	1.379	1.465	0.000
	MDV	0.179	0.156	0.136	0.121	0.110	0.102	0.096	0.092	0.089	0.088	0.089	0.092	0.096	0.099	0.000
	MH	0.116	0.119	0.125	0.130	0.136	0.142	0.149	0.155	0.160	0.168	0.175	0.180	0.184	0.000	0.000
	OBUS	0.133	0.137	0.142	0.149	0.156	0.163	0.170	0.177	0.183	0.192	0.200	0.206	0.210	0.000	0.000
	SBUS	0.334	0.341	0.358	0.374	0.391	0.409	0.427	0.445	0.463	0.478	0.505	0.520	0.000	0.000	0.000
	T6	0.121	0.124	0.129	0.135	0.141	0.148	0.155	0.161	0.167	0.174	0.182	0.187	0.191	0.000	0.000
	T7	3.560	3.629	3.802	4.006	4.168	4.338	4.509	4.691	4.899	5.074	5.223	5.432	5.630	0.000	0.000
	UBUS	1.732	1.776	1.863	1.951	2.039	2.127	2.215	2.302	2.390	2.478	2.566	2.653	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.322	0.306	0.280	0.260	0.245	0.235	0.230	0.228	0.230	0.236	0.246	0.261	0.282	0.310	0.000
	LDT1	0.371	0.354	0.324	0.301	0.285	0.274	0.267	0.265	0.267	0.274	0.285	0.301	0.324	0.353	0.000
	LDT2	0.407	0.386	0.351	0.326	0.307	0.295	0.288	0.286	0.289	0.297	0.310	0.331	0.359	0.396	0.000
	LHD1	1.448	1.312	1.109	0.970	0.882	0.828	0.809	0.818	0.853	0.922	1.038	0.000	0.000	0.000	0.000
	LHD2	1.339	1.213	1.026	0.897	0.816	0.765	0.748	0.756	0.789	0.852	0.960	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.327	0.312	0.284	0.264	0.250	0.240	0.234	0.232	0.234	0.240	0.251	0.266	0.286	0.314	0.000
	MH	10.404	8.936	6.621	5.154	4.527	4.128	3.803	3.548	3.359	3.249	3.210	3.238	3.328	0.000	0.000
	OBUS	4.624	3.396	2.534	2.047	1.833	1.710	1.620	1.455	1.434	1.364	1.316	1.161	1.349	0.000	0.000
	SBUS	12.346	9.282	6.984	5.279	4.732	4.267	3.882	3.578	3.355	3.213	3.151	3.170	0.000	0.000	0.000
	T6	3.412	2.564	1.928	1.458	1.307	1.179	1.073	0.989	0.928	0.889	0.872	0.877	0.905	0.000	0.000
	T7	6.540	4.915	3.697	2.703	2.506	2.260	2.056	1.896	1.778	1.703	1.670	1.680	1.733	0.000	0.000
	UBUS	11.717	10.184	7.987	6.585	5.708	5.201	4.982	5.017	5.311	5.911	6.916	8.506	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2035
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.1	13.9	0.3	1.8	6.2	5.6	33.3	14.2	14.9	7.4	28.5	26.6	0.0	0.0	0.0	**152.8**
LDT1	0.0	2.4	0.1	0.3	1.1	0.9	5.7	2.4	2.5	1.3	4.9	4.6	0.0	0.0	0.0	**26.1**
LDT2	0.0	6.4	0.2	0.8	2.8	2.5	15.2	6.5	6.8	3.4	13.0	12.2	0.0	0.0	0.0	**69.8**
LHD1	0.0	0.9	0.0	0.2	0.7	0.7	4.5	2.1	2.4	1.2	5.0	0.0	0.0	0.0	0.0	**17.7**
LHD2	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.0	0.0	0.0	0.0	**1.4**
MCY	0.0	2.8	0.1	0.4	1.6	1.6	10.1	4.6	5.0	2.6	10.4	10.0	0.0	0.0	0.0	**49.3**
MDV	0.0	8.9	0.2	1.1	3.9	3.5	21.0	9.0	9.4	4.7	18.2	17.1	0.0	0.0	0.0	**97.0**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.1	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**1.5**
OBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.0**
SBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.6**
T6	0.0	0.1	0.0	0.0	0.1	0.1	0.6	0.3	0.3	0.2	0.7	0.6	0.0	0.0	0.0	**3.0**
T7	0.0	0.4	0.0	0.1	0.3	0.3	2.0	0.9	1.1	0.6	2.2	2.1	0.0	0.0	0.0	**9.9**
UBUS	0.0	0.3	0.0	0.1	0.2	0.2	1.5	0.7	0.8	0.4	1.6	1.5	0.0	0.0	0.0	**7.3**
Total	**0.1**	**36.4**	**0.9**	**4.8**	**17.0**	**15.6**	**94.8**	**41.2**	**43.6**	**22.1**	**85.5**	**75.3**	**0.0**	**0.0**	**0.0**	**437.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.3	0.0	0.0	0.0	**1.7**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LHD1	0.0	7.3	0.2	0.9	3.1	2.8	17.4	7.8	8.8	4.8	20.7	0.0	0.0	0.0	0.0	**73.8**
LHD2	0.0	1.8	0.0	0.2	0.7	0.7	4.2	1.9	2.1	1.2	5.1	0.0	0.0	0.0	0.0	**18.0**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
MH	0.0	1.0	0.0	0.1	0.3	0.3	1.6	0.7	0.7	0.3	1.3	1.2	0.0	0.0	0.0	**7.6**
OBUS	0.0	1.3	0.0	0.1	0.4	0.4	2.4	1.0	1.0	0.5	1.8	1.5	0.0	0.0	0.0	**10.4**
SBUS	0.0	1.3	0.0	0.1	0.4	0.4	2.1	0.9	0.9	0.4	1.6	1.4	0.0	0.0	0.0	**9.5**
T6	0.1	14.8	0.3	1.4	4.7	4.1	23.8	9.8	9.9	4.8	18.0	16.5	0.0	0.0	0.0	**108.1**
T7	0.6	137.4	2.8	12.2	43.7	38.3	220.8	90.9	91.8	44.6	166.9	153.6	0.0	0.0	0.0	**1,003.6**
UBUS	0.0	4.4	0.1	0.5	1.5	1.4	8.2	3.7	4.2	2.4	10.6	11.9	0.0	0.0	0.0	**48.9**
Total	**0.8**	**169.4**	**3.5**	**15.5**	**55.0**	**48.3**	**280.9**	**116.9**	**119.6**	**59.1**	**226.4**	**186.7**	**0.0**	**0.0**	**0.0**	**1,282.0**

Total Emissions (tons/year) ***1,719.4***
Total Emissions (tons/day) ***4.7***

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2035
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	1.1	1.0	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.0
	LDT1	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.0
	LDT2	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.0
	LHD1	0.7	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	LHD2	0.6	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	MCY	23.9	22.1	19.1	17.1	15.9	15.3	15.3	15.9	17.2	19.7	23.7	30.3	41.2	59.4	0.0
	MDV	1.8	1.6	1.5	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.0
	MH	0.8	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.0
	OBUS	1.2	1.0	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.0	0.0
	SBUS	3.8	3.1	2.1	1.5	1.2	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.0	0.0	0.0
	T6	1.0	0.8	0.6	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.0	0.0
	T7	123.9	100.6	68.9	49.6	38.0	30.7	26.1	23.5	22.3	22.4	23.9	26.8	31.6	0.0	0.0
	UBUS	19.1	15.5	10.6	7.6	5.8	4.7	4.0	3.6	3.4	3.4	3.7	4.1	0.0	0.0	0.0

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	LDT1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LDT2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LHD1	2.4	2.0	1.4	1.0	0.8	0.6	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0
	LHD2	2.3	1.9	1.3	1.0	0.8	0.6	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0
	MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MDV	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	MH	1.9	1.5	0.9	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.0	0.0
	OBUS	3.0	1.8	1.0	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.8	0.0	0.0
	SBUS	4.0	2.5	1.5	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.0	0.0	0.0
	T6	2.0	1.2	0.7	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.0	0.0
	T7	5.0	3.1	1.8	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.1	0.0	0.0
	UBUS	5.7	4.5	2.9	2.0	1.5	1.1	0.9	0.8	0.8	0.8	0.8	0.9	0.0	0.0	0.0

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2035
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.6	154.3	3.9	20.9	74.8	66.7	388.5	159.2	159.2	75.2	268.6	229.6	0.0	0.0	0.0	**1,601.5**
LDT1	0.1	26.9	0.7	3.6	13.0	11.6	67.4	27.6	27.6	13.1	46.6	39.9	0.0	0.0	0.0	**278.1**
LDT2	0.3	66.7	1.7	9.0	32.3	28.8	167.6	68.7	68.7	32.5	115.9	99.2	0.0	0.0	0.0	**691.3**
LHD1	0.0	5.5	0.1	0.4	1.3	1.0	5.4	2.1	2.2	1.1	4.5	0.0	0.0	0.0	0.0	**23.6**
LHD2	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.8**
MCY	0.2	51.6	1.2	6.5	23.2	21.7	137.1	63.7	74.4	43.0	198.1	231.5	0.0	0.0	0.0	**852.2**
MDV	0.3	90.6	2.3	12.3	43.7	38.9	226.9	93.0	93.0	44.0	157.1	134.4	0.0	0.0	0.0	**936.5**
MH	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.7**
OBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.6**
SBUS	0.0	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**1.2**
T6	0.0	0.9	0.0	0.1	0.2	0.2	0.9	0.3	0.4	0.2	0.7	0.7	0.0	0.0	0.0	**4.5**
T7	0.0	11.7	0.2	0.9	2.8	2.2	11.7	4.7	4.8	2.5	10.0	10.2	0.0	0.0	0.0	**61.8**
UBUS	0.0	2.7	0.0	0.2	0.6	0.5	2.7	1.1	1.1	0.6	2.3	2.3	0.0	0.0	0.0	**14.1**
Total	**1.6**	**412.1**	**10.1**	**54.1**	**192.1**	**171.7**	**1,009.3**	**420.9**	**431.9**	**212.4**	**804.9**	**748.7**	**0.1**	**0.0**	**0.0**	**4,469.8**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.5**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	10.9	0.2	0.9	2.7	2.2	11.6	4.6	4.6	2.2	8.7	0.0	0.0	0.0	0.0	**48.7**
LHD2	0.0	2.7	0.1	0.2	0.7	0.5	2.9	1.1	1.1	0.6	2.2	0.0	0.0	0.0	0.0	**12.2**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MH	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**0.9**
OBUS	0.0	0.7	0.0	0.0	0.1	0.1	0.9	0.4	0.5	0.2	0.9	0.7	0.0	0.0	0.0	**4.7**
SBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.1**
T6	0.0	7.0	0.1	0.4	1.3	1.2	7.5	3.3	3.6	1.9	7.6	7.4	0.0	0.0	0.0	**41.3**
T7	0.5	86.8	1.4	4.3	16.1	15.0	92.6	41.1	44.8	23.4	93.8	91.4	0.0	0.0	0.0	**511.1**
UBUS	0.0	1.9	0.0	0.1	0.4	0.3	1.6	0.6	0.6	0.3	1.2	1.2	0.0	0.0	0.0	**8.4**
Total	**0.6**	**110.7**	**1.8**	**6.1**	**21.5**	**19.4**	**117.7**	**51.4**	**55.5**	**28.8**	**115.1**	**101.3**	**0.0**	**0.0**	**0.0**	**630.0**

Total Emissions (tons/year) ***5,099.9***
Tons/day ***14.0***

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2035
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0139	0.0087	0.0058	0.0041	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LDT1	0.0138	0.0087	0.0058	0.0040	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LDT2	0.0138	0.0087	0.0058	0.0040	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LHD1	0.0013	0.0011	0.0007	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0010	0.0008	0.0006	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	MCY	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0000
	MDV	0.0135	0.0085	0.0056	0.0040	0.0029	0.0023	0.0019	0.0016	0.0015	0.0014	0.0015	0.0016	0.0018	0.0019	0.0000
	MH	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	OBUS	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	SBUS	0.0017	0.0014	0.0009	0.0007	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000
	T6	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	T7	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0019	0.0015	0.0010	0.0007	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0114	0.0097	0.0073	0.0058	0.0048	0.0042	0.0039	0.0038	0.0039	0.0043	0.0049	0.0059	0.0075	0.0101	0.0000
	LDT1	0.0109	0.0092	0.0069	0.0055	0.0046	0.0040	0.0037	0.0037	0.0038	0.0041	0.0048	0.0058	0.0074	0.0100	0.0000
	LDT2	0.0123	0.0105	0.0079	0.0063	0.0053	0.0046	0.0042	0.0041	0.0042	0.0045	0.0051	0.0062	0.0078	0.0104	0.0000
	LHD1	0.0521	0.0461	0.0366	0.0297	0.0246	0.0209	0.0181	0.0160	0.0145	0.0134	0.0127	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0491	0.0433	0.0344	0.0279	0.0232	0.0196	0.0170	0.0151	0.0137	0.0126	0.0120	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0116	0.0098	0.0074	0.0059	0.0049	0.0043	0.0040	0.0039	0.0040	0.0044	0.0050	0.0060	0.0077	0.0104	0.0000
	MH	0.1027	0.0893	0.0670	0.0509	0.0441	0.0411	0.0401	0.0411	0.0442	0.0493	0.0564	0.0656	0.0769	0.0000	0.0000
	OBUS	0.0548	0.0492	0.0446	0.0426	0.0406	0.0416	0.0447	0.0468	0.0541	0.0607	0.0683	0.0696	0.0898	0.0000	0.0000
	SBUS	0.0643	0.0590	0.0538	0.0484	0.0462	0.0458	0.0474	0.0508	0.0562	0.0634	0.0724	0.0834	0.0000	0.0000	0.0000
	T6	0.0418	0.0383	0.0349	0.0313	0.0299	0.0297	0.0307	0.0329	0.0364	0.0410	0.0469	0.0540	0.0623	0.0000	0.0000
	T7	0.0752	0.0689	0.0629	0.0549	0.0539	0.0535	0.0553	0.0593	0.0655	0.0739	0.0845	0.0973	0.1123	0.0000	0.0000
	UBUS	0.3910	0.3315	0.2448	0.1871	0.1482	0.1215	0.1032	0.0907	0.0826	0.0779	0.0761	0.0770	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2035
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.007	1.3	0.0	0.1	0.3	0.2	1.1	0.4	0.4	0.2	0.8	0.8	0.0	0.0	0.0	**5.7**
LDT1	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.8**
LDT2	0.003	0.5	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.1**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.003	0.5	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.1**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.014**	**2.5**	**0.0**	**0.2**	**0.5**	**0.4**	**2.1**	**0.8**	**0.8**	**0.4**	**1.5**	**1.5**	**0.0**	**0.0**	**0.0**	**10.8**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.4	0.2	0.1	0.1	0.3	0.0	0.0	0.0	0.0	**1.5**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.4**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.4**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
T6	0.001	0.2	0.0	0.0	0.1	0.1	0.7	0.3	0.4	0.2	1.0	1.0	0.0	0.0	0.0	**4.1**
T7	0.007	1.9	0.0	0.2	0.9	0.9	5.9	2.8	3.4	1.9	8.4	8.9	0.0	0.0	0.0	**35.5**
UBUS	0.001	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.8**
Total	**0.0**	**2.7**	**0.1**	**0.3**	**1.2**	**1.1**	**7.4**	**3.5**	**4.1**	**2.3**	**10.0**	**10.2**	**0.0**	**0.0**	**0.0**	**42.9**

Total Emissions (tons/year) ***53.7***
Total Emissions (tons/day) ***0.1***

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2035
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0129	0.0081	0.0054	0.0038	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LDT1	0.0128	0.0081	0.0054	0.0038	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LDT2	0.0128	0.0080	0.0053	0.0037	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LHD1	0.0012	0.0010	0.0007	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	MCY	0.0004	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0000
	MDV	0.0125	0.0079	0.0052	0.0037	0.0027	0.0021	0.0017	0.0015	0.0014	0.0013	0.0014	0.0015	0.0016	0.0018	0.0000
	MH	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	OBUS	0.0009	0.0007	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	SBUS	0.0016	0.0013	0.0009	0.0006	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000
	T6	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	T7	0.0009	0.0007	0.0005	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0017	0.0014	0.0009	0.0006	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0105	0.0090	0.0067	0.0053	0.0044	0.0039	0.0036	0.0035	0.0036	0.0039	0.0045	0.0054	0.0069	0.0093	0.0000
	LDT1	0.0100	0.0085	0.0064	0.0050	0.0042	0.0037	0.0034	0.0034	0.0035	0.0038	0.0044	0.0053	0.0068	0.0092	0.0000
	LDT2	0.0114	0.0097	0.0073	0.0058	0.0048	0.0042	0.0039	0.0038	0.0039	0.0042	0.0047	0.0057	0.0072	0.0096	0.0000
	LHD1	0.0480	0.0424	0.0336	0.0273	0.0226	0.0192	0.0166	0.0147	0.0134	0.0124	0.0117	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0451	0.0399	0.0316	0.0257	0.0213	0.0181	0.0157	0.0139	0.0126	0.0116	0.0110	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0107	0.0091	0.0068	0.0054	0.0045	0.0040	0.0037	0.0036	0.0037	0.0040	0.0046	0.0056	0.0071	0.0096	0.0000
	MH	0.0945	0.0821	0.0616	0.0468	0.0406	0.0378	0.0369	0.0378	0.0406	0.0453	0.0519	0.0604	0.0707	0.0000	0.0000
	OBUS	0.0504	0.0453	0.0410	0.0392	0.0374	0.0383	0.0411	0.0430	0.0498	0.0559	0.0629	0.0640	0.0826	0.0000	0.0000
	SBUS	0.0592	0.0543	0.0495	0.0445	0.0425	0.0422	0.0436	0.0468	0.0517	0.0583	0.0666	0.0767	0.0000	0.0000	0.0000
	T6	0.0384	0.0352	0.0321	0.0288	0.0275	0.0273	0.0282	0.0303	0.0335	0.0377	0.0432	0.0497	0.0573	0.0000	0.0000
	T7	0.0692	0.0634	0.0578	0.0505	0.0496	0.0492	0.0509	0.0546	0.0603	0.0680	0.0778	0.0895	0.1033	0.0000	0.0000
	UBUS	0.3597	0.3050	0.2252	0.1721	0.1363	0.1118	0.0949	0.0835	0.0760	0.0717	0.0700	0.0708	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2035
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.007	1.2	0.0	0.1	0.3	0.2	1.0	0.4	0.4	0.2	0.7	0.7	0.0	0.0	0.0	**5.3**
LDT1	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.8**
LDT2	0.002	0.4	0.0	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.9**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.002	0.4	0.0	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**2.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.013**	**2.3**	**0.0**	**0.2**	**0.5**	**0.4**	**1.9**	**0.8**	**0.7**	**0.4**	**1.4**	**1.4**	**0.0**	**0.0**	**0.0**	**10.0**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.2	0.0	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	**1.3**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.3**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
T6	0.001	0.2	0.0	0.0	0.1	0.1	0.6	0.3	0.4	0.2	0.9	0.9	0.0	0.0	0.0	**3.7**
T7	0.007	1.8	0.0	0.2	0.9	0.8	5.5	2.6	3.1	1.8	7.8	8.2	0.0	0.0	0.0	**32.7**
UBUS	0.001	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.7**
Total	**0.009**	**2.4**	**0.1**	**0.3**	**1.1**	**1.1**	**6.8**	**3.2**	**3.8**	**2.1**	**9.2**	**9.4**	**0.0**	**0.0**	**0.0**	**39.4**

Total Emissions (tons/year) ***49.4***
Total Emissions (tons/day) ***0.1***

City of Fresno General Plan

Criteria Pollutants: Summary

Year 2050

Prepared by FirstCarbon Solutions

	Data
City Information	
Population	912,600
Employment	362,145
County Information	
Population	1,521,000

	ROG	NOx	PM10	PM2.5	CO	SO2
Emissions (tons/year)						
Motor vehicles	377	2120	66	61	6289	0
Electricity	0	510	0	0	0	359
Natural gas	147	1296	101	101	848	8
Stationary, area	554	507	238	na	203	89
Offroad	1488	2268	182	182	10972	10
Total	**2566**	**6701**	**588**	**345**	**18312**	**466**
Emissions (tons/day)						
Motor vehicles	1.0	5.8	0.2	0.2	17.2	0.0
Electricity	0.0	1.4	0.0	0.0	0.0	1.0
Natural gas	0.4	3.5	0.3	0.3	2.3	0.0
Stationary, area	1.5	1.4	0.7	na	0.6	0.2
Offroad	4.1	6.2	0.5	0.5	30.1	0.03
Total	**7.0**	**18.4**	**1.6**	**0.9**	**50.2**	**1.3**

Sources:

- Population for the City: Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

- Emissions: refer to subsequent spreadsheets.

- Emissions for stationary, area: California Air Resources Board, CEIDARS 2.5, data is from the year 2010. Note that SO2 emissions for this category represent SOx emissions; SO2 emissions were not available.

www.arb.ca.gov/app/emsinv/facinfo/faccrit.php?dd=y&grp=1&sort=FacilityNameA&dbyr=2010&ab_=&dis_=&co_=10&fname_=&city_=Fresno&fzip_=&fsic_=&facid_=&all_fac=C&displayit=Pollutant&CERR=&showpol=&showpol2=

City of Fresno General Plan
Criteria Pollutants: Energy
Year 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Electricity

Emission Factors (lbs/MWh)		*(lbs/kWh)*
NOx	0.2002	0.0002002
SO2	0.1409	0.0001409

	Usage (kWh/year)	Emissions Per capita (kWh/person or employee/year)	Emissions (tons/year) NOx	SO2
Residential	2,381,886,000	2,610	238.4	167.8
Commercial	2,717,173,935	7,503	272.0	191.4
Industrial	not available			
Total	**5,099,059,935**		**510.4**	**359.2**

Natural Gas

		Natural Gas Emission Factors						
			ROG	NOx	PM10	PM2.5	CO	SO2
lb/MMBTU		Residential	0.01078	0.09216	0.00745	0.00745	0.03922	0.00059
		Nonresidential	0.01078	0.09804	0.00745	0.00745	0.08235	0.00059
lb/therm		Residential	0.0011	0.0092	0.0007	0.0007	0.0039	0.0001
		Nonresidential	0.0011	0.0098	0.0007	0.0007	0.0082	0.0001

	Usage (therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) ROG	NOx	PM10	PM2.5	CO	SO2
Residential	125,938,800	138	68	580	47	47	247	4
Commercial	145,944,435	403	79	715	54	54	601	4
Industrial	not available							
Total	**271,883,235**		**147**	**1,296**	**101**	**101**	**848**	**8**

Sources:

Per capita energy usage: See the spreadsheet calculations for 2010. Residential rates are based on population and commercial are based on employees.

Usage: per capita usage multiplied by the population (for residential) or employees (for commercial)

Emission factors for electricity NOx and SO2 electricity emission factors from Environmental Protection Agency, eGRID2012, state total annual total output emission rate for California (data is from year 2009).

Emission factors for natural gas: CalEEMod Appendix D, Table 8.2, August 2013. 1 therm = 0.1 MMBTU

City of Fresno General Plan

Criteria Pollutants: Offroad

Year 2050

Prepared by FirstCarbon Solutions

Note: yellow shaded cells are data entry cells

Fresno County Emissions (tons/day) (from Offroad 2007)	**ROG Evaporative**	**ROG Exhaust**	**CO**	**NOx**	**SO2**	**PM**
Agricultural Equipment	0.12	0.78	9.82	4.98	0.01	0.25
Airport Ground Support Equipment	0.00	0.01	0.23	0.04	0.00	0.00
Construction and Mining Equipment	0.01	0.52	4.43	3.04	0.01	0.16
Dredging	0.00	0.00	0.00	0.00	0.00	0.00
Entertainment Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Equipment	0.02	0.04	2.58	0.30	0.00	0.01
Lawn and Garden Equipment	0.53	0.95	12.06	0.25	0.00	0.03
Light Commercial Equipment	0.07	0.19	6.46	0.35	0.00	0.04
Logging Equipment	0.00	0.04	0.29	0.04	0.00	0.00
Military Tactical Support Equip	0.00	0.00	0.02	0.02	0.00	0.00
Oil Drilling	0.00	0.00	0.00	0.00	0.00	0.00
Other Portable Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Pleasure Craft	0.67	0.83	7.38	0.41	0.00	0.29
Railyard Operations	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Equipment	0.48	1.41	5.21	0.07	0.02	0.03
Transport Refrigeration Units	0.00	0.12	1.63	0.86	0.00	0.01
Total	1.91	4.88	50.10	10.36	0.04	0.83
Percent Fresno County/Fresno City Population		**0.60**				
City of Fresno Emissions (tons/day)						
Agricultural Equipment	0.07	0.5	5.9	3.0	0.01	0.15
Airport Ground Support Equipment	0.00	0.0	0.1	0.0	0.00	0.00
Construction and Mining Equipment	0.01	0.3	2.7	1.8	0.00	0.10
Dredging	0.00	0.0	0.0	0.0	0.00	0.00
Entertainment Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Industrial Equipment	0.01	0.0	1.5	0.2	0.00	0.01
Lawn and Garden Equipment	0.32	0.6	7.2	0.1	0.00	0.02
Light Commercial Equipment	0.04	0.1	3.9	0.2	0.00	0.03
Logging Equipment	0.00	0.0	0.2	0.0	0.00	0.00
Military Tactical Support Equip	0.00	0.0	0.0	0.0	0.00	0.00
Oil Drilling	0.00	0.0	0.0	0.0	0.00	0.00
Other Portable Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Pleasure Craft	0.40	0.5	4.4	0.2	0.00	0.17
Railyard Operations	0.00	0.0	0.0	0.0	0.00	0.00
Recreational Equipment	0.29	0.8	3.1	0.0	0.01	0.02
Transport Refrigeration Units	0.00	0.1	1.0	0.5	0.00	0.01
Total	1.15	2.9	30.1	6.2	0.03	0.50

Sources:

- County of Fresno emissions from OFFROAD2007, annual, all days, all equipment, for year 2035
- City of Fresno emissions based on the percent of the City's population compared with the County's population.

Note: PM refers to total particulate matter.

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2050
Prepared by FirstCarbon Solutions

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

Note: 2035 emission factors were used, as that is the last year available through EMFAC2011.

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2050
Prepared by FirstCarbon Solutions

VMT/day by Vehicle Class and speed

GAS	**Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA		1584	460945	12503	74719	287504	279308	1770618	790900	850970	431604	1648185	1507772	104	0	0
LDT1		235	68417	1856	11090	42673	41457	262807	117391	126307	64062	244635	223794	15	0	0
LDT2		586	170481	4624	27635	106334	103302	654865	292515	314732	159629	609583	557651	38	0	0
LHD1		96	28072	761	4550	17509	17010	107832	48167	51825	26285	100376	91825	6	0	0
LHD2		10	2803	76	454	1749	1699	10769	4810	5176	2625	10024	9170	1	0	0
MCY		25	7177	195	1163	4476	4349	27568	12314	13250	6720	25662	23476	2	0	0
MDV		601	175030	4748	28372	109171	106059	672338	300320	323130	163888	625847	572530	39	0	0
MH		5	1595	43	259	995	966	6126	2736	2944	1493	5703	5217	0	0	0
OBUS		3	965	26	156	602	585	3707	1656	1781	904	3450	3156	0	0	0
SBUS		1	218	6	35	136	132	837	374	402	204	779	713	0	0	0
T6		11	3122	85	506	1947	1892	11991	5356	5763	2923	11162	10211	1	0	0
T7		1	359	10	58	224	217	1377	615	662	336	1282	1173	0	0	0
UBUS		2	535	15	87	334	324	2055	918	987	501	1913	1750	0	0	0

DSL	**Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**			
LDA		4	1230	33	199	767	745	4725	2111	2271	1152	4398	4023	0	0	0
LDT1		0	91	2	15	57	55	349	156	168	85	325	297	0	0	0
LDT2		0	77	2	12	48	47	295	132	142	72	275	251	0	0	0
LHD1		59	17156	465	2781	10700	10395	65899	29436	31671	16063	61342	56116	4	0	0
LHD2		16	4523	123	733	2821	2740	17373	7760	8349	4235	16171	14794	1	0	0
MCY		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV		0	136	4	22	85	83	524	234	252	128	488	446	0	0	0
MH		1	345	9	56	215	209	1325	592	637	323	1233	1128	0	0	0
OBUS		4	1173	32	190	732	711	4507	2013	2166	1099	4195	3838	0	0	0
SBUS		1	429	12	70	268	260	1649	736	792	402	1535	1404	0	0	0
T6		61	17712	480	2871	11048	10733	68037	30391	32699	16585	63333	57937	4	0	0
T7		295	85853	2329	13917	53549	52022	329786	147309	158497	80388	306983	280830	19	0	0
UBUS		5	1319	36	214	822	799	5065	2262	2434	1235	4715	4313	0	0	0

EMFAC2011 Emission Rates
Region Type: County
Region: Fresno
Calendar Year: 2035
Season: Annual
Vehicle Classification: EMFAC2007 Categories

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.61058	0.0661503	0.122367	1.1438369	0.105519	1132.07376	673.304157	0.013853	0.012854	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	0.0188755	0.021488	0.1206987	0.322311	503.980949	303.820128	0.011442	0.010527	0.000%
Fresno	2035	LDA	GAS	10	35638.706	0.04124	0.07626	1.0279769	0.092659	834.330412	496.221479	0.008718	0.008089	0.094%
Fresno	2035	LDA	DSL	10	95.10123	0.0160499	0.018272	0.1142073	0.306429	455.139526	274.429687	0.00973	0.008951	0.000%
Fresno	2035	LDA	GAS	15	21241.017	0.0276946	0.051197	0.9523351	0.081238	646.517456	384.518119	0.005787	0.00537	0.056%
Fresno	2035	LDA	DSL	15	56.681258	0.012068	0.013739	0.1031034	0.27962	381.698077	230.236122	0.007316	0.006731	0.000%
Fresno	2035	LDA	GAS	20	808500.65	0.0192603	0.03561	0.8610518	0.07266	514.415615	305.950589	0.004053	0.003761	2.136%
Fresno	2035	LDA	DSL	20	2157.469	0.0095589	0.010882	0.0938803	0.259701	332.219565	200.462311	0.005795	0.005332	0.006%
Fresno	2035	LDA	GAS	25	197184.91	0.0143388	0.0265	0.7989048	0.066217	428.337956	254.755245	0.002995	0.002778	0.521%
Fresno	2035	LDA	DSL	25	526.18429	0.0079752	0.009079	0.0860494	0.245193	300.076477	181.120132	0.004835	0.004448	0.001%
Fresno	2035	LDA	GAS	30	537842.7	0.0111563	0.020616	0.7330898	0.061379	368.21896	218.999388	0.002334	0.002165	1.421%
Fresno	2035	LDA	DSL	30	1435.2233	0.0070089	0.007979	0.0792994	0.235453	281.264321	169.799873	0.004249	0.003909	0.004%
Fresno	2035	LDA	GAS	35	1366088.4	0.0091514	0.016912	0.6739171	0.057744	328.478921	195.363966	0.001919	0.00178	3.608%
Fresno	2035	LDA	DSL	35	3645.382	0.0064893	0.007388	0.0734215	0.229856	273.56113	165.164459	0.003934	0.003619	0.010%
Fresno	2035	LDA	GAS	40	1943582.5	0.0078894	0.014581	0.6181806	0.055334	303.471949	180.491197	0.001664	0.001544	5.134%
Fresno	2035	LDA	DSL	40	5186.4142	0.0063315	0.007208	0.0682691	0.228203	276.084845	166.683111	0.003838	0.003531	0.014%
Fresno	2035	LDA	GAS	45	1929011.9	0.0072287	0.013361	0.5747455	0.053673	292.328918	173.863779	0.001523	0.001413	5.095%
Fresno	2035	LDA	DSL	45	5147.5324	0.0065121	0.007414	0.0637359	0.230226	289.122634	174.528631	0.003947	0.003631	0.014%
Fresno	2035	LDA	GAS	50	2232462.6	0.0069809	0.012904	0.5354171	0.052973	292.125802	173.742948	0.00147	0.001364	5.897%
Fresno	2035	LDA	DSL	50	5957.2848	0.0070634	0.008041	0.0597434	0.236193	314.18613	189.610649	0.004281	0.003938	0.016%
Fresno	2035	LDA	GAS	55	1665080.1	0.0071129	0.01315	0.5004716	0.053167	303.02659	180.226197	0.001497	0.001389	4.398%
Fresno	2035	LDA	DSL	55	4443.2357	0.0080823	0.009201	0.0562346	0.246416	354.307143	213.753563	0.004898	0.004506	0.012%
Fresno	2035	LDA	GAS	60	1897400.1	0.0076308	0.01411	0.4677985	0.054217	325.917054	193.840412	0.001608	0.001492	5.012%
Fresno	2035	LDA	DSL	60	5063.1773	0.0097593	0.01111	0.0531705	0.261473	414.65641	250.068876	0.005913	0.00544	0.013%
Fresno	2035	LDA	GAS	65	2035032.5	0.0086351	0.01597	0.4386353	0.05628	363.783005	216.361367	0.001822	0.001691	5.375%
Fresno	2035	LDA	DSL	65	5430.4465	0.0124383	0.01416	0.0505307	0.282274	503.663514	303.629111	0.007536	0.006933	0.014%
Fresno	2035	LDA	GAS	70	1953744	0.0093869	0.017362	0.4261377	0.057624	390.123335	232.027326	0.001979	0.001836	5.161%
Fresno	2035	LDA	DSL	70	5213.5296	0.0167349	0.019052	0.0483169	0.310021	634.981498	382.650018	0.010138	0.009327	0.014%
Fresno	2035	LDT1	GAS	5	102.50505	0.0781814	0.141973	1.3479236	0.122225	1314.76791	800.56989	0.013784	0.012789	0.000%
Fresno	2035	LDT1	DSL	5	0.1360064	0.021304	0.024253	0.1296125	0.371499	504.827175	301.829718	0.010898	0.010026	0.000%
Fresno	2035	LDT1	GAS	10	5289.7355	0.0489995	0.088828	1.2087702	0.106962	969.207598	590.161462	0.008682	0.008055	0.014%
Fresno	2035	LDT1	DSL	10	7.018562	0.018082	0.020585	0.1241136	0.353791	455.724636	272.471938	0.00925	0.00851	0.000%
Fresno	2035	LDT1	GAS	15	3152.7341	0.0330516	0.059827	1.1168612	0.093501	750.848605	457.196034	0.005769	0.005352	0.008%
Fresno	2035	LDT1	DSL	15	4.1831318	0.0135595	0.015437	0.1140363	0.323706	381.890427	228.327407	0.006936	0.006381	0.000%
Fresno	2035	LDT1	GAS	20	120003.09	0.0230579	0.041754	1.0085325	0.083475	597.522898	363.837256	0.004043	0.003751	0.317%
Fresno	2035	LDT1	DSL	20	159.22329	0.0107269	0.012212	0.1050606	0.301221	332.147383	198.586677	0.005487	0.005048	0.000%
Fresno	2035	LDT1	GAS	25	29267.508	0.0172317	0.031148	0.934299	0.075962	497.463371	302.908369	0.002989	0.002773	0.077%
Fresno	2035	LDT1	DSL	25	38.832909	0.0089525	0.010192	0.097053	0.284745	299.832425	179.265976	0.00458	0.004213	0.000%
Fresno	2035	LDT1	GAS	30	79830.22	0.0134396	0.024282	0.8567186	0.070363	427.662588	260.40672	0.002331	0.002163	0.211%
Fresno	2035	LDT1	DSL	30	105.92086	0.0078821	0.008973	0.0898981	0.273609	280.919663	167.958278	0.004032	0.003709	0.000%
Fresno	2035	LDT1	GAS	35	202764.03	0.0110382	0.019944	0.7872989	0.066188	381.527502	232.315209	0.001917	0.001779	0.536%
Fresno	2035	LDT1	DSL	35	269.03268	0.0073212	0.008335	0.0834959	0.267127	273.175322	163.328035	0.003745	0.003445	0.001%
Fresno	2035	LDT1	GAS	40	288479.58	0.009518	0.017205	0.7223129	0.063456	352.529789	214.659347	0.001663	0.001543	0.762%
Fresno	2035	LDT1	DSL	40	382.76239	0.0071738	0.008167	0.0777592	0.265083	275.712512	164.844988	0.00367	0.003376	0.001%
Fresno	2035	LDT1	GAS	45	286316.87	0.0087141	0.015757	0.6716524	0.061606	339.573191	206.769651	0.001521	0.001412	0.756%
Fresno	2035	LDT1	DSL	45	379.89286	0.0074158	0.008442	0.0726125	0.267152	288.820023	172.681802	0.003793	0.00349	0.001%
Fresno	2035	LDT1	GAS	50	331357.07	0.0084009	0.015197	0.6260151	0.060895	339.331167	206.622144	0.001468	0.001362	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	0.0080872	0.009207	0.0679898	0.273613	314.017531	187.74707	0.004137	0.003806	0.001%
Fresno	2035	LDT1	GAS	55	247142.36	0.0085378	0.015454	0.5856615	0.061253	351.985417	214.327261	0.001494	0.001386	0.653%
Fresno	2035	LDT1	DSL	55	327.91509	0.009304	0.010592	0.0638334	0.284763	354.353048	211.86316	0.004759	0.004379	0.001%
Fresno	2035	LDT1	GAS	60	281624.87	0.0091271	0.016538	0.5481625	0.062653	378.579994	230.521082	0.001604	0.001488	0.744%
Fresno	2035	LDT1	DSL	60	373.66739	0.0112923	0.012856	0.0600932	0.301159	415.025007	248.13815	0.005776	0.005314	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	0.0102875	0.018657	0.5149092	0.065297	422.572629	257.308816	0.001816	0.001685	0.798%
Fresno	2035	LDT1	DSL	65	400.77219	0.0144586	0.01646	0.0567251	0.323678	504.508047	301.638916	0.007396	0.006804	0.001%
Fresno	2035	LDT1	GAS	70	289987.78	0.0111589	0.020248	0.5007372	0.067016	453.157125	275.931745	0.001972	0.001829	0.766%
Fresno	2035	LDT1	DSL	70	384.76351	0.0195301	0.022234	0.0536906	0.35342	636.52822	380.57209	0.00999	0.009191	0.001%
Fresno	2035	LDT2	GAS	5	255.42307	0.0807862	0.148505	1.3373414	0.13084	1537.70722	1044.72707	0.013765	0.012772	0.001%
Fresno	2035	LDT2	DSL	5	0.1150683	0.0237373	0.027023	0.1586632	0.407101	502.581245	342.876199	0.012342	0.011355	0.000%
Fresno	2035	LDT2	GAS	10	13181.015	0.0504476	0.092662	1.2015065	0.114698	1133.51983	770.121871	0.008664	0.008039	0.035%
Fresno	2035	LDT2	DSL	10	5.9380597	0.0202214	0.023021	0.1483564	0.386317	454.171785	309.953162	0.010521	0.009679	0.000%
Fresno	2035	LDT2	GAS	15	7856.0134	0.0339175	0.062256	1.1120257	0.1004	878.167189	596.631776	0.005753	0.005338	0.021%
Fresno	2035	LDT2	DSL	15	3.5391415	0.0152463	0.017357	0.1315346	0.351462	381.379828	260.447709	0.00794	0.007305	0.000%
Fresno	2035	LDT2	GAS	20	299024.86	0.0236147	0.043346	1.0052878	0.089718	698.829778	474.789734	0.00403	0.003739	0.790%
Fresno	2035	LDT2	DSL	20	134.71098	0.0120917	0.013766	0.1182917	0.32573	332.338943	227.095244	0.0063	0.005796	0.000%
Fresno	2035	LDT2	GAS	25	72929.061	0.017598	0.032277	0.9321944	0.081698	581.815971	395.289098	0.002978	0.002763	0.193%
Fresno	2035	LDT2	DSL	25	32.854613	0.0100852	0.011481	0.1075137	0.307105	300.480123	205.428217	0.005254	0.004834	0.000%
Fresno	2035	LDT2	GAS	30	198921.7	0.0137025	0.025125	0.8552845	0.075703	500.176625	339.823036	0.002321	0.002154	0.525%
Fresno	2035	LDT2	DSL	30	89.614422	0.0088468	0.010071	0.0985277	0.294692	281.834348	192.747317	0.004606	0.004237	0.000%
Fresno	2035	LDT2	GAS	35	505249.38	0.011245	0.020619	0.7862275	0.071216	446.216101	303.162106	0.001908	0.001771	1.335%
Fresno	2035	LDT2	DSL	35	227.61531	0.0081642	0.009294	0.0909097	0.287659	274.19932	187.554772	0.004246	0.003906	0.001%
Fresno	2035	LDT2	GAS	40	718836.18	0.009696	0.017781	0.7213458	0.068263	412.295273	280.116489	0.001655	0.001536	1.899%
Fresno	2035	LDT2	DSL	40	323.83637	0.0079306	0.009028	0.0843821	0.285742	276.700724	189.255964	0.004117	0.003788	0.001%
Fresno	2035	LDT2	GAS	45	713447.17	0.0088818	0.01629	0.6706601	0.066243	397.143739	269.822318	0.001515	0.001405	1.885%
Fresno	2035	LDT2	DSL	45	321.40864	0.0081143	0.009238	0.0787589	0.288616	289.623184	198.044466	0.004205	0.003868	0.001%
Fresno	2035	LDT2	GAS	50	825678.75	0.0085729	0.015727	0.6248404	0.065431	396.861533	269.630532	0.001462	0.001356	2.181%
Fresno	2035	LDT2	DSL	50	371.96905	0.0087514	0.009963	0.0739148	0.296659	314.465023	214.939279	0.004525	0.004163	0.001%
Fresno	2035	LDT2	GAS	55	615831.76	0.0087281	0.016017	0.5841747	0.065744	411.662269	279.686188	0.001488	0.001381	1.627%
Fresno	2035	LDT2	DSL	55	277.43279	0.0099563	0.011335	0.0697703	0.310342	354.231181	241.984048	0.005137	0.004726	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	LDT2	GAS	60	701755.58	0.0093539	0.017174	0.5462385	0.067149	442.764966	300.817625	0.001599	0.001483	1.854%
Fresno	2035	LDT2	DSL	60	316.14156	0.011956	0.013611	0.0662844	0.330524	414.046697	282.664287	0.006156	0.005664	0.001%
Fresno	2035	LDT2	GAS	65	752659.03	0.0105725	0.01942	0.5124349	0.069848	494.215085	335.773267	0.001811	0.001681	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	0.015162	0.017261	0.0634572	0.358568	502.266607	342.662214	0.007792	0.007169	0.001%
Fresno	2035	LDT2	GAS	70	722594.3	0.0114854	0.021103	0.497949	0.071604	529.986613	360.07659	0.001967	0.001825	1.909%
Fresno	2035	LDT2	DSL	70	325.52944	0.0203114	0.023123	0.061339	0.396335	632.423233	431.181097	0.010422	0.009588	0.001%
Fresno	2035	LHD1	GAS	5	28730.834	0.0468288	0.078146	0.7368093	0.098011	2513.49712	2262.14741	0.001312	0.001217	0.076%
Fresno	2035	LHD1	DSL	5	10879.472	0.1901904	0.216519	2.3726665	1.447606	519.044	467.1396	0.052137	0.047966	0.029%
Fresno	2035	LHD1	GAS	10	74917.972	0.0377331	0.062942	0.5969772	0.100348	2036.12829	1832.51546	0.001056	0.00098	0.198%
Fresno	2035	LHD1	DSL	10	36179.207	0.1680524	0.191316	1.9590347	1.312197	519.043919	467.139527	0.046068	0.042383	0.096%
Fresno	2035	LHD1	GAS	15	170598.31	0.025285	0.042175	0.408915	0.105095	1392.42973	1253.18676	0.000707	0.000656	0.451%
Fresno	2035	LHD1	DSL	15	78353.787	0.1333898	0.151855	1.3818898	1.109385	519.04397	467.139573	0.036566	0.033641	0.207%
Fresno	2035	LHD1	GAS	20	197125.03	0.0175837	0.029353	0.2948783	0.110421	1006.06851	905.461657	0.000493	0.000457	0.521%
Fresno	2035	LHD1	DSL	20	85901.056	0.1082319	0.123215	1.0201524	0.970248	519.044027	467.139624	0.02967	0.027296	0.227%
Fresno	2035	LHD1	GAS	25	151847.06	0.012682	0.021216	0.2238341	0.116734	768.012023	691.21082	0.000358	0.000332	0.401%
Fresno	2035	LHD1	DSL	25	91937.051	0.0897722	0.1022	0.7881648	0.882282	519.044026	467.139624	0.024609	0.022641	0.243%
Fresno	2035	LHD1	GAS	30	134282.63	0.0096155	0.016078	0.1805654	0.121624	619.43358	557.490222	0.000271	0.000252	0.355%
Fresno	2035	LHD1	DSL	30	77606.52	0.0761173	0.086654	0.6372787	0.827804	519.043982	467.139584	0.020866	0.019197	0.205%
Fresno	2035	LHD1	GAS	35	50176.542	0.0075026	0.012588	0.1525298	0.128927	527.846459	475.061813	0.000214	0.000199	0.133%
Fresno	2035	LHD1	DSL	35	40955.973	0.065975	0.075108	0.539265	0.808703	519.043989	467.13959	0.018086	0.016639	0.108%
Fresno	2035	LHD1	GAS	40	14810.971	0.0060602	0.010275	0.1361152	0.136886	475.233144	427.70983	0.000176	0.000164	0.039%
Fresno	2035	LHD1	DSL	40	22483.492	0.0584561	0.066548	0.4775683	0.817813	519.044031	467.139628	0.016025	0.014743	0.059%
Fresno	2035	LHD1	GAS	45	18233.609	0.0052446	0.00888	0.1303835	0.140061	452.055829	406.850246	0.000151	0.00014	0.048%
Fresno	2035	LHD1	DSL	45	24267.079	0.0529462	0.060276	0.442618	0.852959	519.044071	467.139664	0.014514	0.013353	0.064%
Fresno	2035	LHD1	GAS	50	134634.42	0.0047971	0.008053	0.1328765	0.141188	454.321818	408.889636	0.000135	0.000126	0.356%
Fresno	2035	LHD1	DSL	50	93702.888	0.0490223	0.055809	0.4293219	0.921883	519.044016	467.139615	0.013438	0.012363	0.248%
Fresno	2035	LHD1	GAS	55	37030.824	0.0043361	0.007352	0.1381423	0.152612	482.415478	434.17393	0.000126	0.000117	0.098%
Fresno	2035	LHD1	DSL	55	56428.728	0.0463989	0.052822	0.4358102	1.03814	519.043992	467.139593	0.012719	0.011702	0.149%
Fresno	2035	LHD2	GAS	5	2869.2263	0.0352143	0.063946	0.5594356	0.076166	2513.49728	2262.14755	0.001034	0.000959	0.008%
Fresno	2035	LHD2	DSL	5	2868.0838	0.177619	0.202207	2.2585627	1.338565	519.107914	467.197122	0.049051	0.045127	0.008%
Fresno	2035	LHD2	GAS	10	7481.7397	0.0283664	0.051506	0.4532655	0.077982	2036.12823	1832.51541	0.000833	0.000773	0.020%
Fresno	2035	LHD2	DSL	10	9537.6864	0.1569443	0.178671	1.864823	1.213356	519.107918	467.197126	0.043341	0.039874	0.025%
Fresno	2035	LHD2	GAS	15	17036.93	0.0190077	0.034512	0.3104759	0.081671	1392.42956	1253.1866	0.000557	0.000517	0.045%
Fresno	2035	LHD2	DSL	15	20655.896	0.1245729	0.141818	1.3154333	1.02582	519.10791	467.197119	0.034402	0.03165	0.055%
Fresno	2035	LHD2	GAS	20	19686.039	0.0132258	0.024019	0.2238916	0.08581	1006.06851	905.461663	0.000388	0.00036	0.052%
Fresno	2035	LHD2	DSL	20	22645.534	0.1010778	0.11507	0.9710922	0.897164	519.107917	467.197126	0.027913	0.02568	0.060%
Fresno	2035	LHD2	GAS	25	15164.321	0.0095532	0.017359	0.16995	0.090715	768.01204	691.210836	0.000282	0.000262	0.040%
Fresno	2035	LHD2	DSL	25	24236.761	0.0838384	0.095444	0.7502612	0.815824	519.107974	467.197177	0.023153	0.0213	0.064%
Fresno	2035	LHD2	GAS	30	13410.236	0.0072407	0.013155	0.1370975	0.094516	619.433566	557.490209	0.000214	0.000198	0.035%
Fresno	2035	LHD2	DSL	30	20458.898	0.071086	0.080927	0.6066314	0.76545	519.107941	467.197147	0.019631	0.01806	0.054%
Fresno	2035	LHD2	GAS	35	5010.9181	0.005663	0.010298	0.115811	0.100191	527.84649	475.061841	0.000169	0.000157	0.013%
Fresno	2035	LHD2	DSL	35	10796.955	0.0616141	0.070144	0.5133312	0.747787	519.107889	467.1971	0.017015	0.015654	0.029%
Fresno	2035	LHD2	GAS	40	1479.1088	0.0046079	0.008402	0.1033479	0.106376	475.233142	427.709828	0.000139	0.000129	0.004%
Fresno	2035	LHD2	DSL	40	5927.1756	0.0545922	0.06215	0.4546015	0.756211	519.107876	467.197088	0.015076	0.01387	0.016%
Fresno	2035	LHD2	GAS	45	1820.913	0.003984	0.007262	0.098996	0.108844	452.055826	406.850243	0.000119	0.000111	0.005%
Fresno	2035	LHD2	DSL	45	6397.3717	0.0494465	0.056292	0.421332	0.78871	519.107898	467.197108	0.013655	0.012563	0.017%
Fresno	2035	LHD2	GAS	50	13445.368	0.0036222	0.006588	0.1008888	0.109719	454.321772	408.889595	0.000107	9.91E-05	0.036%
Fresno	2035	LHD2	DSL	50	24702.279	0.045782	0.05212	0.4086754	0.852442	519.107864	467.197078	0.012643	0.011632	0.065%
Fresno	2035	LHD2	GAS	55	3698.111	0.0032971	0.006012	0.104887	0.118597	482.415456	434.173911	9.95E-05	9.24E-05	0.010%
Fresno	2035	LHD2	DSL	55	14875.936	0.043332	0.049331	0.4148517	0.959942	519.107902	467.197112	0.011966	0.011009	0.039%
Fresno	2035	MCY	GAS	5	10.752747	4.7189475	5.165712	23.870843	1.236078	266.394097	239.754687	0.000467	0.000411	0.000%
Fresno	2035	MCY	GAS	10	554.89158	4.0924659	4.480206	22.084999	1.217711	242.30076	218.070684	0.000402	0.000353	0.001%
Fresno	2035	MCY	GAS	15	330.7208	3.1688185	3.467933	19.076397	1.162584	205.030744	184.52767	0.000309	0.000271	0.001%
Fresno	2035	MCY	GAS	20	12588.286	2.589213	2.830736	17.08271	1.135271	178.738769	160.864892	0.000251	0.000219	0.033%
Fresno	2035	MCY	GAS	25	3070.1522	2.2223167	2.429782	15.901695	1.116377	160.513437	144.462093	0.000214	0.000187	0.008%
Fresno	2035	MCY	GAS	30	8374.1638	2.0085029	2.195247	15.312538	1.114165	148.522673	133.670406	0.000192	0.000167	0.022%
Fresno	2035	MCY	GAS	35	21269.879	1.9075578	2.084042	15.2783	1.121996	141.675292	127.507762	0.000182	0.000158	0.056%
Fresno	2035	MCY	GAS	40	30261.417	1.9062373	2.081751	15.890486	1.142786	139.435532	125.491979	0.000181	0.000156	0.080%
Fresno	2035	MCY	GAS	45	30034.55	1.9966162	2.179985	17.238489	1.167142	141.742565	127.568309	0.000189	0.000163	0.079%
Fresno	2035	MCY	GAS	50	34759.25	2.1978531	2.399426	19.669568	1.20228	149.01587	134.114283	0.000207	0.000179	0.092%
Fresno	2035	MCY	GAS	55	25925.157	2.5415526	2.774636	23.714161	1.247993	162.250226	146.025203	0.00024	0.000207	0.068%
Fresno	2035	MCY	GAS	60	29542.357	3.0875112	3.370405	30.291061	1.306048	183.22816	164.905344	0.000291	0.000252	0.078%
Fresno	2035	MCY	GAS	65	31685.281	3.9413355	4.302831	41.189322	1.378654	214.9121	193.42089	0.000371	0.000321	0.084%
Fresno	2035	MCY	GAS	70	30419.625	5.2796836	5.764605	59.434256	1.464776	262.137322	235.92359	0.000499	0.000432	0.080%
Fresno	2035	MDV	GAS	5	262.23808	0.1100125	0.195436	1.7718606	0.179144	1969.99002	1370.33855	0.013475	0.012502	0.001%
Fresno	2035	MDV	DSL	5	0.204452	0.0191431	0.021793	0.1208349	0.327478	504.233051	348.357588	0.011581	0.010655	0.000%
Fresno	2035	MDV	GAS	10	13532.7	0.0690463	0.122328	1.5896758	0.156103	1452.2532	1010.20434	0.008486	0.007873	0.036%
Fresno	2035	MDV	DSL	10	10.550669	0.0162675	0.018519	0.1147625	0.311503	455.313852	314.587226	0.009842	0.009054	0.000%
Fresno	2035	MDV	GAS	15	8065.6207	0.0466288	0.082419	1.4692966	0.136006	1125.03783	782.583902	0.005638	0.005231	0.021%
Fresno	2035	MDV	DSL	15	6.2883017	0.0122206	0.013912	0.104181	0.284484	381.755387	263.807654	0.007394	0.006802	0.000%
Fresno	2035	MDV	GAS	20	307003.17	0.0324784	0.057548	1.3271621	0.121137	895.315834	622.79059	0.003951	0.003666	0.811%
Fresno	2035	MDV	DSL	20	239.35278	0.0096758	0.011015	0.0952165	0.264374	332.198042	229.596761	0.005854	0.005386	0.001%
Fresno	2035	MDV	GAS	25	74874.889	0.0243171	0.04294	1.2297065	0.110055	745.377168	518.48947	0.002921	0.00271	0.198%
Fresno	2035	MDV	DSL	25	58.375658	0.0080735	0.009191	0.0874931	0.2497	300.003773	207.372109	0.004885	0.004494	0.000%
Fresno	2035	MDV	GAS	30	204229.16	0.0189682	0.033481	1.1277553	0.101854	640.793851	445.741211	0.002277	0.002113	0.539%
Fresno	2035	MDV	DSL	30	159.22577	0.0070996	0.008082	0.0807626	0.239828	281.161644	194.364833	0.004295	0.003952	0.000%
Fresno	2035	MDV	GAS	35	518729.95	0.0155728	0.027505	1.0364591	0.095789	571.669908	397.658678	0.001873	0.001738	1.370%
Fresno	2035	MDV	DSL	35	404.42401	0.0065804	0.007491	0.0748519	0.234133	273.446191	189.03863	0.003981	0.003662	0.001%
Fresno	2035	MDV	GAS	40	738015.56	0.0134185	0.023729	0.9509382	0.091878	528.227829	367.441432	0.001625	0.001507	1.949%
Fresno	2035	MDV	DSL	40	575.3884	0.0064296	0.00732	0.0696347	0.232416	275.97394	190.783609	0.00389	0.003578	0.002%
Fresno	2035	MDV	GAS	45	732482.74	0.0122813	0.021731	0.8842086	0.089299	508.811884	353.935103	0.001486	0.001379	1.935%
Fresno	2035	MDV	DSL	45	571.07475	0.0066243	0.007541	0.0650156	0.234401	289.032509	199.798324	0.004007	0.003687	0.002%
Fresno	2035	MDV	GAS	50	847708.74	0.0118363	0.020956	0.824051	0.088433	508.448346	353.682037	0.001434	0.001331	2.239%
Fresno	2035	MDV	DSL	50	660.90994	0.0071982	0.008195	0.0609215	0.240351	314.135879	217.127918	0.004354	0.004006	0.002%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	GAS	55	632262.83	0.0120264	0.021305	0.7708121	0.089188	527.40799	366.870322	0.00146	0.001354	1.670%
Fresno	2035	MDV	DSL	55	492.93907	0.0082517	0.009394	0.0572662	0.250567	354.320834	244.868774	0.004991	0.004592	0.001%
Fresno	2035	MDV	GAS	60	720479.2	0.0128467	0.022792	0.7213014	0.091557	567.257667	394.590335	0.001567	0.001454	1.903%
Fresno	2035	MDV	DSL	60	561.71632	0.0099812	0.011363	0.0540983	0.265606	414.766203	286.595991	0.006037	0.005554	0.001%
Fresno	2035	MDV	GAS	65	772740.8	0.0144731	0.025705	0.6773478	0.095873	633.176731	440.444571	0.001775	0.001647	2.041%
Fresno	2035	MDV	DSL	65	602.4617	0.0127412	0.014505	0.0513011	0.286347	503.915118	348.138109	0.007705	0.007089	0.002%
Fresno	2035	MDV	GAS	70	741873.94	0.0156958	0.02789	0.6585872	0.098677	679.002269	472.320926	0.001927	0.001788	1.960%
Fresno	2035	MDV	DSL	70	578.39657	0.0171657	0.019542	0.0488944	0.313934	635.442336	438.935217	0.010381	0.00955	0.002%
Fresno	2035	MH	GAS	5	497.37529	0.0553148	0.09933	0.7610391	0.116409	2513.49733	2262.1476	0.001014	0.000941	0.001%
Fresno	2035	MH	DSL	5	100.05503	1.0506642	1.196111	1.8537301	10.40436	2409.45049	2168.50544	0.102742	0.094523	0.000%
Fresno	2035	MH	GAS	10	2500.3099	0.0445366	0.079952	0.6162304	0.119449	2036.12821	1832.51539	0.000817	0.000758	0.007%
Fresno	2035	MH	DSL	10	498.03629	0.7897955	0.89913	1.4655575	8.936126	2187.78829	1969.00946	0.089264	0.082123	0.001%
Fresno	2035	MH	GAS	15	3158.32	0.0299198	0.053672	0.4228694	0.124529	1392.42964	1253.18668	0.000546	0.000507	0.008%
Fresno	2035	MH	DSL	15	672.17609	0.4011829	0.45672	0.8767346	6.620523	1796.35774	1616.72197	0.066961	0.061604	0.002%
Fresno	2035	MH	GAS	20	3275.9536	0.0208567	0.037433	0.3055777	0.130392	1006.06861	905.461752	0.000381	0.000353	0.009%
Fresno	2035	MH	DSL	20	712.8672	0.1900703	0.216382	0.5379409	5.154415	1474.1187	1326.70683	0.05086	0.046792	0.002%
Fresno	2035	MH	GAS	25	3650.1697	0.0151682	0.027222	0.2333843	0.136157	768.012153	691.210938	0.000277	0.000257	0.010%
Fresno	2035	MH	DSL	25	742.42287	0.146569	0.166859	0.4562472	4.526696	1322.2031	1189.98279	0.044122	0.040592	0.002%
Fresno	2035	MH	GAS	30	4127.0368	0.0114739	0.020587	0.187889	0.142452	619.433653	557.490288	0.00021	0.000195	0.011%
Fresno	2035	MH	DSL	30	892.7034	0.1260962	0.143552	0.4275845	4.128248	1241.08342	1116.97508	0.041074	0.037788	0.002%
Fresno	2035	MH	GAS	35	5129.2808	0.0090439	0.01624	0.1599202	0.148736	527.846586	475.061927	0.000166	0.000154	0.014%
Fresno	2035	MH	DSL	35	1052.6149	0.1087305	0.123782	0.4078958	3.802662	1173.76427	1056.38785	0.040066	0.036861	0.003%
Fresno	2035	MH	GAS	40	6385.4256	0.0074294	0.013359	0.143859	0.155038	475.233226	427.709904	0.000136	0.000127	0.017%
Fresno	2035	MH	DSL	40	1306.6575	0.0944721	0.10755	0.3971811	3.548249	1120.24542	1008.22088	0.041098	0.03781	0.003%
Fresno	2035	MH	GAS	45	5823.0717	0.0063952	0.011482	0.1370593	0.160335	452.05586	406.850274	0.000117	0.000109	0.015%
Fresno	2035	MH	DSL	45	1069.9793	0.0833209	0.094855	0.3954404	3.358787	1080.52712	972.474412	0.044171	0.040637	0.003%
Fresno	2035	MH	GAS	50	5667.0456	0.0056801	0.010217	0.1370394	0.16791	454.32184	408.889656	0.000105	9.72E-05	0.015%
Fresno	2035	MH	DSL	50	1197.4807	0.0752769	0.085698	0.4026736	3.248634	1054.60923	949.148305	0.049283	0.045341	0.003%
Fresno	2035	MH	GAS	55	7411.9792	0.0052533	0.009506	0.1451595	0.174931	482.415536	434.173982	9.76E-05	9.06E-05	0.020%
Fresno	2035	MH	DSL	55	1754.7995	0.0703401	0.080078	0.4188808	3.209985	1042.49168	938.242513	0.056436	0.051921	0.005%
Fresno	2035	MH	GAS	60	8553.0862	0.0050896	0.009255	0.1630902	0.18043	541.209217	487.088295	9.49E-05	8.8E-05	0.023%
Fresno	2035	MH	DSL	60	2108.6858	0.0685105	0.077995	0.444062	3.238258	1044.17453	939.757077	0.065629	0.060379	0.006%
Fresno	2035	MH	GAS	65	1336.5278	0.0052101	0.009435	0.1945296	0.183905	641.497946	577.348151	9.61E-05	8.92E-05	0.004%
Fresno	2035	MH	DSL	65	331.84716	0.0697882	0.079449	0.4782171	3.327952	1059.65797	953.692172	0.076862	0.070713	0.001%
Fresno	2035	OBUS	GAS	5	300.94714	0.080701	0.127238	1.1942561	0.133115	2513.49723	2262.14751	0.001	0.000927	0.001%
Fresno	2035	OBUS	DSL	5	245.79146	1.5861841	1.80575	2.9797481	4.623698	3000.84531	2700.76078	0.05483	0.050444	0.001%
Fresno	2035	OBUS	GAS	10	1512.8638	0.0649959	0.102413	0.967016	0.136592	2036.12852	1832.51567	0.000805	0.000747	0.004%
Fresno	2035	OBUS	DSL	10	1133.6207	0.8871084	1.009905	1.7708363	3.395818	2416.37885	2174.74096	0.049207	0.04527	0.003%
Fresno	2035	OBUS	GAS	15	1911.0064	0.0436741	0.068748	0.6635853	0.1424	1392.42968	1253.18671	0.000539	0.0005	0.005%
Fresno	2035	OBUS	DSL	15	1492.4488	0.4445821	0.506123	1.0103201	2.534191	1966.4595	1769.81355	0.044572	0.041006	0.004%
Fresno	2035	OBUS	GAS	20	1982.183	0.0304376	0.047949	0.479526	0.149105	1006.06863	905.461765	0.000376	0.000348	0.005%
Fresno	2035	OBUS	DSL	20	1992.1444	0.2134666	0.243015	0.6250055	2.04657	1667.58305	1500.82475	0.04257	0.039164	0.005%
Fresno	2035	OBUS	GAS	25	2208.6102	0.0221363	0.03487	0.3662369	0.155698	768.012086	691.210878	0.000273	0.000253	0.006%
Fresno	2035	OBUS	DSL	25	2066.889	0.1862273	0.212006	0.5889262	1.833109	1554.29946	1398.86952	0.0406	0.037352	0.005%
Fresno	2035	OBUS	GAS	30	2497.1484	0.0167474	0.02637	0.2948437	0.162896	619.4336	557.49024	0.000207	0.000192	0.007%
Fresno	2035	OBUS	DSL	30	2883.156	0.1715128	0.195254	0.6018785	1.709603	1513.47471	1362.12724	0.041611	0.038282	0.008%
Fresno	2035	OBUS	GAS	35	3103.5765	0.0131973	0.020803	0.2509538	0.170082	527.846634	475.061971	0.000163	0.000152	0.008%
Fresno	2035	OBUS	DSL	35	4256.6836	0.1596004	0.181693	0.6328688	1.620436	1496.24306	1346.61875	0.044706	0.041129	0.011%
Fresno	2035	OBUS	GAS	40	3863.633	0.0108323	0.017113	0.2257499	0.177288	475.233178	427.70986	0.000134	0.000125	0.010%
Fresno	2035	OBUS	DSL	40	4543.6948	0.1340432	0.152598	0.599408	1.454882	1388.01842	1249.21658	0.046787	0.043044	0.012%
Fresno	2035	OBUS	GAS	45	3523.3691	0.0093333	0.014707	0.2150795	0.183345	452.055855	406.850269	0.000115	0.000107	0.009%
Fresno	2035	OBUS	DSL	45	5084.9367	0.127837	0.145533	0.6642423	1.433593	1412.70212	1271.43191	0.054142	0.049811	0.013%
Fresno	2035	OBUS	GAS	50	3428.9625	0.0082795	0.013089	0.2150483	0.192007	454.321799	408.889619	0.000103	9.58E-05	0.009%
Fresno	2035	OBUS	DSL	50	5430.6309	0.1132843	0.128966	0.6775239	1.364009	1369.39275	1232.45348	0.060719	0.055861	0.014%
Fresno	2035	OBUS	GAS	55	4484.7705	0.0076242	0.012182	0.2277906	0.200036	482.415543	434.173989	9.62E-05	8.93E-05	0.012%
Fresno	2035	OBUS	DSL	55	7117.4272	0.1009084	0.114876	0.6898339	1.315754	1329.59333	1196.63399	0.068347	0.062879	0.019%
Fresno	2035	OBUS	GAS	60	5175.2205	0.0073623	0.011865	0.2559284	0.206324	541.209208	487.088287	9.35E-05	8.68E-05	0.014%
Fresno	2035	OBUS	DSL	60	4814.1661	0.0766515	0.087262	0.5707986	1.16079	1154.53492	1039.08143	0.069619	0.064049	0.013%
Fresno	2035	OBUS	GAS	65	808.69374	0.0075559	0.012092	0.3052643	0.210298	641.497894	577.348105	9.48E-05	8.79E-05	0.002%
Fresno	2035	OBUS	DSL	65	1253.2168	0.0906658	0.103216	0.7737067	1.349263	1334.34751	1200.91276	0.089797	0.082614	0.003%
Fresno	2035	SBUS	GAS	5	77.848973	0.2742692	0.341615	3.8280772	0.333728	2513.49698	2262.14728	0.001744	0.001618	0.000%
Fresno	2035	SBUS	DSL	5	153.26155	2.281405	2.597206	4.0455771	12.3463	2617.43399	2355.69059	0.064331	0.059184	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	0.2214585	0.275662	3.1074489	0.340815	2036.12814	1832.51532	0.001404	0.001303	0.001%
Fresno	2035	SBUS	DSL	10	537.17386	1.3271759	1.510889	2.5203783	9.282154	2162.20503	1945.98453	0.059001	0.054281	0.001%
Fresno	2035	SBUS	GAS	15	545.71332	0.1481515	0.184413	2.1250646	0.357665	1392.42956	1253.1866	0.000939	0.000872	0.001%
Fresno	2035	SBUS	DSL	15	1074.3477	0.6744066	0.767761	1.4621548	6.983592	1775.35776	1597.82198	0.053848	0.04954	0.003%
Fresno	2035	SBUS	GAS	20	740.71711	0.1033393	0.128624	1.5357503	0.374355	1006.06849	905.461637	0.000655	0.000608	0.002%
Fresno	2035	SBUS	DSL	20	1458.2523	0.289941	0.330076	0.7928132	5.278572	1400.58068	1260.52261	0.04836	0.044491	0.004%
Fresno	2035	SBUS	GAS	25	1169.2717	0.0750802	0.093461	1.1719453	0.391468	768.012094	691.210884	0.000476	0.000442	0.003%
Fresno	2035	SBUS	DSL	25	2301.9493	0.2533325	0.2884	0.7484043	4.73246	1306.77308	1176.09577	0.046163	0.04247	0.006%
Fresno	2035	SBUS	GAS	30	1402.8186	0.0568627	0.07079	0.9449195	0.408577	619.43357	557.490213	0.000361	0.000335	0.004%
Fresno	2035	SBUS	DSL	30	2761.7339	0.2209174	0.251498	0.7173262	4.267068	1226.60413	1103.94372	0.045845	0.042178	0.007%
Fresno	2035	SBUS	GAS	35	1439.8169	0.0447923	0.055798	0.8035999	0.427096	527.846492	475.061843	0.000285	0.000264	0.004%
Fresno	2035	SBUS	DSL	35	2834.5724	0.1926958	0.219369	0.6995788	3.882397	1160.07385	1044.06646	0.047406	0.043614	0.007%
Fresno	2035	SBUS	GAS	40	971.95252	0.0368103	0.045873	0.7225244	0.445186	475.23313	427.709817	0.000235	0.000218	0.003%
Fresno	2035	SBUS	DSL	40	1913.4862	0.1686675	0.192015	0.6951622	3.578447	1107.18223	996.464003	0.050847	0.046779	0.005%
Fresno	2035	SBUS	GAS	45	466.31942	0.0315601	0.039339	0.6868198	0.462766	452.055804	406.850224	0.000201	0.000187	0.001%
Fresno	2035	SBUS	DSL	45	918.04463	0.1488326	0.169435	0.7040764	3.355217	1067.92926	961.136336	0.056167	0.051673	0.002%
Fresno	2035	SBUS	GAS	50	233.54692	0.0283194	0.035273	0.6919359	0.477523	454.321742	408.889568	0.00018	0.000167	0.001%
Fresno	2035	SBUS	DSL	50	459.78464	0.1331912	0.151628	0.7263213	3.212709	1042.31496	938.083461	0.063365	0.058296	0.001%
Fresno	2035	SBUS	GAS	55	347.6197	0.0260144	0.032517	0.7263802	0.505327	482.415402	434.173862	0.000168	0.000156	0.001%
Fresno	2035	SBUS	DSL	55	684.36005	0.1217431	0.138595	0.761897	3.15092	1030.33931	927.305381	0.072443	0.066648	0.002%
Fresno	2035	SBUS	GAS	60	193.46668	0.0253707	0.031686	0.8170587	0.520027	541.209093	487.088183	0.000163	0.000151	0.001%
Fresno	2035	SBUS	DSL	60	380.87851	0.1144885	0.130336	0.8108034	3.169853	1032.00233	928.802094	0.0834	0.076728	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	T6	GAS	5	973.52695	0.0689906	0.114074	1.0368676	0.120933	2513.49722	2262.1475	0.00101	0.000938	0.003%
Fresno	2035	T6	DSL	5	5137.5027	1.1013952	1.253855	1.9529146	3.412478	2559.93331	2303.93998	0.041772	0.03843	0.014%
Fresno	2035	T6	GAS	10	4893.9285	0.0555566	0.091818	0.8395749	0.124092	2036.12822	1832.5154	0.000814	0.000755	0.013%
Fresno	2035	T6	DSL	10	25572.553	0.6407234	0.729415	1.2167127	2.564287	2114.70497	1903.23447	0.038279	0.035216	0.068%
Fresno	2035	T6	GAS	15	6181.8708	0.0373232	0.061637	0.5761328	0.129369	1392.42958	1253.18662	0.000544	0.000505	0.016%
Fresno	2035	T6	DSL	15	34514.07	0.3255844	0.370653	0.7059038	1.928473	1736.35609	1562.72048	0.034911	0.032118	0.091%
Fresno	2035	T6	GAS	20	6412.1182	0.0260159	0.042989	0.4163303	0.13546	1006.0686	905.461738	0.00038	0.000352	0.017%
Fresno	2035	T6	DSL	20	36603.426	0.1399714	0.159347	0.3827906	1.457575	1369.81224	1232.83102	0.031334	0.028827	0.097%
Fresno	2035	T6	GAS	25	7144.5819	0.0189203	0.031263	0.3179713	0.141449	768.012142	691.210927	0.000276	0.000256	0.019%
Fresno	2035	T6	DSL	25	38121.017	0.1222948	0.139223	0.3613306	1.307178	1278.06544	1150.2589	0.029906	0.027513	0.101%
Fresno	2035	T6	GAS	30	8077.9677	0.014313	0.023643	0.2559869	0.147988	619.433656	557.49029	0.000209	0.000194	0.021%
Fresno	2035	T6	DSL	30	45837.434	0.1066437	0.121406	0.3463083	1.179023	1199.65767	1079.69191	0.029695	0.027319	0.121%
Fresno	2035	T6	GAS	35	10039.688	0.0112817	0.018651	0.2178811	0.154517	527.846622	475.06196	0.000165	0.000153	0.027%
Fresno	2035	T6	DSL	35	54048.372	0.0930181	0.105894	0.3377237	1.073112	1134.58895	1021.13006	0.030702	0.028246	0.143%
Fresno	2035	T6	GAS	40	12498.377	0.0092646	0.015342	0.1959988	0.161063	475.233217	427.709895	0.000136	0.000126	0.033%
Fresno	2035	T6	DSL	40	67092.64	0.0814181	0.092688	0.3355767	0.989443	1082.85927	974.573342	0.032927	0.030293	0.177%
Fresno	2035	T6	GAS	45	11397.666	0.0079779	0.013186	0.1867346	0.166567	452.055868	406.850281	0.000117	0.000108	0.030%
Fresno	2035	T6	DSL	45	54939.975	0.0718437	0.081789	0.3398673	0.928018	1044.46863	940.021765	0.03637	0.03346	0.145%
Fresno	2035	T6	GAS	50	11092.272	0.0070824	0.011734	0.1867075	0.174436	454.321814	408.889633	0.000104	9.68E-05	0.029%
Fresno	2035	T6	DSL	50	61486.767	0.0642948	0.073195	0.3505956	0.888836	1019.41703	917.475324	0.04103	0.037748	0.162%
Fresno	2035	T6	GAS	55	14507.68	0.0065376	0.010919	0.1977706	0.18173	482.415542	434.173988	9.73E-05	9.03E-05	0.038%
Fresno	2035	T6	DSL	55	90103.285	0.0587715	0.066907	0.3677616	0.871896	1007.70447	906.93402	0.046909	0.043156	0.238%
Fresno	2035	T6	GAS	60	16741.2	0.0063253	0.010633	0.2222001	0.187443	541.20927	487.088343	9.45E-05	8.77E-05	0.044%
Fresno	2035	T6	DSL	60	108274.2	0.0552737	0.062925	0.3913652	0.8772	1009.33095	908.397853	0.054005	0.049684	0.286%
Fresno	2035	T6	GAS	65	2616.0245	0.0064814	0.010838	0.2650342	0.191053	641.497958	577.348162	9.58E-05	8.89E-05	0.007%
Fresno	2035	T6	DSL	65	17039.28	0.0538015	0.061249	0.4214065	0.904747	1024.29647	921.866823	0.062318	0.057333	0.045%
Fresno	2035	T7	GAS	5	47.101317	2.5476473	3.222386	123.91413	3.559864	2513.49743	2262.14768	0.000946	0.000878	0.000%
Fresno	2035	T7	DSL	5	11173.315	2.4953132	2.840724	4.9860909	6.539606	3956.48963	3560.84066	0.075198	0.069182	0.030%
Fresno	2035	T7	GAS	10	230.20846	2.0717203	2.599449	100.61334	3.62884	2036.12818	1832.51536	0.000762	0.000707	0.001%
Fresno	2035	T7	DSL	10	42682.58	1.4516168	1.652555	3.1064068	4.914833	3268.36963	2941.53267	0.068927	0.063412	0.113%
Fresno	2035	T7	GAS	15	251.04595	1.3811242	1.741608	68.880559	3.802273	1392.42954	1253.18658	0.00051	0.000473	0.001%
Fresno	2035	T7	DSL	15	52201.144	0.7376411	0.839748	1.8022111	3.69664	2683.61478	2415.2533	0.062875	0.057845	0.138%
Fresno	2035	T7	GAS	20	429.03323	0.9595161	1.210978	49.625326	4.006074	1006.06856	905.461705	0.000356	0.00033	0.001%
Fresno	2035	T7	DSL	20	128970.49	0.3103818	0.353346	0.9563304	2.702748	2117.09827	1905.38845	0.054875	0.050485	0.341%
Fresno	2035	T7	GAS	25	559.91571	0.6976479	0.882258	37.961887	4.168442	768.012159	691.210943	0.000258	0.00024	0.001%
Fresno	2035	T7	DSL	25	117904.47	0.2770755	0.315429	0.9224851	2.505512	1975.3064	1777.77576	0.053873	0.049564	0.311%
Fresno	2035	T7	GAS	30	1022.5113	0.5311367	0.668991	30.651513	4.338359	619.433557	557.490202	0.000196	0.000182	0.003%
Fresno	2035	T7	DSL	30	199055.58	0.2416181	0.275064	0.8841482	2.259662	1854.12375	1668.71137	0.053497	0.049217	0.526%
Fresno	2035	T7	GAS	35	1818.6731	0.4189901	0.529092	26.149988	4.508745	527.846584	475.061926	0.000155	0.000143	0.005%
Fresno	2035	T7	DSL	35	358105.96	0.2107489	0.239922	0.8622455	2.056474	1753.55717	1578.20145	0.055313	0.050888	0.946%
Fresno	2035	T7	GAS	40	1585.3806	0.3437894	0.435473	23.532082	4.690899	475.233216	427.709894	0.000127	0.000118	0.004%
Fresno	2035	T7	DSL	40	337948	0.1844679	0.210003	0.8567768	1.895949	1673.60667	1506.246	0.059324	0.054578	0.893%
Fresno	2035	T7	GAS	45	1677.502	0.2929053	0.372855	22.327019	4.898946	452.055835	406.850251	0.000109	0.000101	0.004%
Fresno	2035	T7	DSL	45	473149.1	0.1627751	0.185307	0.8677424	1.778087	1614.27224	1452.84502	0.065527	0.060285	1.250%
Fresno	2035	T7	GAS	50	1755.142	0.2603694	0.333832	22.446469	5.073738	454.321872	408.889685	9.77E-05	9.07E-05	0.005%
Fresno	2035	T7	DSL	50	492063.44	0.1456706	0.165835	0.895142	1.702888	1575.55389	1417.9985	0.073925	0.068011	1.300%
Fresno	2035	T7	GAS	55	2576.419	0.2441222	0.312116	23.903883	5.223222	482.415493	434.173944	9.11E-05	8.45E-05	0.007%
Fresno	2035	T7	DSL	55	600041.24	0.1331542	0.151586	0.9389758	1.670351	1557.45162	1401.70645	0.084515	0.077754	1.585%
Fresno	2035	T7	GAS	60	635.8646	0.2323187	0.303095	26.752832	5.432343	541.209196	487.088277	8.86E-05	8.22E-05	0.002%
Fresno	2035	T7	DSL	60	182793.53	0.1252261	0.14256	0.9992437	1.680477	1559.96541	1403.96887	0.0973	0.089516	0.483%
Fresno	2035	T7	GAS	65	340.81023	0.2375011	0.306124	31.645132	5.629918	641.49795	577.348155	8.97E-05	8.32E-05	0.001%
Fresno	2035	T7	DSL	65	100119.68	0.1218862	0.138758	1.0759458	1.733266	1583.09529	1424.78576	0.112278	0.103296	0.264%
Fresno	2035	UBUS	GAS	5	191.16786	1.5441433	1.71055	19.076171	1.731738	2513.49709	2262.14738	0.001864	0.001729	0.001%
Fresno	2035	UBUS	DSL	5	471.24682	0.7751275	0.882431	5.7401873	11.71731	2299.61401	2069.65261	0.390966	0.359688	0.001%
Fresno	2035	UBUS	GAS	10	686.15946	1.2434709	1.377475	15.453184	1.77563	2036.12824	1832.51542	0.001501	0.001392	0.002%
Fresno	2035	UBUS	DSL	10	1691.4479	0.657308	0.748301	4.5199088	10.184	2299.61406	2069.65266	0.331539	0.305016	0.004%
Fresno	2035	UBUS	GAS	15	1372.319	0.8318581	0.921504	10.567837	1.863414	1392.42956	1253.18661	0.001004	0.000932	0.004%
Fresno	2035	UBUS	DSL	15	3382.8957	0.4852444	0.552418	2.9314344	7.987019	2299.61398	2069.65258	0.244752	0.225172	0.009%
Fresno	2035	UBUS	GAS	20	1810.9826	0.5800775	0.64259	7.6355517	1.951197	1006.06858	905.46172	0.0007	0.00065	0.005%
Fresno	2035	UBUS	DSL	20	4464.2431	0.3709816	0.422338	2.0187768	6.585153	2299.6139	2069.65251	0.187119	0.172149	0.012%
Fresno	2035	UBUS	GAS	25	2727.4697	0.4216442	0.467083	5.8288229	2.038981	768.012079	691.210871	0.000509	0.000472	0.007%
Fresno	2035	UBUS	DSL	25	6723.4701	0.2937276	0.334389	1.4762305	5.707709	2299.61415	2069.65273	0.148153	0.136301	0.018%
Fresno	2035	UBUS	GAS	30	3413.629	0.3194695	0.353898	4.7011878	2.126765	619.433576	557.490218	0.000386	0.000358	0.009%
Fresno	2035	UBUS	DSL	30	8414.9173	0.2408448	0.274186	1.1462454	5.200827	2299.61403	2069.65263	0.121479	0.111761	0.022%
Fresno	2035	UBUS	GAS	35	3345.3412	0.2523108	0.279501	4.0060879	2.214549	527.846502	475.061851	0.000305	0.000283	0.009%
Fresno	2035	UBUS	DSL	35	8246.5816	0.2045173	0.232829	0.9450588	4.981931	2299.61388	2069.65249	0.103156	0.094904	0.022%
Fresno	2035	UBUS	GAS	40	2411.6856	0.2077139	0.230099	3.6067795	2.302333	475.233167	427.70985	0.000251	0.000233	0.006%
Fresno	2035	UBUS	DSL	40	5945.0327	0.1798553	0.204753	0.827366	5.016928	2299.614	2069.6526	0.090717	0.08346	0.016%
Fresno	2035	UBUS	GAS	45	1051.3267	0.1782455	0.197454	3.4308752	2.390117	452.055845	406.85026	0.000215	0.0002	0.003%
Fresno	2035	UBUS	DSL	45	2591.6195	0.1638011	0.186477	0.7691201	5.311199	2299.61409	2069.65268	0.082619	0.07601	0.007%
Fresno	2035	UBUS	GAS	50	534.15117	0.1594391	0.176621	3.4480725	2.477901	454.321795	408.889615	0.000192	0.000179	0.001%
Fresno	2035	UBUS	DSL	50	1316.733	0.1544936	0.175881	0.7591863	5.911016	2299.61408	2069.65267	0.077925	0.071691	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	0.14866	0.164681	3.6612897	2.565685	482.415499	434.173949	0.000179	0.000166	0.002%
Fresno	2035	UBUS	DSL	55	1632.4828	0.1509053	0.171796	0.7957199	6.915863	2299.614	2069.6526	0.076115	0.070026	0.004%
Fresno	2035	UBUS	GAS	60	1083.9276	0.144483	0.160053	4.1075042	2.653469	541.209198	487.088279	0.000174	0.000162	0.003%
Fresno	2035	UBUS	DSL	60	2671.9837	0.1526508	0.173783	0.8855839	8.506392	2299.61403	2069.65263	0.076995	0.070836	0.007%

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2050
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.066	0.041	0.028	0.019	0.014	0.011	0.009	0.008	0.007	0.007	0.007	0.008	0.009	0.009	0.000
	LDT1	0.078	0.049	0.033	0.023	0.017	0.013	0.011	0.010	0.009	0.008	0.009	0.009	0.010	0.011	0.000
	LDT2	0.081	0.050	0.034	0.024	0.018	0.014	0.011	0.010	0.009	0.009	0.009	0.009	0.011	0.011	0.000
	LHD1	0.047	0.038	0.025	0.018	0.013	0.010	0.008	0.006	0.005	0.005	0.004	0.000	0.000	0.000	0.000
	LHD2	0.035	0.028	0.019	0.013	0.010	0.007	0.006	0.005	0.004	0.004	0.003	0.000	0.000	0.000	0.000
	MCY	4.719	4.092	3.169	2.589	2.222	2.009	1.908	1.906	1.997	2.198	2.542	3.088	3.941	5.280	0.000
	MDV	0.110	0.069	0.047	0.032	0.024	0.019	0.016	0.013	0.012	0.012	0.012	0.013	0.014	0.016	0.000
	MH	0.055	0.045	0.030	0.021	0.015	0.011	0.009	0.007	0.006	0.006	0.005	0.005	0.005	0.000	0.000
	OBUS	0.081	0.065	0.044	0.030	0.022	0.017	0.013	0.011	0.009	0.008	0.008	0.007	0.008	0.000	0.000
	SBUS	0.274	0.221	0.148	0.103	0.075	0.057	0.045	0.037	0.032	0.028	0.026	0.025	0.000	0.000	0.000
	T6	0.069	0.056	0.037	0.026	0.019	0.014	0.011	0.009	0.008	0.007	0.007	0.006	0.006	0.000	0.000
	T7	2.548	2.072	1.381	0.960	0.698	0.531	0.419	0.344	0.293	0.260	0.244	0.232	0.238	0.000	0.000
	UBUS	1.544	1.243	0.832	0.580	0.422	0.319	0.252	0.208	0.178	0.159	0.149	0.144	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.019	0.016	0.012	0.010	0.008	0.007	0.006	0.006	0.007	0.007	0.008	0.010	0.012	0.017	0.000
	LDT1	0.021	0.018	0.014	0.011	0.009	0.008	0.007	0.007	0.007	0.008	0.009	0.011	0.014	0.020	0.000
	LDT2	0.024	0.020	0.015	0.012	0.010	0.009	0.008	0.008	0.008	0.009	0.010	0.012	0.015	0.020	0.000
	LHD1	0.190	0.168	0.133	0.108	0.090	0.076	0.066	0.058	0.053	0.049	0.046	0.000	0.000	0.000	0.000
	LHD2	0.178	0.157	0.125	0.101	0.084	0.071	0.062	0.055	0.049	0.046	0.043	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.019	0.016	0.012	0.010	0.008	0.007	0.007	0.006	0.007	0.007	0.008	0.010	0.013	0.017	0.000
	MH	1.051	0.790	0.401	0.190	0.147	0.126	0.109	0.094	0.083	0.075	0.070	0.069	0.070	0.000	0.000
	OBUS	1.586	0.887	0.445	0.213	0.186	0.172	0.160	0.134	0.128	0.113	0.101	0.077	0.091	0.000	0.000
	SBUS	2.281	1.327	0.674	0.290	0.253	0.221	0.193	0.169	0.149	0.133	0.122	0.114	0.000	0.000	0.000
	T6	1.101	0.641	0.326	0.140	0.122	0.107	0.093	0.081	0.072	0.064	0.059	0.055	0.054	0.000	0.000
	T7	2.495	1.452	0.738	0.310	0.277	0.242	0.211	0.184	0.163	0.146	0.133	0.125	0.122	0.000	0.000
	UBUS	0.775	0.657	0.485	0.371	0.294	0.241	0.205	0.180	0.164	0.154	0.151	0.153	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2050
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	7.6	0.1	0.6	1.7	1.3	6.5	2.5	2.5	1.2	4.7	4.6	0.0	0.0	0.0	**33.3**
LDT1	0.0	1.3	0.0	0.1	0.3	0.2	1.2	0.4	0.4	0.2	0.8	0.8	0.0	0.0	0.0	**5.9**
LDT2	0.0	3.5	0.1	0.3	0.8	0.6	3.0	1.1	1.1	0.5	2.1	2.1	0.0	0.0	0.0	**15.1**
LHD1	0.0	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	**1.4**
LHD2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MCY	0.0	11.8	0.2	1.2	4.0	3.5	21.1	9.4	10.6	5.9	26.2	29.1	0.0	0.0	0.0	**123.2**
MDV	0.0	4.9	0.1	0.4	1.1	0.8	4.2	1.6	1.6	0.8	3.0	3.0	0.0	0.0	0.0	**21.4**
MH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
SBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
T6	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
T7	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.1**
UBUS	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
Total	**0.1**	**30.2**	**0.6**	**2.6**	**8.0**	**6.5**	**36.8**	**15.5**	**16.6**	**8.8**	**37.4**	**39.9**	**0.0**	**0.0**	**0.0**	**203.0**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	1.2	0.0	0.1	0.4	0.3	1.7	0.7	0.7	0.3	1.1	0.0	0.0	0.0	0.0	**6.6**
LHD2	0.0	0.3	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.6**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
OBUS	0.0	0.4	0.0	0.0	0.1	0.0	0.3	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	**1.4**
SBUS	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.7**
T6	0.0	4.6	0.1	0.2	0.5	0.5	2.5	1.0	0.9	0.4	1.5	1.3	0.0	0.0	0.0	**13.5**
T7	0.3	50.0	0.7	1.7	6.0	5.0	27.9	10.9	10.4	4.7	16.4	14.1	0.0	0.0	0.0	**148.2**
UBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**1.9**
Total	**0.3**	**57.2**	**0.8**	**2.1**	**7.2**	**6.1**	**33.5**	**13.1**	**12.5**	**5.7**	**19.9**	**15.9**	**0.0**	**0.0**	**0.0**	**174.3**

Total Emissions (tons/year)	***377.3***
Total Emissions (tons/day)	***1.0***

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2050
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.106	0.093	0.081	0.073	0.066	0.061	0.058	0.055	0.054	0.053	0.053	0.054	0.056	0.058	0.000
	LDT1	0.122	0.107	0.094	0.083	0.076	0.070	0.066	0.063	0.062	0.061	0.061	0.063	0.065	0.067	0.000
	LDT2	0.131	0.115	0.100	0.090	0.082	0.076	0.071	0.068	0.066	0.065	0.066	0.067	0.070	0.072	0.000
	LHD1	0.098	0.100	0.105	0.110	0.117	0.122	0.129	0.137	0.140	0.141	0.153	0.000	0.000	0.000	0.000
	LHD2	0.076	0.078	0.082	0.086	0.091	0.095	0.100	0.106	0.109	0.110	0.119	0.000	0.000	0.000	0.000
	MCY	1.236	1.218	1.163	1.135	1.116	1.114	1.122	1.143	1.167	1.202	1.248	1.306	1.379	1.465	0.000
	MDV	0.179	0.156	0.136	0.121	0.110	0.102	0.096	0.092	0.089	0.088	0.089	0.092	0.096	0.099	0.000
	MH	0.116	0.119	0.125	0.130	0.136	0.142	0.149	0.155	0.160	0.168	0.175	0.180	0.184	0.000	0.000
	OBUS	0.133	0.137	0.142	0.149	0.156	0.163	0.170	0.177	0.183	0.192	0.200	0.206	0.210	0.000	0.000
	SBUS	0.334	0.341	0.358	0.374	0.391	0.409	0.427	0.445	0.463	0.478	0.505	0.520	0.000	0.000	0.000
	T6	0.121	0.124	0.129	0.135	0.141	0.148	0.155	0.161	0.167	0.174	0.182	0.187	0.191	0.000	0.000
	T7	3.560	3.629	3.802	4.006	4.168	4.338	4.509	4.691	4.899	5.074	5.223	5.432	5.630	0.000	0.000
	UBUS	1.732	1.776	1.863	1.951	2.039	2.127	2.215	2.302	2.390	2.478	2.566	2.653	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.322	0.306	0.280	0.260	0.245	0.235	0.230	0.228	0.230	0.236	0.246	0.261	0.282	0.310	0.000
	LDT1	0.371	0.354	0.324	0.301	0.285	0.274	0.267	0.265	0.267	0.274	0.285	0.301	0.324	0.353	0.000
	LDT2	0.407	0.386	0.351	0.326	0.307	0.295	0.288	0.286	0.289	0.297	0.310	0.331	0.359	0.396	0.000
	LHD1	1.448	1.312	1.109	0.970	0.882	0.828	0.809	0.818	0.853	0.922	1.038	0.000	0.000	0.000	0.000
	LHD2	1.339	1.213	1.026	0.897	0.816	0.765	0.748	0.756	0.789	0.852	0.960	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.327	0.312	0.284	0.264	0.250	0.240	0.234	0.232	0.234	0.240	0.251	0.266	0.286	0.314	0.000
	MH	10.404	8.936	6.621	5.154	4.527	4.128	3.803	3.548	3.359	3.249	3.210	3.238	3.328	0.000	0.000
	OBUS	4.624	3.396	2.534	2.047	1.833	1.710	1.620	1.455	1.434	1.364	1.316	1.161	1.349	0.000	0.000
	SBUS	12.346	9.282	6.984	5.279	4.732	4.267	3.882	3.578	3.355	3.213	3.151	3.170	0.000	0.000	0.000
	T6	3.412	2.564	1.928	1.458	1.307	1.179	1.073	0.989	0.928	0.889	0.872	0.877	0.905	0.000	0.000
	T7	6.540	4.915	3.697	2.703	2.506	2.260	2.056	1.896	1.778	1.703	1.670	1.680	1.733	0.000	0.000
	UBUS	11.717	10.184	7.987	6.585	5.708	5.201	4.982	5.017	5.311	5.911	6.916	8.506	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2050
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.1	17.1	0.4	2.2	7.6	6.9	41.1	17.6	18.3	9.2	35.2	32.8	0.0	0.0	0.0	**188.5**
LDT1	0.0	2.9	0.1	0.4	1.3	1.2	7.0	3.0	3.1	1.6	6.0	5.6	0.0	0.0	0.0	**32.2**
LDT2	0.0	7.9	0.2	1.0	3.5	3.1	18.7	8.0	8.4	4.2	16.1	15.0	0.0	0.0	0.0	**86.1**
LHD1	0.0	1.1	0.0	0.2	0.8	0.8	5.6	2.6	2.9	1.5	6.2	0.0	0.0	0.0	0.0	**21.8**
LHD2	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.5	0.0	0.0	0.0	0.0	**1.7**
MCY	0.0	3.5	0.1	0.5	2.0	1.9	12.4	5.7	6.2	3.2	12.9	12.3	0.0	0.0	0.0	**60.8**
MDV	0.0	11.0	0.3	1.4	4.8	4.3	25.9	11.1	11.6	5.8	22.4	21.0	0.0	0.0	0.0	**119.6**
MH	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**1.8**
OBUS	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.3**
SBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	**0.7**
T6	0.0	0.2	0.0	0.0	0.1	0.1	0.7	0.3	0.4	0.2	0.8	0.8	0.0	0.0	0.0	**3.7**
T7	0.0	0.5	0.0	0.1	0.4	0.4	2.5	1.2	1.3	0.7	2.7	2.6	0.0	0.0	0.0	**12.3**
UBUS	0.0	0.4	0.0	0.1	0.3	0.3	1.8	0.8	0.9	0.5	2.0	1.9	0.0	0.0	0.0	**9.0**
Total	**0.2**	**44.9**	**1.1**	**5.9**	**21.0**	**19.3**	**116.9**	**50.9**	**53.8**	**27.2**	**105.5**	**92.8**	**0.0**	**0.0**	**0.0**	539.3

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.2	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.1**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LHD1	0.0	9.0	0.2	1.1	3.8	3.5	21.4	9.7	10.8	5.9	25.6	0.0	0.0	0.0	0.0	**91.0**
LHD2	0.0	2.2	0.1	0.3	0.9	0.8	5.2	2.4	2.6	1.4	6.2	0.0	0.0	0.0	0.0	**22.2**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
MH	0.0	1.2	0.0	0.1	0.4	0.3	2.0	0.8	0.9	0.4	1.6	1.5	0.0	0.0	0.0	**9.3**
OBUS	0.0	1.6	0.0	0.2	0.5	0.5	2.9	1.2	1.2	0.6	2.2	1.8	0.0	0.0	0.0	**12.8**
SBUS	0.0	1.6	0.0	0.1	0.5	0.4	2.6	1.1	1.1	0.5	1.9	1.8	0.0	0.0	0.0	**11.7**
T6	0.1	18.2	0.4	1.7	5.8	5.1	29.3	12.1	12.2	5.9	22.2	20.4	0.0	0.0	0.0	**133.3**
T7	0.8	169.4	3.5	15.1	53.9	47.2	272.3	112.1	113.2	55.0	205.9	189.5	0.0	0.0	0.0	**1,237.7**
UBUS	0.0	5.4	0.1	0.6	1.9	1.7	10.1	4.6	5.2	2.9	13.1	14.7	0.0	0.0	0.0	**60.3**
Total	**0.9**	**208.9**	**4.3**	**19.1**	**67.8**	**59.6**	**346.4**	**144.1**	**147.5**	**72.9**	**279.2**	**230.2**	**0.0**	**0.0**	**0.0**	1,581.1

Total Emissions (tons/year) ***2,120.4***
Total Emissions (tons/day) ***5.8***

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2050
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	1.1	1.0	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.0
	LDT1	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.0
	LDT2	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.0
	LHD1	0.7	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	LHD2	0.6	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	MCY	23.9	22.1	19.1	17.1	15.9	15.3	15.3	15.9	17.2	19.7	23.7	30.3	41.2	59.4	0.0
	MDV	1.8	1.6	1.5	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.0
	MH	0.8	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.0
	OBUS	1.2	1.0	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.0	0.0
	SBUS	3.8	3.1	2.1	1.5	1.2	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.0	0.0	0.0
	T6	1.0	0.8	0.6	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.0	0.0
	T7	123.9	100.6	68.9	49.6	38.0	30.7	26.1	23.5	22.3	22.4	23.9	26.8	31.6	0.0	0.0
	UBUS	19.1	15.5	10.6	7.6	5.8	4.7	4.0	3.6	3.4	3.4	3.7	4.1	0.0	0.0	0.0

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	LDT1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LDT2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LHD1	2.4	2.0	1.4	1.0	0.8	0.6	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0
	LHD2	2.3	1.9	1.3	1.0	0.8	0.6	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0
	MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MDV	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	MH	1.9	1.5	0.9	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.0	0.0
	OBUS	3.0	1.8	1.0	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.8	0.0	0.0
	SBUS	4.0	2.5	1.5	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.0	0.0	0.0
	T6	2.0	1.2	0.7	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.0	0.0
	T7	5.0	3.1	1.8	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.1	0.0	0.0
	UBUS	5.7	4.5	2.9	2.0	1.5	1.1	0.9	0.8	0.8	0.8	0.8	0.9	0.0	0.0	0.0

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2050
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.7	190.2	4.8	25.8	92.2	82.2	479.1	196.3	196.4	92.8	331.2	283.2	0.0	0.0	0.0	**1,975.0**
LDT1	0.1	33.2	0.8	4.5	16.0	14.3	83.1	34.0	34.1	16.1	57.5	49.3	0.0	0.0	0.0	**343.0**
LDT2	0.3	82.2	2.1	11.2	39.8	35.5	206.7	84.7	84.7	40.0	143.0	122.3	0.0	0.0	0.0	**852.6**
LHD1	0.0	6.7	0.1	0.5	1.6	1.2	6.6	2.6	2.7	1.4	5.6	0.0	0.0	0.0	0.0	**29.1**
LHD2	0.0	0.5	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.0	0.0	0.0	0.0	**2.2**
MCY	0.2	63.6	1.5	8.0	28.6	26.7	169.1	78.6	91.7	53.1	244.3	285.5	0.0	0.0	0.0	**1,051.0**
MDV	0.4	111.7	2.8	15.1	53.9	48.0	279.8	114.7	114.7	54.2	193.7	165.8	0.0	0.0	0.0	**1,154.9**
MH	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.1**
OBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.0**
SBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.4**
T6	0.0	1.1	0.0	0.1	0.2	0.2	1.0	0.4	0.4	0.2	0.9	0.9	0.0	0.0	0.0	**5.5**
T7	0.1	14.5	0.3	1.2	3.4	2.7	14.5	5.8	5.9	3.0	12.3	12.6	0.0	0.0	0.0	**76.2**
UBUS	0.0	3.3	0.1	0.3	0.8	0.6	3.3	1.3	1.4	0.7	2.8	2.9	0.0	0.0	0.0	**17.4**
Total	**1.9**	**508.2**	**12.5**	**66.7**	**236.9**	**211.7**	**1,244.7**	**519.1**	**532.7**	**261.9**	**992.6**	**923.4**	**0.1**	**0.0**	**0.0**	**5,512.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.6**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.1	13.5	0.3	1.1	3.4	2.7	14.3	5.6	5.6	2.8	10.7	0.0	0.0	0.0	0.0	**60.0**
LHD2	0.0	3.4	0.1	0.3	0.8	0.7	3.6	1.4	1.4	0.7	2.7	0.0	0.0	0.0	0.0	**15.1**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MH	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.2**
OBUS	0.0	0.8	0.0	0.0	0.2	0.2	1.1	0.5	0.6	0.3	1.2	0.9	0.0	0.0	0.0	**5.8**
SBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.5	0.5	0.0	0.0	0.0	**2.6**
T6	0.0	8.7	0.1	0.4	1.6	1.5	9.2	4.1	4.5	2.3	9.4	9.1	0.0	0.0	0.0	**50.9**
T7	0.6	107.1	1.7	5.3	19.8	18.5	114.2	50.7	55.2	28.9	115.7	112.7	0.0	0.0	0.0	**630.4**
UBUS	0.0	2.4	0.0	0.2	0.5	0.4	1.9	0.8	0.8	0.4	1.5	1.5	0.0	0.0	0.0	**10.3**
Total	**0.7**	**136.5**	**2.2**	**7.5**	**26.5**	**24.0**	**145.2**	**63.4**	**68.5**	**35.6**	**142.0**	**125.0**	**0.0**	**0.0**	**0.0**	**777.0**

Total Emissions (tons/year) ***6,289.3***
Tons/day ***17.2***

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2050
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0139	0.0087	0.0058	0.0041	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LDT1	0.0138	0.0087	0.0058	0.0040	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LDT2	0.0138	0.0087	0.0058	0.0040	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LHD1	0.0013	0.0011	0.0007	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0010	0.0008	0.0006	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	MCY	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0000
	MDV	0.0135	0.0085	0.0056	0.0040	0.0029	0.0023	0.0019	0.0016	0.0015	0.0014	0.0015	0.0016	0.0018	0.0019	0.0000
	MH	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	OBUS	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	SBUS	0.0017	0.0014	0.0009	0.0007	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000
	T6	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	T7	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0019	0.0015	0.0010	0.0007	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0114	0.0097	0.0073	0.0058	0.0048	0.0042	0.0039	0.0038	0.0039	0.0043	0.0049	0.0059	0.0075	0.0101	0.0000
	LDT1	0.0109	0.0092	0.0069	0.0055	0.0046	0.0040	0.0037	0.0037	0.0038	0.0041	0.0048	0.0058	0.0074	0.0100	0.0000
	LDT2	0.0123	0.0105	0.0079	0.0063	0.0053	0.0046	0.0042	0.0041	0.0042	0.0045	0.0051	0.0062	0.0078	0.0104	0.0000
	LHD1	0.0521	0.0461	0.0366	0.0297	0.0246	0.0209	0.0181	0.0160	0.0145	0.0134	0.0127	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0491	0.0433	0.0344	0.0279	0.0232	0.0196	0.0170	0.0151	0.0137	0.0126	0.0120	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0116	0.0098	0.0074	0.0059	0.0049	0.0043	0.0040	0.0039	0.0040	0.0044	0.0050	0.0060	0.0077	0.0104	0.0000
	MH	0.1027	0.0893	0.0670	0.0509	0.0441	0.0411	0.0401	0.0411	0.0442	0.0493	0.0564	0.0656	0.0769	0.0000	0.0000
	OBUS	0.0548	0.0492	0.0446	0.0426	0.0406	0.0416	0.0447	0.0468	0.0541	0.0607	0.0683	0.0696	0.0898	0.0000	0.0000
	SBUS	0.0643	0.0590	0.0538	0.0484	0.0462	0.0458	0.0474	0.0508	0.0562	0.0634	0.0724	0.0834	0.0000	0.0000	0.0000
	T6	0.0418	0.0383	0.0349	0.0313	0.0299	0.0297	0.0307	0.0329	0.0364	0.0410	0.0469	0.0540	0.0623	0.0000	0.0000
	T7	0.0752	0.0689	0.0629	0.0549	0.0539	0.0535	0.0553	0.0593	0.0655	0.0739	0.0845	0.0973	0.1123	0.0000	0.0000
	UBUS	0.3910	0.3315	0.2448	0.1871	0.1482	0.1215	0.1032	0.0907	0.0826	0.0779	0.0761	0.0770	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2050
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.009	1.6	0.0	0.1	0.3	0.3	1.4	0.5	0.5	0.3	1.0	1.0	0.0	0.0	0.0	**7.0**
LDT1	0.001	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
LDT2	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.6**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.6**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.017**	**3.1**	**0.1**	**0.2**	**0.7**	**0.5**	**2.6**	**1.0**	**1.0**	**0.5**	**1.9**	**1.8**	**0.0**	**0.0**	**0.0**	**13.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.8**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.4**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.5**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
T6	0.001	0.3	0.0	0.0	0.1	0.1	0.8	0.4	0.5	0.3	1.2	1.3	0.0	0.0	0.0	**5.0**
T7	0.009	2.4	0.1	0.3	1.2	1.1	7.3	3.5	4.2	2.4	10.4	11.0	0.0	0.0	0.0	**43.8**
UBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
Total	**0.0**	**3.3**	**0.1**	**0.4**	**1.5**	**1.4**	**9.1**	**4.3**	**5.0**	**2.9**	**12.3**	**12.6**	**0.0**	**0.0**	**0.0**	**52.9**

Total Emissions (tons/year) ***66.2***
Total Emissions (tons/day) ***0.2***

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2050
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.0129	0.0081	0.0054	0.0038	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LDT1	0.0128	0.0081	0.0054	0.0038	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LDT2	0.0128	0.0080	0.0053	0.0037	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LHD1	0.0012	0.0010	0.0007	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	MCY	0.0004	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0000
	MDV	0.0125	0.0079	0.0052	0.0037	0.0027	0.0021	0.0017	0.0015	0.0014	0.0013	0.0014	0.0015	0.0016	0.0018	0.0000
	MH	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	OBUS	0.0009	0.0007	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	SBUS	0.0016	0.0013	0.0009	0.0006	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000
	T6	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	T7	0.0009	0.0007	0.0005	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0017	0.0014	0.0009	0.0006	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.0105	0.0090	0.0067	0.0053	0.0044	0.0039	0.0036	0.0035	0.0036	0.0039	0.0045	0.0054	0.0069	0.0093	0.0000
	LDT1	0.0100	0.0085	0.0064	0.0050	0.0042	0.0037	0.0034	0.0034	0.0035	0.0038	0.0044	0.0053	0.0068	0.0092	0.0000
	LDT2	0.0114	0.0097	0.0073	0.0058	0.0048	0.0042	0.0039	0.0038	0.0039	0.0042	0.0047	0.0057	0.0072	0.0096	0.0000
	LHD1	0.0480	0.0424	0.0336	0.0273	0.0226	0.0192	0.0166	0.0147	0.0134	0.0124	0.0117	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0451	0.0399	0.0316	0.0257	0.0213	0.0181	0.0157	0.0139	0.0126	0.0116	0.0110	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0107	0.0091	0.0068	0.0054	0.0045	0.0040	0.0037	0.0036	0.0037	0.0040	0.0046	0.0056	0.0071	0.0096	0.0000
	MH	0.0945	0.0821	0.0616	0.0468	0.0406	0.0378	0.0369	0.0378	0.0406	0.0453	0.0519	0.0604	0.0707	0.0000	0.0000
	OBUS	0.0504	0.0453	0.0410	0.0392	0.0374	0.0383	0.0411	0.0430	0.0498	0.0559	0.0629	0.0640	0.0826	0.0000	0.0000
	SBUS	0.0592	0.0543	0.0495	0.0445	0.0425	0.0422	0.0436	0.0468	0.0517	0.0583	0.0666	0.0767	0.0000	0.0000	0.0000
	T6	0.0384	0.0352	0.0321	0.0288	0.0275	0.0273	0.0282	0.0303	0.0335	0.0377	0.0432	0.0497	0.0573	0.0000	0.0000
	T7	0.0692	0.0634	0.0578	0.0505	0.0496	0.0492	0.0509	0.0546	0.0603	0.0680	0.0778	0.0895	0.1033	0.0000	0.0000
	UBUS	0.3597	0.3050	0.2252	0.1721	0.1363	0.1118	0.0949	0.0835	0.0760	0.0717	0.0700	0.0708	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2050
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.008	1.5	0.0	0.1	0.3	0.2	1.3	0.5	0.5	0.2	0.9	0.9	0.0	0.0	0.0	**6.5**
LDT1	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
LDT2	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.4**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.4**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.015**	**2.8**	**0.1**	**0.2**	**0.6**	**0.5**	**2.4**	**0.9**	**0.9**	**0.4**	**1.7**	**1.7**	**0.0**	**0.0**	**0.0**	**12.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.7**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.4**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.4**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
T6	0.001	0.3	0.0	0.0	0.1	0.1	0.8	0.4	0.4	0.3	1.1	1.2	0.0	0.0	0.0	**4.6**
T7	0.008	2.2	0.1	0.3	1.1	1.0	6.7	3.2	3.8	2.2	9.6	10.1	0.0	0.0	0.0	**40.3**
UBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.9**
Total	**0.011**	**3.0**	**0.1**	**0.4**	**1.4**	**1.3**	**8.4**	**4.0**	**4.6**	**2.6**	**11.4**	**11.6**	**0.0**	**0.0**	**0.0**	**48.6**

Total Emissions (tons/year)	***61.0***
Total Emissions (tons/day)	***0.2***

City of Fresno General Plan

Criteria Pollutants: Summary

Year 2056

Prepared by FirstCarbon Solutions

	Data
City Information	
Population	970,000
Employment	393,200
County Information	
Population	1,616,667

	ROG	NOx	PM10	PM2.5	CO	SO2
Emissions (tons/year)						
Motor vehicles	406	2281	71	66	6765	0
Electricity	0	549	0	0	0	386
Natural gas	158	1394	109	109	915	9
Stationary, area	554	507	238	na	203	89
Offroad	1488	2268	182	182	10972	10
Total	**2606**	**6998**	**600**	**357**	**18855**	**493**
Emissions (tons/day)						
Motor vehicles	1.1	6.2	0.2	0.2	18.5	0.0
Electricity	0.0	1.5	0.0	0.0	0.0	1.1
Natural gas	0.4	3.8	0.3	0.3	2.5	0.0
Stationary, area	1.5	1.4	0.7	na	0.6	0.2
Offroad	4.1	6.2	0.5	0.5	30.1	0.03
Total	**7.1**	**19.2**	**1.6**	**1.0**	**51.7**	**1.4**

Sources:
- Population for the City: Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.
-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).
- Emissions: refer to subsequent spreadsheets.
- Emissions for stationary, area: California Air Resources Board, CEIDARS 2.5, data is from the year 2010. Note that SO2 emissions for this category represent SOx emissions; SO2 emissions were not available.
www.arb.ca.gov/app/emsinv/facinfo/faccrit.php?dd=y&grp=1&sort=FacilityNameA&dbyr=2010&ab_=&dis_=&co_=10&fname_=&city_=Fresno&fzip_=&fsic_=&facid_=&all_fac=C&displayit=Pollutant&CERR=&showpol=&showpol2=

City of Fresno General Plan

Criteria Pollutants: Energy

Year 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/MWh)		*(lbs/kWh)*
NOx	0.2002	0.0002002
SO2	0.1409	0.0001409

	Usage (kWh/year)	Emissions Per capita (kWh/person or employee/year)	Emissions (tons/year) NOx	SO2
Residential	2,531,700,000	2,610	253.4	178.4
Commercial	2,950,179,600	7,503	295.3	207.8
Industrial	not available			
Total	**5,481,879,600**		**548.7**	**386.2**

Natural Gas

		Natural Gas Emission Factors						
			ROG	NOx	PM10	PM2.5	CO	SO2
	lb/MMBTU	Residential	0.01078	0.09216	0.00745	0.00745	0.03922	0.00059
		Nonresidential	0.01078	0.09804	0.00745	0.00745	0.08235	0.00059
	lb/therm	Residential	0.0011	0.0092	0.0007	0.0007	0.0039	0.0001
		Nonresidential	0.0011	0.0098	0.0007	0.0007	0.0082	0.0001

	Usage (therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) ROG	NOx	PM10	PM2.5	CO	SO2
Residential	133,860,000	138	72	617	50	50	262	4
Commercial	158,459,600	403	85	777	59	59	652	5
Industrial	not available							
Total	**292,319,600**		**158**	**1,394**	**109**	**109**	**915**	**9**

Sources:

Per capita energy usage: See the spreadsheet calculations for 2010. Residential rates are based on population and commercial are based on employees.

Usage: per capita usage multiplied by the population (for residential) or employees (for commercial)

Emission factors for electricity NOx and SO2 electricity emission factors from Environmental Protection Agency, eGRID2012, state total annual total output emission rate for California (data is from year 2009).

Emission factors for natural gas: CalEEMod Appendix D, Table 8.2, August 2013. 1 therm = 0.1 MMBTU

City of Fresno General Plan

Criteria Pollutants: Offroad

Year 2056

Prepared by FirstCarbon Solutions

Note: yellow shaded cells are data entry cells

Fresno County Emissions (tons/day) (from Offroad 2007)	**ROG Evaporative**	**ROG Exhaust**	**CO**	**NOx**	**SO2**	**PM**
Agricultural Equipment	0.12	0.78	9.82	4.98	0.01	0.25
Airport Ground Support Equipment	0.00	0.01	0.23	0.04	0.00	0.00
Construction and Mining Equipment	0.01	0.52	4.43	3.04	0.01	0.16
Dredging	0.00	0.00	0.00	0.00	0.00	0.00
Entertainment Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Equipment	0.02	0.04	2.58	0.30	0.00	0.01
Lawn and Garden Equipment	0.53	0.95	12.06	0.25	0.00	0.03
Light Commercial Equipment	0.07	0.19	6.46	0.35	0.00	0.04
Logging Equipment	0.00	0.04	0.29	0.04	0.00	0.00
Military Tactical Support Equip	0.00	0.00	0.02	0.02	0.00	0.00
Oil Drilling	0.00	0.00	0.00	0.00	0.00	0.00
Other Portable Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Pleasure Craft	0.67	0.83	7.38	0.41	0.00	0.29
Railyard Operations	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Equipment	0.48	1.41	5.21	0.07	0.02	0.03
Transport Refrigeration Units	0.00	0.12	1.63	0.86	0.00	0.01
Total	1.91	4.88	50.10	10.36	0.04	0.83
Percent Fresno County/Fresno City Population		**0.60**				
City of Fresno Emissions (tons/day)						
Agricultural Equipment	0.07	0.5	5.9	3.0	0.01	0.15
Airport Ground Support Equipment	0.00	0.0	0.1	0.0	0.00	0.00
Construction and Mining Equipment	0.01	0.3	2.7	1.8	0.00	0.10
Dredging	0.00	0.0	0.0	0.0	0.00	0.00
Entertainment Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Industrial Equipment	0.01	0.0	1.5	0.2	0.00	0.01
Lawn and Garden Equipment	0.32	0.6	7.2	0.1	0.00	0.02
Light Commercial Equipment	0.04	0.1	3.9	0.2	0.00	0.03
Logging Equipment	0.00	0.0	0.2	0.0	0.00	0.00
Military Tactical Support Equip	0.00	0.0	0.0	0.0	0.00	0.00
Oil Drilling	0.00	0.0	0.0	0.0	0.00	0.00
Other Portable Equipment	0.00	0.0	0.0	0.0	0.00	0.00
Pleasure Craft	0.40	0.5	4.4	0.2	0.00	0.17
Railyard Operations	0.00	0.0	0.0	0.0	0.00	0.00
Recreational Equipment	0.29	0.8	3.1	0.0	0.01	0.02
Transport Refrigeration Units	0.00	0.1	1.0	0.5	0.00	0.01
Total	1.15	2.9	30.1	6.2	0.03	0.50

Sources:

- County of Fresno emissions from OFFROAD2007, annual, all days, all equipment, for year 2035
- City of Fresno emissions based on the percent of the City's population compared with the County's population.

Note: PM refers to total particulate matter.

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2056
Prepared by FirstCarbon Solutions

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

Note: EMFAC2011 for year 2035 was used.

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

City of Fresno General Plan
Vehicle Miles Traveled Estimates
Year 2056
Prepared by FirstCarbon Solutions

VMT/day by Vehicle Class and speed

GAS	Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA		1704	495815	13449	80371	309253	300437	1904561	850730	915344	464254	1772866	1621832	111	0	0
LDT1		253	73592	1996	11929	45901	44593	282688	126271	135861	68908	263141	240723	17	0	0
LDT2		630	183378	4974	29725	114377	111117	704404	314643	338541	171705	655697	599836	41	0	0
LHD1		104	30196	819	4895	18834	18297	115990	51810	55745	28274	107969	98771	7	0	0
LHD2		10	3016	82	489	1881	1827	11583	5174	5567	2824	10782	9864	1	0	0
MCY		27	7720	209	1251	4815	4678	29654	13246	14252	7228	27603	25252	2	0	0
MDV		647	188270	5107	30518	117429	114082	723198	323038	347574	176286	673191	615841	42	0	0
MH		6	1715	47	278	1070	1039	6590	2943	3167	1606	6134	5611	0	0	0
OBUS		4	1038	28	168	647	629	3987	1781	1916	972	3711	3395	0	0	0
SBUS		1	234	6	38	146	142	901	402	433	220	838	767	0	0	0
T6		12	3358	91	544	2094	2035	12898	5761	6199	3144	12006	10983	1	0	0
T7		1	386	10	63	241	234	1481	662	712	361	1379	1261	0	0	0
UBUS		2	575	16	93	359	349	2210	987	1062	539	2057	1882	0	0	0

DSL	Speed	5	10	15	20	25	30	35	40	45	50	55	60			
LDA		5	1323	36	214	825	802	5082	2270	2443	1239	4731	4328	0	0	0
LDT1		0	98	3	16	61	59	375	168	180	91	349	319	0	0	0
LDT2		0	83	2	13	52	50	317	142	153	77	295	270	0	0	0
LHD1		63	18453	501	2991	11510	11182	70884	31663	34067	17279	65983	60362	4	0	0
LHD2		17	4865	132	789	3034	2948	18687	8347	8981	4555	17395	15913	1	0	0
MCY		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV		1	147	4	24	92	89	564	252	271	137	525	480	0	0	0
MH		1	371	10	60	231	225	1425	637	685	347	1327	1214	0	0	0
OBUS		4	1262	34	205	787	765	4848	2166	2330	1182	4513	4128	0	0	0
SBUS		2	462	13	75	288	280	1773	792	852	432	1651	1510	0	0	0
T6		65	19052	517	3088	11883	11545	73184	32690	35173	17839	68124	62320	4	0	0
T7		317	92348	2505	14970	57600	55958	354734	158453	170487	86470	330205	302074	21	0	0
UBUS		5	1418	38	230	885	859	5448	2434	2618	1328	5071	4639	0	0	0

EMFAC2011 Emission Rates
Region Type: County
Region: Fresno
Calendar Year: 2035
Season: Annual
Vehicle Classification: EMFAC2007 Categories

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.61058	0.0661503	0.122367	1.1438369	0.105519	1132.07376	673.304157	0.013853	0.012854	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	0.0188755	0.021488	0.1206987	0.322311	503.980949	303.820128	0.011442	0.010527	0.000%
Fresno	2035	LDA	GAS	10	35638.706	0.04124	0.07626	1.0279769	0.092659	834.330412	496.221479	0.008718	0.008089	0.094%
Fresno	2035	LDA	DSL	10	95.10123	0.0160499	0.018272	0.1142073	0.306429	455.139526	274.429687	0.00973	0.008951	0.000%
Fresno	2035	LDA	GAS	15	21241.017	0.0276946	0.051197	0.9523351	0.081238	646.517456	384.518119	0.005787	0.00537	0.056%
Fresno	2035	LDA	DSL	15	56.681258	0.012068	0.013739	0.1031034	0.27962	381.698077	230.236122	0.007316	0.006731	0.000%
Fresno	2035	LDA	GAS	20	808500.65	0.0192603	0.03561	0.8610518	0.07266	514.415615	305.950589	0.004053	0.003761	2.136%
Fresno	2035	LDA	DSL	20	2157.469	0.0095589	0.010882	0.0938803	0.259701	332.219565	200.462311	0.005795	0.005332	0.006%
Fresno	2035	LDA	GAS	25	197184.91	0.0143388	0.0265	0.7989048	0.066217	428.337956	254.755245	0.002995	0.002778	0.521%
Fresno	2035	LDA	DSL	25	526.18429	0.0079752	0.009079	0.0860494	0.245193	300.076477	181.120132	0.004835	0.004448	0.001%
Fresno	2035	LDA	GAS	30	537842.7	0.0111563	0.020616	0.7330898	0.061379	368.21896	218.999388	0.002334	0.002165	1.421%
Fresno	2035	LDA	DSL	30	1435.2233	0.0070089	0.007979	0.0792994	0.235453	281.264321	169.799873	0.004249	0.003909	0.004%
Fresno	2035	LDA	GAS	35	1366088.4	0.0091514	0.016912	0.6739171	0.057744	328.478921	195.363966	0.001919	0.00178	3.608%
Fresno	2035	LDA	DSL	35	3645.382	0.0064893	0.007388	0.0734215	0.229856	273.56113	165.164459	0.003934	0.003619	0.010%
Fresno	2035	LDA	GAS	40	1943582.5	0.0078894	0.014581	0.6181806	0.055334	303.471949	180.491197	0.001664	0.001544	5.134%
Fresno	2035	LDA	DSL	40	5186.4142	0.0063315	0.007208	0.0682691	0.228203	276.084845	166.683111	0.003838	0.003531	0.014%
Fresno	2035	LDA	GAS	45	1929011.9	0.0072287	0.013361	0.5747455	0.053673	292.328918	173.863779	0.001523	0.001413	5.095%
Fresno	2035	LDA	DSL	45	5147.5324	0.0065121	0.007414	0.0637359	0.230226	289.122634	174.528631	0.003947	0.003631	0.014%
Fresno	2035	LDA	GAS	50	2232462.6	0.0069809	0.012904	0.5354171	0.052973	292.125802	173.742948	0.00147	0.001364	5.897%
Fresno	2035	LDA	DSL	50	5957.2848	0.0070634	0.008041	0.0597434	0.236193	314.18613	189.610649	0.004281	0.003938	0.016%
Fresno	2035	LDA	GAS	55	1665080.1	0.0071129	0.01315	0.5004716	0.053167	303.02659	180.226197	0.001497	0.001389	4.398%
Fresno	2035	LDA	DSL	55	4443.2357	0.0080823	0.009201	0.0562346	0.246416	354.307143	213.753563	0.004898	0.004506	0.012%
Fresno	2035	LDA	GAS	60	1897400.1	0.0076308	0.01411	0.4677985	0.054217	325.917054	193.840412	0.001608	0.001492	5.012%
Fresno	2035	LDA	DSL	60	5063.1773	0.0097593	0.01111	0.0531705	0.261473	414.65641	250.068876	0.005913	0.00544	0.013%
Fresno	2035	LDA	GAS	65	2035032.5	0.0086351	0.01597	0.4386353	0.05628	363.783005	216.361367	0.001822	0.001691	5.375%
Fresno	2035	LDA	DSL	65	5430.4465	0.0124383	0.01416	0.0505307	0.282274	503.663514	303.629111	0.007536	0.006933	0.014%
Fresno	2035	LDA	GAS	70	1953744	0.0093869	0.017362	0.4261377	0.057624	390.123335	232.027326	0.001979	0.001836	5.161%
Fresno	2035	LDA	DSL	70	5213.5296	0.0167349	0.019052	0.0483169	0.310021	634.981498	382.650018	0.010138	0.009327	0.014%
Fresno	2035	LDT1	GAS	5	102.50505	0.0781814	0.141973	1.3479236	0.122225	1314.76791	800.56989	0.013784	0.012789	0.000%
Fresno	2035	LDT1	DSL	5	0.1360064	0.021304	0.024253	0.1296125	0.371499	504.827175	301.829718	0.010898	0.010026	0.000%
Fresno	2035	LDT1	GAS	10	5289.7355	0.0489995	0.088828	1.2087702	0.106962	969.207598	590.161462	0.008682	0.008055	0.014%
Fresno	2035	LDT1	DSL	10	7.018562	0.018082	0.020585	0.1241136	0.353791	455.724636	272.471938	0.00925	0.00851	0.000%
Fresno	2035	LDT1	GAS	15	3152.7341	0.0330516	0.059827	1.1168612	0.093501	750.848605	457.196034	0.005769	0.005352	0.008%
Fresno	2035	LDT1	DSL	15	4.1831318	0.0135595	0.015437	0.1140363	0.323706	381.890427	228.327407	0.006936	0.006381	0.000%
Fresno	2035	LDT1	GAS	20	120003.09	0.0230579	0.041754	1.0085325	0.083475	597.522898	363.837256	0.004043	0.003751	0.317%
Fresno	2035	LDT1	DSL	20	159.22329	0.0107269	0.012212	0.1050606	0.301221	332.147383	198.586677	0.005487	0.005048	0.000%
Fresno	2035	LDT1	GAS	25	29267.508	0.0172317	0.031148	0.934299	0.075962	497.463371	302.908369	0.002989	0.002773	0.077%
Fresno	2035	LDT1	DSL	25	38.832909	0.0089525	0.010192	0.097053	0.284745	299.832425	179.265976	0.00458	0.004213	0.000%
Fresno	2035	LDT1	GAS	30	79830.22	0.0134396	0.024282	0.8567186	0.070363	427.662588	260.40672	0.002331	0.002163	0.211%
Fresno	2035	LDT1	DSL	30	105.92086	0.0078821	0.008973	0.0898981	0.273609	280.919663	167.958278	0.004032	0.003709	0.000%
Fresno	2035	LDT1	GAS	35	202764.03	0.0110382	0.019944	0.7872989	0.066188	381.527502	232.315209	0.001917	0.001779	0.536%
Fresno	2035	LDT1	DSL	35	269.03268	0.0073212	0.008335	0.0834959	0.267127	273.175322	163.328035	0.003745	0.003445	0.001%
Fresno	2035	LDT1	GAS	40	288479.58	0.009518	0.017205	0.7223129	0.063456	352.529789	214.659347	0.001663	0.001543	0.762%
Fresno	2035	LDT1	DSL	40	382.76239	0.0071738	0.008167	0.0777592	0.265083	275.712512	164.844988	0.00367	0.003376	0.001%
Fresno	2035	LDT1	GAS	45	286316.87	0.0087141	0.015757	0.6716524	0.061606	339.573191	206.769651	0.001521	0.001412	0.756%
Fresno	2035	LDT1	DSL	45	379.89286	0.0074158	0.008442	0.0726125	0.267152	288.820023	172.681802	0.003793	0.00349	0.001%
Fresno	2035	LDT1	GAS	50	331357.07	0.0084009	0.015197	0.6260151	0.060895	339.331167	206.622144	0.001468	0.001362	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	0.0080872	0.009207	0.0679898	0.273613	314.017531	187.74707	0.004137	0.003806	0.001%
Fresno	2035	LDT1	GAS	55	247142.36	0.0085378	0.015454	0.5856615	0.061253	351.985417	214.327261	0.001494	0.001386	0.653%
Fresno	2035	LDT1	DSL	55	327.91509	0.009304	0.010592	0.0638334	0.284763	354.353048	211.86316	0.004759	0.004379	0.001%
Fresno	2035	LDT1	GAS	60	281624.87	0.0091271	0.016538	0.5481625	0.062653	378.579994	230.521082	0.001604	0.001488	0.744%
Fresno	2035	LDT1	DSL	60	373.66739	0.0112923	0.012856	0.0600932	0.301159	415.025007	248.13815	0.005776	0.005314	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	0.0102875	0.018657	0.5149092	0.065297	422.572629	257.308816	0.001816	0.001685	0.798%
Fresno	2035	LDT1	DSL	65	400.77219	0.0144586	0.01646	0.0567251	0.323678	504.508047	301.638916	0.007396	0.006804	0.001%
Fresno	2035	LDT1	GAS	70	289987.78	0.0111589	0.020248	0.5007372	0.067016	453.157125	275.931745	0.001972	0.001829	0.766%
Fresno	2035	LDT1	DSL	70	384.76351	0.0195301	0.022234	0.0536906	0.35342	636.52822	380.57209	0.00999	0.009191	0.001%
Fresno	2035	LDT2	GAS	5	255.42307	0.0807862	0.148505	1.3373414	0.13084	1537.70722	1044.72707	0.013765	0.012772	0.001%
Fresno	2035	LDT2	DSL	5	0.1150683	0.0237373	0.027023	0.1586632	0.407101	502.581245	342.876199	0.012342	0.011355	0.000%
Fresno	2035	LDT2	GAS	10	13181.015	0.0504476	0.092662	1.2015065	0.114698	1133.51983	770.121871	0.008664	0.008039	0.035%
Fresno	2035	LDT2	DSL	10	5.9380597	0.0202214	0.023021	0.1483564	0.386317	454.171785	309.953162	0.010521	0.009679	0.000%
Fresno	2035	LDT2	GAS	15	7856.0134	0.0339175	0.062256	1.1120257	0.1004	878.167189	596.631776	0.005753	0.005338	0.021%
Fresno	2035	LDT2	DSL	15	3.5391415	0.0152463	0.017357	0.1315346	0.351462	381.379828	260.447709	0.00794	0.007305	0.000%
Fresno	2035	LDT2	GAS	20	299024.86	0.0236147	0.043346	1.0052878	0.089718	698.829778	474.789734	0.00403	0.003739	0.790%
Fresno	2035	LDT2	DSL	20	134.71098	0.0120917	0.013766	0.1182917	0.32573	332.338943	227.095244	0.0063	0.005796	0.000%
Fresno	2035	LDT2	GAS	25	72929.061	0.017598	0.032277	0.9321944	0.081698	581.815971	395.289098	0.002978	0.002763	0.193%
Fresno	2035	LDT2	DSL	25	32.854613	0.0100852	0.011481	0.1075137	0.307105	300.480123	205.428217	0.005254	0.004834	0.000%
Fresno	2035	LDT2	GAS	30	198921.7	0.0137025	0.025125	0.8552845	0.075703	500.176625	339.823036	0.002321	0.002154	0.525%
Fresno	2035	LDT2	DSL	30	89.614422	0.0088468	0.010071	0.0985277	0.294692	281.834348	192.747317	0.004606	0.004237	0.000%
Fresno	2035	LDT2	GAS	35	505249.38	0.011245	0.020619	0.7862275	0.071216	446.216101	303.162106	0.001908	0.001771	1.335%
Fresno	2035	LDT2	DSL	35	227.61531	0.0081642	0.009294	0.0909097	0.287659	274.19932	187.554772	0.004246	0.003906	0.001%
Fresno	2035	LDT2	GAS	40	718836.18	0.009696	0.017781	0.7213458	0.068263	412.295273	280.116489	0.001655	0.001536	1.899%
Fresno	2035	LDT2	DSL	40	323.83637	0.0079306	0.009028	0.0843821	0.285742	276.700724	189.255964	0.004117	0.003788	0.001%
Fresno	2035	LDT2	GAS	45	713447.17	0.0088818	0.01629	0.6706601	0.066243	397.143739	269.822318	0.001515	0.001405	1.885%
Fresno	2035	LDT2	DSL	45	321.40864	0.0081143	0.009238	0.0787589	0.288616	289.623184	198.044466	0.004205	0.003868	0.001%
Fresno	2035	LDT2	GAS	50	825678.75	0.0085729	0.015727	0.6248404	0.065431	396.861533	269.630532	0.001462	0.001356	2.181%
Fresno	2035	LDT2	DSL	50	371.96905	0.0087514	0.009963	0.0739148	0.296659	314.465023	214.939279	0.004525	0.004163	0.001%
Fresno	2035	LDT2	GAS	55	615831.76	0.0087281	0.016017	0.5841747	0.065744	411.662269	279.686188	0.001488	0.001381	1.627%
Fresno	2035	LDT2	DSL	55	277.43279	0.0099563	0.011335	0.0697703	0.310342	354.231181	241.984048	0.005137	0.004726	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	LDT2	GAS	60	701755.58	0.0093539	0.017174	0.5462385	0.067149	442.764966	300.817625	0.001599	0.001483	1.854%
Fresno	2035	LDT2	DSL	60	316.14156	0.011956	0.013611	0.0662844	0.330524	414.046697	282.664287	0.006156	0.005664	0.001%
Fresno	2035	LDT2	GAS	65	752659.03	0.0105725	0.01942	0.5124349	0.069848	494.215085	335.773267	0.001811	0.001681	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	0.015162	0.017261	0.0634572	0.358568	502.266607	342.662214	0.007792	0.007169	0.001%
Fresno	2035	LDT2	GAS	70	722594.3	0.0114854	0.021103	0.497949	0.071604	529.986613	360.07659	0.001967	0.001825	1.909%
Fresno	2035	LDT2	DSL	70	325.52944	0.0203114	0.023123	0.061339	0.396335	632.423233	431.181097	0.010422	0.009588	0.001%
Fresno	2035	LHD1	GAS	5	28730.834	0.0468288	0.078146	0.7368093	0.098011	2513.49712	2262.14741	0.001312	0.001217	0.076%
Fresno	2035	LHD1	DSL	5	10879.472	0.1901904	0.216519	2.3726665	1.447606	519.044	467.1396	0.052137	0.047966	0.029%
Fresno	2035	LHD1	GAS	10	74917.972	0.0377331	0.062942	0.5969772	0.100348	2036.12829	1832.51546	0.001056	0.00098	0.198%
Fresno	2035	LHD1	DSL	10	36179.207	0.1680524	0.191316	1.9590347	1.312197	519.043919	467.139527	0.046068	0.042383	0.096%
Fresno	2035	LHD1	GAS	15	170598.31	0.025285	0.042175	0.408915	0.105095	1392.42973	1253.18676	0.000707	0.000656	0.451%
Fresno	2035	LHD1	DSL	15	78353.787	0.1333898	0.151855	1.3818898	1.109385	519.04397	467.139573	0.036566	0.033641	0.207%
Fresno	2035	LHD1	GAS	20	197125.03	0.0175837	0.029353	0.2948783	0.110421	1006.06851	905.461657	0.000493	0.000457	0.521%
Fresno	2035	LHD1	DSL	20	85901.056	0.1082319	0.123215	1.0201524	0.970248	519.044027	467.139624	0.02967	0.027296	0.227%
Fresno	2035	LHD1	GAS	25	151847.06	0.012682	0.021216	0.2238341	0.116734	768.012023	691.21082	0.000358	0.000332	0.401%
Fresno	2035	LHD1	DSL	25	91937.051	0.0897722	0.1022	0.7881648	0.882282	519.044026	467.139624	0.024609	0.022641	0.243%
Fresno	2035	LHD1	GAS	30	134282.63	0.0096155	0.016078	0.1805654	0.121624	619.43358	557.490222	0.000271	0.000252	0.355%
Fresno	2035	LHD1	DSL	30	77606.52	0.0761173	0.086654	0.6372787	0.827804	519.043982	467.139584	0.020866	0.019197	0.205%
Fresno	2035	LHD1	GAS	35	50176.542	0.0075026	0.012588	0.1525298	0.128927	527.846459	475.061813	0.000214	0.000199	0.133%
Fresno	2035	LHD1	DSL	35	40955.973	0.065975	0.075108	0.539265	0.808703	519.043989	467.13959	0.018086	0.016639	0.108%
Fresno	2035	LHD1	GAS	40	14810.971	0.0060602	0.010275	0.1361152	0.136886	475.233144	427.70983	0.000176	0.000164	0.039%
Fresno	2035	LHD1	DSL	40	22483.492	0.0584561	0.066548	0.4775683	0.817813	519.044031	467.139628	0.016025	0.014743	0.059%
Fresno	2035	LHD1	GAS	45	18233.609	0.0052446	0.00888	0.1303835	0.140061	452.055829	406.850246	0.000151	0.00014	0.048%
Fresno	2035	LHD1	DSL	45	24267.079	0.0529462	0.060276	0.442618	0.852959	519.044071	467.139664	0.014514	0.013353	0.064%
Fresno	2035	LHD1	GAS	50	134634.42	0.0047971	0.008053	0.1328765	0.141188	454.321818	408.889636	0.000135	0.000126	0.356%
Fresno	2035	LHD1	DSL	50	93702.888	0.0490223	0.055809	0.4293219	0.921883	519.044016	467.139615	0.013438	0.012363	0.248%
Fresno	2035	LHD1	GAS	55	37030.824	0.0043361	0.007352	0.1381423	0.152612	482.415478	434.17393	0.000126	0.000117	0.098%
Fresno	2035	LHD1	DSL	55	56428.728	0.0463989	0.052822	0.4358102	1.03814	519.043992	467.139593	0.012719	0.011702	0.149%
Fresno	2035	LHD2	GAS	5	2869.2263	0.0352143	0.063946	0.5594356	0.076166	2513.49728	2262.14755	0.001034	0.000959	0.008%
Fresno	2035	LHD2	DSL	5	2868.0838	0.177619	0.202207	2.2585627	1.338565	519.107914	467.197122	0.049051	0.045127	0.008%
Fresno	2035	LHD2	GAS	10	7481.7397	0.0283664	0.051506	0.4532655	0.077982	2036.12823	1832.51541	0.000833	0.000773	0.020%
Fresno	2035	LHD2	DSL	10	9537.6864	0.1569443	0.178671	1.864823	1.213356	519.107918	467.197126	0.043341	0.039874	0.025%
Fresno	2035	LHD2	GAS	15	17036.93	0.0190077	0.034512	0.3104759	0.081671	1392.42956	1253.1866	0.000557	0.000517	0.045%
Fresno	2035	LHD2	DSL	15	20655.896	0.1245729	0.141818	1.3154333	1.02582	519.10791	467.197119	0.034402	0.03165	0.055%
Fresno	2035	LHD2	GAS	20	19686.039	0.0132258	0.024019	0.2238916	0.08581	1006.06851	905.461663	0.000388	0.00036	0.052%
Fresno	2035	LHD2	DSL	20	22645.534	0.1010778	0.11507	0.9710922	0.897164	519.107917	467.197126	0.027913	0.02568	0.060%
Fresno	2035	LHD2	GAS	25	15164.321	0.0095532	0.017359	0.16995	0.090715	768.01204	691.210836	0.000282	0.000262	0.040%
Fresno	2035	LHD2	DSL	25	24236.761	0.0838384	0.095444	0.7502612	0.815824	519.107974	467.197177	0.023153	0.0213	0.064%
Fresno	2035	LHD2	GAS	30	13410.236	0.0072407	0.013155	0.1370975	0.094516	619.433566	557.490209	0.000214	0.000198	0.035%
Fresno	2035	LHD2	DSL	30	20458.898	0.071086	0.080927	0.6066314	0.76545	519.107941	467.197147	0.019631	0.01806	0.054%
Fresno	2035	LHD2	GAS	35	5010.9181	0.005663	0.010298	0.115811	0.100191	527.84649	475.061841	0.000169	0.000157	0.013%
Fresno	2035	LHD2	DSL	35	10796.955	0.0616141	0.070144	0.5133312	0.747787	519.107889	467.1971	0.017015	0.015654	0.029%
Fresno	2035	LHD2	GAS	40	1479.1088	0.0046079	0.008402	0.1033479	0.106376	475.233142	427.709828	0.000139	0.000129	0.004%
Fresno	2035	LHD2	DSL	40	5927.1756	0.0545922	0.06215	0.4546015	0.756211	519.107876	467.197088	0.015076	0.01387	0.016%
Fresno	2035	LHD2	GAS	45	1820.913	0.003984	0.007262	0.098996	0.108844	452.055826	406.850243	0.000119	0.000111	0.005%
Fresno	2035	LHD2	DSL	45	6397.3717	0.0494465	0.056292	0.421332	0.78871	519.107898	467.197108	0.013655	0.012563	0.017%
Fresno	2035	LHD2	GAS	50	13445.368	0.0036222	0.006588	0.1008888	0.109719	454.321772	408.889595	0.000107	9.91E-05	0.036%
Fresno	2035	LHD2	DSL	50	24702.279	0.045782	0.05212	0.4086754	0.852442	519.107864	467.197078	0.012643	0.011632	0.065%
Fresno	2035	LHD2	GAS	55	3698.111	0.0032971	0.006012	0.104887	0.118597	482.415456	434.173911	9.95E-05	9.24E-05	0.010%
Fresno	2035	LHD2	DSL	55	14875.936	0.043332	0.049331	0.4148517	0.959942	519.107902	467.197112	0.011966	0.011009	0.039%
Fresno	2035	MCY	GAS	5	10.752747	4.7189475	5.165712	23.870843	1.236078	266.394097	239.754687	0.000467	0.000411	0.000%
Fresno	2035	MCY	GAS	10	554.89158	4.0924659	4.480206	22.084999	1.217711	242.30076	218.070684	0.000402	0.000353	0.001%
Fresno	2035	MCY	GAS	15	330.7208	3.1688185	3.467933	19.076397	1.162584	205.030744	184.52767	0.000309	0.000271	0.001%
Fresno	2035	MCY	GAS	20	12588.286	2.589213	2.830736	17.08271	1.135271	178.738769	160.864892	0.000251	0.000219	0.033%
Fresno	2035	MCY	GAS	25	3070.1522	2.2223167	2.429782	15.901695	1.116377	160.513437	144.462093	0.000214	0.000187	0.008%
Fresno	2035	MCY	GAS	30	8374.1638	2.0085029	2.195247	15.312538	1.114165	148.522673	133.670406	0.000192	0.000167	0.022%
Fresno	2035	MCY	GAS	35	21269.879	1.9075578	2.084042	15.2783	1.121996	141.675292	127.507762	0.000182	0.000158	0.056%
Fresno	2035	MCY	GAS	40	30261.417	1.9062373	2.081751	15.890486	1.142786	139.435532	125.491979	0.000181	0.000156	0.080%
Fresno	2035	MCY	GAS	45	30034.55	1.9966162	2.179985	17.238489	1.167142	141.742565	127.568309	0.000189	0.000163	0.079%
Fresno	2035	MCY	GAS	50	34759.25	2.1978531	2.399426	19.669568	1.20228	149.01587	134.114283	0.000207	0.000179	0.092%
Fresno	2035	MCY	GAS	55	25925.157	2.5415526	2.774636	23.714161	1.247993	162.250226	146.025203	0.00024	0.000207	0.068%
Fresno	2035	MCY	GAS	60	29542.357	3.0875112	3.370405	30.291061	1.306048	183.22816	164.905344	0.000291	0.000252	0.078%
Fresno	2035	MCY	GAS	65	31685.281	3.9413355	4.302831	41.189322	1.378654	214.9121	193.42089	0.000371	0.000321	0.084%
Fresno	2035	MCY	GAS	70	30419.625	5.2796836	5.764605	59.434256	1.464776	262.137322	235.92359	0.000499	0.000432	0.080%
Fresno	2035	MDV	GAS	5	262.23808	0.1100125	0.195436	1.7718606	0.179144	1969.99002	1370.33855	0.013475	0.012502	0.001%
Fresno	2035	MDV	DSL	5	0.204452	0.0191431	0.021793	0.1208349	0.327478	504.233051	348.357588	0.011581	0.010655	0.000%
Fresno	2035	MDV	GAS	10	13532.7	0.0690463	0.122328	1.5896758	0.156103	1452.2532	1010.20434	0.008486	0.007873	0.036%
Fresno	2035	MDV	DSL	10	10.550669	0.0162675	0.018519	0.1147625	0.311503	455.313852	314.587226	0.009842	0.009054	0.000%
Fresno	2035	MDV	GAS	15	8065.6207	0.0466288	0.082419	1.4692966	0.136006	1125.03783	782.583902	0.005638	0.005231	0.021%
Fresno	2035	MDV	DSL	15	6.2883017	0.0122206	0.013912	0.104181	0.284484	381.755387	263.807654	0.007394	0.006802	0.000%
Fresno	2035	MDV	GAS	20	307003.17	0.0324784	0.057548	1.3271621	0.121137	895.315834	622.79059	0.003951	0.003666	0.811%
Fresno	2035	MDV	DSL	20	239.35278	0.0096758	0.011015	0.0952165	0.264374	332.198042	229.596761	0.005854	0.005386	0.001%
Fresno	2035	MDV	GAS	25	74874.889	0.0243171	0.04294	1.2297065	0.110055	745.377168	518.48947	0.002921	0.00271	0.198%
Fresno	2035	MDV	DSL	25	58.375658	0.0080735	0.009191	0.0874931	0.2497	300.003773	207.372109	0.004885	0.004494	0.000%
Fresno	2035	MDV	GAS	30	204229.16	0.0189682	0.033481	1.1277553	0.101854	640.793851	445.741211	0.002277	0.002113	0.539%
Fresno	2035	MDV	DSL	30	159.22577	0.0070996	0.008082	0.0807626	0.239828	281.161644	194.364833	0.004295	0.003952	0.000%
Fresno	2035	MDV	GAS	35	518729.95	0.0155728	0.027505	1.0364591	0.095789	571.669908	397.658678	0.001873	0.001738	1.370%
Fresno	2035	MDV	DSL	35	404.42401	0.0065804	0.007491	0.0748519	0.234133	273.446191	189.03863	0.003981	0.003662	0.001%
Fresno	2035	MDV	GAS	40	738015.56	0.0134185	0.023729	0.9509382	0.091878	528.227829	367.441432	0.001625	0.001507	1.949%
Fresno	2035	MDV	DSL	40	575.3884	0.0064296	0.00732	0.0696347	0.232416	275.97394	190.783609	0.00389	0.003578	0.002%
Fresno	2035	MDV	GAS	45	732482.74	0.0122813	0.021731	0.8842086	0.089299	508.811884	353.935103	0.001486	0.001379	1.935%
Fresno	2035	MDV	DSL	45	571.07475	0.0066243	0.007541	0.0650156	0.234401	289.032509	199.798324	0.004007	0.003687	0.002%
Fresno	2035	MDV	GAS	50	847708.74	0.0118363	0.020956	0.824051	0.088433	508.448346	353.682037	0.001434	0.001331	2.239%
Fresno	2035	MDV	DSL	50	660.90994	0.0071982	0.008195	0.0609215	0.240351	314.135879	217.127918	0.004354	0.004006	0.002%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	GAS	55	632262.83	0.0120264	0.021305	0.7708121	0.089188	527.40799	366.870322	0.00146	0.001354	1.670%
Fresno	2035	MDV	DSL	55	492.93907	0.0082517	0.009394	0.0572662	0.250567	354.320834	244.868774	0.004991	0.004592	0.001%
Fresno	2035	MDV	GAS	60	720479.2	0.0128467	0.022792	0.7213014	0.091557	567.257667	394.590335	0.001567	0.001454	1.903%
Fresno	2035	MDV	DSL	60	561.71632	0.0099812	0.011363	0.0540983	0.265606	414.766203	286.595991	0.006037	0.005554	0.001%
Fresno	2035	MDV	GAS	65	772740.8	0.0144731	0.025705	0.6773478	0.095873	633.176731	440.444571	0.001775	0.001647	2.041%
Fresno	2035	MDV	DSL	65	602.4617	0.0127412	0.014505	0.0513011	0.286347	503.915118	348.138109	0.007705	0.007089	0.002%
Fresno	2035	MDV	GAS	70	741873.94	0.0156958	0.02789	0.6585872	0.098677	679.002269	472.320926	0.001927	0.001788	1.960%
Fresno	2035	MDV	DSL	70	578.39657	0.0171657	0.019542	0.0488944	0.313934	635.442336	438.935217	0.010381	0.00955	0.002%
Fresno	2035	MH	GAS	5	497.37529	0.0553148	0.09933	0.7610391	0.116409	2513.49733	2262.1476	0.001014	0.000941	0.001%
Fresno	2035	MH	DSL	5	100.05503	1.0506642	1.196111	1.8537301	10.40436	2409.45049	2168.50544	0.102742	0.094523	0.000%
Fresno	2035	MH	GAS	10	2500.3099	0.0445366	0.079952	0.6162304	0.119449	2036.12821	1832.51539	0.000817	0.000758	0.007%
Fresno	2035	MH	DSL	10	498.03629	0.7897955	0.89913	1.4655575	8.936126	2187.78829	1969.00946	0.089264	0.082123	0.001%
Fresno	2035	MH	GAS	15	3158.32	0.0299198	0.053672	0.4228694	0.124529	1392.42964	1253.18668	0.000546	0.000507	0.008%
Fresno	2035	MH	DSL	15	672.17609	0.4011829	0.45672	0.8767346	6.620523	1796.35774	1616.72197	0.066961	0.061604	0.002%
Fresno	2035	MH	GAS	20	3275.9536	0.0208567	0.037433	0.3055777	0.130392	1006.06861	905.461752	0.000381	0.000353	0.009%
Fresno	2035	MH	DSL	20	712.8672	0.1900703	0.216382	0.5379409	5.154415	1474.1187	1326.70683	0.05086	0.046792	0.002%
Fresno	2035	MH	GAS	25	3650.1697	0.0151682	0.027222	0.2333843	0.136157	768.012153	691.210938	0.000277	0.000257	0.010%
Fresno	2035	MH	DSL	25	742.42287	0.146569	0.166859	0.4562472	4.526696	1322.2031	1189.98279	0.044122	0.040592	0.002%
Fresno	2035	MH	GAS	30	4127.0368	0.0114739	0.020587	0.187889	0.142452	619.433653	557.490288	0.00021	0.000195	0.011%
Fresno	2035	MH	DSL	30	892.7034	0.1260962	0.143552	0.4275845	4.128248	1241.08342	1116.97508	0.041074	0.037788	0.002%
Fresno	2035	MH	GAS	35	5129.2808	0.0090439	0.01624	0.1599202	0.148736	527.846586	475.061927	0.000166	0.000154	0.014%
Fresno	2035	MH	DSL	35	1052.6149	0.1087305	0.123782	0.4078958	3.802662	1173.76427	1056.38785	0.040066	0.036861	0.003%
Fresno	2035	MH	GAS	40	6385.4256	0.0074294	0.013359	0.143859	0.155038	475.233226	427.709904	0.000136	0.000127	0.017%
Fresno	2035	MH	DSL	40	1306.6575	0.0944721	0.10755	0.3971811	3.548249	1120.24542	1008.22088	0.041098	0.03781	0.003%
Fresno	2035	MH	GAS	45	5823.0717	0.0063952	0.011482	0.1370593	0.160335	452.05586	406.850274	0.000117	0.000109	0.015%
Fresno	2035	MH	DSL	45	1069.9793	0.0833209	0.094855	0.3954404	3.358787	1080.52712	972.474412	0.044171	0.040637	0.003%
Fresno	2035	MH	GAS	50	5667.0456	0.0056801	0.010217	0.1370394	0.16791	454.32184	408.889656	0.000105	9.72E-05	0.015%
Fresno	2035	MH	DSL	50	1197.4807	0.0752769	0.085698	0.4026736	3.248634	1054.60923	949.148305	0.049283	0.045341	0.003%
Fresno	2035	MH	GAS	55	7411.9792	0.0052533	0.009506	0.1451595	0.174931	482.415536	434.173982	9.76E-05	9.06E-05	0.020%
Fresno	2035	MH	DSL	55	1754.7995	0.0703401	0.080078	0.4188808	3.209985	1042.49168	938.242513	0.056436	0.051921	0.005%
Fresno	2035	MH	GAS	60	8553.0862	0.0050896	0.009255	0.1630902	0.18043	541.209217	487.088295	9.49E-05	8.8E-05	0.023%
Fresno	2035	MH	DSL	60	2108.6858	0.0685105	0.077995	0.444062	3.238258	1044.17453	939.757077	0.065629	0.060379	0.006%
Fresno	2035	MH	GAS	65	1336.5278	0.0052101	0.009435	0.1945296	0.183905	641.497946	577.348151	9.61E-05	8.92E-05	0.004%
Fresno	2035	MH	DSL	65	331.84716	0.0697882	0.079449	0.4782171	3.327952	1059.65797	953.692172	0.076862	0.070713	0.001%
Fresno	2035	OBUS	GAS	5	300.94714	0.080701	0.127238	1.1942561	0.133115	2513.49723	2262.14751	0.001	0.000927	0.001%
Fresno	2035	OBUS	DSL	5	245.79146	1.5861841	1.80575	2.9797481	4.623698	3000.84531	2700.76078	0.05483	0.050444	0.001%
Fresno	2035	OBUS	GAS	10	1512.8638	0.0649959	0.102413	0.967016	0.136592	2036.12852	1832.51567	0.000805	0.000747	0.004%
Fresno	2035	OBUS	DSL	10	1133.6207	0.8871084	1.009905	1.7708363	3.395818	2416.37885	2174.74096	0.049207	0.04527	0.003%
Fresno	2035	OBUS	GAS	15	1911.0064	0.0436741	0.068748	0.6635853	0.1424	1392.42968	1253.18671	0.000539	0.0005	0.005%
Fresno	2035	OBUS	DSL	15	1492.4488	0.4445821	0.506123	1.0103201	2.534191	1966.4595	1769.81355	0.044572	0.041006	0.004%
Fresno	2035	OBUS	GAS	20	1982.183	0.0304376	0.047949	0.479526	0.149105	1006.06863	905.461765	0.000376	0.000348	0.005%
Fresno	2035	OBUS	DSL	20	1992.1444	0.2134666	0.243015	0.6250055	2.04657	1667.58305	1500.82475	0.04257	0.039164	0.005%
Fresno	2035	OBUS	GAS	25	2208.6102	0.0221363	0.03487	0.3662369	0.155698	768.012086	691.210878	0.000273	0.000253	0.006%
Fresno	2035	OBUS	DSL	25	2066.889	0.1862273	0.212006	0.5889262	1.833109	1554.29946	1398.86952	0.0406	0.037352	0.005%
Fresno	2035	OBUS	GAS	30	2497.1484	0.0167474	0.02637	0.2948437	0.162896	619.4336	557.49024	0.000207	0.000192	0.007%
Fresno	2035	OBUS	DSL	30	2883.156	0.1715128	0.195254	0.6018785	1.709603	1513.47471	1362.12724	0.041611	0.038282	0.008%
Fresno	2035	OBUS	GAS	35	3103.5765	0.0131973	0.020803	0.2509538	0.170082	527.846634	475.061971	0.000163	0.000152	0.008%
Fresno	2035	OBUS	DSL	35	4256.6836	0.1596004	0.181693	0.6328688	1.620436	1496.24306	1346.61875	0.044706	0.041129	0.011%
Fresno	2035	OBUS	GAS	40	3863.633	0.0108323	0.017113	0.2257499	0.177288	475.233178	427.70986	0.000134	0.000125	0.010%
Fresno	2035	OBUS	DSL	40	4543.6948	0.1340432	0.152598	0.599408	1.454882	1388.01842	1249.21658	0.046787	0.043044	0.012%
Fresno	2035	OBUS	GAS	45	3523.3691	0.0093333	0.014707	0.2150795	0.183345	452.055855	406.850269	0.000115	0.000107	0.009%
Fresno	2035	OBUS	DSL	45	5084.9367	0.127837	0.145533	0.6642423	1.433593	1412.70212	1271.43191	0.054142	0.049811	0.013%
Fresno	2035	OBUS	GAS	50	3428.9625	0.0082795	0.013089	0.2150483	0.192007	454.321799	408.889619	0.000103	9.58E-05	0.009%
Fresno	2035	OBUS	DSL	50	5430.6309	0.1132843	0.128966	0.6775239	1.364009	1369.39275	1232.45348	0.060719	0.055861	0.014%
Fresno	2035	OBUS	GAS	55	4484.7705	0.0076242	0.012182	0.2277906	0.200036	482.415543	434.173989	9.62E-05	8.93E-05	0.012%
Fresno	2035	OBUS	DSL	55	7117.4272	0.1009084	0.114876	0.6898339	1.315754	1329.59333	1196.63399	0.068347	0.062879	0.019%
Fresno	2035	OBUS	GAS	60	5175.2205	0.0073623	0.011865	0.2559284	0.206324	541.209208	487.088287	9.35E-05	8.68E-05	0.014%
Fresno	2035	OBUS	DSL	60	4814.1661	0.0766515	0.087262	0.5707986	1.16079	1154.53492	1039.08143	0.069619	0.064049	0.013%
Fresno	2035	OBUS	GAS	65	808.69374	0.0075559	0.012092	0.3052643	0.210298	641.497894	577.348105	9.48E-05	8.79E-05	0.002%
Fresno	2035	OBUS	DSL	65	1253.2168	0.0906658	0.103216	0.7737067	1.349263	1334.34751	1200.91276	0.089797	0.082614	0.003%
Fresno	2035	SBUS	GAS	5	77.848973	0.2742692	0.341615	3.8280772	0.333728	2513.49698	2262.14728	0.001744	0.001618	0.000%
Fresno	2035	SBUS	DSL	5	153.26155	2.281405	2.597206	4.0455771	12.3463	2617.43399	2355.69059	0.064331	0.059184	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	0.2214585	0.275662	3.1074489	0.340815	2036.12814	1832.51532	0.001404	0.001303	0.001%
Fresno	2035	SBUS	DSL	10	537.17386	1.3271759	1.510889	2.5203783	9.282154	2162.20503	1945.98453	0.059001	0.054281	0.001%
Fresno	2035	SBUS	GAS	15	545.71332	0.1481515	0.184413	2.1250646	0.357665	1392.42956	1253.1866	0.000939	0.000872	0.001%
Fresno	2035	SBUS	DSL	15	1074.3477	0.6744066	0.767761	1.4621548	6.983592	1775.35776	1597.82198	0.053848	0.04954	0.003%
Fresno	2035	SBUS	GAS	20	740.71711	0.1033393	0.128624	1.5357503	0.374355	1006.06849	905.461637	0.000655	0.000608	0.002%
Fresno	2035	SBUS	DSL	20	1458.2523	0.289941	0.330076	0.7928132	5.278572	1400.58068	1260.52261	0.04836	0.044491	0.004%
Fresno	2035	SBUS	GAS	25	1169.2717	0.0750802	0.093461	1.1719453	0.391468	768.012094	691.210884	0.000476	0.000442	0.003%
Fresno	2035	SBUS	DSL	25	2301.9493	0.2533325	0.2884	0.7484043	4.73246	1306.77308	1176.09577	0.046163	0.04247	0.006%
Fresno	2035	SBUS	GAS	30	1402.8186	0.0568627	0.07079	0.9449195	0.408577	619.43357	557.490213	0.000361	0.000335	0.004%
Fresno	2035	SBUS	DSL	30	2761.7339	0.2209174	0.251498	0.7173262	4.267068	1226.60413	1103.94372	0.045845	0.042178	0.007%
Fresno	2035	SBUS	GAS	35	1439.8169	0.0447923	0.055798	0.8035999	0.427096	527.846492	475.061843	0.000285	0.000264	0.004%
Fresno	2035	SBUS	DSL	35	2834.5724	0.1926958	0.219369	0.6995788	3.882397	1160.07385	1044.06646	0.047406	0.043614	0.007%
Fresno	2035	SBUS	GAS	40	971.95252	0.0368103	0.045873	0.7225244	0.445186	475.23313	427.709817	0.000235	0.000218	0.003%
Fresno	2035	SBUS	DSL	40	1913.4862	0.1686675	0.192015	0.6951622	3.578447	1107.18223	996.464003	0.050847	0.046779	0.005%
Fresno	2035	SBUS	GAS	45	466.31942	0.0315601	0.039339	0.6868198	0.462766	452.055804	406.850224	0.000201	0.000187	0.001%
Fresno	2035	SBUS	DSL	45	918.04463	0.1488326	0.169435	0.7040764	3.355217	1067.92926	961.136336	0.056167	0.051673	0.002%
Fresno	2035	SBUS	GAS	50	233.54692	0.0283194	0.035273	0.6919359	0.477523	454.321742	408.889568	0.00018	0.000167	0.001%
Fresno	2035	SBUS	DSL	50	459.78464	0.1331912	0.151628	0.7263213	3.212709	1042.31496	938.083461	0.063365	0.058296	0.001%
Fresno	2035	SBUS	GAS	55	347.6197	0.0260144	0.032517	0.7263802	0.505327	482.415402	434.173862	0.000168	0.000156	0.001%
Fresno	2035	SBUS	DSL	55	684.36005	0.1217431	0.138595	0.761897	3.15092	1030.33931	927.305381	0.072443	0.066648	0.002%
Fresno	2035	SBUS	GAS	60	193.46668	0.0253707	0.031686	0.8170587	0.520027	541.209093	487.088183	0.000163	0.000151	0.001%
Fresno	2035	SBUS	DSL	60	380.87851	0.1144885	0.130336	0.8108034	3.169853	1032.00233	928.802094	0.0834	0.076728	0.001%

Region	CalYr	Veh_Cl	Fuel	Speed (miles/hr)	VMT (miles/day)	ROG_RUNI (gms/mile)	TOG_RUNI (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	PM10_RUN (gms/mile)	PM2_5_RUNEX (gms/mile)	Percent of Total VMT
Fresno	2035	T6	GAS	5	973.52695	0.0689906	0.114074	1.0368676	0.120933	2513.49722	2262.1475	0.00101	0.000938	0.003%
Fresno	2035	T6	DSL	5	5137.5027	1.1013952	1.253855	1.9529146	3.412478	2559.93331	2303.93998	0.041772	0.03843	0.014%
Fresno	2035	T6	GAS	10	4893.9285	0.0555566	0.091818	0.8395749	0.124092	2036.12822	1832.5154	0.000814	0.000755	0.013%
Fresno	2035	T6	DSL	10	25572.553	0.6407234	0.729415	1.2167127	2.564287	2114.70497	1903.23447	0.038279	0.035216	0.068%
Fresno	2035	T6	GAS	15	6181.8708	0.0373232	0.061637	0.5761328	0.129369	1392.42958	1253.18662	0.000544	0.000505	0.016%
Fresno	2035	T6	DSL	15	34514.07	0.3255844	0.370653	0.7059038	1.928473	1736.35609	1562.72048	0.034911	0.032118	0.091%
Fresno	2035	T6	GAS	20	6412.1182	0.0260159	0.042989	0.4163303	0.13546	1006.0686	905.461738	0.00038	0.000352	0.017%
Fresno	2035	T6	DSL	20	36603.426	0.1399714	0.159347	0.3827906	1.457575	1369.81224	1232.83102	0.031334	0.028827	0.097%
Fresno	2035	T6	GAS	25	7144.5819	0.0189203	0.031263	0.3179713	0.141449	768.012142	691.210927	0.000276	0.000256	0.019%
Fresno	2035	T6	DSL	25	38121.017	0.1222948	0.139223	0.3613306	1.307178	1278.06544	1150.2589	0.029906	0.027513	0.101%
Fresno	2035	T6	GAS	30	8077.9677	0.014313	0.023643	0.2559869	0.147988	619.433656	557.49029	0.000209	0.000194	0.021%
Fresno	2035	T6	DSL	30	45837.434	0.1066437	0.121406	0.3463083	1.179023	1199.65767	1079.69191	0.029695	0.027319	0.121%
Fresno	2035	T6	GAS	35	10039.688	0.0112817	0.018651	0.2178811	0.154517	527.846622	475.06196	0.000165	0.000153	0.027%
Fresno	2035	T6	DSL	35	54048.372	0.0930181	0.105894	0.3377237	1.073112	1134.58895	1021.13006	0.030702	0.028246	0.143%
Fresno	2035	T6	GAS	40	12498.377	0.0092646	0.015342	0.1959988	0.161063	475.233217	427.709895	0.000136	0.000126	0.033%
Fresno	2035	T6	DSL	40	67092.64	0.0814181	0.092688	0.3355767	0.989443	1082.85927	974.573342	0.032927	0.030293	0.177%
Fresno	2035	T6	GAS	45	11397.666	0.0079779	0.013186	0.1867346	0.166567	452.055868	406.850281	0.000117	0.000108	0.030%
Fresno	2035	T6	DSL	45	54939.975	0.0718437	0.081789	0.3398673	0.928018	1044.46863	940.021765	0.03637	0.03346	0.145%
Fresno	2035	T6	GAS	50	11092.272	0.0070824	0.011734	0.1867075	0.174436	454.321814	408.889633	0.000104	9.68E-05	0.029%
Fresno	2035	T6	DSL	50	61486.767	0.0642948	0.073195	0.3505956	0.888836	1019.41703	917.475324	0.04103	0.037748	0.162%
Fresno	2035	T6	GAS	55	14507.68	0.0065376	0.010919	0.1977706	0.18173	482.415542	434.173988	9.73E-05	9.03E-05	0.038%
Fresno	2035	T6	DSL	55	90103.285	0.0587715	0.066907	0.3677616	0.871896	1007.70447	906.93402	0.046909	0.043156	0.238%
Fresno	2035	T6	GAS	60	16741.2	0.0063253	0.010633	0.2222001	0.187443	541.20927	487.088343	9.45E-05	8.77E-05	0.044%
Fresno	2035	T6	DSL	60	108274.2	0.0552737	0.062925	0.3913652	0.8772	1009.33095	908.397853	0.054005	0.049684	0.286%
Fresno	2035	T6	GAS	65	2616.0245	0.0064814	0.010838	0.2650342	0.191053	641.497958	577.348162	9.58E-05	8.89E-05	0.007%
Fresno	2035	T6	DSL	65	17039.28	0.0538015	0.061249	0.4214065	0.904747	1024.29647	921.866823	0.062318	0.057333	0.045%
Fresno	2035	T7	GAS	5	47.101317	2.5476473	3.222386	123.91413	3.559864	2513.49743	2262.14768	0.000946	0.000878	0.000%
Fresno	2035	T7	DSL	5	11173.315	2.4953132	2.840724	4.9860909	6.539606	3956.48963	3560.84066	0.075198	0.069182	0.030%
Fresno	2035	T7	GAS	10	230.20846	2.0717203	2.599449	100.61334	3.62884	2036.12818	1832.51536	0.000762	0.000707	0.001%
Fresno	2035	T7	DSL	10	42682.58	1.4516168	1.652555	3.1064068	4.914833	3268.36963	2941.53267	0.068927	0.063412	0.113%
Fresno	2035	T7	GAS	15	251.04595	1.3811242	1.741608	68.880559	3.802273	1392.42954	1253.18658	0.00051	0.000473	0.001%
Fresno	2035	T7	DSL	15	52201.144	0.7376411	0.839748	1.8022111	3.69664	2683.61478	2415.2533	0.062875	0.057845	0.138%
Fresno	2035	T7	GAS	20	429.03323	0.9595161	1.210978	49.625326	4.006074	1006.06856	905.461705	0.000356	0.00033	0.001%
Fresno	2035	T7	DSL	20	128970.49	0.3103818	0.353346	0.9563304	2.702748	2117.09827	1905.38845	0.054875	0.050485	0.341%
Fresno	2035	T7	GAS	25	559.91571	0.6976479	0.882258	37.961887	4.168442	768.012159	691.210943	0.000258	0.00024	0.001%
Fresno	2035	T7	DSL	25	117904.47	0.2770755	0.315429	0.9224851	2.505512	1975.3064	1777.77576	0.053873	0.049564	0.311%
Fresno	2035	T7	GAS	30	1022.5113	0.5311367	0.668991	30.651513	4.338359	619.433557	557.490202	0.000196	0.000182	0.003%
Fresno	2035	T7	DSL	30	199055.58	0.2416181	0.275064	0.8841482	2.259662	1854.12375	1668.71137	0.053497	0.049217	0.526%
Fresno	2035	T7	GAS	35	1818.6731	0.4189901	0.529092	26.149988	4.508745	527.846584	475.061926	0.000155	0.000143	0.005%
Fresno	2035	T7	DSL	35	358105.96	0.2107489	0.239922	0.8622455	2.056474	1753.55717	1578.20145	0.055313	0.050888	0.946%
Fresno	2035	T7	GAS	40	1585.3806	0.3437894	0.435473	23.532082	4.690899	475.233216	427.709894	0.000127	0.000118	0.004%
Fresno	2035	T7	DSL	40	337948	0.1844679	0.210003	0.8567768	1.895949	1673.60667	1506.246	0.059324	0.054578	0.893%
Fresno	2035	T7	GAS	45	1677.502	0.2929053	0.372855	22.327019	4.898946	452.055835	406.850251	0.000109	0.000101	0.004%
Fresno	2035	T7	DSL	45	473149.1	0.1627751	0.185307	0.8677424	1.778087	1614.27224	1452.84502	0.065527	0.060285	1.250%
Fresno	2035	T7	GAS	50	1755.142	0.2603694	0.333832	22.446469	5.073738	454.321872	408.889685	9.77E-05	9.07E-05	0.005%
Fresno	2035	T7	DSL	50	492063.44	0.1456706	0.165835	0.895142	1.702888	1575.55389	1417.9985	0.073925	0.068011	1.300%
Fresno	2035	T7	GAS	55	2576.419	0.2441222	0.312116	23.903883	5.223222	482.415493	434.173944	9.11E-05	8.45E-05	0.007%
Fresno	2035	T7	DSL	55	600041.24	0.1331542	0.151586	0.9389758	1.670351	1557.45162	1401.70645	0.084515	0.077754	1.585%
Fresno	2035	T7	GAS	60	635.8646	0.2323187	0.303095	26.752832	5.432343	541.209196	487.088277	8.86E-05	8.22E-05	0.002%
Fresno	2035	T7	DSL	60	182793.53	0.1252261	0.14256	0.9992437	1.680477	1559.96541	1403.96887	0.0973	0.089516	0.483%
Fresno	2035	T7	GAS	65	340.81023	0.2375011	0.306124	31.645132	5.629918	641.49795	577.348155	8.97E-05	8.32E-05	0.001%
Fresno	2035	T7	DSL	65	100119.68	0.1218862	0.138758	1.0759458	1.733266	1583.09529	1424.78576	0.112278	0.103296	0.264%
Fresno	2035	UBUS	GAS	5	191.16786	1.5441433	1.71055	19.076171	1.731738	2513.49709	2262.14738	0.001864	0.001729	0.001%
Fresno	2035	UBUS	DSL	5	471.24682	0.7751275	0.882431	5.7401873	11.71731	2299.61401	2069.65261	0.390966	0.359688	0.001%
Fresno	2035	UBUS	GAS	10	686.15946	1.2434709	1.377475	15.453184	1.77563	2036.12824	1832.51542	0.001501	0.001392	0.002%
Fresno	2035	UBUS	DSL	10	1691.4479	0.657308	0.748301	4.5199088	10.184	2299.61406	2069.65266	0.331539	0.305016	0.004%
Fresno	2035	UBUS	GAS	15	1372.319	0.8318581	0.921504	10.567837	1.863414	1392.42956	1253.18661	0.001004	0.000932	0.004%
Fresno	2035	UBUS	DSL	15	3382.8957	0.4852444	0.552418	2.9314344	7.987019	2299.61398	2069.65258	0.244752	0.225172	0.009%
Fresno	2035	UBUS	GAS	20	1810.9826	0.5800775	0.64259	7.6355517	1.951197	1006.06858	905.46172	0.0007	0.00065	0.005%
Fresno	2035	UBUS	DSL	20	4464.2431	0.3709816	0.422338	2.0187768	6.585153	2299.6139	2069.65251	0.187119	0.172149	0.012%
Fresno	2035	UBUS	GAS	25	2727.4697	0.4216442	0.467083	5.8288229	2.038981	768.012079	691.210871	0.000509	0.000472	0.007%
Fresno	2035	UBUS	DSL	25	6723.4701	0.2937276	0.334389	1.4762305	5.707709	2299.61415	2069.65273	0.148153	0.136301	0.018%
Fresno	2035	UBUS	GAS	30	3413.629	0.3194695	0.353898	4.7011878	2.126765	619.433576	557.490218	0.000386	0.000358	0.009%
Fresno	2035	UBUS	DSL	30	8414.9173	0.2408448	0.274186	1.1462454	5.200827	2299.61403	2069.65263	0.121479	0.111761	0.022%
Fresno	2035	UBUS	GAS	35	3345.3412	0.2523108	0.279501	4.0060879	2.214549	527.846502	475.061851	0.000305	0.000283	0.009%
Fresno	2035	UBUS	DSL	35	8246.5816	0.2045173	0.232829	0.9450588	4.981931	2299.61388	2069.65249	0.103156	0.094904	0.022%
Fresno	2035	UBUS	GAS	40	2411.6856	0.2077139	0.230099	3.6067795	2.302333	475.233167	427.70985	0.000251	0.000233	0.006%
Fresno	2035	UBUS	DSL	40	5945.0327	0.1798553	0.204753	0.827366	5.016928	2299.614	2069.6526	0.090717	0.08346	0.016%
Fresno	2035	UBUS	GAS	45	1051.3267	0.1782455	0.197454	3.4308752	2.390117	452.055845	406.85026	0.000215	0.0002	0.003%
Fresno	2035	UBUS	DSL	45	2591.6195	0.1638011	0.186477	0.7691201	5.311199	2299.61409	2069.65268	0.082619	0.07601	0.007%
Fresno	2035	UBUS	GAS	50	534.15117	0.1594391	0.176621	3.4480725	2.477901	454.321795	408.889615	0.000192	0.000179	0.001%
Fresno	2035	UBUS	DSL	50	1316.733	0.1544936	0.175881	0.7591863	5.911016	2299.61408	2069.65267	0.077925	0.071691	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	0.14866	0.164681	3.6612897	2.565685	482.415499	434.173949	0.000179	0.000166	0.002%
Fresno	2035	UBUS	DSL	55	1632.4828	0.1509053	0.171796	0.7957199	6.915863	2299.614	2069.6526	0.076115	0.070026	0.004%
Fresno	2035	UBUS	GAS	60	1083.9276	0.144483	0.160053	4.1075042	2.653469	541.209198	487.088279	0.000174	0.000162	0.003%
Fresno	2035	UBUS	DSL	60	2671.9837	0.1526508	0.173783	0.8855839	8.506392	2299.61403	2069.65263	0.076995	0.070836	0.007%

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2056
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.066	0.041	0.028	0.019	0.014	0.011	0.009	0.008	0.007	0.007	0.007	0.008	0.009	0.009	0.000
	LDT1	0.078	0.049	0.033	0.023	0.017	0.013	0.011	0.010	0.009	0.008	0.009	0.009	0.010	0.011	0.000
	LDT2	0.081	0.050	0.034	0.024	0.018	0.014	0.011	0.010	0.009	0.009	0.009	0.009	0.011	0.011	0.000
	LHD1	0.047	0.038	0.025	0.018	0.013	0.010	0.008	0.006	0.005	0.005	0.004	0.000	0.000	0.000	0.000
	LHD2	0.035	0.028	0.019	0.013	0.010	0.007	0.006	0.005	0.004	0.004	0.003	0.000	0.000	0.000	0.000
	MCY	4.719	4.092	3.169	2.589	2.222	2.009	1.908	1.906	1.997	2.198	2.542	3.088	3.941	5.280	0.000
	MDV	0.110	0.069	0.047	0.032	0.024	0.019	0.016	0.013	0.012	0.012	0.012	0.013	0.014	0.016	0.000
	MH	0.055	0.045	0.030	0.021	0.015	0.011	0.009	0.007	0.006	0.006	0.005	0.005	0.005	0.000	0.000
	OBUS	0.081	0.065	0.044	0.030	0.022	0.017	0.013	0.011	0.009	0.008	0.008	0.007	0.008	0.000	0.000
	SBUS	0.274	0.221	0.148	0.103	0.075	0.057	0.045	0.037	0.032	0.028	0.026	0.025	0.000	0.000	0.000
	T6	0.069	0.056	0.037	0.026	0.019	0.014	0.011	0.009	0.008	0.007	0.007	0.006	0.006	0.000	0.000
	T7	2.548	2.072	1.381	0.960	0.698	0.531	0.419	0.344	0.293	0.260	0.244	0.232	0.238	0.000	0.000
	UBUS	1.544	1.243	0.832	0.580	0.422	0.319	0.252	0.208	0.178	0.159	0.149	0.144	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.019	0.016	0.012	0.010	0.008	0.007	0.006	0.006	0.007	0.007	0.008	0.010	0.012	0.017	0.000
	LDT1	0.021	0.018	0.014	0.011	0.009	0.008	0.007	0.007	0.007	0.008	0.009	0.011	0.014	0.020	0.000
	LDT2	0.024	0.020	0.015	0.012	0.010	0.009	0.008	0.008	0.008	0.009	0.010	0.012	0.015	0.020	0.000
	LHD1	0.190	0.168	0.133	0.108	0.090	0.076	0.066	0.058	0.053	0.049	0.046	0.000	0.000	0.000	0.000
	LHD2	0.178	0.157	0.125	0.101	0.084	0.071	0.062	0.055	0.049	0.046	0.043	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.019	0.016	0.012	0.010	0.008	0.007	0.007	0.006	0.007	0.007	0.008	0.010	0.013	0.017	0.000
	MH	1.051	0.790	0.401	0.190	0.147	0.126	0.109	0.094	0.083	0.075	0.070	0.069	0.070	0.000	0.000
	OBUS	1.586	0.887	0.445	0.213	0.186	0.172	0.160	0.134	0.128	0.113	0.101	0.077	0.091	0.000	0.000
	SBUS	2.281	1.327	0.674	0.290	0.253	0.221	0.193	0.169	0.149	0.133	0.122	0.114	0.000	0.000	0.000
	T6	1.101	0.641	0.326	0.140	0.122	0.107	0.093	0.081	0.072	0.064	0.059	0.055	0.054	0.000	0.000
	T7	2.495	1.452	0.738	0.310	0.277	0.242	0.211	0.184	0.163	0.146	0.133	0.125	0.122	0.000	0.000
	UBUS	0.775	0.657	0.485	0.371	0.294	0.241	0.205	0.180	0.164	0.154	0.151	0.153	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
Reactive Organic Gases (ROG)
Year 2056
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	8.2	0.1	0.6	1.8	1.3	7.0	2.7	2.7	1.3	5.1	5.0	0.0	0.0	0.0	**35.8**
LDT1	0.0	1.4	0.0	0.1	0.3	0.2	1.3	0.5	0.5	0.2	0.9	0.9	0.0	0.0	0.0	**6.4**
LDT2	0.0	3.7	0.1	0.3	0.8	0.6	3.2	1.2	1.2	0.6	2.3	2.3	0.0	0.0	0.0	**16.3**
LHD1	0.0	0.5	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	**1.5**
LHD2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MCY	0.1	12.7	0.3	1.3	4.3	3.8	22.7	10.1	11.4	6.4	28.2	31.3	0.0	0.0	0.0	**132.5**
MDV	0.0	5.2	0.1	0.4	1.1	0.9	4.5	1.7	1.7	0.8	3.3	3.2	0.0	0.0	0.0	**23.0**
MH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
SBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
T6	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
T7	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.2**
UBUS	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.1**
Total	**0.2**	**32.5**	**0.6**	**2.8**	**8.6**	**7.0**	**39.6**	**16.6**	**17.8**	**9.5**	**40.2**	**42.9**	**0.0**	**0.0**	**0.0**	**218.4**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.0	1.2	0.0	0.1	0.4	0.3	1.9	0.7	0.7	0.3	1.2	0.0	0.0	0.0	0.0	**7.1**
LHD2	0.0	0.3	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.7**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
OBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0	**1.5**
SBUS	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.7**
T6	0.0	4.9	0.1	0.2	0.6	0.5	2.7	1.1	1.0	0.5	1.6	1.4	0.0	0.0	0.0	**14.5**
T7	0.3	53.8	0.7	1.9	6.4	5.4	30.0	11.7	11.1	5.1	17.7	15.2	0.0	0.0	0.0	**159.4**
UBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.1**
Total	**0.4**	**61.5**	**0.9**	**2.3**	**7.7**	**6.5**	**36.1**	**14.1**	**13.4**	**6.1**	**21.4**	**17.1**	**0.0**	**0.0**	**0.0**	**187.5**

Total Emissions (tons/year) ***405.9***
Total Emissions (tons/day) ***1.1***

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2056
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.106	0.093	0.081	0.073	0.066	0.061	0.058	0.055	0.054	0.053	0.053	0.054	0.056	0.058	0.000
	LDT1	0.122	0.107	0.094	0.083	0.076	0.070	0.066	0.063	0.062	0.061	0.061	0.063	0.065	0.067	0.000
	LDT2	0.131	0.115	0.100	0.090	0.082	0.076	0.071	0.068	0.066	0.065	0.066	0.067	0.070	0.072	0.000
	LHD1	0.098	0.100	0.105	0.110	0.117	0.122	0.129	0.137	0.140	0.141	0.153	0.000	0.000	0.000	0.000
	LHD2	0.076	0.078	0.082	0.086	0.091	0.095	0.100	0.106	0.109	0.110	0.119	0.000	0.000	0.000	0.000
	MCY	1.236	1.218	1.163	1.135	1.116	1.114	1.122	1.143	1.167	1.202	1.248	1.306	1.379	1.465	0.000
	MDV	0.179	0.156	0.136	0.121	0.110	0.102	0.096	0.092	0.089	0.088	0.089	0.092	0.096	0.099	0.000
	MH	0.116	0.119	0.125	0.130	0.136	0.142	0.149	0.155	0.160	0.168	0.175	0.180	0.184	0.000	0.000
	OBUS	0.133	0.137	0.142	0.149	0.156	0.163	0.170	0.177	0.183	0.192	0.200	0.206	0.210	0.000	0.000
	SBUS	0.334	0.341	0.358	0.374	0.391	0.409	0.427	0.445	0.463	0.478	0.505	0.520	0.000	0.000	0.000
	T6	0.121	0.124	0.129	0.135	0.141	0.148	0.155	0.161	0.167	0.174	0.182	0.187	0.191	0.000	0.000
	T7	3.560	3.629	3.802	4.006	4.168	4.338	4.509	4.691	4.899	5.074	5.223	5.432	5.630	0.000	0.000
	UBUS	1.732	1.776	1.863	1.951	2.039	2.127	2.215	2.302	2.390	2.478	2.566	2.653	0.000	0.000	0.000

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.322	0.306	0.280	0.260	0.245	0.235	0.230	0.228	0.230	0.236	0.246	0.261	0.282	0.310	0.000
	LDT1	0.371	0.354	0.324	0.301	0.285	0.274	0.267	0.265	0.267	0.274	0.285	0.301	0.324	0.353	0.000
	LDT2	0.407	0.386	0.351	0.326	0.307	0.295	0.288	0.286	0.289	0.297	0.310	0.331	0.359	0.396	0.000
	LHD1	1.448	1.312	1.109	0.970	0.882	0.828	0.809	0.818	0.853	0.922	1.038	0.000	0.000	0.000	0.000
	LHD2	1.339	1.213	1.026	0.897	0.816	0.765	0.748	0.756	0.789	0.852	0.960	0.000	0.000	0.000	0.000
	MCY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	MDV	0.327	0.312	0.284	0.264	0.250	0.240	0.234	0.232	0.234	0.240	0.251	0.266	0.286	0.314	0.000
	MH	10.404	8.936	6.621	5.154	4.527	4.128	3.803	3.548	3.359	3.249	3.210	3.238	3.328	0.000	0.000
	OBUS	4.624	3.396	2.534	2.047	1.833	1.710	1.620	1.455	1.434	1.364	1.316	1.161	1.349	0.000	0.000
	SBUS	12.346	9.282	6.984	5.279	4.732	4.267	3.882	3.578	3.355	3.213	3.151	3.170	0.000	0.000	0.000
	T6	3.412	2.564	1.928	1.458	1.307	1.179	1.073	0.989	0.928	0.889	0.872	0.877	0.905	0.000	0.000
	T7	6.540	4.915	3.697	2.703	2.506	2.260	2.056	1.896	1.778	1.703	1.670	1.680	1.733	0.000	0.000
	UBUS	11.717	10.184	7.987	6.585	5.708	5.201	4.982	5.017	5.311	5.911	6.916	8.506	0.000	0.000	0.000

City of Fresno General Plan
Motor Vehicle Emissions
NOx
Year 2056
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.1	18.4	0.4	2.3	8.2	7.4	44.2	18.9	19.7	9.9	37.8	35.3	0.0	0.0	0.0	**202.7**
LDT1	0.0	3.2	0.1	0.4	1.4	1.3	7.5	3.2	3.4	1.7	6.5	6.1	0.0	0.0	0.0	**34.6**
LDT2	0.0	8.4	0.2	1.1	3.8	3.4	20.1	8.6	9.0	4.5	17.3	16.2	0.0	0.0	0.0	**92.6**
LHD1	0.0	1.2	0.0	0.2	0.9	0.9	6.0	2.8	3.1	1.6	6.6	0.0	0.0	0.0	0.0	**23.5**
LHD2	0.0	0.1	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.5	0.0	0.0	0.0	0.0	**1.8**
MCY	0.0	3.8	0.1	0.6	2.2	2.1	13.4	6.1	6.7	3.5	13.8	13.2	0.0	0.0	0.0	**65.4**
MDV	0.0	11.8	0.3	1.5	5.2	4.7	27.8	11.9	12.5	6.3	24.1	22.6	0.0	0.0	0.0	**128.7**
MH	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**1.9**
OBUS	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.1	0.3	0.3	0.0	0.0	0.0	**1.3**
SBUS	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**0.8**
T6	0.0	0.2	0.0	0.0	0.1	0.1	0.8	0.4	0.4	0.2	0.9	0.8	0.0	0.0	0.0	**4.0**
T7	0.0	0.6	0.0	0.1	0.4	0.4	2.7	1.2	1.4	0.7	2.9	2.8	0.0	0.0	0.0	**13.2**
UBUS	0.0	0.4	0.0	0.1	0.3	0.3	2.0	0.9	1.0	0.5	2.1	2.0	0.0	0.0	0.0	**9.6**
Total	**0.2**	**48.2**	**1.2**	**6.3**	**22.6**	**20.7**	**125.7**	**54.7**	**57.9**	**29.3**	**113.5**	**99.8**	**0.0**	**0.0**	**0.0**	580.1

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.2	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.5	0.5	0.0	0.0	0.0	**2.3**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
LHD1	0.0	9.7	0.2	1.2	4.1	3.7	23.0	10.4	11.7	6.4	27.5	0.0	0.0	0.0	0.0	**97.9**
LHD2	0.0	2.4	0.1	0.3	1.0	0.9	5.6	2.5	2.8	1.6	6.7	0.0	0.0	0.0	0.0	**23.9**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.3**
MH	0.0	1.3	0.0	0.1	0.4	0.4	2.2	0.9	0.9	0.5	1.7	1.6	0.0	0.0	0.0	**10.0**
OBUS	0.0	1.7	0.0	0.2	0.6	0.5	3.2	1.3	1.3	0.6	2.4	1.9	0.0	0.0	0.0	**13.8**
SBUS	0.0	1.7	0.0	0.2	0.5	0.5	2.8	1.1	1.1	0.6	2.1	1.9	0.0	0.0	0.0	**12.6**
T6	0.1	19.6	0.4	1.8	6.2	5.5	31.5	13.0	13.1	6.4	23.8	21.9	0.0	0.0	0.0	**143.4**
T7	0.8	182.2	3.7	16.2	57.9	50.8	292.9	120.6	121.7	59.1	221.5	203.8	0.0	0.0	0.0	**1,331.4**
UBUS	0.0	5.8	0.1	0.6	2.0	1.8	10.9	4.9	5.6	3.2	14.1	15.8	0.0	0.0	0.0	**64.8**
Total	**1.0**	**224.7**	**4.6**	**20.6**	**72.9**	**64.1**	**372.6**	**155.0**	**158.6**	**78.4**	**300.4**	**247.6**	**0.0**	**0.0**	**0.0**	1,700.7

Total Emissions (tons/year) ***2,280.8***
Total Emissions (tons/day) ***6.2***

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2056
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	1.1	1.0	1.0	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.0
	LDT1	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.0
	LDT2	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.0
	LHD1	0.7	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	LHD2	0.6	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	MCY	23.9	22.1	19.1	17.1	15.9	15.3	15.3	15.9	17.2	19.7	23.7	30.3	41.2	59.4	0.0
	MDV	1.8	1.6	1.5	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.0
	MH	0.8	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.0
	OBUS	1.2	1.0	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.0	0.0
	SBUS	3.8	3.1	2.1	1.5	1.2	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.0	0.0	0.0
	T6	1.0	0.8	0.6	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.0	0.0
	T7	123.9	100.6	68.9	49.6	38.0	30.7	26.1	23.5	22.3	22.4	23.9	26.8	31.6	0.0	0.0
	UBUS	19.1	15.5	10.6	7.6	5.8	4.7	4.0	3.6	3.4	3.4	3.7	4.1	0.0	0.0	0.0

EMFAC2011 Emission factors (g/mile)

DSL	Speed (mph):	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	LDA	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	LDT1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LDT2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	LHD1	2.4	2.0	1.4	1.0	0.8	0.6	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0
	LHD2	2.3	1.9	1.3	1.0	0.8	0.6	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0
	MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MDV	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	MH	1.9	1.5	0.9	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.0	0.0
	OBUS	3.0	1.8	1.0	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.8	0.0	0.0
	SBUS	4.0	2.5	1.5	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.0	0.0	0.0
	T6	2.0	1.2	0.7	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.0	0.0
	T7	5.0	3.1	1.8	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.1	0.0	0.0
	UBUS	5.7	4.5	2.9	2.0	1.5	1.1	0.9	0.8	0.8	0.8	0.8	0.9	0.0	0.0	0.0

City of Fresno General Plan
Motor Vehicle Emissions
Carbon Monoxide (CO)
Year 2056
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.8	204.6	5.1	27.8	99.2	88.4	515.3	211.2	211.2	99.8	356.2	304.6	0.0	0.0	0.0	**2,124.4**
LDT1	0.1	35.7	0.9	4.8	17.2	15.3	89.4	36.6	36.6	17.3	61.9	53.0	0.0	0.0	0.0	**368.9**
LDT2	0.3	88.5	2.2	12.0	42.8	38.2	222.4	91.1	91.2	43.1	153.8	131.6	0.0	0.0	0.0	**917.1**
LHD1	0.0	7.2	0.1	0.6	1.7	1.3	7.1	2.8	2.9	1.5	6.0	0.0	0.0	0.0	0.0	**31.4**
LHD2	0.0	0.5	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.5	0.0	0.0	0.0	0.0	**2.4**
MCY	0.3	68.5	1.6	8.6	30.7	28.8	181.9	84.5	98.6	57.1	262.8	307.1	0.0	0.0	0.0	**1,130.5**
MDV	0.5	120.2	3.0	16.3	58.0	51.7	301.0	123.3	123.4	58.3	208.3	178.3	0.0	0.0	0.0	**1,242.2**
MH	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.2**
OBUS	0.0	0.4	0.0	0.0	0.1	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.0	0.0	0.0	**2.1**
SBUS	0.0	0.3	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.3	0.0	0.0	0.0	**1.5**
T6	0.0	1.1	0.0	0.1	0.3	0.2	1.1	0.5	0.5	0.2	1.0	1.0	0.0	0.0	0.0	**5.9**
T7	0.1	15.6	0.3	1.2	3.7	2.9	15.6	6.3	6.4	3.3	13.2	13.5	0.0	0.0	0.0	**81.9**
UBUS	0.0	3.6	0.1	0.3	0.8	0.7	3.6	1.4	1.5	0.7	3.0	3.1	0.0	0.0	0.0	**18.8**
Total	**2.1**	**546.6**	**13.4**	**71.8**	**254.8**	**227.7**	**1,338.9**	**558.4**	**573.0**	**281.7**	**1,067.7**	**993.2**	**0.1**	**0.0**	**0.0**	**5,929.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.6**
LDT1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
LDT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.1	14.5	0.3	1.2	3.6	2.9	15.3	6.1	6.1	3.0	11.5	0.0	0.0	0.0	0.0	**64.6**
LHD2	0.0	3.6	0.1	0.3	0.9	0.7	3.9	1.5	1.5	0.7	2.9	0.0	0.0	0.0	0.0	**16.2**
MCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
MH	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	**1.3**
OBUS	0.0	0.9	0.0	0.1	0.2	0.2	1.2	0.5	0.6	0.3	1.2	0.9	0.0	0.0	0.0	**6.2**
SBUS	0.0	0.5	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.5	0.5	0.0	0.0	0.0	**2.8**
T6	0.1	9.3	0.1	0.5	1.7	1.6	9.9	4.4	4.8	2.5	10.1	9.8	0.0	0.0	0.0	**54.8**
T7	0.6	115.2	1.8	5.7	21.3	19.9	122.8	54.5	59.4	31.1	124.5	121.2	0.0	0.0	0.0	**678.0**
UBUS	0.0	2.6	0.0	0.2	0.5	0.4	2.1	0.8	0.8	0.4	1.6	1.6	0.0	0.0	0.0	**11.1**
Total	**0.8**	**146.9**	**2.4**	**8.0**	**28.5**	**25.8**	**156.1**	**68.2**	**73.6**	**38.3**	**152.7**	**134.4**	**0.0**	**0.0**	**0.0**	**835.8**

Total Emissions (tons/year) ***6,765.1***
Tons/day ***18.5***

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2056
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0139	0.0087	0.0058	0.0041	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LDT1	0.0138	0.0087	0.0058	0.0040	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LDT2	0.0138	0.0087	0.0058	0.0040	0.0030	0.0023	0.0019	0.0017	0.0015	0.0015	0.0015	0.0016	0.0018	0.0020	0.0000
	LHD1	0.0013	0.0011	0.0007	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0010	0.0008	0.0006	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	MCY	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0000
	MDV	0.0135	0.0085	0.0056	0.0040	0.0029	0.0023	0.0019	0.0016	0.0015	0.0014	0.0015	0.0016	0.0018	0.0019	0.0000
	MH	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	OBUS	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	SBUS	0.0017	0.0014	0.0009	0.0007	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000
	T6	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	T7	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0019	0.0015	0.0010	0.0007	0.0005	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0114	0.0097	0.0073	0.0058	0.0048	0.0042	0.0039	0.0038	0.0039	0.0043	0.0049	0.0059	0.0075	0.0101	0.0000
	LDT1	0.0109	0.0092	0.0069	0.0055	0.0046	0.0040	0.0037	0.0037	0.0038	0.0041	0.0048	0.0058	0.0074	0.0100	0.0000
	LDT2	0.0123	0.0105	0.0079	0.0063	0.0053	0.0046	0.0042	0.0041	0.0042	0.0045	0.0051	0.0062	0.0078	0.0104	0.0000
	LHD1	0.0521	0.0461	0.0366	0.0297	0.0246	0.0209	0.0181	0.0160	0.0145	0.0134	0.0127	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0491	0.0433	0.0344	0.0279	0.0232	0.0196	0.0170	0.0151	0.0137	0.0126	0.0120	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0116	0.0098	0.0074	0.0059	0.0049	0.0043	0.0040	0.0039	0.0040	0.0044	0.0050	0.0060	0.0077	0.0104	0.0000
	MH	0.1027	0.0893	0.0670	0.0509	0.0441	0.0411	0.0401	0.0411	0.0442	0.0493	0.0564	0.0656	0.0769	0.0000	0.0000
	OBUS	0.0548	0.0492	0.0446	0.0426	0.0406	0.0416	0.0447	0.0468	0.0541	0.0607	0.0683	0.0696	0.0898	0.0000	0.0000
	SBUS	0.0643	0.0590	0.0538	0.0484	0.0462	0.0458	0.0474	0.0508	0.0562	0.0634	0.0724	0.0834	0.0000	0.0000	0.0000
	T6	0.0418	0.0383	0.0349	0.0313	0.0299	0.0297	0.0307	0.0329	0.0364	0.0410	0.0469	0.0540	0.0623	0.0000	0.0000
	T7	0.0752	0.0689	0.0629	0.0549	0.0539	0.0535	0.0553	0.0593	0.0655	0.0739	0.0845	0.0973	0.1123	0.0000	0.0000
	UBUS	0.3910	0.3315	0.2448	0.1871	0.1482	0.1215	0.1032	0.0907	0.0826	0.0779	0.0761	0.0770	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM10
Year 2056
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.009	1.7	0.0	0.1	0.4	0.3	1.5	0.6	0.6	0.3	1.1	1.0	0.0	0.0	0.0	**7.5**
LDT1	0.001	0.3	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	**1.1**
LDT2	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.8**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.8**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.018**	**3.3**	**0.1**	**0.2**	**0.7**	**0.5**	**2.8**	**1.1**	**1.1**	**0.5**	**2.0**	**2.0**	**0.0**	**0.0**	**0.0**	**14.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.9**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.5**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**0.5**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	**0.2**
T6	0.001	0.3	0.0	0.0	0.1	0.1	0.9	0.4	0.5	0.3	1.3	1.4	0.0	0.0	0.0	**5.4**
T7	0.010	2.6	0.1	0.3	1.2	1.2	7.9	3.8	4.5	2.6	11.2	11.8	0.0	0.0	0.0	**47.1**
UBUS	0.001	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	**1.0**
Total	**0.0**	**3.5**	**0.1**	**0.4**	**1.6**	**1.5**	**9.8**	**4.6**	**5.4**	**3.1**	**13.3**	**13.5**	**0.0**	**0.0**	**0.0**	**56.9**

Total Emissions (tons/year) ***71.2***
Total Emissions (tons/day) ***0.2***

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2056
Prepared by FirstCarbon Solutions

EMFAC2011 Emission factors (g/mile)

GAS	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0129	0.0081	0.0054	0.0038	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LDT1	0.0128	0.0081	0.0054	0.0038	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LDT2	0.0128	0.0080	0.0053	0.0037	0.0028	0.0022	0.0018	0.0015	0.0014	0.0014	0.0014	0.0015	0.0017	0.0018	0.0000
	LHD1	0.0012	0.0010	0.0007	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0010	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
	MCY	0.0004	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0000
	MDV	0.0125	0.0079	0.0052	0.0037	0.0027	0.0021	0.0017	0.0015	0.0014	0.0013	0.0014	0.0015	0.0016	0.0018	0.0000
	MH	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	OBUS	0.0009	0.0007	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	SBUS	0.0016	0.0013	0.0009	0.0006	0.0004	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000
	T6	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	T7	0.0009	0.0007	0.0005	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
	UBUS	0.0017	0.0014	0.0009	0.0006	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000

EMFAC2011 Emission factors (g/mile)

DSL	**Speed (mph):**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
	LDA	0.0105	0.0090	0.0067	0.0053	0.0044	0.0039	0.0036	0.0035	0.0036	0.0039	0.0045	0.0054	0.0069	0.0093	0.0000
	LDT1	0.0100	0.0085	0.0064	0.0050	0.0042	0.0037	0.0034	0.0034	0.0035	0.0038	0.0044	0.0053	0.0068	0.0092	0.0000
	LDT2	0.0114	0.0097	0.0073	0.0058	0.0048	0.0042	0.0039	0.0038	0.0039	0.0042	0.0047	0.0057	0.0072	0.0096	0.0000
	LHD1	0.0480	0.0424	0.0336	0.0273	0.0226	0.0192	0.0166	0.0147	0.0134	0.0124	0.0117	0.0000	0.0000	0.0000	0.0000
	LHD2	0.0451	0.0399	0.0316	0.0257	0.0213	0.0181	0.0157	0.0139	0.0126	0.0116	0.0110	0.0000	0.0000	0.0000	0.0000
	MCY	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MDV	0.0107	0.0091	0.0068	0.0054	0.0045	0.0040	0.0037	0.0036	0.0037	0.0040	0.0046	0.0056	0.0071	0.0096	0.0000
	MH	0.0945	0.0821	0.0616	0.0468	0.0406	0.0378	0.0369	0.0378	0.0406	0.0453	0.0519	0.0604	0.0707	0.0000	0.0000
	OBUS	0.0504	0.0453	0.0410	0.0392	0.0374	0.0383	0.0411	0.0430	0.0498	0.0559	0.0629	0.0640	0.0826	0.0000	0.0000
	SBUS	0.0592	0.0543	0.0495	0.0445	0.0425	0.0422	0.0436	0.0468	0.0517	0.0583	0.0666	0.0767	0.0000	0.0000	0.0000
	T6	0.0384	0.0352	0.0321	0.0288	0.0275	0.0273	0.0282	0.0303	0.0335	0.0377	0.0432	0.0497	0.0573	0.0000	0.0000
	T7	0.0692	0.0634	0.0578	0.0505	0.0496	0.0492	0.0509	0.0546	0.0603	0.0680	0.0778	0.0895	0.1033	0.0000	0.0000
	UBUS	0.3597	0.3050	0.2252	0.1721	0.1363	0.1118	0.0949	0.0835	0.0760	0.0717	0.0700	0.0708	0.0000	0.0000	0.0000

City of Fresno General Plan
Motor Vehicle Emissions
PM2.5
Year 2056
Prepared by FirstCarbon Solutions

Emissions (tons/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

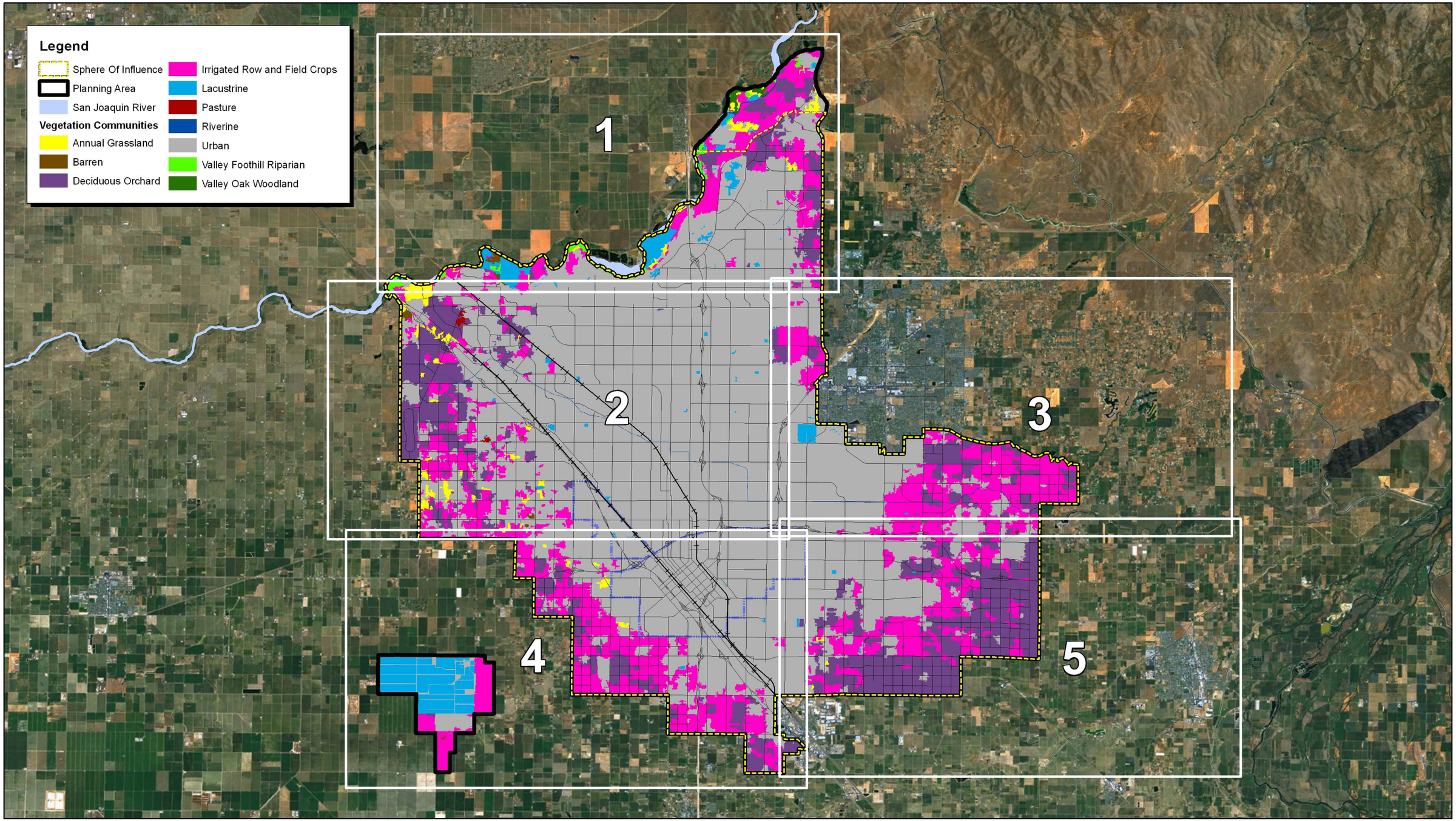
GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.009	1.6	0.0	0.1	0.3	0.3	1.4	0.5	0.5	0.3	1.0	1.0	0.0	0.0	0.0	**7.0**
LDT1	0.001	0.2	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
LDT2	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.6**
LHD1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.003	0.6	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	**2.6**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T6	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
T7	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
UBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.017**	**3.1**	**0.1**	**0.2**	**0.7**	**0.5**	**2.6**	**1.0**	**1.0**	**0.5**	**1.9**	**1.8**	**0.0**	**0.0**	**0.0**	**13.3**

DSL Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
LDA	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LDT2	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
LHD1	0.001	0.3	0.0	0.0	0.1	0.1	0.5	0.2	0.2	0.1	0.3	0.0	0.0	0.0	0.0	**1.8**
LHD2	0.000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.4**
MCY	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MDV	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
MH	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**
OBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	**0.5**
SBUS	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
T6	0.001	0.3	0.0	0.0	0.1	0.1	0.8	0.4	0.5	0.3	1.2	1.2	0.0	0.0	0.0	**5.0**
T7	0.009	2.4	0.1	0.3	1.1	1.1	7.2	3.5	4.1	2.4	10.3	10.9	0.0	0.0	0.0	**43.3**
UBUS	0.001	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	**1.0**
Total	**0.012**	**3.2**	**0.1**	**0.4**	**1.5**	**1.4**	**9.0**	**4.3**	**5.0**	**2.8**	**12.2**	**12.4**	**0.0**	**0.0**	**0.0**	**52.3**

Total Emissions (tons/year)	***65.6***
Total Emissions (tons/day)	***0.2***

Appendix C: Biological Resources

C.1 - Vegetation Communities Mapping

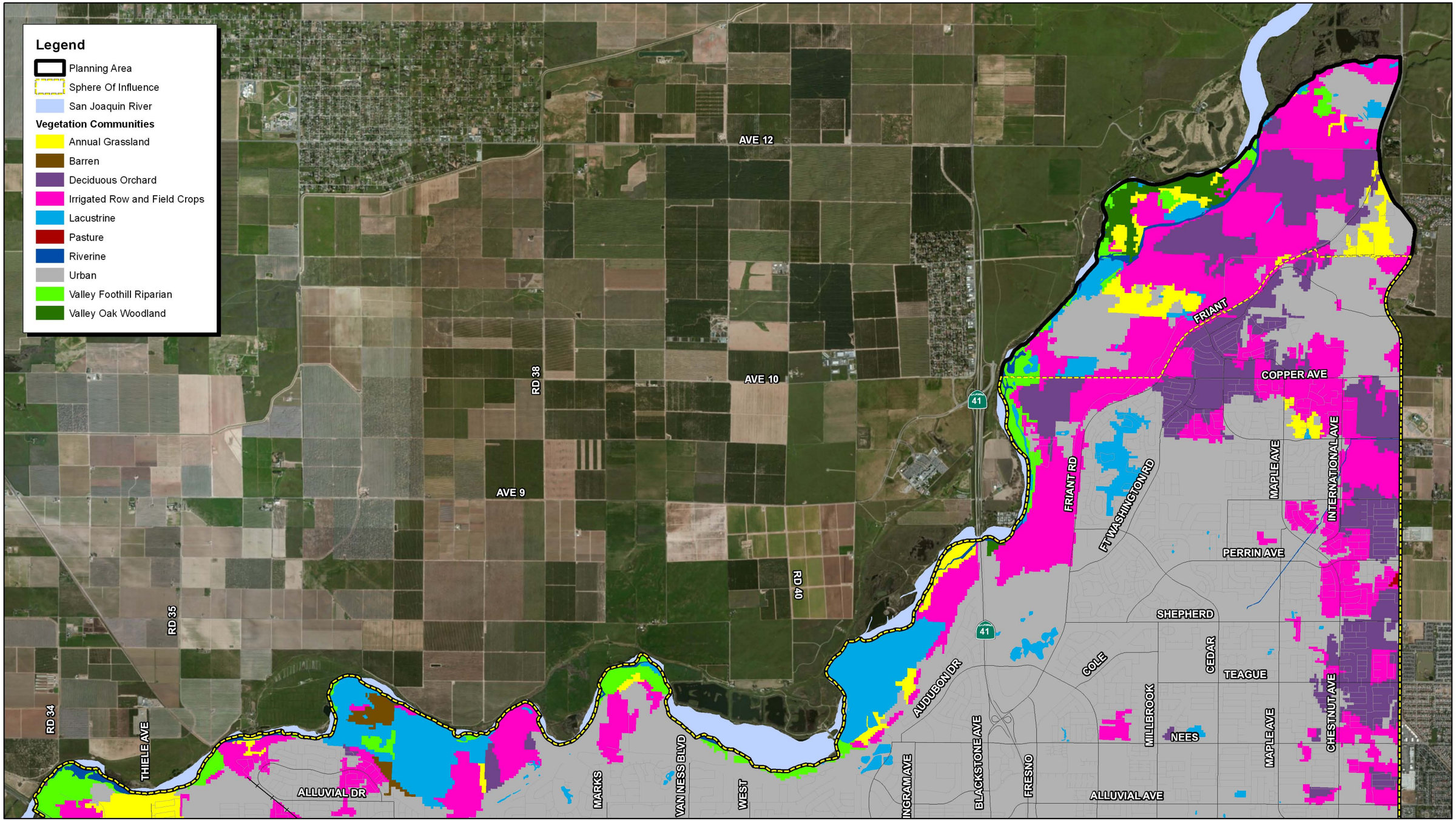


Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon SOLUTIONS

2.2 1.1 0 2.2 Miles

Exhibit 5.4-A
Vegetation Communities Index Map

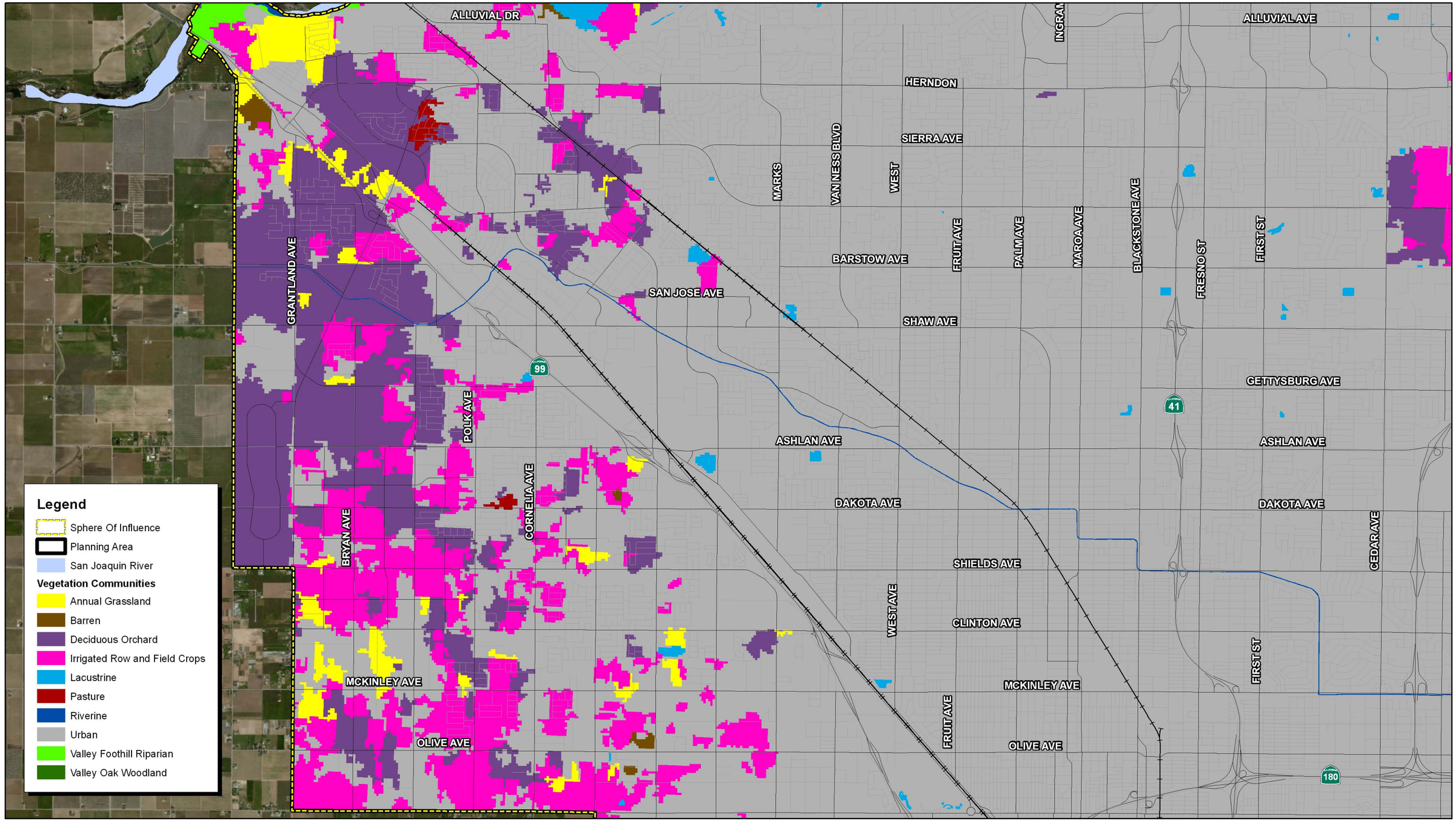


Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon SOLUTIONS

4,000 2,000 0 4,000 Feet

Exhibit 5.4-B
Vegetation Communities Map 1

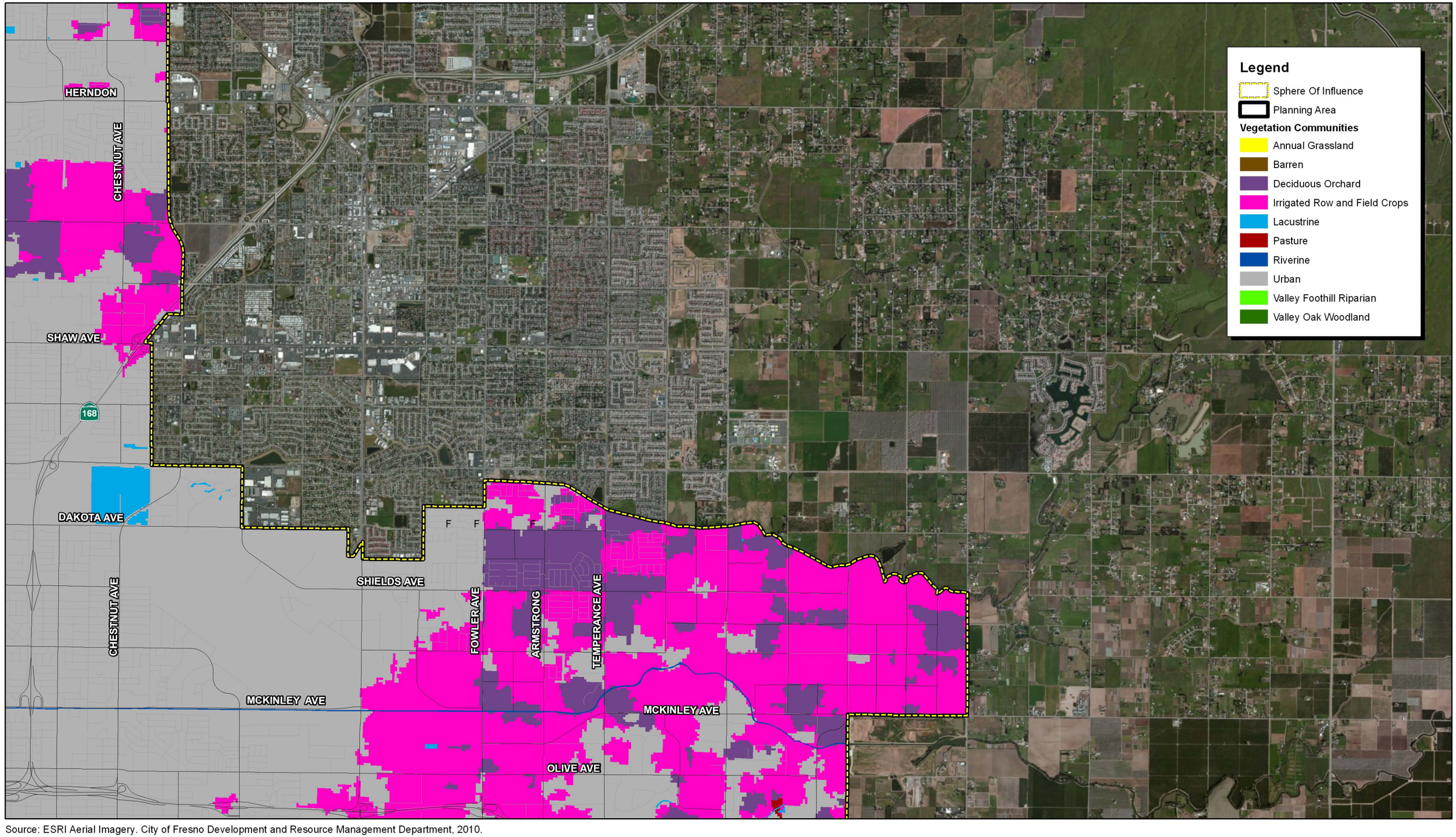


Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon SOLUTIONS

4,000 2,000 0 4,000 Feet

Exhibit 5.4-C
Vegetation Communities Map 2

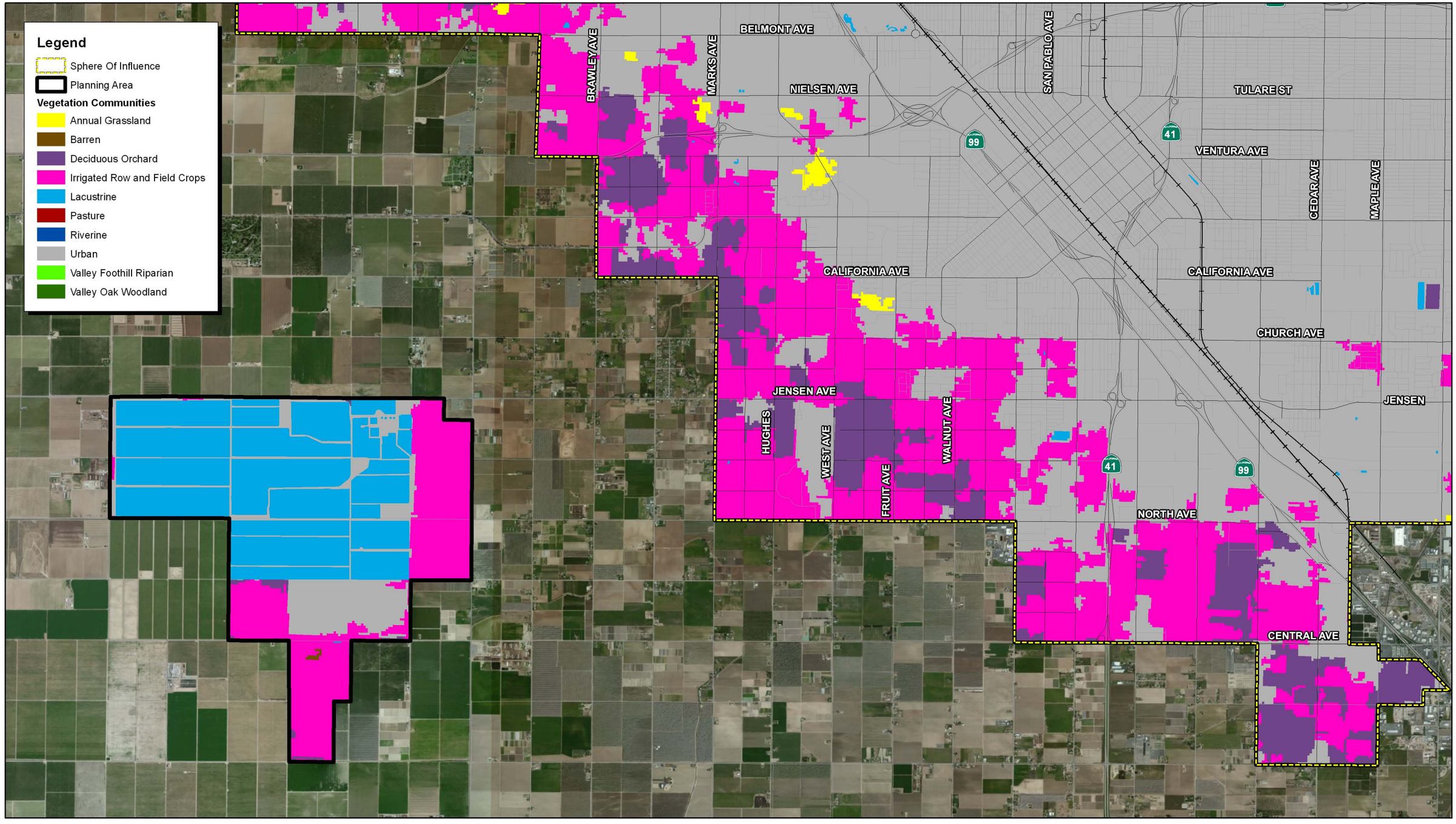


Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon SOLUTIONS

4,000 2,000 0 4,000
Feet

Exhibit 5.4-D
Vegetation Communities Map 3

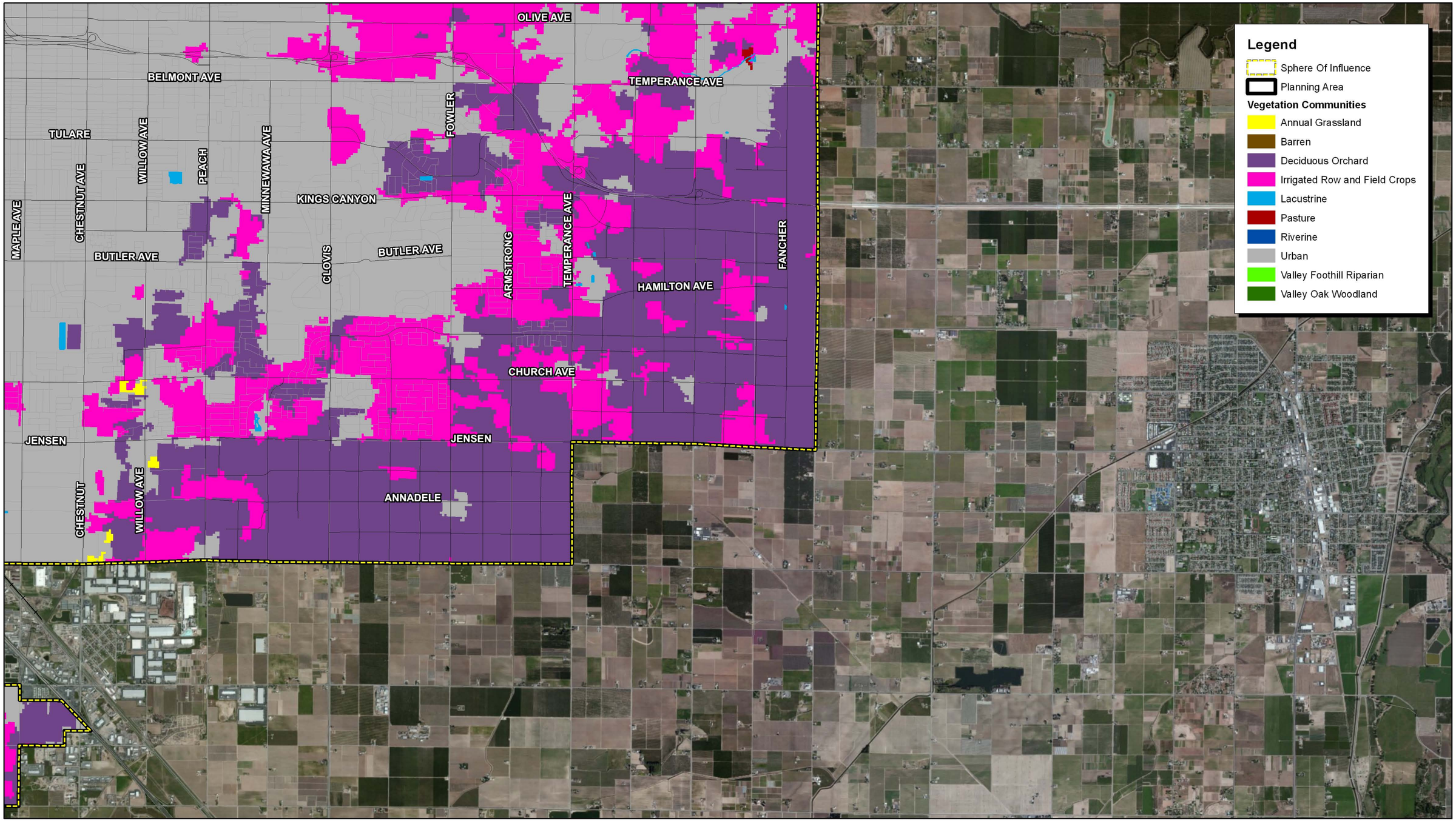


Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon SOLUTIONS

4,000 2,000 0 4,000 Feet

Exhibit 5.4-E
Vegetation Communities Map 4



Source: ESRI Aerial Imagery. City of Fresno Development and Resource Management Department, 2010.

FirstCarbon® SOLUTIONS

4,000 2,000 0 4,000
Feet

Exhibit 5.4-F
Vegetation Communities Map 5

C.2 - California Native Plant Society Inventory of Rare and Endangered Plants

CNPS Inventory of Rare and Endangered Plants

Status: Plant Press Manager window with 12 items - Wed, Aug. 15, 2012 18:12 c

- During each visit, we provide you with an empty "Plant Press" for collecting items of interest.
- Several report formats are available. Use the CSV and XML options to download raw data.

Reformat list as: Standard List - with Plant Press controls

DELETE unchecked items | check all | check none

open	save	scientific	common	family	CNPS
		Castilleja campestris ssp. succulenta	succulent owl's-clover	Orobanchaceae	List 1B.2
		Caulanthus californicus	California jewel-flower	Brassicaceae	List 1B.1
		Downingia pusilla	dwarf downingia	Campanulaceae	List 2.2
		Eryngium spinosepalum	spiny-sepaled button-celery	Apiaceae	List 1B.2
		Imperata brevifolia	California satintail	Poaceae	List 2.1
		Leptosiphon serrulatus	Madera leptosiphon	Polemoniaceae	List 1B.2
		Orcuttia inaequalis	San Joaquin Valley Orcutt grass	Poaceae	List 1B.1
		Orcuttia pilosa	hairy Orcutt grass	Poaceae	List 1B.1
		Pseudobahia bahiifolia	Hartweg's golden sunburst	Asteraceae	List 1B.1
		Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	List 1B.2
		Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	List 1B.1
		Tuctoria greenei	Greene's tuctoria	Poaceae	List 1B.1

DELETE unchecked items | check all | check none

C.3 - California Natural Diversity Database

Multiple Occurrences per Page

California Department of Fish and Game

California Natural Diversity Database

Ambystoma californiense **Element Code:** AAAAA01180

California tiger salamander

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G2G3
	State:	Threatened		**State:**	S2S3
	Other:	DFG_SSC-Species of Special Concern, IUCN_VU-Vulnerable			
Habitat:	**General:**	CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.			
	Micro:	NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING			

Occurrence No.	49	**Map Index:**	14529	**EO Index:**	28414	**Element Last Seen:**	1974-04-02
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1974-04-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-05-19

Quad Summary: Lanes Bridge (3611987), Gregg (3611988), Little Table Mtn. (3711917), Daulton (3711918)

County Summary: Madera

Lat/Long:	36.98800 / -119.88182	**Accuracy:**	1 mile
UTM:	Zone-11 N4097423 E243516	**Elevation (ft):**	375
PLSS:	T11S, R19E, Sec. 10 (M)	**Acres:**	0.0

Location: THE GENERAL AREA EAST OF ROAD 36 AND NORTH OF AVE 16. WEST OF FRIANT.

Detailed Location: 3 SITES: NE OF AVE 16 & ROAD 37, NW OF AVE 16 & ROAD 37, & 1.6 TO 2.6 MILES SW OF HWY 145 & ROAD 38.

Ecological: 2009 AERIAL PHOTO SHOWS THAT THIS AREA HAS UNDERGONE SIGNIFICANT DEVELOPMENT. THERE IS STILL HABITAT IN SURROUNDING AREAS.

General: L. DUNN FIELD NOTES #2 & 3 FROM 13 FEB 74 & NOTE #12 FROM 2 APRIL 1974.

Owner/Manager: UNKNOWN

Occurrence No.	76	**Map Index:**	37893	**EO Index:**	32900	**Element Last Seen:**	1973-03-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1973-03-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-06-17

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.98483 / -119.66352	**Accuracy:**	3/5 mile
UTM:	Zone-11 N4096505 E262939	**Elevation (ft):**	680
PLSS:	T11S, R21E, Sec. 10 (M)	**Acres:**	0.0

Location: ALONG MILLERTON ROAD, SOUTH OF MILLERTON LAKE STATE RECREATION AREA, EAST OF FRIANT.

Detailed Location:

Ecological: 2009 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL NATURAL HABITAT WITH MINIMAL DISTURBANCES.

General: J. BRODE FIELD NOTES #186.

Owner/Manager: UNKNOWN

Occurrence No.	91	**Map Index:**	14875	**EO Index:**	28383	**Element Last Seen:**	2005-04-21
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-04-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-09

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.95062 / -119.69310	**Accurracy:**	specific area
UTM:	Zone-11 N4092784 E260198	**Elevation (ft):**	475
PLSS:	T11S, R21E, Sec. 29 (M)	**Acres:**	5.0

Location:	POOL ON EAST SIDE OF FRIANT-KERN CANAL AT MILEPOST 003.73, 1 AIR MILE NW OF THE CANAL/AUBERRY RD X-ING, SE OF FRIANT.
Detailed Location:	1974 OBS DESCRIBED AS "VERNAL POND ABOUT 0.12 ACRE & 3-4 FT DEEP, APPROX 2.5 MI SSW OF FRIANT, ON E SIDE OF FRIANT-KERN CANAL" (DUNN POND #5). REMAPPED TO 2005 ESRP COORDINATES (SITE ID FKC-L-003.73.1) WHICH IS SIMILAR TO DUNN'S MAP.
Ecological:	CATTLE PRESENT (1974). HABITAT DESCRIBED AS A TURBID VERNAL POOL WITH CATTLE DISTURBANCE (2005).
General:	LARVAE OBSERVED AS PRESENT ON 1 MAY 1974. AT LEAST ONE OBSERVED ON 21 APR 2005 BY J. KOKX.
Owner/Manager:	USBOR, PVT

Occurrence No.	93	**Map Index:**	14918	**EO Index:**	28376	**Element Last Seen:**	1974-05-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1974-05-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-06-17

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.96216 / -119.66070	**Accurracy:**	1 mile
UTM:	Zone-11 N4093983 E263120	**Elevation (ft):**	600
PLSS:	T11S, R21E, Sec. 22 (M)	**Acres:**	0.0

Location:	3.4 ROAD MILES ON DIRT ROAD OFF MILLERTON RD, 3 AIR MILES SE OF FRIANT.
Detailed Location:	
Ecological:	VERNAL POOL. 2009 AERIAL PHOTO SHOWS THAT THIS AREA IS STILL PRIMARILY NATURAL HABITAT WITH MINIMAL DISTURBANCES.
General:	L. DUNN FIELD NOTES #13.
Owner/Manager:	UNKNOWN

Occurrence No.	94	**Map Index:**	14592	**EO Index:**	28380	**Element Last Seen:**	1995-04-04
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-04-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-20

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96855 / -119.84268	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4095160 E246936	**Elevation (ft):**	375
PLSS:	T11S, R19E, Sec. 13 (M)	**Acres:**	127.6

Location:	2-3 MI W OF HWY 41 ON THE N SIDE OF AVE 15, W OF LITTLE TABLE MOUNTAIN.
Detailed Location:	SITE IS LOCATED ON A SIX-SECTION PIECE OF PROPERTY WHICH IS QUITE NEAR TWO PROPOSED NEW CITIES, RIO MESA AND CASTLE COOK DEVELOPMENT.
Ecological:	HABITAT DESCRIBED AS CLAYPAN VERNAL POOLS & SWALES IN NON-NATIVE GRASSLAND. OTHER TAXA PRESENT INCLUDE SCAPHIOPUS HAMMONDII, BUFO BOREAS, HYLA REGILLA, BRANCHINECTA LYNCHI, & LINDERIELLA OCCIDENTALIS.
General:	UNKNOWN NUMBER OBSERVED ON 2 APR 1974, 3 MI W OF HWY 41 (L. DUNN FIELD NOTES #11). UNKNOWN NUMBER OBSERVED DURING SPRING OF 1993. 4 LARVAE OBS IN ONE POOL & 3 IN ANOTHER POOL 0.4 MI W OF RD 39-1/2 ON 4 APR 1995.
Owner/Manager:	PVT

Occurrence No.	124	**Map Index:**	32551	**EO Index:**	1755	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-05-29

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91077 / -119.73529	**Accurracy:**	specific area
UTM:	Zone-11 N4088468 E256314	**Elevation (ft):**	375
PLSS:	T12S, R20E, Sec. 01 (M)	**Acres:**	5.6

Location:	1.2 KM SOUTH OF WILLOW AVENUE X FRIANT ROAD; 10 KM SSW OF FRIANT.
Detailed Location:	3 POOLS AT SITE: 1 LARGE POOL IN NORTHERN REGION AND 2 SMALL POOLS IN SOUTHERN REGION.
Ecological:	1992: HABITAT IS LARGER POOL IN NORTHERN AREA OF SITE (~ 1 ACRE) IN NON-NATIVE GRASSLAND. ROLLING HILL TOPOGRAPHY. DEGRADED BY CONSTRUCTION OF RESIDENTIAL ROAD. 2009 AERIAL PHOTO SHOWS SITE DEVELOPED BY GOLF COURSE & RURAL RESIDENTIAL.
General:	"MANY" OBSERVED; WESTERN SPADEFOOT TOAD AND BRANCHINECTA LYNCHI ALSO OBSERVED AT SITE.
Owner/Manager:	PVT

Occurrence No.	125	**Map Index:**	22172	**EO Index:**	18452	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-02-18

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.98955 / -119.69674	**Accurracy:**	80 meters
UTM:	Zone-11 N4097113 E259997	**Elevation (ft):**	580
PLSS:	T11S, R21E, Sec. 08 (M)	**Acres:**	0.0

Location:	ON THE SOUTH SIDE OF MILLERTON ROAD, 0.75 MILE EAST OF FRIANT.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF A CATTLE POND SURROUNDED BY NON-NATIVE GRASSLAND HABITAT.
General:	"MANY" OBSERVED.
Owner/Manager:	PVT

Occurrence No.	126	**Map Index:**	22173	**EO Index:**	27243	**Element Last Seen:**	2008-03-13
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-03-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-12-03

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.98523 / -119.68572	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4096605 E260964	**Elevation (ft):**	575
PLSS:	T11S, R21E, Sec. 09 (M)	**Acres:**	0.0

Location:	ON THE SOUTH SIDE OF MILLERTON ROAD, 1.25 MILES EAST OF FRIANT.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF 3 VERNAL POOLS SURROUNDED BY NON-NATIVE GRASSLAND HABITAT (1992). ON 13 MAR 2008, VERNAL POOL W/CTS HAD AN AVERAGE DEPTH OF 2 INCHES. VISIBLE DISTURBANCE CONSISTED OF A DIRT ROAD RUNNING E-W THROUGH VERNAL POOL/SWALE.
General:	IN 1992, "MANY" OBSERVED. 30 LARVAE & 5 EGGS OBSERVED IN ONE VERNAL POOL WITHIN VERNAL POOL/SWALE COMPLEX ON 13 MAR 2008. POOL WAS DRY ON 19 MAR 2008
Owner/Manager:	DPR-MILLERTON LAKE SRA

Occurrence No.	127	**Map Index:**	22171	**EO Index:**	18450	**Element Last Seen:**	2008-03-12
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-03-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-11

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.97664 / -119.71324	**Accurracy:**	specific area
UTM:	Zone-11 N4095722 E258487	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 18 (M)	**Acres:**	708.9

Location:	BELOW FRIANT DAM. EAST OF FRIANT ROAD AND WEST OF THE FRIANT-KERN CANAL, SOUTH OF FRIANT.
Detailed Location:	
Ecological:	SALAMANDERS FOUND IN AN EXTENSIVE VERNAL POOL HABITAT IN GRASSLAND. SPADEFOOT TOADS ALSO VERY COMMON. WESTERN TOAD LARVAE & LINDERIELLA OCCIDENTALIS ALSO OBSERVED.
General:	MVZ 164875 COLL 25 MAR 1973 FROM THIS AREA. 5 APR 1992: ~100 ADULTS & 500 JUV OBS IN 7 POOLS. 20+ LARVAE OBS 19 MAR 1993 & A 3" LONG ADULT OBS 30 MAR 1993, IN ONE OF LARGEST POOLS IN COMPLEX. 10 LARVAE OBS IN LARGE VERNAL POOL 12 MAR 2008.
Owner/Manager:	PVT-FRIANT RANCH LLC

Occurrence No.	135	**Map Index:**	24097	**EO Index:**	18715	**Element Last Seen:**	1993-03-17
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-03-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-09-08

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.95557 / -119.71450	**Accurracy:**	specific area
UTM:	Zone-11 N4093387 E258308	**Elevation (ft):**	440
PLSS:	T11S, R21E, Sec. 19 (M)	**Acres:**	32.7

Location:	1 MILE ESE OF LOST LAKE, 2 MILES SOUTH OF FRIANT.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF A VERNAL POOL COMMUNITY, VEGETATED BY PLAGIOBOTHRYS SP, BRODIAEA PULCHELLUM, ESCHSCHOLZIA SP, ETC.
General:	5 JUVENILES OBSERVED IN 1993.
Owner/Manager:	UNKNOWN

Occurrence No.	163	**Map Index:**	24430	**EO Index:**	6581	**Element Last Seen:**	2004-03-17
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-03

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96414 / -119.76555	**Accuracy:**	specific area
UTM:	Zone-11 N4094469 E253789	**Elevation (ft):**	439
PLSS:	T11S, R20E, Sec. 23 (M)	**Acres:**	8.0

Location:	ALONG MADERA CANAL, 0.3 MILE N OF RD 204, ALONG SOUTH END OF LITTLE TABLE MOUNTAIN, ABOUT 3.1 MILES SW OF THE FRIANT PO.
Detailed Location:	2004: MAPPED TO PROVIDED COORDINATES; SITE NAME MAC-R-005.66.1 AT CANAL MILEPOST 005.66.
Ecological:	HABITAT IN 2004 DESCRIBED AS A CLEAR VERNAL POOL AT CANAL ROAD EDGE (DAMMED BY ROAD); DRAINS INTO CULVERT WHEN FULL; EMERGENT VEG INCL JUNCUS SP. & ERYNGIUM SP.; WATER CLEAR-BRACKISH & DEEP; GOOD FOR CTS.
General:	1993: ONE JUVENILE OBSERVED; SITE QUALITY DIMINISHED BY CONCRETE BLOCKS PILED ALONG THE BANK. 2004: DATA NOT CLEAR AS TO WHEN OR HOW MANY WERE PRESENT, BUT ASSUME AT LEAST ONE WAS OBSERVED ON 17 MAR 2004 BY J. KOKX.
Owner/Manager:	USBOR

Occurrence No.	164	**Map Index:**	24601	**EO Index:**	6394	**Element Last Seen:**	1993-03-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-03-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-09-16

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.99778 / -119.80560	**Accuracy:**	80 meters
UTM:	Zone-11 N4098306 E250333	**Elevation (ft):**	420
PLSS:	T11S, R20E, Sec. 05 (M)	**Acres:**	0.0

Location:	ALONG MADERA CANAL, 0.6 MILE WEST OF HWY 41 AND 2.2 MILES NORTH OF AVENUE 15, WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	
Ecological:	
General:	ONE JUVENILE OBSERVED IN 1993.
Owner/Manager:	USBOR

Occurrence No.	222	**Map Index:**	25584	**EO Index:**	5486	**Element Last Seen:**	1991-04-15
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-20

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.98806 / -119.75621	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4097099 E254698	**Elevation (ft):**	440
PLSS:	T11S, R20E, Sec. 11 (M)	**Acres:**	0.0

Location:	WEST SIDE OF ROAD 204, 0.7 MILE SOUTH OF HWY 145, ON THE EAST SIDE OF LITTLE TABLE MOUNTAIN.
Detailed Location:	SHAFFER SITE #107. LOCATED ON THE URRUTINA RANCH.
Ecological:	HABITAT CONSISTS OF A VERNAL POOL.
General:	THERE IS A VERY GENERALIZED RECORD OF CTS LARVA OBSERVED BY DUNN IN A VERNAL POOL ABOUT 3 MILES WEST OF FRIANT DURING SPRING 1969. CTS PRESENT ON 15 APR 1991; NUMBER AND LIFESTAGE UNKNOWN.
Owner/Manager:	PVT

Occurrence No.	223	**Map Index:**	24599	**EO Index:**	5487	**Element Last Seen:**	2005-03-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-03-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-20

Quad Summary:	Friant (3611986), Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.97667 / -119.75240	**Accurracy:**	specific area
UTM:	Zone-11 N4095826 E255000	**Elevation (ft):**	435
PLSS:	T11S, R20E, Sec. 14 (M)	**Acres:**	18.0

Location:	IN THE AREA OF MADERA CANAL & ROAD 204, 1.5 MILES SOUTH OF HWY 145, ON THE SE SIDE OF LITTLE TABLE MOUNTAIN.
Detailed Location:	JUST EAST OF ROAD 204 IN 1991; SHAFFER SITE #111; LOCATED ON THE URRUTINA RANCH. IN 2005, ABOUT 0.1 MILES EAST OF RD 204 ON N SIDE OF CANAL, MILE POST 4.06 ; POOL ID MAC-R-004.06.1.
Ecological:	HABITAT CONSISTED OF AN ARTIFICIAL POND (1991). 2005: TEA-COLORED VERNAL POOL.
General:	VERY GENERAL RECORD OF LARVA OBS BY DUNN IN VERNAL POOL ABOUT 3 MILES W OF FRIANT DURING SPRING 1969. CTS PRESENT ON 15 APR 1991. LARVAL EGG MASSES PRESENT ON 3 MAR 2005.
Owner/Manager:	USBOR, PVT

Occurrence No.	322	**Map Index:**	33076	**EO Index:**	19891	**Element Last Seen:**	1994-03-30
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-03-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-09-10

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.96660 / -119.63658	**Accurracy:**	specific area
UTM:	Zone-11 N4094416 E265281	**Elevation (ft):**	660
PLSS:	T11S, R21E, Sec. 13 (M)	**Acres:**	9.7

Location: NORTH SIDE OF AUBERRY ROAD, 0.6 ROAD MILES WEST OF MILLERTON ROAD JUNCTION, APPROXIMATELY 4.5 MILES ESE OF FRIANT.

Detailed Location: 2 VERNAL POOLS NEAR ROAD AND OLD RAILROAD GRADE

Ecological: VERNAL POOLS IN BLUE OAK WOODLAND, AUGMENTED BY RUNOFF FROM ROAD AND RAILROAD GRADE.

General: COLLECTION #RS-94-06, DEPOSITED AT DFG-IFD, AND #RS-94-07, DEPOSITED AT UCD. CAS# 199424, LARVA. 800 TADPOLES OBSERVED (1994). POOLS ALSO CONTAIN SPADEFOOT TOAD TADPOLES. SITE COULD BE PROTECTED BY AN EASEMENT.

Owner/Manager: PVT

Occurrence No.	583	**Map Index:**	46277	**EO Index:**	46277	**Element Last Seen:**	1936-05-16
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1936-05-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-08-20

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accurracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	300
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location:

Ecological:

General: 1879 RECORD FROM THE USNM (#11794), NO OTHER INFORMATION GIVEN. CORNELL UNIVERSITY MUSEUM OF VERTEBRATES # 3017 (2 SPECIMENS) COLLECTED 16 MAY 1936 BY L.F. HADSELL. JENNINGS CONSIDERS THIS SITE EXTIRPATED.

Owner/Manager: UNKNOWN

Occurrence No.	613	**Map Index:**	46427	**EO Index:**	46427	**Element Last Seen:**	1974-05-03
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1974-05-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-11-07

Quad Summary:	Clovis (3611976)
County Summary:	Fresno

Lat/Long:	36.85063 / -119.68563	**Accurracy:**	1 mile
UTM:	Zone-11 N4081669 E260551	**Elevation (ft):**	380
PLSS:	T12S, R21E, Sec. 33 (M)	**Acres:**	0.0

Location:	WEST SIDE OF THE FRIANT-KERN CANAL, 1.5 MILES NORTHWEST OF HWY 168. NORTH OF CLOVIS.
Detailed Location:	
Ecological:	VERNAL POOL.
General:	OBSERVATION BY L.G. DUNN (DFG) DURING 1-3 MAY 1974 SURVEY. JENNINGS CONSIDERS THIS SITE EXTIRPATED.
Owner/Manager:	UNKNOWN

Occurrence No.	624	**Map Index:**	46539	**EO Index:**	46539	**Element Last Seen:**	1984-03-13
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1984-03-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-05-21

Quad Summary:	Friant (3611986), Millerton Lake West (3711916)
County Summary:	Madera

Lat/Long:	36.99674 / -119.73696	**Accurracy:**	2/5 mile
UTM:	Zone-11 N4098012 E256439	**Elevation (ft):**	460
PLSS:	T11S, R20E, Sec. 01 (M)	**Acres:**	0.0

Location:	NORTHWEST OF MADERA CANAL, EAST OF ROAD 204, VICINITY OF JUNCTION OF ROAD 205 AND 206.
Detailed Location:	POOL IN VICINITY OF MADERA CANAL & ROAD 205, W OF FRIANT. POND AT JUNCTION OF ROADS 206 & 205, & AT ROAD 205, 0.5 MI EAST OF ROAD 204. WNW OF FRIANT.
Ecological:	2007 & 2009 AERIAL PHOTOS SHOW THAT THE SITE OF THIS OCCURRENCE HAS BEEN CONVERTED TO AGRICULTURE. THERE IS STILL HABITAT TO THE NORTH, ON THE NORTH SIDE OF ROAD 205.
General:	FOR MADERA CANAL & ROAD 205 OBSERVATION, NO SPECIFIC DATE GIVEN, BUT PRIOR TO 1968. CAS #178430 COLLECTED 25 MAR 1982. UMMZ #188522 & 188523 COLLECTED 13 MARCH 1984 BY BOB HANSEN.
Owner/Manager:	UNKNOWN

Occurrence No.	626	**Map Index:**	46543	**EO Index:**	46543	**Element Last Seen:**	2005-02-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-02-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-04

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.96183 / -119.68887	**Accurracy:**	80 meters
UTM:	Zone-11 N4094017 E260610	**Elevation (ft):**	475
PLSS:	T11S, R21E, Sec. 21 (M)	**Acres:**	0.0

Location:	POOL ON EAST SIDE OF FRIANT-KERN CANAL AT MILEPOST 2.83, 1.4 AIR MILES NNW OF THE CANAL/AUBERRY RD INTERSECTION, FRIANT.
Detailed Location:	ORIGINALLY MAPPED TO 1974 DESCRIPTION OF "VERNAL POOL ON EAST SIDE OF FRIANT-KERN CANAL, 2 MILES NW AUBERRY RD, 475FT ELEV" AS A 600M RADIUS CIRCLE. RE-MAPPED TO 2005 ESRP COORDINATES, SITE NAME FKC-L-002.83.1.
Ecological:	HABITAT DESCRIBED AS A TEA-COLORED VERNAL POOL (2005).
General:	UKNOWN NUMBER OBSERVED ON 1-3 MAY 1974, & LATER CONSIDERED EXTIRPATED BY M. JENNINGS & M. HAYES (1992). AT LEAST ONE CTS LARVAE OBSERVED (2CM LONG) ON 23 FEB 2005 BY F. VANG, & CONSIDERED EXTREMELY SMALL.
Owner/Manager:	USBOR, PVT

Occurrence No.	656	**Map Index:**	47430	**EO Index:**	47430	**Element Last Seen:**	2002-02-23
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-03-14

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.92358 / -119.71469	**Accurracy:**	specific area
UTM:	Zone-11 N4089837 E258190	**Elevation (ft):**	330
PLSS:	T12S, R21E, Sec. 06 (M)	**Acres:**	13.1

Location:	SOUTH OF LITTLE DRY CREEK AND WEST OF AUBERRY ROAD, 4.5 MILES SOUTH OF FRIANT
Detailed Location:	SURROUNDING LAND IS DESTINED TO BECOME A MITIGATION BANK.
Ecological:	HABITAT CONSISTS OF GRAZED ANNUAL GRASSLAND, WITH A RIPARIAN CORRIDOR CLOSE BY; TOPOGRAPHY IS MADE UP OF NUMEROUS MOUNDS/HARDPAN DEPRESSIONS, WITH SQUIRRELS AND GOPHERS. SITE IS WASHED OUT REGULARLY FROM PRECIPITATION OR SNOW-MELT RUN-OFF.
General:	DOZENS OF JUVENILES OBSERVED ON 10 FEB 2002; COLLECTION MADE AND DEPOSITED AT CAS.
Owner/Manager:	PVT

Occurrence No.	708	**Map Index:**	49019	**EO Index:**	49019	**Element Last Seen:**	2002-02-08
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-10-15

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.92790 / -119.71173	**Accurracy:**	80 meters
UTM:	Zone-11 N4090309 E258467	**Elevation (ft):**	330
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	0.0

Location: 0.3 MILES WEST OF AUBERRY ROAD, SOUTH OF LITTLE DRY CREEK, 4 MILES SOUTH OF FRIANT

Detailed Location: SITE IS PROPOSED FOR A MITIGATION BANK.

Ecological: HABITAT CONSISTS OF A FLOOD CONTROL THAT FLOWS FROM DRY CREEK RESERVOIR THROUGH ANNUAL GRASSLANDS; NUMEROUS MOUNDS AND HARDPAN DEPRESSIONS.

General: DOZENS OF LARVAE COLLECTED ON 8 FEB 2002, THEN DEPOSITED AT CAS (MRJ #1539).

Owner/Manager: PVT

Occurrence No.	732	**Map Index:**	41666	**EO Index:**	51282	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94479 / -119.76380	**Accurracy:**	80 meters
UTM:	Zone-11 N4092317 E253883	**Elevation (ft):**	390
PLSS:	T11S, R20E, Sec. 26 (M)	**Acres:**	0.0

Location: WEST OF CREEK THAT DRAINS LITTLE TABLE MTN , 2 MILES SE OF ROAD 204 & HWY 41, 2.2 MILES NE OF AVENUE 12 & HIGHWAY 41

Detailed Location: VERNAL POOL, CREEK DRAINS TO, AND IS 1 MILE NORTHWEST OF SAN JOAQUIN RIVER MILE 261.

Ecological: VERNAL POOL IN CURRENTLY-GRAZED NON-NATIVE GRASSLAND; SURROUNDING LAND USE IS AGRICULTURE, HOUSING DEVELOPMENT.

General: LARVAL CTS OBSERVED IN FEB 2001.

Owner/Manager: PVT

Occurrence No.	733	**Map Index:**	51283	**EO Index:**	51283	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.93709 / -119.78719	**Accurracy:**	80 meters
UTM:	Zone-11 N4091523 E251774	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 33 (M)	**Acres:**	0.0

Location: 0.4 MILE EAST OF HIGHWAY 41 AND 0.9 MILE NORTH OF AVENUE 12, 14 MILES EAST OF MADERA

Detailed Location:

Ecological: HABITAT CONSISTS OF A VERNAL POOL IN CURRENTLY-GRAZED NON-NATIVE GRASSLAND; SURROUNDING LAND USE IS AGRICULTURE AND COMMERCIAL/URBAN.

General: LARVAL CTS OBSERVED IN FEB 2001.

Owner/Manager: PVT

Occurrence No.	734	**Map Index:**	45182	**EO Index:**	51285	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.90552 / -119.78512	**Accurracy:**	80 meters
UTM:	Zone-11 N4088015 E251857	**Elevation (ft):**	350
PLSS:	T12S, R20E, Sec. 09 (M)	**Acres:**	0.0

Location:	0.4 MILE EAST OF HIGHWAY 41 AND 0.3 MILE SOUTH OF AVENUE 11, 4.5 MILES NORTH OF PINEDALE
Detailed Location:	
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS NOW USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	LARVAL CTS OBSERVED DURING FEB 2001.
Owner/Manager:	PVT

Occurrence No.	735	**Map Index:**	51287	**EO Index:**	51287	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.92715 / -119.77153	**Accurracy:**	80 meters
UTM:	Zone-11 N4090379 E253138	**Elevation (ft):**	350
PLSS:	T11S, R20E, Sec. 34 (M)	**Acres:**	0.0

Location:	1.3 MILES EAST OF HIGHWAY 41 AND 0.2 MILE NE OF AVENUE 12 "CURVE," 15 MILES EAST OF MADERA
Detailed Location:	
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS NOW USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	LARVAL CTS OBSERVED DURING FEB 2001.
Owner/Manager:	PVT

Occurrence No.	888	**Map Index:**	66458	**EO Index:**	66562	**Element Last Seen:**	2006-02-26
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-02-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-02-20

Quad Summary:	Clovis (3611976)
County Summary:	Fresno

Lat/Long:	36.87369 / -119.67091	**Accurracy:**	80 meters
UTM:	Zone-11 N4084192 E261935	**Elevation (ft):**	400
PLSS:	T12S, R21E, Sec. 22 (M)	**Acres:**	0.0

Location:	NORTH SIDE OF A CONSTRUCTED FLOOD CONTROL CHANNEL, 0.25 MILE DOWNSTREAM OF BIG CREEK DAM, 3.5 MILES NE OF CLOVIS.
Detailed Location:	THE SWALE THAT CONTAINED THE LARVAE WAS IMMEDIATELY ADJACENT TO A CHANNEL THAT FRESNO METROPOLITAN FLOOD CONTROL DISTRICT CONSTRUCTED AND USES TO RELEASE WATER DOWNSTREAM. SURROUNDING AREA CONTAINS SEASONAL WETLANDS AND VERNAL POOLS.
Ecological:	HABITAT CONSISTS OF A SWALE CONTAINING ~3" OF WATER; SWALE APPEARS TO BE PART OF THE ORIGINAL CREEK MEANDER THAT WAS CUT OFF WHEN BIG CREEK DAM WAS CONSTRUCTED IN 1948. THE ADJACENT FLOOD CONTROL CHANNEL CONTAINS FISH AND BULLFROGS.
General:	2 CTS LARVAE OBSERVED ON 26 FEB 2006.
Owner/Manager:	UNKNOWN

Occurrence No.	911	**Map Index:**	68133	**EO Index:**	68277	**Element Last Seen:**	2006-02-22
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-02-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-02-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91406 / -119.70718	**Accurracy:**	80 meters
UTM:	Zone-11 N4088763 E258828	**Elevation (ft):**	410
PLSS:	T12S, R21E, Sec. 05 (M)	**Acres:**	0.0

Location:	ABOUT 5MI SOUTH OF FRIANT, 1.3MI NNE OF INTERSECTION OF COPPER AVE AND AUBERRY RD.
Detailed Location:	
Ecological:	VERNAL POOL LOCATED IN MIDDLE OF A DRY FARMED FIELD.
General:	5 LARVAE OBSERVED ON 22 FEB 2006.
Owner/Manager:	PVT

Occurrence No.	1027	**Map Index:**	72280	**EO Index:**	73096	**Element Last Seen:**	2004-03-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.89482 / -119.63740	**Accurracy:**	specific area
UTM:	Zone-11 N4086453 E264987	**Elevation (ft):**	465
PLSS:	T12S, R21E, Sec. 13 (M)	**Acres:**	9.0

Location: FRIANT-KERN CANAL @ MILEPOSTS 010.17, 010.24 (E OF BRIDGE), 2.4MI S OF OWENS MT, 1.1MI NE OF N DEWOLF AVE @ BEHYMER AVE.

Detailed Location: SERIES OF TWO POOLS; WEST POOL ON SOUTH SIDE OF CANAL (POOL IDS FKC-R-010.17.1) AND EAST POOL ON NORTH SIDE OF CANAL (ID FKC-L-010.24.1). MAPPED TO PROVIDED COORDINATES IN ESRP SHAPEFILE.

Ecological: WEST POOL: CLEAR POOL W/ JUNCUS SP, & GRASSES IN SURROUNDING AREA. EAST POOL: TEA COLORED & VERY DEEP (2005); AND VERY CLEAR, LONG & NARROW VERNAL POOL WITH LOTS OF EMERGENT VEG (2004).

General: 2 SMALL LARVAE (1-2 DAYS OLD) WERE IDENTIFIED IN VERNAL POOL SAMPLES FROM EAST POOL FROM 11 MAR 2004 BY J. KOKX.

Owner/Manager: USBOR, PVT

Spea hammondii

Element Code: AAABF02020

western spadefoot

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_NT-Near Threatened			
Habitat:	**General:**	OCCURS PRIMARILY IN GRASSLAND HABITATS, BUT CAN BE FOUND IN VALLEY-FOOTHILL HARDWOOD WOODLANDS.			
	Micro:	VERNAL POOLS ARE ESSENTIAL FOR BREEDING AND EGG-LAYING.			

Occurrence No.	23	**Map Index:**	22101	**EO Index:**	16883	**Element Last Seen:**	1992-03-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-01-04

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.91559 / -119.78953	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4089143 E251497	**Elevation (ft):**	350
PLSS:	T12S, R20E, Sec. 04 (M)	**Acres:**	0.0

Location: IN THE VICINITY OF ROOT CREEK, EAST OF STATE ROUTE 41 AND ABOUT 0.6 MILE SOUTH OF AVENUE 12, 9 MILES WEST OF FRIANT.

Detailed Location: TADPOLES FOUND IN FOUR VERNAL POOLS LOCATED BETWEEN STATE ROUTE 41 AND UP TO 0.5 MILES TO THE EAST.

Ecological: HABITAT CONSISTS OF NORTHERN HARDPAN VERNAL POOLS DOMINATED BY HORDEUM GENICULATUM AND ERYNGIUM VASEYI. BRANCHINECTA LYNCHI ALSO PRESENT.

General: AN UNESTIMATED NUMBER OF TADPOLES OBSERVED.

Owner/Manager: PVT

Occurrence No.	27	**Map Index:**	22171	**EO Index:**	20000	**Element Last Seen:**	1992-04-05
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-03-30

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.97664 / -119.71324	**Accurracy:**	specific area
UTM:	Zone-11 N4095722 E258487	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 18 (M)	**Acres:**	708.9

Location: EAST OF FRIANT ROAD AND WEST OF THE FRIANT-KERN CANAL, SOUTH OF FRIANT.

Detailed Location:

Ecological: SPADEFOOT TOADS FOUND IN AN EXTENSIVE VERNAL POOL HABITAT IN GRASSLAND.

General: TIGER SALAMANDERS ALSO VERY COMMON IN THE AREA.

Owner/Manager: PVT-FRIANT RANCH LLC

Occurrence No.	28	**Map Index:**	23081	**EO Index:**	20430	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-06-03

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.98360 / -119.69843	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4096457 E259827	**Elevation (ft):**	500
PLSS:	T11S, R21E, Sec. 08 (M)	**Acres:**	120.6

Location: EAST OF FRIANT-KERN CANAL, SW OF MILLERTON LAKE STATE RECREATION AREA.

Detailed Location: BOTH ADULTS AND JUVENILES FOUND IN 3 CATTLE PONDS LOCATED 0.5 MILE APART.

Ecological: HABITAT CONSISTS OF 3 CATTLE PONDS SURROUNDED BY GRAZED NON-NATIVE GRASSLAND.

General: MANY ADULTS AND JUVENILES OBSERVED DURING 1992 VISIT TO THIS SITE.

Owner/Manager: PVT

Occurrence No.	29	**Map Index:**	32551	**EO Index:**	1756	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-06-17

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.91077 / -119.73529	**Accurracy:**	specific area
UTM:	Zone-11 N4088468 E256314	**Elevation (ft):**	360
PLSS:	T12S, R20E, Sec. 01 (M)	**Acres:**	5.6

Location: 1.2 KM SOUTH OF THE INTERSECTION OF FRIANT ROAD AND WILLOW AVENUE, 10 KM SSW OF FRIANT.

Detailed Location: THREE CLOSELY-SITUATED VERNAL POOLS: 1 LARGE POOL IN NORTHERN REGION AND 2 SMALLER POOLS IN SOUTHERN REGION.

Ecological: HABITAT CONSISTS OF THREE VERNAL POOLS WITHIN NON-NATIVE GRASSLAND; ROLLING HILL TOPOGRAPHY. 2009 AERIAL PHOTO SHOWS SITE DEVELOPED BY GOLF COURSE & RURAL RESIDENTIAL.

General: OBSERVATION; NUMBER AND LIFE STAGE UNKNOWN; AMBYSTOMA CALIFORNIENSE AND BRANCHINECTA LYNCHI ALSO PRESENT.

Owner/Manager: PVT

Occurrence No.	103	**Map Index:**	33337	**EO Index:**	517	**Element Last Seen:**	1995-04-03
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-11-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-01-02

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91139 / -119.71441	**Accurracy:**	80 meters
UTM:	Zone-11 N4088484 E258177	**Elevation (ft):**	405
PLSS:	T12S, R21E, Sec. 06 (M)	**Acres:**	0.0

Location:	1 MILE NORTH OF COPPER AVENUE, ON THE EAST SIDE OF AUBERRY ROAD, 5.5 MILES SOUTH OF FRIANT.
Detailed Location:	LOCATED IN A VERNAL POOL IMMEDIATELY ADJACENT TO THE ROAD.
Ecological:	HABITAT CONSISTS OF A VERNAL POOL IN NON-NATIVE GRASSLAND. RANA CATESBIANA AND HYLA REGILLA ALSO PRESENT.
General:	APPROXIMATELY 100 LARVAE OBSERVED ON 3 APRIL 1995. SITE WAS OBSERVED ON 27 NOV 2001, AND SITE APPEARED TO BE EXTIRPATED, ALTHOUGH THIS IS NOT THE CORRECT TIME OF YEAR FOR CONDUCTING SURVEYS.
Owner/Manager:	CSU-FRESNO

Occurrence No.	104	**Map Index:**	33338	**EO Index:**	23154	**Element Last Seen:**	1995-03-28
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-03-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-06-07

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96913 / -119.82762	**Accurracy:**	80 meters
UTM:	Zone-11 N4095185 E248279	**Elevation (ft):**	370
PLSS:	T11S, R20E, Sec. 18 (M)	**Acres:**	0.0

Location:	0.25 MILE EAST OF THE ROAD 39-1/2 ALIGNMENT AND 0.2 MILE NORTH OF AVENUE 15, WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	1995-LOCATED IN THE FOURTH POOL IN A SERIES. 1993-G. KIRKPATRICK SAMPLED 4 POOLS IN A SERIES.
Ecological:	HABITAT CONSISTS OF A CLAYPAN VERNAL POOL IN NON-NATIVE GRASSLAND. HYLA REGILLA, LINDERIELLA OCCIDENTALIS, AND BRANCHINECTA LYNCHI ALSO PRESENT.
General:	100'S OF LARVAE OBSERVED ON 28 MARCH 1995. TOADS FOUND IN 3 OF 4 POOLS SAMPLED LATER IN SPRING OF 1993.
Owner/Manager:	PVT

Occurrence No.	105	**Map Index:**	14592	**EO Index:**	27678	**Element Last Seen:**	1995-03-28
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-03-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-06

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96855 / -119.84268	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4095160 E246936	**Elevation (ft):**	380
PLSS:	T11S, R19E, Sec. 13 (M)	**Acres:**	127.6

Location:	0.4 MILE WEST OF ROAD 39-1/2, JUST NORTH OF AVENUE 15, WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	SITE IS LOCATED ON A SIX-SECTION PIECE OF PROPERTY WHICH IS QUITE NEAR TWO PROPOSED NEW CITIES, RIO MESA AND CASTLE COOK DEVELOPMENT.
Ecological:	HABITAT CONSISTS OF CLAYPAN VERNAL POOLS & SWALES IN NON-NATIVE GRASSLAND. OTHER TAXA PRESENT INCLUDE AMBYSTOMA CALIFORNIENSE, BUFO BOREAS, HYLA REGILLA BRANCHI LYNCHI & LINDERIELLA OCCIDENTALIS.
General:	100'S OF LARVAE FOUND IN 2 ADJACENT POOLS ON 28 MARCH 1995. TOADS & TIGER SALAMANDERS BOTH OBSERVED IN 2 OF 2 POOLS SAMPLED DURING A BRANCHINECTA LYNCHI SURVEY IN SPRING 1993.
Owner/Manager:	PVT

Occurrence No.	106	**Map Index:**	33340	**EO Index:**	23162	**Element Last Seen:**	2000-04-04
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-04-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-27

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94525 / -119.79368	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4092446 E251223	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	82.0

Location:	ALONG STATE HIGHWAY 41, FROM 1.2 MILES NORTH OF AVENUE 12 TO JUST SOUTH OF THE MADERA CANA, 7 MILES NORTH OF PINEDALE.
Detailed Location:	1992: WEST OF STATE HIGHWAY 41. 1995: APPROXIMATELY 30 YARDS EAST OF MADERA COUNTY MILEPOST 5.0 ALONG STATE HIGHWAY 41; SOUTH OF MILEPOST 5.0 APPROXIMATELY 200 YARDS.
Ecological:	HABITAT CONSISTS OF A SWALE-LIKE VERNAL POOL; DOWNINGIA ORNATISSIMA, ERYNGIUM VASEYI, AND PLAGIOBOTHRYS STIPITATUS, ORCUTTIA INAEQUALIS, AND CASTILLEJA CAMPESTRIS SUCCULENTA; SURROUNDED BY GRAZED GRASSLAND.
General:	TADPOLES OBSERVED IN 3 POOLS ON 12 MARCH 1992. 100'S OF LARVAE OBSERVED ON 28 MARCH AND 4 APRIL 1995.. 4 JUVENILES OBSERVED ON 4 APRIL 2000.
Owner/Manager:	CALTRANS

Occurrence No.	118	**Map Index:**	33076	**EO Index:**	7317	**Element Last Seen:**	1994-03-29
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-03-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-07-26

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.96660 / -119.63658	**Accuracy:**	specific area
UTM:	Zone-11 N4094416 E265281	**Elevation (ft):**	660
PLSS:	T11S, R21E, Sec. 13 (M)	**Acres:**	9.7

Location: NORTH SIDE OF AUBERRY ROAD, 0.6 ROAD MILES WEST OF MILLERTON ROAD JUNCTION, APPROXIMATELY 4.5 MILES ESE OF FRIANT.

Detailed Location: 2 VERNAL POOLS NEAR ROAD AND OLD RAILROAD GRADE.

Ecological: VERNAL POOLS IN BLUE OAK WOODLAND, AUGMENTED BY RUNOFF FROM ROAD AND RAILROAD GRADE.

General: SPADEFOOT TOAD TADPOLES OBSERVED 3/29/94. TIGER SALAMANDER TADPOLES ALSO OBSERVED. NEED EASEMENT TO PROTECT THIS SITE.

Owner/Manager: PVT

Occurrence No.	161	**Map Index:**	39295	**EO Index:**	34297	**Element Last Seen:**	1995-03-03
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-03-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-04

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.86791 / -119.78589	**Accuracy:**	80 meters
UTM:	Zone-11 N4083843 E251666	**Elevation (ft):**	355
PLSS:	T12S, R20E, Sec. 21 (M)	**Acres:**	0.0

Location: BETWEEN BLACKSTONE ROAD AND FRIANT (RICE) ROAD, WOODWARD PARK.

Detailed Location: SITE CONSISTS OF AN OVERFLOW POOL ADJACENT TO THE ROAD.

Ecological: HABITAT SURROUNDING OVERFLOW POOL CONSISTS OF NON-NATIVE GRASSLAND; POOL SHADED BY TREES.

General: HUNDREDS OF TADPOLES OBSERVED ON 3 MARCH 1995; ONE TADPOLE CAPTURED AND RAISED TO MATURITY.

Owner/Manager: UNKNOWN

Occurrence No.	196	**Map Index:**	45181	**EO Index:**	45181	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-04-11

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94405 / -119.76259	**Accuracy:**	80 meters
UTM:	Zone-11 N4092232 E253989	**Elevation (ft):**	320
PLSS:	T11S, R20E, Sec. 26 (M)	**Acres:**	0.0

Location: 2 MILES SE OF THE INTERSECTION OF ROAD 204 AND HIGHWAY 41, WEST OF FRIANT

Detailed Location:

Ecological: NON-NATIVE ANNUAL GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.

General: UNKNOWN NUMBER/LIFE STAGE OBSERVED DURING FEB 2001.

Owner/Manager: PVT

Occurrence No.	197	**Map Index:**	45182	**EO Index:**	45182	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.90552 / -119.78512	**Accuracy:**	80 meters
UTM:	Zone-11 N4088015 E251857	**Elevation (ft):**	350
PLSS:	T12S, R20E, Sec. 09 (M)	**Acres:**	0.0

Location: 0.4 MILE EAST OF HIGHWAY 41 AND 0.3 MILE SOUTH OF AVENUE 11, 4.5 MILES NORTH OF PINEDALE

Detailed Location:

Ecological: NON-NATIVE ANNUAL GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.

General: UNKNOWN NUMBER/LIFE STAGE OBSERVED DURING FEB 2001.

Owner/Manager: PVT

Occurrence No.	198	**Map Index:**	45183	**EO Index:**	45183	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.95126 / -119.77616	**Accuracy:**	80 meters
UTM:	Zone-11 N4093067 E252803	**Elevation (ft):**	420
PLSS:	T11S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: 0.9 MILE EAST OF HIGHWAY 41 AND 0.5 MILE SOUTH OF ROAD 204, 7 MILES NORTH OF PINEDALE

Detailed Location:

Ecological: NON-NATIVE ANNUAL GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.

General: UNKNOWN NUMBER/LIFE STAGE OBSERVED DURING FEB 2001.

Owner/Manager: PVT

Occurrence No.	199	**Map Index:**	67495	**EO Index:**	45184	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-22

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.93610 / -119.78924	**Accuracy:**	specific area
UTM:	Zone-11 N4091419 E251589	**Elevation (ft):**	390
PLSS:	T11S, R20E, Sec. 33 (M)	**Acres:**	55.0

Location: 0.3 MILE EAST OF HIGHWAY 41 AND 0.8 MILE NORTH OF AVENUE 12, 6 MILES NORTH OF PINEDALE.

Detailed Location: POOLS ARE LOCATED ALONG UNNAMED STREAM AND TO THE NORTH OF THE STREAM. 1992 SURVEY POOL NUMBERS: 41, 43, 44, 47, 49, 50, 67, 68.

Ecological: NON-NATIVE ANNUAL GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.

General: TADPOLES OBSERVED IN 8 POOLS ON 19 MARCH 1992. UNKNOWN NUMBER/LIFE STAGE OBSERVED DURING FEB 2001.

Owner/Manager: PVT

Occurrence No.	241	**Map Index:**	49020	**EO Index:**	49020	**Element Last Seen:**	2002-03-27
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-03-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-10-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.92934 / -119.71063	**Accurracy:**	80 meters
UTM:	Zone-11 N4090466 E258570	**Elevation (ft):**	410
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	0.0

Location:	0.1 MILE WEST OF AUBERRY ROAD, SOUTH OF LITTLE DRY CREEK, 7 MILES SOUTH OF FRIANT
Detailed Location:	SITE IS PROPOSED AS A MITIGATION BANK.
Ecological:	HABITAT CONSISTS OF A VERNAL POOL IN AN AREA OF NUMEROUS MOUNDS AND DEPRESSIONS; SURROUNDED BY GRAZED GRASSLANDS.
General:	9 LARVAE COLLECTED (MRJ #1540) ON 27 MAR 2002 AND DEPOSITED AT CAS.
Owner/Manager:	PVT

Occurrence No.	248	**Map Index:**	25584	**EO Index:**	49452	**Element Last Seen:**	1991-04-15
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-11-21

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.98806 / -119.75621	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4097099 E254698	**Elevation (ft):**	440
PLSS:	T11S, R20E, Sec. 11 (M)	**Acres:**	0.0

Location:	WEST SIDE OF ROAD 204, 0.7 MILE SOUTH OF HIGHWAY 145, ON THE EAST SIDE OF LITTLE TABLE MOUNTAIN
Detailed Location:	SHAFFER SITE #107. LOCATED ON THE URRUTINA RANCH.
Ecological:	HABITAT CONSISTS OF A VERNAL POOL.
General:	SPADEFOOT TOADS PRESENT ON 15 APR 1991; NUMBER AND LIFESTAGE UNKNOWN.
Owner/Manager:	PVT

Occurrence No.	249	**Map Index:**	24599	**EO Index:**	49453	**Element Last Seen:**	2005-03-21
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-03-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-03

Quad Summary:	Friant (3611986), Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.97667 / -119.75240	**Accurracy:**	specific area
UTM:	Zone-11 N4095826 E255000	**Elevation (ft):**	435
PLSS:	T11S, R20E, Sec. 14 (M)	**Acres:**	18.0

Location:	ALONG MADERA CANAL, JUST EAST OF ROAD 204, 1.5 MILES SOUTH OF HWY 145, ON THE SE EDGE OF LITTLE TABLE MOUNTAIN.
Detailed Location:	1991: SHAFFER SITE #111; LOCATED ON THE URRUTINA RANCH. 2005: AT MILE POSTS 004.06 & 004.20; SITE NAMES MAC-R-004.06.1 & MAC-L-004.20.1 (ESRP).
Ecological:	1991: HABITAT CONSISTS OF AN ARTIFICIAL POND. 2005: POOL AT MILEPOST 004.06 DESCRIBED AS A TEA-COLORED VERNAL POOL.
General:	SPADEFOOT TOADS PRESENT ON 15 APR 1991 (UNKNOWN #). AT LEAST 1 OBSERVED AT EACH MILEPOST SITE ON 21 MAR 2005 BY F. VANG & K. GARCIA-TOMLINSON.
Owner/Manager:	USBOR, PVT

Occurrence No.	354	**Map Index:**	67500	**EO Index:**	67666	**Element Last Seen:**	1992-03-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-22

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96699 / -119.78798	**Accurracy:**	specific area
UTM:	Zone-11 N4094843 E251801	**Elevation (ft):**	425
PLSS:	T11S, R20E, Sec. 21 (M)	**Acres:**	11.0

Location:	JUST NORTH OF AVENUE 15, APROXIMATELY 0.3 MILES EAST OF STATE ROUTE 41, 8.5 MILES NORTH OF PINEDALE.
Detailed Location:	POOL #114. WRITTEN DIRECTIONS GIVEN AS 100 FEET EAST OF STATE ROUTE 41 AND 2000 FEET NORTH OF AVENUE 15, HOWEVER MAP INDICATES POOL AS JUST NORTH OF AVE 15 AND APPROX 2000 FT EAST OF SR 41. LOCATION MAPPED ACCORDING MAP PROVIDED.
Ecological:	HABITAT CONSISTS OF NORTHERN HARDPAN VERNAL POOL DOMINATED BY ERYNGIUM VASEYI.
General:	UNKNOWN NUMBER OF TADPOLES OBSERVED ON 18 MARCH 1992.
Owner/Manager:	PVT

Coccyzus americanus occidentalis **Element Code:** ABNRB02022

western yellow-billed cuckoo

Listing Status:	**Federal:**	Candidate	**CNDDB Element Ranks:**	**Global:**	G5T3Q
	State:	Endangered		**State:**	S1
	Other:	BLM_S-Sensitive, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	RIPARIAN FOREST NESTER, ALONG THE BROAD, LOWER FLOOD-BOTTOMS OF LARGER RIVER SYSTEMS.			
	Micro:	NESTS IN RIPARIAN JUNGLES OF WILLOW, OFTEN MIXED WITH COTTONWOODS, W/ LOWER STORY OF BLACKBERRY, NETTLES, OR WILD GRAPE.			

Occurrence No.	87	**Map Index:**	14944	**EO Index:**	25589	**Element Last Seen:**	1902-07-10
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1902-07-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: Sanger (3611965), Malaga (3611966), Round Mountain (3611975), Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.75271 / -119.63986	**Accuracy:**	1 mile
UTM:	Zone-11 N4070690 E264333	**Elevation (ft):**	345
PLSS:	T13S, R21E, Sec. 36 (M)	**Acres:**	0.0

Location: FANCHER CREEK, 6 MI NE OF FRESNO.

Detailed Location:

Ecological:

General: REPORTED AS UNCOMMON BUT NESTING BY TYLER (1913).

Owner/Manager: PVT

Athene cunicularia **Element Code:** ABNSB10010

burrowing owl

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S2
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.			
	Micro:	SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.			

Occurrence No.	355 **Map Index:** 42847	**EO Index:**	42847	**Element Last Seen:**	2000-04-04
Occ. Rank:	Good	**Presence:**	Presumed Extant	**Site Last Seen:**	2000-04-04
Occ. Type:	Natural/Native occurrence	**Trend:**	Unknown	**Record Last Updated:**	2000-05-02

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94372 / -119.78949	**Accuracy:**	80 meters
UTM:	Zone-11 N4092265 E251591	**Elevation (ft):**	396
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location: 0.25 MILE EAST OF HIGHWAY 41, 1.4 MILES NORTH OF AVENUE 12, 8 MILES NW OF FRIANT

Detailed Location:

Ecological: HABITAT CONSISTS OF GRAZED ANNUAL GRASSLAND INTERSPERSED BY VERNAL POOLS; DOMINATED BY BROMUS SPP, TRIFOLIUM SPP, AVENA FATUA, AND HORDEUM SPP.

General: ON 4 APR 2000, 1 ADULT WAS OBSERVED AT THE BURROW SITE, WHICH CONTAINED WHITEWASH AND PELLETS.

Owner/Manager: CALTRANS

Occurrence No.	584 **Map Index:** 51291	**EO Index:**	51291	**Element Last Seen:**	2000-XX-XX
Occ. Rank:	Unknown	**Presence:**	Presumed Extant	**Site Last Seen:**	2000-XX-XX
Occ. Type:	Natural/Native occurrence	**Trend:**	Unknown	**Record Last Updated:**	2003-05-19

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.95096 / -119.78377	**Accuracy:**	80 meters
UTM:	Zone-11 N4093053 E252125	**Elevation (ft):**	405
PLSS:	T11S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: 0.6 MILE EAST OF HIGHWAY 41 AND 0.6 MILE SOUTH OF ROAD 204, 7.5 MILES NORTH OF PINEDALE

Detailed Location:

Ecological:

General: PAIR OBSERVED IN SPRING 2000.

Owner/Manager: PVT

Eremophila alpestris actia **Element Code:** ABPAT02011

California horned lark

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3Q
	State:	None		**State:**	S3
	Other:	DFG_WL-Watch List, IUCN_LC-Least Concern			
Habitat:	**General:**	COASTAL REGIONS, CHIEFLY FROM SONOMA CO. TO SAN DIEGO CO. ALSO MAIN PART OF SAN JOAQUIN VALLEY & EAST TO FOOTHILLS.			
	Micro:	SHORT-GRASS PRAIRIE, "BALD" HILLS, MOUNTAIN MEADOWS, OPEN COASTAL PLAINS, FALLOW GRAIN FIELDS, ALKALI FLATS.			

Occurrence No.	2	**Map Index:**	34860	**EO Index:**	12425	**Element Last Seen:**	1992-04-25
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-06

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Fresno, Madera

Lat/Long:	36.89556 / -119.79294	**Accuracy:**	1 mile
UTM:	Zone-11 N4086930 E251128	**Elevation (ft):**	370
PLSS:	T12S, R20E, Sec. 09 (M)	**Acres:**	0.0

Location:	NORTH OF LANES BRIDGE ON SAN JOAQUIN RIVER; AT JUNCTION OF AVENUE 10 X HWY 41.
Detailed Location:	GUNNER RANCH.
Ecological:	FALLOW FIELDS, BARE FIELDS AND DRY FARMED FIELDS. TOTAL ACREAGE APPROX. 600 AC.
General:	30 ADULTS (APPROX. 10-20 PAIRS) OBSERVED IN POSSIBLE NESTING SITE; MALES(?) APPEARED TO BE TERRITORIAL (SINGING AND CHASING OTHER LARKS).
Owner/Manager:	PVT

Agelaius tricolor **Element Code:** ABPBXB0020

tricolored blackbird

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2G3
	State:	None		**State:**	S2
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern, BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_EN-Endangered, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.			
	Micro:	REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.			

Occurrence No.	269	**Map Index:** 24424	**EO Index:**	6138	**Element Last Seen:** 1975-XX-XX
Occ. Rank:	None		**Presence:**	Extirpated	**Site Last Seen:** 1975-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 1993-10-06

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.82473 / -119.75553	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4078973 E254235	**Elevation (ft):**	330
PLSS:	T13S, R20E, Sec. 02 (M)	**Acres:**	0.0

Location: NW OF BULLARD AVENUE & CEDAR AVENUE, FRESNO.

Detailed Location: SIZE OF COLONY IS 3-4 ACRES, AND IS LOCATED IN A FLOOD CONTROL BASIN.

Ecological: NESTING SUBSTRATE IS A CATTAIL MARSH.

General: 3000 INDIVIDUALS OBSERVED; SEVERAL OBSERVATIONS IN JUNE-JULY 1975 INDICATED SUCCESSFUL NESTING. COLONY FORAGED ON CSUF GRAIN FIELDS TO THE EAST. COLONY WAS ABANDONED WHEN HABITAT WAS ELIMINATED AS PART OF FLOOD CONTROL BASIN MAINTENANCE.

Owner/Manager: UNKNOWN

Mylopharodon conocephalus **Element Code:** AFCJB25010

hardhead

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3
	Other:	DFG_SSC-Species of Special Concern, USFS_S-Sensitive			
Habitat:	**General:**	LOW TO MID-ELEVATION STREAMS IN THE SACRAMENTO-SAN JOAQUIN DRAINAGE. ALSO PRESENT IN THE RUSSIAN RIVER.			
	Micro:	CLEAR, DEEP POOLS WITH SAND-GRAVEL-BOULDER BOTTOMS & SLOW WATER VELOCITY. NOT FOUND WHERE EXOTIC CENTRARCHIDS PREDOMINATE.			

Occurrence No.	12	**Map Index:** 32387	**EO Index:**	2311	**Element Last Seen:**	1981-11-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:**	1981-11-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:**	1995-08-08

Quad Summary: Lanes Bridge (3611987)

County Summary: Fresno, Madera

Lat/Long:	36.88469 / -119.78572	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4085704 E251736	**Elevation (ft):**	255
PLSS:	T12S, R20E, Sec. 16 (M)	**Acres:**	144.6

Location: SAN JOAQUIN RIVER; WEST OF FORT WASHINGTON; NORTHEAST OF LANES BRIDGE.

Detailed Location:

Ecological: RIVER. DISSOLVED OXYGEN = 9.1-12.2 MG/L. PH = 7.6-8.5. TOTAL ALKALINITY = 12-30 MG/L CACO3. TEMP = 6.8-24.4 C. MOST COMMON SPECIES WERE SACRAMENTO SUCKER, GREEN SUNFISH, BLUEGILL, REDEAR SUNFISH, LARGEMOUTH BASS, SCULPINS & SQUAWFISH.

General: AT SAMPLING SITE SJR-1, NONE OBSERVED USING BAG SEINE, NONE OBSERVED USING BEACH SEINE, RARE ABUNDANCE OBSERVED USING ELECTROFISHING. RELATIVE ABUNDANCE BASED ON AVERAGE PERCENTAGES OF MONTHLY CATCHES.

Owner/Manager: UNKNOWN

Lasiurus cinereus **Element Code:** AMACC05030

hoary bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S4?
	Other:	IUCN_LC-Least Concern, WBWG_M-Medium Priority			
Habitat:	**General:**	PREFERS OPEN HABITATS OR HABITAT MOSAICS, WITH ACCESS TO TREES FOR COVER & OPEN AREAS OR HABITAT EDGES FOR FEEDING.			
	Micro:	ROOSTS IN DENSE FOLIAGE OF MEDIUM TO LARGE TREES. FEEDS PRIMARILY ON MOTHS. REQUIRES WATER.			

Occurrence No.	25	**Map Index:** 68488	**EO Index:**	68782	**Element Last Seen:** 1915-04-03
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:** 1915-04-03
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 2007-03-15

Quad Summary: Fresno South (3611967)

County Summary: Fresno

Lat/Long:	36.72100 / -119.85331	**Accuracy:**	nonspecific area
UTM:	Zone-11 N4067718 E245168	**Elevation (ft):**	270
PLSS:	T14S, R19E, Sec. 13 (M)	**Acres:**	31.0

Location: FRESNO, CALIFORNIA AVE NEAR VALENTINE ST.

Detailed Location: MAPPED ACCORDING TO LAT/LONG COORDINATES WITH UNCERTAINTY OF 30M AND LOCATION DESCRIPTION PROVIDED BY MANIS.

Ecological:

General: 1 FEMALE SPECIMEN (MVZ #21439) COLLECTED BY ADREY E. BORELL AND WALTER P. TAYLOR ON 3 APR 1915.

Owner/Manager: UNKNOWN

Euderma maculatum **Element Code:** AMACC07010

spotted bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S2S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority			
Habitat:	**General:**	OCCUPIES A WIDE VARIETY OF HABITATS FROM ARID DESERTS AND GRASSLANDS THROUGH MIXED CONIFER FORESTS.			
	Micro:	FEEDS OVER WATER AND ALONG WASHES. FEEDS ALMOST ENTIRELY ON MOTHS. NEEDS ROCK CREVICES IN CLIFFS OR CAVES FOR ROOSTING.			

Occurrence No.	40	**Map Index:** 66253	**EO Index:**	66334	**Element Last Seen:** 1970-06-06
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:** 1970-06-06
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 2006-09-19

Quad Summary: Friant (3611986), Millerton Lake West (3711916)

County Summary: Fresno, Madera

Lat/Long:	37.00052 / -119.70501	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4098351 E259295	**Elevation (ft):**	500
PLSS:	T11S, R21E, Sec. 05 (M)	**Acres:**	41.0

Location: FRIANT DAM.

Detailed Location: COLLECTED AT SAN JOAQUIN FISH HATCHERY.

Ecological: LARGE POOLS AND RUNWAYS. BASALT CLIFFS SUITABLE FOR ROOSTING NEARBY.

General: BAT WITH RABIES COLLECTED 1 JUN 1970. MUSEUM SPECIMEN (MUSEUM NOT SPECIFIED) COLLECTED 6 JUN 1970.

Owner/Manager: UNKNOWN

Antrozous pallidus

Element Code: AMACC10010

pallid bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority			
Habitat:	**General:**	DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.			
	Micro:	ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.			

Occurrence No.	147	**Map Index:** 66492	**EO Index:**	66606	**Element Last Seen:** 1909-10-06
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:** 1909-10-06
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 2006-10-02

Quad Summary: Fresno South (3611967)

County Summary: Fresno

Lat/Long:	36.74789 / -119.77191	**Accuracy:**	1/10 mile
UTM:	Zone-11 N4070489 E252526	**Elevation (ft):**	310
PLSS:	T14S, R20E, Sec. 02 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location: MAPPED ACCORDING TO LAT/LONG COORDINATES GIVEN BY MANIS, WITH UNCERTAINTY OF 30M. MAPPED LOCATION IS NEAR 1ST STREET AND GRANT AVE IN FRESNO.

Ecological:

General: 1 UNKNOWN SPECIMEN COLLECTED BY W.N. WEAR ON 6 OCT 1909, MVZ #9440.

Owner/Manager: UNKNOWN

Eumops perotis californicus

Element Code: AMACD02011

western mastiff bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T4
	State:	None		**State:**	S3?
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, WBWG_H-High Priority			
Habitat:	**General:**	MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC			
	Micro:	ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.			

Occurrence No.	46	**Map Index:**	66289	**EO Index:**	66373	**Element Last Seen:**	1991-04-17
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-11-01

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.75822 / -119.85940	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4071865 E244747	**Elevation (ft):**	310
PLSS:	T13S, R19E, Sec. 36 (M)	**Acres:**	0.0

Location: FRESNO, ABOUT 0.6 MI NNE OF INTERSECTION OF BRAWLEY AVE. AND BELMONT AVE.

Detailed Location: GENERAL LOCATION "FRESNO" AND SPECIFIC LOCATION "1437 KNOLL, FRESNO" INCLUDED HERE.

Ecological:

General: 1 SPECIMEN COLLECTED ON 9 MAR 1905, CAS #6448. 1 FEMALE SPECIMEN COLLECTED BY WILLIAM E. RAINEY ON 17 APR 1991, MVZ #182348.

Owner/Manager: UNKNOWN

Occurrence No.	47	**Map Index:**	66290	**EO Index:**	66374	**Element Last Seen:**	1991-04-17
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-26

Quad Summary: Fresno South (3611967), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.74878 / -119.78150	**Accurracy:**	1 mile
UTM:	Zone-11 N4070613 E251672	**Elevation (ft):**	
PLSS:	T14S, R20E, Sec. 03 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location: INCLUDES OBSERVATION FROM "FRESNO, WASHINGTON GRAMMAR SCHOOL."

Ecological:

General: SPECIMENS COLLECTED APR 1895 & 20 NOV 1958 AND DEPOSITED AT CAS. 1 MALE SPECIMEN COLLECTED BY ARDREY E. BORELLI ON 6 OCT 1916 AT "WASHINGTON GRAMMAR SCHOOL," MVZ #35082. SPECIMEN COLLECTED 17 APR 1991 AND DEPOSITED AT MVZ.

Owner/Manager: UNKNOWN

Occurrence No.	73	**Map Index:**	66317	**EO Index:**	66403	**Element Last Seen:**	1958-11-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1958-11-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-21

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.79386 / -119.81289	**Accurracy:**	80 meters
UTM:	Zone-11 N4075697 E249017	**Elevation (ft):**	320
PLSS:	T13S, R20E, Sec. 20 (M)	**Acres:**	0.0

Location: FRESNO, AT ASHLAND AND THORNE AVENUES.

Detailed Location: BASE OF POWER POLE.

Ecological:

General: 1 MALE SPECIMEN COLLECTED BY R. STOLZ ON 20 NOV 1958, CAS #12237,

Owner/Manager: UNKNOWN

Occurrence No.	161	**Map Index:**	66420	**EO Index:**	66517	**Element Last Seen:**	1958-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1958-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-26

Quad Summary: Fresno South (3611967)

County Summary: Fresno

Lat/Long:	36.65045 / -119.79075	**Accurracy:**	3/5 mile
UTM:	Zone-11 N4059725 E250529	**Elevation (ft):**	
PLSS:	T15S, R20E, Sec. 04 (M)	**Acres:**	0.0

Location: EASTON.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED IN PIERSON & RAINEY.

Ecological:

General: SPECIMENS COLLECTED IN 1968 AND DEPOSITED AT CSUF.

Owner/Manager: UNKNOWN

Perognathus inornatus inornatus

Element Code: AMAFD01061

San Joaquin pocket mouse

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4T2T3
	State:	None		**State:**	S2S3
	Other:	BLM_S-Sensitive			
Habitat:	**General:**	TYPICALLY FOUND IN GRASSLANDS AND BLUE OAK SAVANNAS.			
	Micro:	NEEDS FRIABLE SOILS.			

Occurrence No.	14	**Map Index:**	14685	**EO Index:**	23938	**Element Last Seen:**	1911-04-07
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1911-04-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-11

Quad Summary: Fresno North (3611977), Lanes Bridge (3611987)

County Summary: Fresno, Madera

Lat/Long:	36.87661 / -119.79181	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4084824 E251167	**Elevation (ft):**	
PLSS:	T12S, R20E, Sec. 21 (M)	**Acres:**	0.0

Location: LANES BRIDGE 10 MILES NORTH OF FRESNO.

Detailed Location:

Ecological:

General: 2 SPECIMENS COLLECTED MVZ #14488 & 14489.

Owner/Manager: UNKNOWN

Occurrence No.	16	**Map Index:**	14563	**EO Index:**	23951	**Element Last Seen:**	1915-11-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1915-11-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary:	Fresno South (3611967), Fresno North (3611977)
County Summary:	Fresno

Lat/Long:	36.73689 / -119.85793	**Accurracy:**	1 mile
UTM:	Zone-11 N4069494 E244808	**Elevation (ft):**	
PLSS:	T14S, R19E, Sec. 01 (M)	**Acres:**	0.0

Location:	4 MI W FRESNO.
Detailed Location:	
Ecological:	
General:	MVZ #21989.
Owner/Manager:	UNKNOWN

Occurrence No.	17	**Map Index:**	14364	**EO Index:**	7329	**Element Last Seen:**	1924-04-13
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1986-04-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-09-23

Quad Summary:	Herndon (3611978)
County Summary:	Fresno

Lat/Long:	36.80466 / -119.97710	**Accurracy:**	1 mile
UTM:	Zone-11 N4077339 E234399	**Elevation (ft):**	265
PLSS:	T13S, R18E, Sec. 14 (M)	**Acres:**	0.0

Location:	JUNCTION OF GETTYSBURG & DOWER AVENUES. 4 MI SW HERNDON.
Detailed Location:	
Ecological:	THE SITE HAS BEEN CONVERTED TO VINEYARDS.
General:	MVZ #33646.
Owner/Manager:	PVT

Dipodomys nitratoides exilis

Element Code: AMAFD03151

Fresno kangaroo rat

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G3T1
	State:	Endangered		**State:**	S1
	Other:	IUCN_VU-Vulnerable			
Habitat:	**General:**	ALKALI SINK-OPEN GRASSLAND HABITATS IN WESTERN FRESNO COUNTY.			
	Micro:	BARE ALKALINE CLAY-BASED SOILS SUBJECT TO SEASONAL INUNDATION, WITH MORE FRIABLE SOIL MOUNDS AROUND SHRUBS & GRASSES.			

Occurrence No.	15	**Map Index:** 14593	**EO Index:** 23963	**Element Last Seen:**	1898-04-23
Occ. Rank:	None		**Presence:** Extirpated	**Site Last Seen:**	1898-04-23
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2006-07-25

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77910 / -119.84460	**Accuracy:**	1 mile
UTM:	Zone-11 N4074142 E246138	**Elevation (ft):**	
PLSS:	T13S, R20E, Sec. 30 (M)	**Acres:**	0.0

Location: FRESNO; 4 MILES NORTH OF RAILROAD STATION ALONG SOUTHERN PACIFIC RIGHT-OF-WAY.

Detailed Location:

Ecological: AREA COMPLETELY DEVELOPED.

General: TYPE LOCALITY. COLLECTED BY BAILEY 23 SEP 1891; U. S. BIOLOGICAL SURVEY COLLECTIONS (BSC) #34843/43823. ALSO COLLECTED FROM "FRESNO" BY C.P. STREATOR 22-23 APRIL 1898 (MVZ #19064-19067 COMPLETE SKULLS & STUDY SKINS).

Owner/Manager: PVT

Vulpes macrotis mutica

Element Code: AMAJA03041

San Joaquin kit fox

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G4T2T3
	State:	Threatened		**State:**	S2S3
	Other:				
Habitat:	**General:**	ANNUAL GRASSLANDS OR GRASSY OPEN STAGES WITH SCATTERED SHRUBBY VEGETATION.			
	Micro:	NEED LOOSE-TEXTURED SANDY SOILS FOR BURROWING, AND SUITABLE PREY BASE.			

Occurrence No.	89	**Map Index:**	53873	**EO Index:**	53873	**Element Last Seen:**	1993-05-05
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-05-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-09

Quad Summary: Herndon (3611978)

County Summary: Fresno

Lat/Long:	36.82028 / -119.90199	**Accuracy:**	nonspecific area
UTM:	Zone-11 N4078866 E241153	**Elevation (ft):**	302
PLSS:	T13S, R19E, Sec. 09 (M)	**Acres:**	29.5

Location: HERNDON, ABOUT 1MI SE OF GRANTLAND AVE EXIT ON HIGHWAY 99 (EAST EDGE OF NORTHBOUND LANE)

Detailed Location:

Ecological: FALLOW LAND ADJACENT TO EAST SIDE OF HIGHWAY; LIGHT INDUSTRIAL DEVELOPMENT NEARBY. WEST OF THE HIGHWAY IS LOW DENSITY HOUSING AND IRRIGATED AGRICULTURE.

General: 5/5/1993: ONE ANIMAL DEAD ON THE ROAD.

Owner/Manager: UNKNOWN

Occurrence No.	1113	**Map Index:**	64361	**EO Index:**	70600	**Element Last Seen:**	199X-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	199X-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-08-22

Quad Summary: Friant (3611986)

County Summary: Fresno, Madera

Lat/Long:	36.98663 / -119.70939	**Accuracy:**	2/5 mile
UTM:	Zone-11 N4096821 E258861	**Elevation (ft):**	410
PLSS:	T11S, R21E, Sec. 07 (M)	**Acres:**	0.0

Location: VICINITY OF FRIANT.

Detailed Location: LOCATION GIVEN ONLY AS "FRIANT"

Ecological:

General: ONE KIT FOX SIGHTED SOMETIME IN THE EARLY 1990'S BY DALE MITCHELL (DFG).

Owner/Manager: UNKNOWN

Occurrence No.	1115	**Map Index:**	69792	**EO Index:**	70606	**Element Last Seen:**	198X-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	198X-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-08-23

Quad Summary: Sanger (3611965)

County Summary: Fresno

Lat/Long:	36.70281 / -119.55857	**Accuracy:**	1 mile
UTM:	Zone-11 N4064956 E271443	**Elevation (ft):**	365
PLSS:	T14S, R22E, Sec. 22 (M)	**Acres:**	0.0

Location: SANGER.

Detailed Location: LOCATION GIVEN ONLY AS "SANGER"

Ecological:

General: ONE SIGHTED IN THE 1980'S BY HENRY LAMELLE.

Owner/Manager: UNKNOWN

Taxidea taxus **Element Code:** AMAJF04010

American badger

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S4
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern			
Habitat:	**General:**	MOST ABUNDANT IN DRIER OPEN STAGES OF MOST SHRUB, FOREST, AND HERBACEOUS HABITATS, WITH FRIABLE SOILS.			
	Micro:	NEEDS SUFFICIENT FOOD, FRIABLE SOILS & OPEN, UNCULTIVATED GROUND. PREYS ON BURROWING RODENTS. DIGS BURROWS.			

Occurrence No.	79	**Map Index:** 56599	**EO Index:** 56615	**Element Last Seen:**	1988-04-12
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1988-04-12
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2004-09-07

Quad Summary: Herndon (3611978)

County Summary: Fresno

Lat/Long:	36.83704 / -119.89058	**Accuracy:**	nonspecific area
UTM:	Zone-11 N4080696 E242228	**Elevation (ft):**	315
PLSS:	T13S, R19E, Sec. 03 (M)	**Acres:**	19.6

Location: JUST WEST OF THE INTERSECTION OF HERNDON AVE & THE SANTA FE RAILROAD TRACKS, FRESNO.

Detailed Location: SW 1/4 OF SW 1/4 SECTION 34; MAPPED ALONG ROAD.

Ecological: FIG ORCHARD TO SOUTH AND PERMANENT PASTURE, SMALL MARSH TO THE NORTH.

General: 1 ADULT OBSERVED (ROADKILL) ON 11, 12 APR 1988.

Owner/Manager: UNKNOWN

Occurrence No.	80	**Map Index:** 56600	**EO Index:** 56616	**Element Last Seen:**	1987-08-27
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1987-08-27
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2004-09-02

Quad Summary: Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.78938 / -119.69158	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4074888 E259829	**Elevation (ft):**	250
PLSS:	T13S, R21E, Sec. 21 (M)	**Acres:**	0.0

Location: SUNNYSIDE AVE, TARPEY VILLAGE, SOUTH CLOVIS.

Detailed Location: DENNING IN A HOMEOWNER'S BACKYARD. LOCATION MAPPED ACCORDING TO ADDRESS GIVEN ON FORM.

Ecological:

General: 1 OBSERVED ON 27 AUG 1987.

Owner/Manager: PVT

Emys marmorata

Element Code: ARAAD02030

western pond turtle

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3G4
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive			
Habitat:	**General:**	A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES, USUALLY WITH AQUATIC VEGETATION, BELOW 6000 FT ELEVATION.			
	Micro:	NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT UP TO 0.5 KM FROM WATER FOR EGG-LAYING.			

Occurrence No.	366	**Map Index:** 72057	**EO Index:**	72980	**Element Last Seen:** 2004-03-10
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:** 2004-03-10
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 2008-08-25

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.93364 / -119.67403	**Accurracy:**	specific area
UTM:	Zone-11 N4090851 E261844	**Elevation (ft):**	470
PLSS:	T11S, R21E, Sec. 33 (M)	**Acres:**	10.0

Location: FRIANT-KERN CANAL, APPROX 0.6 MILES SOUTH OF AUBERRY RD (AUBERRY CREEK), CLOVIS.

Detailed Location: NORTH POOL AT MILEPOST 006.06 (POOL ID FKC-R-006.06.1) AND SOUTH POOL AT 006.17 (FKC-R-006.17.1).

Ecological: N POOL: CIRCULAR W/ JUNCAS SP., DOCK, & DUCKWEED. STEEP BANK. POOL SLIGHTLY TURBID. S POOL: LINEAR UNDERCROSSING W/CATTAILS, SMARTWEED MINOR'S LETTUCS, NETTLE, SOCHUS, & DELPHINIUM. POOL CLEAR-MUDDY.

General: MORE THAN 1 TURTLE IN NORTH POOL WITH 1 CAPTURED & MEASURED (16X14CM) ON 10 MAR 2004, AND IN SOUTH POOL TURTLES "ABUNDANT" ON 9 MAR 2004.

Owner/Manager: USBOR, PVT

Northern Hardpan Vernal Pool

Element Code: CTT44110CA

Northern Hardpan Vernal Pool

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3.1
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	5	**Map Index:**	14693	**EO Index:**	744	**Element Last Seen:**	1983-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94715 / -119.78987	**Accuracy:**	1 mile
UTM:	Zone-11 N4092647 E251569	**Elevation (ft):**	395
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location:	EAST SIDE OF HWY 41 ABOUT 1.5 MILES NORTH OF AVENUE 12, NEAR LITTLE TABLE MOUNTAIN.
Detailed Location:	POOLS NOT CONTINUOUS BUT IN UNPLOWED AREAS; SOME DENSE POOLS AREAS.
Ecological:	VALLEY GRASSLAND W/VERNAL STREAMS AND POOLS. VERY HUMMOCKY. RELATIVELY UNDISTURBED IN 1982. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.
General:	SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	UNKNOWN

Occurrence No.	22	**Map Index:**	14877	**EO Index:**	28005	**Element Last Seen:**	1983-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.90355 / -119.68653	**Accuracy:**	1 mile
UTM:	Zone-11 N4087544 E260636	**Elevation (ft):**	380
PLSS:	T12S, R21E, Sec. 09 (M)	**Acres:**	0.0

Location:	COPPER HILL VERNAL POOL, NW OF JUNCTION OF COPPER & ARMSTRONG AVENUES, VICINITY OF CLOVIS.
Detailed Location:	
Ecological:	UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.
General:	MAY NO LONGER FIT EO CRITERIA. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	UNKNOWN

Occurrence No.	35	**Map Index:**	14549	**EO Index:**	27457	**Element Last Seen:**	1980-04-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-15

Quad Summary:	Lanes Bridge (3611987), Gregg (3611988)
County Summary:	Madera

Lat/Long:	36.96160 / -119.86737	**Accurracy:**	1 mile
UTM:	Zone-11 N4094455 E244714	**Elevation (ft):**	350
PLSS:	T11S, R10E, Sec. 23 (M)	**Acres:**	0.0

Location:	HWY 41 NORTH FROM FRESNO TO AVENUE 15 THEN 3 MILES WEST. AREA INCLUDES 3 SECTIONS.
Detailed Location:	POOLS IN MEANDERS OF EPHEMERAL CREEKS. POOLS VERY DENSE IN SOME AREAS OF 1-5 ACRES. W/IN ANNUAL GRASSLAND.
Ecological:	ROLLING PLAIN BUT FAIRLY LEVEL. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.
General:	SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	UNKNOWN

Occurrence No.	36	**Map Index:**	14580	**EO Index:**	27313	**Element Last Seen:**	1980-04-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-15

Quad Summary:	Lanes Bridge (3611987), Little Table Mtn. (3711917)
County Summary:	Madera

Lat/Long:	37.00272 / -119.85487	**Accurracy:**	1 mile
UTM:	Zone-11 N4098985 E245964	**Elevation (ft):**	400
PLSS:	T11S, R19E, Sec. 01 (M)	**Acres:**	0.0

Location:	10 MILES EAST OF MADERA ON AVENUE 15. AREA INCLUDES SECTIONS 1 & 2. (ACTUALLY EAST ON HWY 145).
Detailed Location:	POOLS FORM IN MEANDERS OF EPHEMERAL CREEKS. SOME AREAS OF 1-5 ACRES W/ VERY DENSE VERNAL POOL HABITAT. W/IN ANNUAL GRASSLAND.
Ecological:	ROLLING PLAIN BUT FAIRLY LEVEL. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.
General:	SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	UNKNOWN

Occurrence No.	122	**Map Index:**	20262	**EO Index:**	14614	**Element Last Seen:**	1991-04-XX
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.95532 / -119.71101	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4093350 E258618	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 20 (M)	**Acres:**	295.3

Location:	ABOUT TWO AIR MILES SOUTH OF FRIANT, AND ONE AIR MILE EAST OF LOST LAKE RECREATION AREA.
Detailed Location:	NUMEROUS VERNAL POOLS DISTRIBUTED OVER THREE SECTIONS WITH THE BULK LYING ON THE BORDER BETWEEN SECTIONS 19 AND 20.
Ecological:	CONTAINS AT LEAST ONE LISTED SPECIES (ORTHOCARPUS CAMPESTRIS SUCCULENTIS) AND POSSIBLY TIGER SALAMANDERS. SPECIES LIST NOT AVAILABLE. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.
General:	BEST AND LARGEST EXAMPLE OF VERNAL POOLS LEFT IN FRESNO COUNTY. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	PVT

Occurrence No.	125	**Map Index:**	25121	**EO Index:**	14557	**Element Last Seen:**	1986-05-21
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1986-05-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96801 / -119.83676	**Accurracy:**	specific area
UTM:	Zone-11 N4095085 E247461	**Elevation (ft):**	365
PLSS:	T11S, R20E, Sec. 18 (M)	**Acres:**	9.4

Location:	JUST NORTH OF AVENUE 15, 1/2 MILE WEST OF ROAD 39 1/2.
Detailed Location:	
Ecological:	VERNAL POOLS IN CISMONTANE VALLEY GRASSLAND. CRACKED CLAY SOILS IN CENTER OF POOLS. ORCUTTIA INAEQUALIS IN ASSOCIATION WITH ORTHOCARPUS CAMPESTRIS SUCCULENTIS, PSILOCARPHUS, DOWNINGIA, PLAGIOBOTHRYS AND VULPIA MYUROS.
General:	UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	PVT

Occurrence No.	126	**Map Index:** 14573	**EO Index:**	9519	**Element Last Seen:**	1986-05-21
Occ. Rank:	Poor		**Presence:**	Presumed Extant	**Site Last Seen:**	1986-05-21
Occ. Type:	Natural/Native occurrence		**Trend:**	Decreasing	**Record Last Updated:**	1998-07-15

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.93331 / -119.85505	**Accurracy:**	specific area
UTM:	Zone-11 N4091283 E245717	**Elevation (ft):**	325
PLSS:	T11S, R19E, Sec. 36 (M)	**Acres:**	5.5

Location: JUST EAST OF ROAD 38, AND JUST NORTH OF THE SE ARM OF THE MADERA CANAL.

Detailed Location: UNDER PG&E POWER LINES.

Ecological: VERNAL POOL IN VALLEY GRASSLAND, RECENTLY DISKED CAUSING IRREVERSIBLE DAMAGE. ASSOCIATED SPECIES INCLUDE ERYNGIUM VASEYI, POLYPOGON, PSILOCARPHUS AND BROMUS RUBENS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Northern Claypan Vernal Pool

Element Code: CTT44120CA

Northern Claypan Vernal Pool

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1.1
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	6	**Map Index:** 14687	**EO Index:**	26474	**Element Last Seen:**	1980-01-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:**	1980-01-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:**	1998-07-15

Quad Summary: Fresno North (3611977), Lanes Bridge (3611987)

County Summary: Fresno, Madera

Lat/Long:	36.86226 / -119.79161	**Accurracy:**	1 mile
UTM:	Zone-11 N4083231 E251138	**Elevation (ft):**	350
PLSS:	T12S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location: NORTH OF PINEDALE. EAST SIDE BOUNDED BY FRIANT ROAD. WEST SIDE BOUNDED BY RIVER BLUFF.

Detailed Location: ABOUT 700 ACRES.

Ecological: SERIES OF MIMA MOUNDS W/INTERSPERSED POOLS. ENDANGERED ORTHOCARPUS SUCCULENTUS, ORCUTTIA CALIFORNICA VAR INEQUALIS HERE. GRASSLAND W/ HIGH % EXOTICS.

General: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: UNKNOWN

Great Valley Mixed Riparian Forest

Element Code: CTT61420CA

Great Valley Mixed Riparian Forest

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2.2
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	36	**Map Index:** 14761	**EO Index:** 15633	**Element Last Seen:**	1983-10-27
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1983-10-27
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-07-21

Quad Summary: Friant (3611986), Lanes Bridge (3611987)

County Summary: Fresno, Madera

Lat/Long:	36.93375 / -119.75252	**Accuracy:**	specific area
UTM:	Zone-11 N4091063 E254853	**Elevation (ft):**	280
PLSS:	T11S, R20E, Sec. 35 (M)	**Acres:**	103.6

Location: BALL RANCH ROOKERY VICINITY, ALONG SAN JOAQUIN RIVER, SOUTH OF LEDGER ISLAND.

Detailed Location: MAP GENERALIZED FROM 1983 USAGE AERIAL PHOTOS.

Ecological: RIPARIAN ASSOC W/POPULUS FREMONTII, SALIX SPP, ALNUS RHOMBIFOLIA & PLATANUS RACEMOSA. ADJ TO GRASSLAND W/VALLEY OAKS.

General: SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Sycamore Alluvial Woodland

Element Code: CTT62100CA

Sycamore Alluvial Woodland

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1.1
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	9	**Map Index:** 22658	**EO Index:** 17208	**Element Last Seen:**	1992-09-28
Occ. Rank:	Fair		**Presence:** Presumed Extant	**Site Last Seen:**	1992-09-28
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-07-21

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.94031 / -119.68562	**Accuracy:**	specific area
UTM:	Zone-11 N4091621 E260832	**Elevation (ft):**	360
PLSS:	T11S, R21E, Sec. 28 (M)	**Acres:**	28.5

Location: LITTLE DRY CREEK; NORTH OF ADJACENT AUBERRY ROAD AND JUST EAST OF THE FRIANT-KERN CANAL IN FRESNO COUNTY.

Detailed Location: THREE POLYGONS ALONG LITTLE DRY CREEK EXTENDING FROM THE SOUTHERN PART OF SECTION 28 INTO THE SE PART OF SECTION 29 AND THE NE PART OF SECTION 32.

Ecological: A FAIRLY CLOSED WOODLAND ON A RELATIVELY FINE-GROUND TO COBBLY ALLUVIUM. STRONGLY DOMINATED BY SYCAMORES WITH A DENSE, GRASSY UNDERSTORY. THIS AREA IS WELL WATERED BY THE FRIANT-KERN CANAL. BERMUDA GRASS AND SCATTERED NETTLES ALSO PRESENT.

General: SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Branchinecta lynchi

Element Code: ICBRA03030

vernal pool fairy shrimp

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S2S3
	Other:	IUCN_VU-Vulnerable			
Habitat:	**General:**	ENDEMIC TO THE GRASSLANDS OF THE CENTRAL VALLEY, CENTRAL COAST MTNS, AND SOUTH COAST MTNS, IN ASTATIC RAIN-FILLED POOLS.			
	Micro:	INHABIT SMALL, CLEAR-WATER SANDSTONE-DEPRESSION POOLS AND GRASSED SWALE, EARTH SLUMP, OR BASALT-FLOW DEPRESSION POOLS.			

Occurrence No.	2	**Map Index:**	22101	**EO Index:**	8053	**Element Last Seen:**	1992-03-19
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-20

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.91559 / -119.78953	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4089143 E251497	**Elevation (ft):**	375
PLSS:	T12S, R20E, Sec. 04 (M)	**Acres:**	0.0

Location:	VICINITY OF ROOT CREEK, EAST OF STATE ROUTE 41 & ABOUT 0.6 MILE SOUTH OF AVENUE 12, 9 MILES WEST OF FRIANT.
Detailed Location:	VERNAL POOLS LOCATED BETWEEN STATE ROUTE 41 & UP TO 0.6 MILES TO THE EAST. 1992 SURVEY POOL NUMBERS: 30, 31, 32.
Ecological:	HABITAT CONSISTS OF NORTHERN HARDPAN VERNAL POOLS DOMINATED BY HORDEUM GENICULATUM & ERYNGIUM VASEYI.
General:	ADULTS OBSERVED IN 1 (POSSIBLY 2) POOLS ON 18 MAR 1992. FAIRY SHRIMP FOUND IN 4 POOLS ON 19 MAR 1992. SCAPHIOPUS HAMMONDI HAMMONDI TADPOLES ALSO PRESENT.
Owner/Manager:	PVT

Occurrence No.	5	**Map Index:**	24599	**EO Index:**	6578	**Element Last Seen:**	2004-03-16
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-02

Quad Summary:	Friant (3611986), Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.97667 / -119.75240	**Accuracy:**	specific area
UTM:	Zone-11 N4095826 E255000	**Elevation (ft):**	435
PLSS:	T11S, R20E, Sec. 14 (M)	**Acres:**	18.0

Location:	IN THE AREA OF THE JUNCTION OF MADERA CANAL & ROAD 204, ON THE EAST SIDE OF LITTLE TABLE MOUNTAIN.
Detailed Location:	NE OF THE JUNCTION IN 1993. POOL ID MAC-L-004.20.1 IN 2004 AT MADERA CANAL MILEPOST 004.20.
Ecological:	"TYPICAL VERNAL POOL, CIRCULAR DEPRESSION, CLEAR WATER. ERYNGIUM EMERGENT, PLAGIOBOTHRYS, ERODIUM, SONCHUS, BROMUS DIANDRUS, TRIFOLIUM, ALEPCURUS, AND CASTILLEA."
General:	SEVERAL INDIVIDUALS OBSERVED IN 1993. 2 MALE & 3 FEMALE FAIRY SHRIMP OBS BY D. NEWMAN ON 16 MAR 2004.
Owner/Manager:	USBOR, PVT

Occurrence No.	101	**Map Index:**	32551	**EO Index:**	1757	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-06-17

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91077 / -119.73529	**Accuracy:**	specific area
UTM:	Zone-11 N4088468 E256314	**Elevation (ft):**	360
PLSS:	T12S, R20E, Sec. 01 (M)	**Acres:**	5.6

Location:	1.2 KM SOUTH OF THE INTERSECTION BETWEEN WILLOW AVENUE AND FRIANT ROAD; 10 KM SSW OF FRIANT.
Detailed Location:	3 CLOSELY SITUATED POOLS: 1 LARGE POOL IN NORTHERN AREA AND 2 SMALLER POOLS IN SOUTHERN AREA.
Ecological:	3 VERNAL POOLS IN NON- NATIVE GRASSLAND HABITAT; ROLLING HILL TOPOGRAPHY. 2009 AERIAL PHOTO SHOWS SITE DEVELOPED BY GOLF COURSE & RURAL RESIDENTIAL.
General:	"MANY" INDIVIDUALS OBSERVED IN 3 POOLS; WESTERN SPADEFOOT TOAD AND CALIFORNIA TIGER SALAMANDER ALSO PRESENT.
Owner/Manager:	PVT

Occurrence No.	127	**Map Index:**	33338	**EO Index:**	21886	**Element Last Seen:**	1993-02-17
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-02-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-06-07

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96913 / -119.82762	**Accuracy:**	80 meters
UTM:	Zone-11 N4095185 E248279	**Elevation (ft):**	370
PLSS:	T11S, R20E, Sec. 18 (M)	**Acres:**	0.0

Location:	0.25 MILE EAST OF ROAD 39-1/2 ALIGNMENT AND 0.2 MILE NORTH OF AVENUE 15, WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	4 POOLS SAMPLED IN A SERIES.
Ecological:	CLAYPAN VERNAL POOLS AND SWALES IN NON NATIVE GRASSLAND. LINDERIELLA OCCIDENTALIS AND SCAPHIOPUS HAMMONDII ALSO PRESENT.
General:	G. KIRKPATRICK COLLECTED SHRIMP IN ALL 4 SAMPLED POOLS ON 17 FEBRUARY 1993.
Owner/Manager:	PVT

Occurrence No.	129	**Map Index:**	14592	**EO Index:**	25271	**Element Last Seen:**	1993-02-17
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-02-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-06

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.96855 / -119.84268	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4095160 E246936	**Elevation (ft):**	375
PLSS:	T11S, R19E, Sec. 13 (M)	**Acres:**	127.6

Location: NORTHWEST OF AVENUE 15 X AVENUE 39 1/2; NORTH OF LITTLE DRY CREEK; APPROX. 4.5 AIR MILES WEST OF LITTLE TABLE MTN.

Detailed Location: SAMPLED 2 POOLS IN A SERIES.

Ecological: CLAYPAN VERNAL POOLS AND SWALES IN NON-NATIVE GRASSLAND.

General: B. LYNCHI COLLECTED FROM BOTH POOLS & DEPOSITED IN CALIFORNIA ACADEMY OF SCIENCE; LINDERIELLA OCCIDENTALIS CO-OCCURED IN 1 POOL; AMBYSTOMA CALIFORNIENSE AND SCAPHIOPUS HAMMONDII OBSERVED IN POOLS LATER IN SPRING OF 1993.

Owner/Manager: PVT

Occurrence No.	148	**Map Index:**	33666	**EO Index:**	30639	**Element Last Seen:**	1993-03-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-03-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-03-17

Quad Summary: Round Mountain (3611975), Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.81407 / -119.63591	**Accurracy:**	3/5 mile
UTM:	Zone-11 N4077489 E264873	**Elevation (ft):**	385
PLSS:	T13S, R21E, Sec. 12 (M)	**Acres:**	0.0

Location: EAST OF DE WOLF AVE & SOUTH OF BULLARD AVE. EAST OF CLOVIS.

Detailed Location: 1 FEATURE INSPECTED SOMEWHERE IN SECTION 12. BRANCHINECTA LYNCHI OBSERVED. NO LEPIDURUS PACKARDI OBSERVED.

Ecological: NATURAL VERNAL POOL.

General: SUGNET RECORD NUMBER 98.

Owner/Manager: UNKNOWN

Occurrence No.	189	**Map Index:**	36859	**EO Index:**	31856	**Element Last Seen:**	1993-04-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-04-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-09-24

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.97427 / -119.70036	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4095426 E259626	**Elevation (ft):**	460
PLSS:	T11S, R21E, Sec. 17 (M)	**Acres:**	641.9

Location: 1 MILE SOUTH OF FRIANT DAM (LAKE MILLERTON), NORTH OF FRESNO.

Detailed Location:

Ecological: HABITAT CONSISTS OF A VERNAL POOL.

General: COLLECTED BY ANNE HATHORN IN APRIL 1993; SENT TO DENTON BELK FOR IDENTIFICATION (DB#1166).

Owner/Manager: UNKNOWN

Occurrence No.	198	**Map Index:**	40245	**EO Index:**	35247	**Element Last Seen:**	1998-02-14
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-02-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-30

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.97622 / -119.66868	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4095563 E262453	**Elevation (ft):**	600
PLSS:	T11S, R21E, Sec. 15 (M)	**Acres:**	937.4

Location:	MILLERTON NEW TOWN, IMMEDIATELY SOUTH OF MILLERTON ROAD, EAST OF FRIANT-KERN CANAL, NW OF AUBERY ROAD.
Detailed Location:	VERNAL POOL COMPLEX; VERNAL POOLS THAT CONTAIN FAIRY SHRIMP ARE OF GOOD QUALITY, THE REST OF THE SITE RANGES FROM MODERATE TO POOR.
Ecological:	VERNAL POOLS IN GENTLY ROLLING ANNUAL GRASSLAND WITH A SCATTERING OF OAKS. THE ANNUAL GRASSLAND CONSISTS PRIMARILY OF NON NATIVE SP: STORKSBILL, HORDEUM SP, TRIFOLIUM SP, AVENA SP.
General:	POOLS: #10 OBS <10'S; #19 OBS 100'S; #20 OBS 100'S; #20A OBS 100'S; #25 OBS <10'S; SPECIMENS (ADULT MALES/FEMALES & CYSTS) COLLECTED AT POOLS AND STORED AT CALIFORNIA ACADEMY OF SCIENCES.
Owner/Manager:	PVT

Occurrence No.	214	**Map Index:**	41666	**EO Index:**	41666	**Element Last Seen:**	1999-03-13
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-03-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-10-25

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94479 / -119.76380	**Accurracy:**	80 meters
UTM:	Zone-11 N4092317 E253883	**Elevation (ft):**	390
PLSS:	T11S, R20E, Sec. 26 (M)	**Acres:**	0.0

Location:	W OF CREEK THAT DRAINS LITTLE TABLE MTN , 2 MILES SE OF ROAD 204 & HIGHWAY 41, 2.2 MILES NE OF AVENUE 12 & HIGHWAY 41.
Detailed Location:	VERNAL POOL, CREEK DRAINS TO, AND IS 1 MILE NORTHWEST OF SAN JOAQUIN RIVER MILE 261.
Ecological:	VERNAL POOL IN NON-NATIVE GRASSLAND. SURROUNDING LAND USE IS AGRICULTURE, HOUSING DEVELOPMENT. CURRENT USE IS CATTLE GRAZING.
General:	100'S OBSERVED, 10 COLLECTED AND SENT TO CAS, 1999.
Owner/Manager:	PVT

Occurrence No.	220	**Map Index:**	41787	**EO Index:**	41787	**Element Last Seen:**	1999-03-13
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-03-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-10-25

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.93993 / -119.76693	**Accurracy:**	80 meters
UTM:	Zone-11 N4091786 E253589	**Elevation (ft):**	440
PLSS:	T11S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location:	UPPER ROOT CREEK DRAINAGE, 1.7 MILES SE OF HIGHWAY 41 AND ROAD 204, 2.2 MILES NE OF HIGHWAY 41 AND AVENUE 12.
Detailed Location:	VERNAL POOL
Ecological:	VERNAL POOL IN NON-NATIVE GRASSLAND. SURROUNDING LAND USE IS AGRICULTURE & HOUSING DEVELOPMENT. CURRENT USE IS CATTLE GRAZING.
General:	100'S OBSERVED, 40 FOR THE THREE LOCATIONS (OCCURRENCES 214, 220 & 221) COLLECTED AND SENT TO CAS, 1999.
Owner/Manager:	PVT

Occurrence No.	221	**Map Index:**	41788	**EO Index:**	41788	**Element Last Seen:**	1999-03-13
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-03-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-10-25

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94793 / -119.76777	**Accurracy:**	80 meters
UTM:	Zone-11 N4092675 E253540	**Elevation (ft):**	390
PLSS:	T11S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location:	UPPER ROOT CREEK DRAINAGE, 2 MILES SE OF HIGHWAY 41 AND ROAD 204, 1.9 MILES NE OF HIGHWAY 41 AND AVENUE 12.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF A VERNAL POOL IN NON-NATIVE GRASSLAND. SURROUNDING LY GRAZED BY CATTLE.
General:	100'S OBSERVED, ~40 FOR THE THREE LOCATIONS (OCCURRENCES 214, 220 & 221) COLLECTED AND SENT TO CAS, 1999.
Owner/Manager:	PVT

Occurrence No.	322	**Map Index:**	48387	**EO Index:**	48387	**Element Last Seen:**	2002-02-16
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-07-29

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91179 / -119.68856	**Accuracy:**	specific area
UTM:	Zone-11 N4088463 E260481	**Elevation (ft):**	435
PLSS:	T12S, R21E, Sec. 04 (M)	**Acres:**	17.9

Location:	5 MI SSE OF FRIANT; 1.0 - 1.5 MILES NORTH OF COPPER AVE & 1.4 - 1.7 MILES EAST OF AUBERRY RD. WEST OF FRIANT-KERN CANAL.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF VERNAL POOLS IN ANNUAL GRASSLAND. AREA IS USED FOR CATTLE-GRAZING.
General:	1000'S OBSERVED BETWEEN THIS OCCURRENCE AND OCCURRENCE 323 (TO THE EAST) ON 16 FEB 2002. NUMBERS 609 -624 COLLECTED FOR CAL. ACADEMY OF SCIENCES. SITE TARGETED TO BECOME A MITIGATION BANK.
Owner/Manager:	PVT

Occurrence No.	323	**Map Index:**	48391	**EO Index:**	48391	**Element Last Seen:**	2002-02-16
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-07-29

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91512 / -119.67997	**Accuracy:**	80 meters
UTM:	Zone-11 N4088811 E261257	**Elevation (ft):**	425
PLSS:	T12S, R21E, Sec. 04 (M)	**Acres:**	0.0

Location:	5 MILES SSE OF FRIANT; 1.3 MILES NORTH OF COPPER AVE AND 2 MILES EAST OF AUBERRY ROAD. WEST OF FRIANT-KERN CANAL.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF VERNAL POOL IN ANNUAL GRASSLAND. AREA IS USED FOR CATTLE-GRAZING.
General:	1000'S OBSERVED BETWEEN THIS OCCURRENCE AND OCCURRENCE 322 (TO THE WEST) ON 16 FEB 2002. NUMBERS 609 -624 COLLECTED FOR CAL. ACADEMY OF SCIENCES. SITE TARGETED TO BECOME A MITIGATION BANK.
Owner/Manager:	PVT

Occurrence No.	324	**Map Index:**	48392	**EO Index:**	48392	**Element Last Seen:**	2002-02-10
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-07-29

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.92880 / -119.72742	**Accurracy:**	80 meters
UTM:	Zone-11 N4090449 E257073	**Elevation (ft):**	375
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	0.0

Location: ABOUT 4 MILES SSW OF FRIANT; NEAR LITTLE DRY CREEK, 0.2 MILES EAST OF FRIANT ROAD.

Detailed Location:

Ecological: HABITAT CONSISTS OF NUMEROUS MOUNDS AND HARDPAN DEPRESSIONS (NEAR A RIPARIAN CORRIDOR) WITHIN AN ANNUAL GRASSLAND. MANY CALIFORNIA TIGER SALAMANDERS, WESTERN SPADEFOOT TOADS, MIDVALLEY FAIRY SHRIMP AND GROUND SQUIRRELS IN VICINITY.

General: 100'S OBSERVED BETWEEN THIS OCCURRENCE AND OCCURRENCES 325 AND 326 (TO THE EAST) ON 10 FEB 2002. NUMBERS 601-607 COLLECTED FOR CAL. ACADEMY OF SCIENCES. SITE IS USED FOR CATTLE-GRAZING AND IS TARGETED TO BECOME A MITIGATION BANK.

Owner/Manager: PVT

Occurrence No.	325	**Map Index:**	48393	**EO Index:**	48393	**Element Last Seen:**	2002-02-10
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-07-29

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.92929 / -119.71195	**Accurracy:**	80 meters
UTM:	Zone-11 N4090464 E258452	**Elevation (ft):**	360
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	0.0

Location: 3.9 MILES DIRECTLY SOUTH OF FRIANT; APPROXIMATELY 0.3 MILES WEST OF AUBERRY ROAD, EAST OF CREEK.

Detailed Location:

Ecological: HABITAT CONSISTS OF NUMEROUS MOUNDS AND HARDPAN DEPRESSIONS (NEAR A RIPARIAN CORRIDOR) WITHIN AN ANNUAL GRASSLAND. MANY CALIFORNIA TIGER SALAMANDERS, WESTERN SPADEFOOT TOADS, MIDVALLEY FAIRY SHRIMP AND GROUND SQUIRRELS IN VICINITY.

General: 100'S OBS BETWEEN THIS OCCURRENCE & OCCURRENCES 324 (TO WEST) & 326 (TO SOUTH) ON 10 FEB 2002. NUMBERS 601-607 COLLECTED FOR CAL. ACADEMY OF SCIENCES. SITE IS USED FOR CATTLE-GRAZING AND IS TARGETED TO BECOME A MITIGATION BANK.

Owner/Manager: PVT

Occurrence No.	326	**Map Index:**	47430	**EO Index:**	48394	**Element Last Seen:**	2002-02-10
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-07-29

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.92358 / -119.71469	**Accuracy:**	specific area
UTM:	Zone-11 N4089837 E258190	**Elevation (ft):**	400
PLSS:	T12S, R21E, Sec. 06 (M)	**Acres:**	13.1

Location:	4.5 MILES SOUTH OF FRIANT; 0.2 TO 0.4 MILE WEST OF AUBERRY ROAD, LOCATED BETWEEN 2 CREEKS.
Detailed Location:	
Ecological:	HABITAT CONSISTS OF NUMEROUS MOUNDS AND HARDPAN DEPRESSIONS (NEAR A RIPARIAN CORRIDOR) WITHIN AN ANNUAL GRASSLAND. MANY CALIFORNIA TIGER SALAMANDERS, WESTERN SPADEFOOT TOADS, MIDVALLEY FAIRY SHRIMP AND GROUND SQUIRRELS IN VICINITY.
General:	100'S OBS BETWEEN THIS OCCURRENCE & OCCURRENCES 324 (TO NW) AND 325 (TO NORTH) ON 10 FEB 2002. NUMBERS 601-607 COLLECTED FOR CAL. ACADEMY OF SCIENCES. SITE IS USED FOR CATTLE-GRAZING AND IS TARGETED TO BECOME A MITIGATION BANK.
Owner/Manager:	PVT

Occurrence No.	346	**Map Index:**	67495	**EO Index:**	51284	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-21

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.93610 / -119.78924	**Accuracy:**	specific area
UTM:	Zone-11 N4091419 E251589	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 33 (M)	**Acres:**	55.0

Location:	JUST EAST OF HIGHWAY 41 AND 0.9 MILE NORTH OF AVENUE 12, 14 MILES EAST OF MADERA
Detailed Location:	POOLS LOCATED PRIMARILY ALONG UNNAMED STREAM. SOME POOLS LOCATED TO THE NORTH OF THE STREAM. 1992 POOOL SURVEY NUMBERS: 41, 43, 47, 49, 50, 66, 67.
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS NOW USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	UNKNOWN NUMBER OF ADULTS IN 7 POOLS ON 19 MARCH 1992. INDIVIDUALS IN 5 OF THE 7 POOLS WERE NOT IDENTIFIED TO SPECIES - THESE MAY BE B. LYNCHI. UNKNOWN NUMBER OF ADULT SHRIMP OBSERVED FEB 2001.
Owner/Manager:	PVT

Occurrence No.	347	**Map Index:**	45182	**EO Index:**	51286	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.90552 / -119.78512	**Accurracy:**	80 meters
UTM:	Zone-11 N4088015 E251857	**Elevation (ft):**	350
PLSS:	T12S, R20E, Sec. 09 (M)	**Acres:**	0.0

Location:	0.4 MILE EAST OF HIGHWAY 41 AND 0.3 MILE SOUTH OF AVENUE 11, 4.5 MILES NORTH OF PINEDALE
Detailed Location:	
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS NOW USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	ADULT SHRIMP OBSERVED DURING FEB 2001.
Owner/Manager:	PVT

Occurrence No.	349	**Map Index:**	45183	**EO Index:**	51289	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.95126 / -119.77616	**Accurracy:**	80 meters
UTM:	Zone-11 N4093067 E252803	**Elevation (ft):**	420
PLSS:	T11S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location:	0.9 MILE EAST OF HIGHWAY 41 AND 0.5 MILE SOUTH OF ROAD 204, 7 MILES NORTH OF PINEDALE
Detailed Location:	
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	ADULT SHRIMP OBSERVED DURING FEB 2001.
Owner/Manager:	PVT

Occurrence No.	350	**Map Index:**	51334	**EO Index:**	51334	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-20

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94681 / -119.78415	**Accurracy:**	80 meters
UTM:	Zone-11 N4092594 E252077	**Elevation (ft):**	420
PLSS:	T11S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location:	0.6 MILE EAST OF HIGHWAY 41 AND 0.9 MILE SOUTH OF ROAD 204, 6.5 MILES NORTH OF PINEDALE
Detailed Location:	
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	ADULT SHRIMP OBSERVED DURING FEB 2001.
Owner/Manager:	PVT

Occurrence No.	351	**Map Index:**	51335	**EO Index:**	51335	**Element Last Seen:**	2001-02-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-20

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.93495 / -119.76771	**Accurracy:**	80 meters
UTM:	Zone-11 N4091235 E253503	**Elevation (ft):**	310
PLSS:	T11S, R20E, Sec. 34 (M)	**Acres:**	0.0

Location:	1.4 MILES EAST OF HIGHWAY 41 AND 1.6 MILES SOUTH OF ROAD 204, 6.4 MILES NORTH OF PINEDALE
Detailed Location:	
Ecological:	HABITAT CONSISTS OF GRAZED NON-NATIVE GRASSLAND WITH VERNAL POOLS AND WETLAND DRAINAGES. GRASSLANDS USED AS PASTURE; MOST WERE DRYLAND FARMED HISTORICALLY. SURROUNDING LANDS ARE AGRICULTURE, COMMERCIAL OR URBAN.
General:	ADULT SHRIMP OBSERVED DURING FEB 2001.
Owner/Manager:	PVT

Occurrence No.	403	**Map Index:**	64301	**EO Index:**	64380	**Element Last Seen:**	2004-11-08
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-11-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-03-20

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.97708 / -119.79240	**Accuracy:**	1/10 mile
UTM:	Zone-11 N4095975 E251440	**Elevation (ft):**	430
PLSS:	T11S, R20E, Sec. 16 (M)	**Acres:**	0.0

Location:	EAST OF STATE ROUTE 41 JUST NORTH OF THE MADERA CANAL.
Detailed Location:	LAT-LONG AND UTM GIVEN ARE IN FRESNO AND DO NOT MATCH T-R-S AND WRITTEN DESCRIPTION. MAPPED USING T-R-S AND WRITTEN DESCRIPTION.
Ecological:	ON GRAZED NON-NATIVE GRASSLAND. VEGETATION IN POOL INCLUDED ERYNGIUM SP. AND JUNCUS SP.
General:	4 ADULT FAIRY SHRIMP OBSERVED.
Owner/Manager:	PVT

Occurrence No.	404	**Map Index:**	64752	**EO Index:**	64831	**Element Last Seen:**	2006-02-03
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-02-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-05-30

Quad Summary:	Clovis (3611976)
County Summary:	Fresno

Lat/Long:	36.83106 / -119.63997	**Accuracy:**	80 meters
UTM:	Zone-11 N4079385 E264563	**Elevation (ft):**	395
PLSS:	T13S, R21E, Sec. 01 (M)	**Acres:**	0.0

Location:	EAST SIDE OF ENTERPRISE CANAL, 0.3 MILE EAST OF DE WOLF AVENUE AND 0.4 MILE SOUTH OF HERNDON AVENUE, ENE OF CLOVIS.
Detailed Location:	IN SE1/4 OF NW1/4 SEC 1.
Ecological:	HABITAT CONSISTS OF A 2' X 10' (1-2" IN DEPTH) PUDDLE THAT IS LIKELY A REMNANT OF VERNAL POOLS THAT ONCE WERE FOUND AT THIS SITE; PUDDLE CONTAINED A MUD SUBSTRATE AND WAS SLIGHTLY MURKY.
General:	3 ADULTS OBSERVED ON 3 FEB 2006.
Owner/Manager:	PVT

Occurrence No.	410	**Map Index:**	64321	**EO Index:**	64400	**Element Last Seen:**	2005-02-01
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-02-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-17

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.98865 / -119.79486	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4097265 E251259	**Elevation (ft):**	430
PLSS:	T11S, R20E, Sec. 09 (M)	**Acres:**	38.0

Location:	ABOUT 1.5 MILES SOUTH OF STATE ROUTE 145 ALONG STATE ROUTE 41 (AT BENCH MARK 432) AND MADERA CANAL RIGHT-OF-WAY.
Detailed Location:	1992: 50 FT EAST OF SR 41. 2004: ALONG EAST SIDE OF CANAL AT CANAL MILEPOSTS 008.57 (POOL ID MAC-R-008.57.1) & 008.34 (MAC-R-008.34.1). 2004-2005: EAST & WEST OF SR41 NEAR POST MILE 7.9 (1 POOL IN CALTRANS ROW; OTHERS ON PVT PROPERTY).
Ecological:	SR145: ISOLATED POOLS W/IN SWALE COMPLEXES & DIRT ROADS; VEG VARIOUS W/ TRICHOSTEMA LANCEOLATUM, CENTAUREA SOLSTITIALIS, &ERYGIUM, JUNCUS, ERODIUM, & HORDEUM SP. CANAL: CLEAR, LARGE VERNAL POOLS. AREA IS GRAZED ANNUAL GRASSLAND.
General:	ADULTS IN 2 POOLS, 10 MAR 1992. 2 MALES & 5 UNK FEMALES (PROB B. LYNCHI) OBS AT N POOL ALONG CANAL, & 1 MALE & 1 FEMALE OBS AT S POOL ON 18 MAR 2004. 6 POOLS SURVEYED 08 NOV 2004 - 01 FEB 2005, EACH W/ <7 ADULTS (COLL & DEPOSITED IN CAS).
Owner/Manager:	CALTRANS, USBOR, PVT

Occurrence No.	424	**Map Index:**	67498	**EO Index:**	67664	**Element Last Seen:**	1992-03-18
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-22

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94918 / -119.79348	**Accurracy:**	80 meters
UTM:	Zone-11 N4092882 E251254	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location:	JUST EAST OF STATE ROUTE 41 AND 1.8 MILES NORTH OF AVENUE 12, 7 MILES NORTH OF PINEDALE.
Detailed Location:	POOL #C005 IS LOCATED 50 FEET EAST OF STATE ROUTE 41. MAPPED ACCORDING TO LOCATION SHOWN ON A MAP.
Ecological:	HABITAT CONSISTS OF NORTHERN HARDPAN VERNAL POOL.
General:	UNKNOWN NUMBER OF B. LYNCHI OBSERVED IN 1 POOL ON 18 MARCH 1992.
Owner/Manager:	PVT

Occurrence No.	425	**Map Index:**	67499	**EO Index:**	67665	**Element Last Seen:**	1992-03-17
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-22

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94359 / -119.79416	**Accuracy:**	80 meters
UTM:	Zone-11 N4092262 E251175	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location:	JUST WEST OF STATE ROUTE 41 AND 1.4 MILES NORTH OF AVENUE 12, 6.8 MILES NORTH OF PINEDALE.
Detailed Location:	POOL #C214 IS LOCATED 20 FEET WEST OF STATE ROUTE 41. MAPPED ACCORDING TO LOCATION SHOWN ON A MAP.
Ecological:	HABITAT CONSISTS OF NORTHERN HARDPAN VERNAL POOL DOMINATED BY ERYNGIUM VASEYI. AMBYSTOMA CALIFORNIENSE AND SPEA HAMMONDII ALOS IN AREA.
General:	UNKNOWN NUMBER OF ADULT B. LYNCHI OBSERVED IN 1 POOL ON 17 MARCH 1992.
Owner/Manager:	PVT

Occurrence No.	596	**Map Index:**	72190	**EO Index:**	73141	**Element Last Seen:**	2004-03-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-08

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.99505 / -119.79864	**Accuracy:**	80 meters
UTM:	Zone-11 N4097986 E250943	**Elevation (ft):**	423
PLSS:	T11S, R20E, Sec. 09 (M)	**Acres:**	0.0

Location:	EAST SIDE OF MADERA CANAL AT MILEPOST 009.17, 0.14 CANAL MILES NE OF LITTLE DRY CREEK, & 0.25 MILES WEST OF HWY 41.
Detailed Location:	MAPPED TO PROVIDED COORDINATES IN SHAPEFILE. POOL ID MAC-R-009.17.1.
Ecological:	HABITAT DESCRIBED AS A "SMALL LINEAR ROAD-SIDE DITCH, CLEAR WATER, EMERGENT RUMEX, JUCUS SP., ALSO SILYBUM, MIMULUS, GRASSES, AND LACTUCA."
General:	1 MALE AND 3 FEMALES CAPTURED AND IDENTIFIED TO SPECIES ON 18 MAR 2004 BY D. NEWMAN.
Owner/Manager:	USBOR

Occurrence No.	597	**Map Index:**	72210	**EO Index:**	73150	**Element Last Seen:**	2004-03-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-09

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.95880 / -119.68952	**Accurracy:**	specific area
UTM:	Zone-11 N4093682 E260542	**Elevation (ft):**	477
PLSS:	T11S, R21E, Sec. 21 (M)	**Acres:**	15.0

Location: ALONG EAST SIDE OF FRIANT-KERN CANAL, 1.3 AIR MI NNW OF THE CROSSING OF THE CANAL & AUBERRY RD, 2.2 MI SE OF FRIANT PO.

Detailed Location: SERIES OF 3 POOLS AT MILEPOSTS 003.00 (NORTH, POOL ID FKC-L-003.00.1), 003.12 (MIDDLE, ID FKC-L-003.12.1), AND 003.21 (SOUTH, ID FKC-L-003.21.1). MAPPED TO PROVIDED COORDINATES IN SHAPFILE.

Ecological: HABITAT DESCRIBED AS A CLEAR VERNAL POOL W/ ERYNGIUM SP & NON-NATIVE GRASSES (N), A TURBID SWALE W/ CATTLE DISTURBANCE & HOOF PRINTS & EMERGENT VEG & NON-NATIVE GRASSES (MID), & A TEA-COLORED VERNAL POOL NEXT TO CATTLE PASTURE (S).

General: ALL 3 POOLS SAMPLED ON 9 MAR 2004 BY C. UPTAIN W/ THE FOLLOWING FOUND: 3 MALES & 4 FEMALES FROM NORTH POOL, SPECIES PRESENT IN MIDDLE POOL, & 2 MALES, 1 FEMALE, & 1 IMMATURE FROM SOUTH POOL.

Owner/Manager: USBOR, PVT

Occurrence No.	598	**Map Index:**	72216	**EO Index:**	73153	**Element Last Seen:**	2004-03-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-09

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.94810 / -119.69563	**Accurracy:**	specific area
UTM:	Zone-11 N4092511 E259965	**Elevation (ft):**	477
PLSS:	T11S, R21E, Sec. 29 (M)	**Acres:**	23.0

Location: FRIANT-KERN CANAL, 1 AIR MI NW TO 1 AIR MI WNW OF THE CROSSING OF THE CANAL AT AUBERRY RD, 2.7 MI SSW OF FRIANT PO.

Detailed Location: SERIES OF 5 POOLS ALONG CANAL'S E SIDE AT CANAL MILEPOSTS 003.78 (N, POOL ID FKC-L-003.78.1), 003.82 (MID-N, FKC-L-003.82.1), 003.95 (MID, FKC-L-003.95.1), 004.04 (MID-S, FKC-L-004.04.1), & 004.12 (S, FKC-L-004.12.1). MAPPED TO SHAPEFILE.

Ecological: POOLS DESCRIBED AS: CLEAR, LONG, NARROW, TURBID, VERNAL POOL (N); LONG, NARROW, TEA-COLORED SWALE (MID-N); TURBID VERNAL POOL <1 FT FROM RD (MID); TURBID VERNAL POOL W/ CATTLE DISTURB (MID-S); TURBID POOL W/ REMAINING POOLS IN HOOF PRINTS.

General: POOLS SAMPLED 10 MAR 2004: 4 MALES ID'D BY G. BASSO (NORTH) THOUSANDS MORE OBS, 3 MALES OBS BY G.B. (MID-NORTH), 1 (SEX NOT STATED) OBS BY G.B. (MIDDLE), 1 FEMALE OBS BY G.B. (MID-SOUTH), & 6 MALES & 2 FEMALES OBS BY J. KOKX (SOUTH).

Owner/Manager: USBOR, PVT

Occurrence No.	599	**Map Index:**	72219	**EO Index:**	73159	**Element Last Seen:**	2004-03-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-09

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.93101 / -119.67326	**Accurracy:**	specific area
UTM:	Zone-11 N4090558 E261904	**Elevation (ft):**	480
PLSS:	T11S, R21E, Sec. 34 (M)	**Acres:**	7.0

Location: FRIANT-KERN CANAL, 0.88 AIR MI SSE OF THE CROSSING OF THE CANAL AT AUBERRY RD, 4.3 MI SE OF FRIANT PO.

Detailed Location: 2 POOLS ALONG THE EAST SIDE OF THE CANAL (ONE EACH ON EACH SIDE OF CANAL BRIDGE) AT MILEPOSTS 006.35 (NORTH, POOL ID FKC-L-006.35.1) AND 006.42 (SOUTH, POOL ID FKC-L-006.42.1). MAPPED TO PROVIDED SHAPEFILE.

Ecological: HABITAT DESCRIBED AS A TURBID, ROADSIDE DITCH (PUDDLE) W/OUT EMERGENT VEGETATION (NORTH), AND A SMALL, TURBID VERNAL POOL DRAINING INTO CULVERT (SOUTH).

General: NORTH POOL SAMPLED ON 11 MAR 2004 WITH 1 MALE OBSERVED BY K. GARCIA-TOMLINSON. SOUTH POOL SAMPLED ON 10 MAR 2004 WITH 5 FEMALES OBSERVED BY J. KOKX.

Owner/Manager: USBOR, PVT

Occurrence No.	600	**Map Index:**	72220	**EO Index:**	73161	**Element Last Seen:**	2004-03-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-09

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.89856 / -119.64453	**Accurracy:**	80 meters
UTM:	Zone-11 N4086886 E264364	**Elevation (ft):**	475
PLSS:	T12S, R21E, Sec. 11 (M)	**Acres:**	0.0

Location: FRIANT-KERN CANAL AT MILEPOST 9.68, 262 METERS E OF BRIDGE OVER CANAL, 2.5 MI NNW OF COLLINS (ST HWY 168 @ THOMPSON AVE)

Detailed Location: MAPPED TO PROVIDED SHAPEFLIE. POOL ID FKC-L-009.68.1.

Ecological: HABITAT DESCRIBED AS A CLEAR, RECEDING, ROADSIDE DITCH WITH ERYNGIUM.

General: 4 MALES (1 IMMATURE) IDENTIFIED TO SPECIES & 3 UKNOWN FEMALES OBS ON 10 MAR 2004 BY J. KOKX.

Owner/Manager: USBOR, PVT

Occurrence No.	601	**Map Index:**	72280	**EO Index:**	73162	**Element Last Seen:**	2004-03-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.89482 / -119.63740	**Accuracy:**	specific area
UTM:	Zone-11 N4086453 E264987	**Elevation (ft):**	465
PLSS:	T12S, R21E, Sec. 13 (M)	**Acres:**	9.0

Location:	FRIANT-KERN CANAL @ MILEPOSTS 010.17, 010.24 (E OF BRIDGE), 2.4MI S OF OWENS MT, 1.1MI NE OF N DEWOLF AVE @ BEHYMER AVE.
Detailed Location:	SERIES OF TWO POOLS; WEST POOL ON SOUTH SIDE OF CANAL (POOL IDS FKC-R-010.17.1) AND EAST POOL ON NORTH SIDE OF CANAL (ID FKC-L-010.24.1). MAPPED TO PROVIDED COORDINATES IN ESRP SHAPEFILE.
Ecological:	WEST POOL: CLEAR POOL W/ JUNCUS SP, & GRASSES IN SURROUNDING AREA. EAST POOL: TEA COLORED & VERY DEEP (2005); AND VERY CLEAR, LONG & NARROW VERNAL POOL WITH LOTS OF EMERGENT VEG (2004).
General:	2 MALES IDENTIFIED TO SPECIES (2 UNKNOWN FEMALES) IN EAST POOL ON 11 MAR 2004 BY J. KOKX.
Owner/Manager:	USBOR

Occurrence No.	602	**Map Index:**	72226	**EO Index:**	73168	**Element Last Seen:**	2004-03-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-10

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.89843 / -119.62954	**Accuracy:**	specific area
UTM:	Zone-11 N4086834 E265699	**Elevation (ft):**	465
PLSS:	T12S, R21E, Sec. 12 (M)	**Acres:**	10.0

Location:	FRIANT-KERN CANAL, 2.3 MI SSE OF OWENS MOUNTAIN, 1.5 MI NE OF N DEWOLF AVE AT BEHYMER AVE.
Detailed Location:	SERIES OF 2 POOLS ON NORTH SIDE OF THE CANAL NEAR A TIGHT BEND. WEST POOL AT MILEPOST 010.63 (POOL ID FKC-L-010.63.1), & EAST POOL AT MILEPOST 010.78 (POOL ID FKC-L-010.78.1). MAPPED TO PROVIDED COORDINATES IN SHAPEFILE.
Ecological:	HABITAT DESCRIBED AS A CLEAR SHALLOW POOL W/ EMERGENT ERYNGIUM SP. SURROUNDED BY NON-NATIVE GRASSES (WEST), AND A CLEAR SHALLOW POOL W/ LOTS OF EMERGENT ERYNGIUM SP W/ NON-NATIVE GRASSES & UNKNOWN LIGHT-GREEN NARROW GRASS (EAST).
General:	BOTH POOLS SAMPLED ON 11 MAR 2004 BY K. GARCIA-TOMLINSON & J. KOKX WITH 3 MALES IDENTIFIED TO SPECIES (& 2 UNKNOWN FEMALES) IN THE WEST POOL, & 2 MALES & 2 FEMALES IDENTIFIED TO SPECIES IN THE EAST POOL.
Owner/Manager:	USBOR

Branchinecta mesovallensis

Element Code: ICBRA03150

midvalley fairy shrimp

Listing Status: **Federal:** None
State: None
Other:

CNDDB Element Ranks: **Global:** G2
State: S2

Habitat: **General:** VERNAL POOLS IN THE CENTRAL VALLEY.
Micro:

Occurrence No.	22	**Map Index:** 47427	**EO Index:** 47427	**Element Last Seen:**	2002-02-10
Occ. Rank:	Excellent		**Presence:** Presumed Extant	**Site Last Seen:**	2002-02-10
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2002-03-14

Quad Summary: Friant (3611986)
County Summary: Fresno

Lat/Long:	36.92967 / -119.71144	**Accuracy:**	80 meters
UTM:	Zone-11 N4090505 E258499	**Elevation (ft):**	335
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	0.0

Location: SOUTH OF LITTLE DRY CREEK AND WEST OF AUBERRY ROAD, 4 MILES SOUTH OF FRIANT

Detailed Location: SITE IS DESTINED TO BECOME A MITIGATION BANK.

Ecological: HABITAT CONSISTS OF GRAZED ANNUAL GRASSLAND, WITH A RIPARIAN CORRIDOR CLOSE BY; TOPOGRAPHY IS MADE UP OF NUMEROUS MOUNDS & HARDPAN DEPRESSIONS. SITE IS A BREEDING AREA WHICH IS WASHED OUT REGULARLY FROM PRECIPITATION OR SNOW-MELT RUN-OFF.

General: 25 ADULTS OBSERVED ON 10 FEB 2002; COLLECTION MADE AND DEPOSITED AT CAS.

Owner/Manager: PVT

Occurrence No.	48	**Map Index:** 48374	**EO Index:** 48374	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2002-07-25

Quad Summary: Friant (3611986)
County Summary: Fresno

Lat/Long:	36.88961 / -119.63571	**Accuracy:**	1/10 mile
UTM:	Zone-11 N4085870 E265122	**Elevation (ft):**	430
PLSS:	T12S, R21E, Sec. 13 (M)	**Acres:**	0.0

Location: 5.6 MILES NE OF CLOVIS; 0.35 MILE SOUTH OF THE FRIANT-KERN CANAL ALONG AN UNIMPROVED ROAD.

Detailed Location:

Ecological:

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED/COLLECTED AT SITE #036 ON AN UNKNOWN DATE. LOCATION INFORMATION OBTAINED FROM VARIOUS SOURCES.

Owner/Manager: UNKNOWN

Linderiella occidentalis

Element Code: ICBRA06010

California linderiella

Listing Status: **Federal:** None
State: None
Other: IUCN_NT-Near Threatened

CNDDB Element Ranks: **Global:** G3
State: S2S3

Habitat: **General:** SEASONAL POOLS IN UNPLOWED GRASSLANDS WITH OLD ALLUVIAL SOILS UNDERLAIN BY HARDPAN OR IN SANDSTONE DEPRESSIONS.

Micro: WATER IN THE POOLS HAS VERY LOW ALKALINITY, CONDUCTIVITY, AND TDS.

Occurrence No.	1	**Map Index:**	24602	**EO Index:**	6391	**Element Last Seen:**	1993-03-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-03-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-09-20

Quad Summary: Friant (3611986)

County Summary: Madera

Lat/Long:	36.98227 / -119.73825	**Accuracy:**	80 meters
UTM:	Zone-11 N4096410 E256278	**Elevation (ft):**	440
PLSS:	T11S, R20E, Sec. 12 (M)	**Acres:**	0.0

Location: ALONG MADERA CANAL, 1.5 MILES WSW OF FRIANT.

Detailed Location:

Ecological:

General: SEVERAL OBSERVED IN 1993.

Owner/Manager: USBOR

Occurrence No.	2	**Map Index:**	64321	**EO Index:**	6582	**Element Last Seen:**	2004-03-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.98865 / -119.79486	**Accuracy:**	nonspecific area
UTM:	Zone-11 N4097265 E251259	**Elevation (ft):**	430
PLSS:	T11S, R20E, Sec. 09 (M)	**Acres:**	38.0

Location: ABOUT 1.5 MILES SOUTH OF STATE ROUTE 145 ALONG STATE ROUTE 41 (AT BENCH MARK 432) AND MADERA CANAL RIGHT-OF-WAY.

Detailed Location: SERIES OF 3 POOLS ON E SIDE OF CANAL. 1993: "ALONG CANAL, <0.1 MI W OF SR41"; MAPPED TO PROVIDED MAP (MIDDLE CANAL POOL). 2004: AT CANAL MILEPOSTS 008.57 (POOL ID MAC-R-008.57.1) & 008.34 (MAC-R-008.34.1), N & S POOLS RESPECTIVELY.

Ecological: 2004: N POOL DESCRIBED AS VERY LARGE, CLEAR VERNAL POOL W/ EMERGENT VEG INCL JUNCUS, GRASSES, ERYNGIUM, RUMEX; DRAINS INTO ADJ POOL. S POOL DESCRIBED AS VERY LARGE, CLEAR VERNAL POOL EXTENDING N (250X1M) THRU FENCE LINE TO NEXT LARGE POOL.

General: A "FEW" OBSERVED ON 24 MAR 1993; SITE QUALITY "FAIR". 4 MALES IDENTIFIED TO SPECIES IN N POOL BY D. NEWMAN, AND 3 MALES & 6 FEMALES IDENTIFIED TO SPECIES IN S POOL BY K. GARCIA-TOMLINSON, BOTH ON 18 MAR 2004.

Owner/Manager: USBOR

Occurrence No.	21	**Map Index:**	24599	**EO Index:**	6393	**Element Last Seen:**	2005-02-03
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-02-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-04

Quad Summary: Friant (3611986), Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.97667 / -119.75240	**Accurracy:**	specific area
UTM:	Zone-11 N4095826 E255000	**Elevation (ft):**	435
PLSS:	T11S, R20E, Sec. 14 (M)	**Acres:**	18.0

Location: IN THE AREA OF THE JUNCTION OF MADERA CANAL & ROAD 204, 3 MILES SW OF FRIANT, ON THE EAST SIDE OF LITTLE TABLE MOUNTAIN.

Detailed Location: SW AND NE OF THE JUNCTION IN 1993. POOL IDS MAC-R-004.06.1 AND MAC-L-004.20.1 IN 2005 AT CANAL MILEPOSTS 004.06 & 004.20, RESPECTIVELY.

Ecological: MAC-R-004.06.1: "APPROX. 30M X 7M. VEG & DOWN LOGS IN POOL. WATER BRACKISH COLOR W/ FILM & ALGAE FLOATING." MAC-L-004.20.1: "POOL SIGNIFICANT INCREASE SURFACE AREA THIS YEAR. NOW UP AGAINST W FENCE-LINE. VERY COLD. AMPHIB EGG-MASSES OBS."

General: SEVERAL OBSERVED IN 1993. 3 MALE CA LINDERIELLA & 4 UNIDENTIFIED FEMALE SHRIMP AT MAC-R-004.06.1, & 4 MALE CA LINDERIELLA & 1 UNIDENTIFIED FEMALE SHRIMP OBSERVED ON 3 FEB 2005 AT MAC-L-004.20.1 BY K. GARCIA-TOMLINSON & G. BASSO.

Owner/Manager: USBOR, PVT

Occurrence No.	34	**Map Index:**	33054	**EO Index:**	3693	**Element Last Seen:**	1994-03-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-03-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-03-16

Quad Summary: Round Mountain (3611975), Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.83561 / -119.62808	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4079860 E265637	**Elevation (ft):**	400
PLSS:	T13S, R21E, Sec. 01 (M)	**Acres:**	0.0

Location: JUST SOUTH OF THE INTERSECTION ON HERNDON AVENUE AND HIGHLAND AVENUE, 3 MILES ENE OF CLOVIS.

Detailed Location: #MW-94-04 COLLECTED AT THE SW CORNER OF HERNDON AVENUE AND HIGHLAND AVENUE; #MW-94-05 COLLECTED AT THE SE CORNER.

Ecological:

General: COLLECTION #MW-94-04 AND #MW-94-05, DEPOSITED AT DFG-IFD.

Owner/Manager: UNKNOWN

Occurrence No.	39	**Map Index:**	33077	**EO Index:**	18876	**Element Last Seen:**	1994-03-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-03-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-03-23

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96816 / -119.86231	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4095169 E245186	**Elevation (ft):**	350
PLSS:	T11S, R19E, Sec. 14 (M)	**Acres:**	0.0

Location:	NORTH SIDE OF AVENUE 15, 1.2 MILES EAST OF ROAD 36-1/2, 5 MILES WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	
Ecological:	
General:	COLLECTION #RS-94-03, DEPOSITED AT DFG-IFD.
Owner/Manager:	UNKNOWN

Occurrence No.	114	**Map Index:**	33338	**EO Index:**	23155	**Element Last Seen:**	1995-04-04
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-04-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-06-07

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96913 / -119.82762	**Accurracy:**	80 meters
UTM:	Zone-11 N4095185 E248279	**Elevation (ft):**	370
PLSS:	T11S, R20E, Sec. 18 (M)	**Acres:**	0.0

Location:	0.25 MILE EAST OF THE ROAD 39-1/2 ALIGNMENT AND 0.2 MILE NORTH OF AVENUE 15, WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	1995-LOCATED IN THE FOURTH POOL IN A SERIES. 1993-G. KIRKPATRICK SAMPLED 4 POOLS IN A SERIES.
Ecological:	HABITAT CONSISTS OF A CLAYPAN VERNAL POOL IN NON-NATIVE GRASSLAND. HYLA REGILLA, SCAPHIOPUS HAMMONDI AND BRANCHINECTA LYNCHI ALSO PRESENT AT THIS SITE.
General:	15-20 OBSERVED ON 4 APRIL 1995, BUT NO ATTEMPT WAS MADE TO DETERMINE A TOTAL POPULATION NUMBER; UNKNOWN NUMBER OBSERVED ON 17 FEBRUARY 1993 IN 2 POOLS.
Owner/Manager:	PVT

Occurrence No.	121	**Map Index:**	14592	**EO Index:**	29256	**Element Last Seen:**	1993-02-17
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-02-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-06

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96855 / -119.84268	**Accuracy:**	nonspecific area
UTM:	Zone-11 N4095160 E246936	**Elevation (ft):**	375
PLSS:	T11S, R19E, Sec. 13 (M)	**Acres:**	127.6

Location:	NORTHWEST OF AVENUE 15 X AVENUE 39 1/2; NORTH OF LITTLE DRY CREEK; APPROX. 4.5 AIR MILES WEST OF LITTLE TABLE MTN.
Detailed Location:	SAMPLED 2 POOLS IN A SERIES.
Ecological:	CLAYPAN VERNAL POOLS AND SWALES IN NON-NATIVE GRASSLAND.
General:	LINDERIELLA CO-OCCURS WITH BRANCHINECTA LYNCHI IN BOTH POOLS; AMBYSTOMA CALIFORNIENSE AND SCAPHIOPUS HAMMONDII PRESENT LATER IN SPRING OF 1993.
Owner/Manager:	PVT

Occurrence No.	266	**Map Index:**	67497	**EO Index:**	67662	**Element Last Seen:**	1992-03-11
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-12-22

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94816 / -119.79410	**Accuracy:**	80 meters
UTM:	Zone-11 N4092769 E251195	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location:	JUST WEST OF STATE ROUTE 41 AND 1.7 MILES NORTH OF AVENUE 12, 7 MILES NORTH OF PINEDALE.
Detailed Location:	POOL #C211IS LOCATED 50 FEET WEST OF STATE ROUTE 41. LOCATION MAPPED ACCORDING TO LOCATION SHOWN ON A MAP.
Ecological:	HABITAT CONSISTS OF NORTHERN HARDPAN VERNAL POOL DOMINATED BY ERYNGIUM VASEYI. SPEA HAMMONDII AND ORCUTTIA INAEQUALIS ALSO IN AREA.
General:	UNKNOWN NUMBER OF ADULTS OBSERVED IN ONE POOL ON 11 MARCH 1992.
Owner/Manager:	UNKNOWN

Occurrence No.	361	**Map Index:**	72190	**EO Index:**	73229	**Element Last Seen:**	2004-03-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.99505 / -119.79864	**Accuracy:**	80 meters
UTM:	Zone-11 N4097986 E250943	**Elevation (ft):**	423
PLSS:	T11S, R20E, Sec. 09 (M)	**Acres:**	0.0

Location:	EAST SIDE OF MADERA CANAL AT MILEPOST 009.17, 0.14 CANAL MILES NE OF LITTLE DRY CREEK, & 0.25 MILES WEST OF HWY 41.
Detailed Location:	MAPPED TO PROVIDED COORDINATES IN SHAPEFILE. POOL ID MAC-R-009.17.1.
Ecological:	HABITAT DESCRIBED AS A "SMALL LINEAR ROAD-SIDE DITCH, CLEAR WATER, EMERGENT RUMEX, JUCUS SP., ALSO SILYBUM, MIMULUS, GRASSES, AND LACTUCA."
General:	6 MALES & 1 FEMALE OBSERVED ON 18 MAR 2004 BY D. NEWMAN.
Owner/Manager:	USBOR

Occurrence No.	362	**Map Index:**	72276	**EO Index:**	73230	**Element Last Seen:**	2004-03-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.97229 / -119.78936	**Accuracy:**	80 meters
UTM:	Zone-11 N4095436 E251695	**Elevation (ft):**	432
PLSS:	T11S, R20E, Sec. 16 (M)	**Acres:**	0.0

Location:	EAST SIDE OF MADERA CANAL AT MILEPOST 007.33, 0.45 MILES NORTHEAST OF HWY 41 AT AVE 15, WEST SIDE OF LITTLE TABLE MT.
Detailed Location:	MAPPED TO PROVIDED COORDINATES IN SHAPEFILE. POOL ID MAC-R-007.33.1.
Ecological:	HABITAT DESCRIBED AS A LARGE, TURBID VERNAL POOL ALONG FENCELINE, W/ CATTLE DISTURBANCE. NON-NATIVE EMERGENT GRASSES INCL VICIA, AMSINCKIA, SONCHUS, LACTUCA, RUMEX, LUPINUS, TRIFOLIUM, BROMUS DIANDRUS, MIMULUS, LASTENIA & 2 UNKNOWN GRASSES.
General:	1 MALE OBSERVED ON 18 MAR 2004 BY D. NEWMAN.
Owner/Manager:	USBOR

Occurrence No.	363	**Map Index:**	72216	**EO Index:**	73233	**Element Last Seen:**	2004-03-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.94810 / -119.69563	**Accurracy:**	specific area
UTM:	Zone-11 N4092511 E259965	**Elevation (ft):**	477
PLSS:	T11S, R21E, Sec. 29 (M)	**Acres:**	23.0

Location:	FRIANT-KERN CANAL, 1 AIR MI NW TO 1 AIR MI WNW OF THE CROSSING OF THE CANAL AT AUBERRY RD, 2.7 MI SSW OF FRIANT PO.
Detailed Location:	SERIES OF 5 POOLS ALONG CANAL'S E SIDE. L. OCCIDENTALIS OBSERVED IN MIDDLE POOL ONLY AT MILEPOST 003.95; POOL ID FKC-L-003.95.1. MAPPED TO PROVIDED COORDINATES IN ESRP SHAPEFILE.
Ecological:	HABITAT DESCRIBED AS A SOMEWHAT TURBID VERNAL POOL, ABOUT 35FT FROM FENCE & <1 FT FROM RD; VEG = ERYNGIUM SP & TRIPHYSERIA ERIANTHA.
General:	1 MALE OBSERVED ON 10 MAR 2004 BY G. BASSO.
Owner/Manager:	USBOR, PVT

Occurrence No.	364	**Map Index:**	72278	**EO Index:**	73234	**Element Last Seen:**	2004-03-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-03-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.89846 / -119.64969	**Accurracy:**	80 meters
UTM:	Zone-11 N4086888 E263903	**Elevation (ft):**	642
PLSS:	T12S, R21E, Sec. 11 (M)	**Acres:**	0.0

Location:	S SIDE FRIANT-KERN CANAL @ MILEPOST 009.40, 235 METERS W OF CANAL BRIDGE, 2.7 MI NW OF COLLINS (HWY 168 @ THOMPSON AVE).
Detailed Location:	MAPPED TO PROVIDED COORDINATES IN ESRP SHAPEFILE. POOL ID FKC-R-009.40.1.
Ecological:	HABITAT DESCRIBED AS A MUDDY "WALLOW" ALONG FENCELINE, W/ MANY HOOF PRINTS, & VERY TURBID WATER.
General:	CALIFORNIA FAIRY SHRIMP NOTED AS PRESENT ON 10 MAR 2004 BY D. NEWMAN.
Owner/Manager:	USBOR

Occurrence No.	365	**Map Index:**	72280	**EO Index:**	73235	**Element Last Seen:**	2005-02-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-02-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-09-15

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.89482 / -119.63740	**Accurracy:**	specific area
UTM:	Zone-11 N4086453 E264987	**Elevation (ft):**	465
PLSS:	T12S, R21E, Sec. 13 (M)	**Acres:**	9.0

Location: FRIANT-KERN CANAL @ MILEPOSTS 010.17, 010.24 (E OF BRIDGE), 2.4MI S OF OWENS MT, 1.1MI NE OF N DEWOLF AVE @ BEHYMER AVE.

Detailed Location: SERIES OF TWO POOLS; WEST POOL ON SOUTH SIDE OF CANAL (POOL IDS FKC-R-010.17.1) AND EAST POOL ON NORTH SIDE OF CANAL (ID FKC-L-010.24.1). MAPPED TO PROVIDED COORDINATES IN ESRP SHAPEFILE.

Ecological: WAST POOL: CLEAR POOL W/ JUNCUS SP, & GRASSES IN SURROUNDING AREA. EAST POOL: TEA COLORED & VERY DEEP (2005); AND VERY CLEAR, LONG & NARROW VERNAL POOL WITH LOTS OF EMERGENT VEG (2004).

General: CALIFORNIA FAIRY SHRIMP NOTED AS PRESENT IN WEST POOL ON 10 MAR 2004 BY D. NEWMAN, AND NOTED AS PRESENT IN EAST POOL ON 23 FEB 2005 BY F. VANG.

Owner/Manager: USBOR

Desmocerus californicus dimorphus

Element Code: IICOL48011

valley elderberry longhorn beetle

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G3T2
	State:	None		**State:**	S2
	Other:				
Habitat:	**General:**	OCCURS ONLY IN THE CENTRAL VALLEY OF CALIFORNIA, IN ASSOCIATION WITH BLUE ELDERBERRY (SAMBUCUS MEXICANA).			
	Micro:	PREFERS TO LAY EGGS IN ELDERBERRRIES 2-8 INCHES IN DIAMETER; SOME PREFERENCE SHOWN FOR "STRESSED" ELDERBERRIES.			

Occurrence No.	70	**Map Index:**	33007	**EO Index:**	4066	**Element Last Seen:**	1991-05-01
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-05-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-11

Quad Summary: Sanger (3611965)

County Summary: Fresno

Lat/Long:	36.67840 / -119.53215	**Accurracy:**	80 meters
UTM:	Zone-11 N4062184 E273732	**Elevation (ft):**	330
PLSS:	T14S, R22E, Sec. 25 (M)	**Acres:**	0.0

Location: COLLINS CREEK, TRIBUTARY TO KINGS RIVER, IN THE VICINITY OF CHANNEL ROAD, ~2 MILES SE OF SANGER.

Detailed Location: REPORT ON: TAXONOMY; DISTRIBUTION; LIFE HISTORY; HABITAT; FIELD TECHNIQUES & OBSERVATIONS; BEETLE RECOVERY.

Ecological: HABITAT CONSISTS OF DENSE RIPARIAN WOODLAND WITH OAKS, COTTONWOODS, AND ELDERBERRIES.

General: BOTH OLD AND RECENT EXIT HOLES FOUND IN SEVERAL LARGE, OLD ELDERBERRIES.

Owner/Manager: PVT

Occurrence No.	134	**Map Index:**	39385	**EO Index:**	34387	**Element Last Seen:**	1989-05-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-05-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-11

Quad Summary: Herndon (3611978)

County Summary: Fresno

Lat/Long:	36.84800 / -119.90599	**Accurracy:**	1/10 mile
UTM:	Zone-11 N4081953 E240891	**Elevation (ft):**	225
PLSS:	T12S, R19E, Sec. 33 (M)	**Acres:**	0.0

Location: SAN JOAQUIN RIVER MILE 245, ~1 MILE NE OF HERNDON, DOWNSTREAM OF THE ATCHISON TOPEKA AND SANTA FE RAILROAD CROSSING.

Detailed Location: RIPARIAN STRIP BETWEEN SAN JOAQUIN RIVER AND RIVERSIDE GOLF COURSE. (1970 RECORD ADDED FOR SITE IS DESCRIBED SOLELY AS HERNDON)

Ecological: ELDERBERRY HABITAT PRESENT

General: 14 OF 20 ELDERBERRY TREES HAD MANY EMERGENCE HOLES, NO ADULTS OBSERVED. 1970: COLLECTED 1 MALE BEETLE (MUSEUM SPECIMEN, CSUF). GNIS MAP# 1484.

Owner/Manager: UNKNOWN

Occurrence No.	135	**Map Index:**	39388	**EO Index:**	34390	**Element Last Seen:**	1992-03-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-06-22

Quad Summary: Lanes Bridge (3611987)

County Summary: Fresno, Madera

Lat/Long:	36.88429 / -119.79248	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4085678 E251132	**Elevation (ft):**	270
PLSS:	T12S, R20E, Sec. 16 (M)	**Acres:**	250.2

Location: ALONG HWY 41 NORTH OF LANES BRIDGE, WEST OF THE SAN JOAQUIN RIVER, NORTH OF PINEDALE

Detailed Location: RIPARIAN STRIP BETWEEN TURF FARM AND THE RIVER.

Ecological: HABITAT CONSISTS OF RIPARIAN, WHICH INCLUDES AN UNDERSTORY OF ELDERBERRY PLANTS.

General: OBSERVATION OF 1 FEMALE BEETLE MADE BY A CDFG BIOLOGIST IN 1987 (GNIS MAP #1446). IN 1992, 35 POTENTIAL HABITAT SITES WERE EXAMINED, AND 8 CONTAINED CONFIRMED EXIT HOLES.

Owner/Manager: UNKNOWN

Occurrence No.	167	**Map Index:**	39533	**EO Index:**	34535	**Element Last Seen:**	1989-04-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-04-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-25

Quad Summary: Sanger (3611965)

County Summary: Fresno

Lat/Long:	36.70086 / -119.50636	**Accurracy:**	specific area
UTM:	Zone-11 N4064616 E276102	**Elevation (ft):**	345
PLSS:	T14S, R23E, Sec. 19 (M)	**Acres:**	41.1

Location: KINGS RIVER, 0.25 MILE NE OF ANNADALE AND RIVERBEND AVENUES, 2.8 MILES EAST OF SANGER.

Detailed Location: RIPARIAN, GRAVEL MINING PITS/PONDS.

Ecological: RIPARIAN WITH ELDERBERRY HABITAT PRESENT.

General: 1 FEMALE LAYING EGGS OBSERVED BUT NOT COLLECTED. EGGS AND EMERGENCE HOLES ON ONE ELDERBERRY NOTED.

Owner/Manager: UNKNOWN

Occurrence No.	168	**Map Index:**	39534	**EO Index:**	34536	**Element Last Seen:**	1990-06-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-08-25

Quad Summary: Sanger (3611965)

County Summary: Fresno

Lat/Long:	36.69427 / -119.52570	**Accurracy:**	80 meters
UTM:	Zone-11 N4063930 E274355	**Elevation (ft):**	340
PLSS:	T14S, R22E, Sec. 24 (M)	**Acres:**	0.0

Location: ALONG CHANNEL ROAD, 0,5 MILE SOUTH OF ANNADALE AVE INTERSECTION, 1.9 MILES SE OF SANGER.

Detailed Location:

Ecological: ELDERBERRY AND OAK FOREST ALONG ROAD.

General: MANY ELDERBERRIES ALONG ROAD. A FEW ELDERBERRY TREES WITH EMERGENCE HOLES. NO ADULTS OBSERVED.

Owner/Manager: UNKNOWN

Occurrence No.	178	**Map Index:**	40240	**EO Index:**	35242	**Element Last Seen:**	1998-04-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-24

Quad Summary: Sanger (3611965)

County Summary: Fresno

Lat/Long:	36.70507 / -119.51215	**Accurracy:**	specific area
UTM:	Zone-11 N4065097 E275597	**Elevation (ft):**	256
PLSS:	T14S, R23E, Sec. 19 (M)	**Acres:**	8.6

Location: TRANSMISSION LINES, 0.4 MILE N OF INTERSECTION OF RIVERBEND & ANNADALE AVES & KINGS RIVER, 2.5 MILES E OF SANGER.

Detailed Location: EXIT HOLE FOUND IN DEAD WOOD 650 FEET NORTHEAST OF TOWER 33/167. POTENTIAL HABITAT (OTHER AVAILABLE PLANTS) FROM 423 TO 650 FEET NE OF TOWER.

Ecological: RIPARIAN

General: EXIT HOLES FOUND IN DEAD WOOD.

Owner/Manager: UNKNOWN

Occurrence No.	179	**Map Index:**	40241	**EO Index:**	35243	**Element Last Seen:**	1998-04-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-24

Quad Summary:	Sanger (3611965)
County Summary:	Fresno

Lat/Long:	36.70191 / -119.51709	**Accurracy:**	specific area
UTM:	Zone-11 N4064757 E275147	**Elevation (ft):**	350
PLSS:	T14S, R23E, Sec. 19 (M)	**Acres:**	19.2

Location:	TRANSMISSION LINES, 0.35 MILE NW OF INTERSECTION RIVERBEND & ANNADALE AVES, & KINGS RIVER, 2.5 MILES E OF SANGER.
Detailed Location:	ELDERBERRIESS WITH EXIT HOLES FOUND 289 FT & 180 FT NE; & 112 FT & 52 FT WEST OF TOWER 33/168. POTENTIAL HABITAT (OTHER ELDERBERRY BUSHES) FOUND 102 FT SW; 174, 151 & 62 FT WEST & 30 FT SE OF THE TOWER.
Ecological:	AGRICULTURE (ORCHARDS, ROW CROPS, VINEYARD) UNCERTAIN WHICH OF THESE IS AT THIS SITE.
General:	EXIT HOLES FOUND IN BOTH LIVE AND DEAD WOOD.
Owner/Manager:	UNKNOWN

Occurrence No.	180	**Map Index:**	40242	**EO Index:**	35244	**Element Last Seen:**	1998-04-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-24

Quad Summary:	Sanger (3611965)
County Summary:	Fresno

Lat/Long:	36.68014 / -119.53810	**Accurracy:**	80 meters
UTM:	Zone-11 N4062392 E273205	**Elevation (ft):**	332
PLSS:	T14S, R22E, Sec. 25 (M)	**Acres:**	0.0

Location:	~1 MILE ENE OF JCT CENTRAL & ACADEMY AVES, & 0.4 MILE N OF JCT GOODFELLOW AVE & CHANNEL RD, 2 MILES SE OF SANGER.
Detailed Location:	43 FEET NORTHWEST OF TOWER 35/177.
Ecological:	AGRICULTURE (ORCHARDS, ROW CROPS, VINEYARD), UNCERTAIN WHICH OF THESE IS AT THIS SITE.
General:	EXIT HOLES FOUND IN LIVE WOOD.
Owner/Manager:	UNKNOWN

Lytta moesta **Element Code:** IICOL4C020

moestan blister beetle

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2
	Other:				
Habitat:	**General:**	CENTRAL CALIFORNIA.			
	Micro:				

Occurrence No.	3	**Map Index:** 64361	**EO Index:** 64440	**Element Last Seen:**	19XX-XX-XX
Occ. Rank:	None		**Presence:** Possibly Extirpated	**Site Last Seen:**	19XX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2007-08-22

Quad Summary: Friant (3611986)

County Summary: Fresno, Madera

Lat/Long:	36.98663 / -119.70939	**Accuracy:**	2/5 mile
UTM:	Zone-11 N4096821 E258861	**Elevation (ft):**	410
PLSS:	T11S, R21E, Sec. 07 (M)	**Acres:**	0.0

Location: FRIANT, ABOUT 0.85 MILE SOUTHWEST OF MILLERTON LAKE.

Detailed Location:

Ecological:

General: LOCALITY FROM CALIFORNIA BEETLE PROJECT ONLINE DATABASE; COLLECTION INFORMATION NOT GIVEN. HISTORICAL RECORD; EXACT LOCATION UNKNOWN.

Owner/Manager: UNKNOWN

Lytta molesta **Element Code:** IICOL4C030

molestan blister beetle

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2
	Other:				
Habitat:	**General:**	INHABITS THE CENTRAL VALLEY OF CALIFORNIA, FROM CONTRA COSTA TO KERN AND TULARE COUNTIES.			
	Micro:				

Occurrence No.	7	**Map Index:** 14685	**EO Index:** 22651	**Element Last Seen:**	19XX-XX-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	19XX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2006-03-30

Quad Summary: Fresno North (3611977), Lanes Bridge (3611987)

County Summary: Fresno, Madera

Lat/Long:	36.87661 / -119.79181	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4084824 E251167	**Elevation (ft):**	275
PLSS:	T12S, R20E, Sec. 21 (M)	**Acres:**	0.0

Location: LANES BRIDGE, 10 MILES NORTH OF FRESNO.

Detailed Location:

Ecological:

General: SEASONAL DISTRIBUTION: APRIL 3 TO JULY 1. 3 COLLECTED IN APRIL; YEAR OF COLLECTION UNKNOWN.

Owner/Manager: UNKNOWN

Occurrence No.	13	**Map Index:** 46277	**EO Index:** 64456	**Element Last Seen:**	19XX-XX-XX
Occ. Rank:	Unknown		**Presence:** Possibly Extirpated	**Site Last Seen:**	19XX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2006-03-30

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accuracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	360
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location:

Ecological:

General: LOCALITY FROM CALIFORNIA BEETLE PROJECT ONLINE DATABASE; COLLECTION INFORMATION NOT GIVEN. HISTORICAL RECORD; EXACT LOCATION UNKNOWN.

Owner/Manager: UNKNOWN

Efferia antiochi **Element Code:** IIDIP07010

Antioch efferian robberfly

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1G3
	State:	None		**State:**	S1S3
	Other:				
Habitat:	**General:**	KNOWN ONLY FROM CONTRA COSTA AND FRESNO COUNTIES.			
	Micro:				

Occurrence No.	2	**Map Index:** 46277	**EO Index:** 63436	**Element Last Seen:**	1954-12-15
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1954-12-15
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2005-12-08

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accurracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	300
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location:

Ecological:

General: COLLECTED BY CHRIS THOMPSON; ALSO COLLECTED 24 OCT 1954 BY G. FRYMIRE. IN COLLECTION AT CSU FRESNO. PARATYPES.

Owner/Manager: UNKNOWN

Occurrence No.	3	**Map Index:** 63347	**EO Index:** 63439	**Element Last Seen:**	1935-10-10
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1935-10-10
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2005-12-08

Quad Summary: Fresno North (3611977)

County Summary: Fresno, Madera

Lat/Long:	36.85747 / -119.84374	**Accurracy:**	2/5 mile
UTM:	Zone-11 N4082837 E246473	**Elevation (ft):**	260
PLSS:	T12S, R19E, Sec. 25 (M)	**Acres:**	0.0

Location: SCOUT ISLAND, SAN JOAQUIN RIVER.

Detailed Location:

Ecological:

General: COLLECTED BY G. WILSON 10 OCT 1935, IN COLLECTION AT CSU FRESNO. PARATYPES.

Owner/Manager: UNKNOWN

Metapogon hurdi

Element Code: IIDIP08010

Hurd's metapogon robberfly

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1G3
	State:	None		**State:**	S1S3
	Other:				
Habitat:	**General:**	KNOWN ONLY FROM ANTIOCH (DUNES?) AND FRESNO.			
	Micro:				

Occurrence No.	2	**Map Index:** 46277	**EO Index:** 60267	**Element Last Seen:**	1922-11-29
Occ. Rank:	Unknown		**Presence:** Possibly Extirpated	**Site Last Seen:**	1922-11-29
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2005-02-25

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accuracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	325
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location: NO OTHER COLLECTION INFORMATION GIVEN.

Ecological:

General: HISTORICAL SPECIMENS. 4 MALE AND 6 FEMALE PARATYPES.

Owner/Manager: UNKNOWN

Eryngium spinosepalum

Element Code: PDAPI0Z0Y0

spiny-sepaled button-celery

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2.2
	Other:	Rare Plant Rank - 1B.2			
Habitat:	**General:**	VERNAL POOLS, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	SOME SITES ON CLAY SOIL OF GRANITIC ORIGIN; VERNAL POOLS, WITHIN GRASSLAND. 100-420M.			

Occurrence No.	30	**Map Index:** 50757	**EO Index:** 50757	**Element Last Seen:**	1991-05-07
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1991-05-07
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2010-10-28

Quad Summary: Friant (3611986), Millerton Lake West (3711916)

County Summary: Fresno, Madera

Lat/Long:	36.99013 / -119.71142	**Accuracy:**	1 mile
UTM:	Zone-11 N4097214 E258692	**Elevation (ft):**	
PLSS:	T11S, R21E, Sec. 07 (M)	**Acres:**	0.0

Location: FRIANT.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB IN GENERAL VICINITY OF FRIANT.

Ecological: BEDS OF FORMER WINTER POOLS.

General: OCCURRENCE IS BASED ON A 1928 JEPSON COLLECTION FROM "FRIANT" AND A 1991 REISER COLLECTION FROM "NEAR TABLE MOUNTAIN, WEST OF FRIANT DAM." NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	72	**Map Index:**	83425	**EO Index:**	84444	**Element Last Seen:**	2010-06-29
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-02

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94345 / -119.79385	**Accuracy:**	specific area
UTM:	Zone-11 N4092247 E251202	**Elevation (ft):**	405
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	1.0

Location: ~1.1 MI SOUTH OF ROAD 204 ON EAST SIDE OF SR 41, SOUTH OF FOUR CORNERS.

Detailed Location: ERYNGIUM SPINOSEPALUM WAS LISTED AS AN ASSOCIATE IN A 2010 O'LEARY FIELD SURVEY FOR ORCUTTIA INAEQUALIS. 2010 CALTRANS DIGITAL DATA ACCOMPANIES THIS FIELD SURVEY; MAPPED BASED ON DIGITAL DATA FOR ORCUTTIA INAEQUALIS.

Ecological: POOLS SURROUNDED BY ANNUAL GRASSLAND. BLOOMING ASSOCIATED SPECIES INCLUDED ORCUTTIA INAEQUALIS, EPILOBIUM CLEISTOGAMUM, PSILOCARPHUS BREVISSIMUS, ELEOCHARIS MACROSTACHYA AND LYTHRUM HYSSOPIFOLIA.

General: UNKNOWN NUMBER OF PLANTS SEEN IN 2010. DURING THE DRY SEASON OF 2009 SITE WAS UNDER CONSTRUCTION FOR CREATION/RESTORATION/ENHANCEMENT OF VERNAL POOLS. O'LEARY NOTES THAT THIS PLANT MAY LIKELY BE AN INTERMEDIATE WITH E. CASTRENSE.

Owner/Manager: CALTRANS

Occurrence No.	73	**Map Index:**	83427	**EO Index:**	84446	**Element Last Seen:**	2010-06-29
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-02

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94770 / -119.79007	**Accuracy:**	specific area
UTM:	Zone-11 N4092708 E251552	**Elevation (ft):**	405
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	5.0

Location: ~0.75 MI SOUTH OF ROAD 204; ON ROAD SIDE AND 0.2 AIR MI EAST OF SR 41, SOUTH OF FOUR CORNERS.

Detailed Location: ERYNGIUM SPINOSEPALUM WAS LISTED AS AN ASSOCIATE IN 2010 O'LEARY FIELD SURVEYS FOR ORCUTTIA PILOSA AND O. INAEQUALIS. 2010 CALTRANS DIGITAL DATA ACCOMPANIES THESE FIELD SURVEYS; MAPPED BASED ON DIGITAL DATA FOR BOTH ORCUTTIA SPECIES.

Ecological: POOLS SURROUNDED BY ANNUAL GRASSLAND. BLOOMING ASSOCIATED SPECIES INCLUDED ORCUTTIA INAEQUALIS, EPILOBIUM CLEISTOGAMUM, PSILOCARPHUS BREVISSIMUS, ELEOCHARIS MACROSTACHYA AND LYTHRUM HYSSOPIFOLIA.

General: UNKNOWN NUMBER OF PLANTS SEEN IN 2010. DURING THE DRY SEASON OF 2009 SITE WAS UNDER CONSTRUCTION FOR CREATION/RESTORATION/ENHANCEMENT OF VERNAL POOLS. O'LEARY NOTES THAT THIS PLANT MAY LIKELY BE AN INTERMEDIATE WITH E. CASTRENSE.

Owner/Manager: CALTRANS

Pseudobahia bahiifolia

Element Code: PDAST7P010

Hartweg's golden sunburst

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G2
	State:	Endangered		**State:**	S2
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.			
	Micro:	CLAY SOILS, PREDOMINANTLY ON THE NORTHERN SLOPES OF KNOLLS, BUT ALSO ALONG SHADY CREEKS OR NEAR VERNAL POOLS. 15-150M.			

Occurrence No.	1	**Map Index:**	14795	**EO Index:**	7949	**Element Last Seen:**	1980-04-03
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	2010-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2011-04-15

Quad Summary:	Friant (3611986), Millerton Lake West (3711916)
County Summary:	Madera

Lat/Long:	37.00073 / -119.73601	**Accuracy:**	specific area
UTM:	Zone-11 N4098453 E256536	**Elevation (ft):**	500
PLSS:	T11S, R20E, Sec. 01 (M)	**Acres:**	10.0

Location:	JUNCTION OF ROAD 206 & ROAD 205; BOTH SIDES OF ROAD 205, ~1.6 AIR MILES WEST OF FRIANT DAM.
Detailed Location:	TWO COLONIES MAPPED ACCORDING TO 1991 MAPS BY STEBBINS.
Ecological:	VALLEY GRASSLAND ASSOCIATED WITH ERODIUM, BROMUS, BRODIAEA, AND AVENA.
General:	S POLY: SEEN IN 1970S. N POLY: <100 PLANTS IN 1980. PLANTS NOT RELOCATED IN 1985, 1986, 1990, 2008, AND 2010. SOME POTENTIAL REMAINS FOR SPECIES TO BE PRESENT UNDER MORE FAVORABLE CONDITIONS IN N POLY. INCLUDES FORMER OCCURRENCE #2.
Owner/Manager:	PVT

Occurrence No.	21	**Map Index:**	14849	**EO Index:**	7948	**Element Last Seen:**	2010-04-22
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-04-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-04-15

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.98760 / -119.70578	**Accuracy:**	specific area
UTM:	Zone-11 N4096919 E259186	**Elevation (ft):**	450
PLSS:	T11S, R21E, Sec. 08 (M)	**Acres:**	64.0

Location:	FROM ABOUT 0.5 TO 1.5 AIR MILES SOUTH OF FRIANT DAM, JUST EAST AND SOUTH OF TOWN OF FRIANT.
Detailed Location:	WEST OF FRIANT-KERN CANAL. MAPPED AS TWO POLYGONS. NORTHERN POLYGON IS AROUND FRIANT WATER TANK. SOUTHERN POLYGON IS ABOUT 1/2 MILE TO SOUTH.
Ecological:	ON TOPS OF ROLLING LOW HILLS IN VALLEY GRASSLAND AND VERNAL POOLS IN ROCKLIN LOAM SOIL. ASSOCIATED WITH BROMUS RUBENS, MUILLA MARITIMA, BROMUS MOLLIS, VULPIA MYUROS, ERODIUM BOTYRS, LUPINUS BICOLOR, AMSINCKIA INTERMEDIA, AND FESTUCA.
General:	~400 PLANTS IN 1984, 150 IN 1987 (LOW PRECIP), 2000 IN 1989, 800 IN 1990, <2500 IN 1992, <1200 IN 1995, UNKNOWN NUMBER IN 2001, 75 ALONG POWER LINE IN E HALF OF N POLY IN 2008. 1000S IN N POLY IN 2010. INCLUDES FORMER OCCURRENCE #22.
Owner/Manager:	USBOR, PVT

Occurrence No.	23	**Map Index:**	14857	**EO Index:**	7946	**Element Last Seen:**	2009-XX-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-04-25

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.97137 / -119.70634	**Accurracy:**	specific area
UTM:	Zone-11 N4095119 E259085	**Elevation (ft):**	460
PLSS:	T11S, R21E, Sec. 17 (M)	**Acres:**	16.5

Location:	ABOUT ONE AIR MILE SSE OF TOWN OF FRIANT, 0.5 MILE WEST OF THE FRIANT-KERN CANAL.
Detailed Location:	TWO COLONIES MAPPED ACCORDING TO A 1984 MAP BY STEBBINS.
Ecological:	TOPS OF LOW ROLLING HILLS INTERSPERSED WITH NON-NATIVE GRASSLAND AND VERNAL POOLS. ASSOCIATED WITH BROMUS RUBENS, BROMUS MOLLIS, MUILLA MARITIMA, AMSINCKIA INTERMEDIA, AND FESTUCA. ORTHOCARPUS CAMPESTRIS VAR. SUCCULENTUS GROWING NEARBY.
General:	400 PLANTS OBSERVED IN 1990, 2500 OBSERVED IN 1992 BETWEEN THIS EO AND EO #21 & 24. 600 TOTAL OBSERVED BETWEEN THIS EO AND EO #21 IN 1995. PLANTS NOT RELOCATED IN 2008, POSSIBLY DUE TO LOW RAINFALL. DOCUMENTED AT SITE BETWEEN 2007-2009.
Owner/Manager:	PVT

Occurrence No.	24	**Map Index:**	22190	**EO Index:**	7945	**Element Last Seen:**	2009-XX-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-04-25

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.97115 / -119.71578	**Accurracy:**	80 meters
UTM:	Zone-11 N4095119 E258243	**Elevation (ft):**	440
PLSS:	T11S, R21E, Sec. 18 (M)	**Acres:**	0.0

Location:	APPROXIMATELY 1 MILE SOUTH OF FRIANT, 0.6 MILE EAST OF GRAVEL PIT.
Detailed Location:	NEAR THE CENTER OF THE SE 1/4 OF SECTION 18.
Ecological:	GROWING ON ROCKLIN VOLCANIC SOILS WITHIN VALLEY GRASSLAND WITH MIMA MOUND TOPOGRAPHY. ASSOCIATED WITH BROMUS RUBENS, MUILLA MARITIMA, AND LUPINUS BICOLOR.
General:	2500 OBSERVED IN 1992 BETWEEN THIS OCCURRENCE AND OCCURRENCE #21 & #23. BOTANISTS FROM LIVE OAK ASSOCIATES CONDUCTED SURVEYS AND DOCUMENTED PLANTS ON SITE SOMETIME BETWEEN 2007-2009 (VOLLMAR CONSULTING 2010). SITE NOT ACCESSIBLE IN 2010.
Owner/Manager:	PVT

Occurrence No.	25	**Map Index:** 22861	**EO Index:**	7944	**Element Last Seen:**	2010-04-22
Occ. Rank:	Good		**Presence:**	Presumed Extant	**Site Last Seen:**	2010-04-22
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:**	2011-04-29

Quad Summary: Friant (3611986), Millerton Lake West (3711916)

County Summary: Madera

Lat/Long:	37.00676 / -119.72646	**Accuracy:**	specific area
UTM:	Zone-11 N4099098 E257405	**Elevation (ft):**	450
PLSS:	T11S, R21E, Sec. 06 (M)	**Acres:**	66.0

Location: EAST SIDE OF ROAD 206, FROM ABOUT 1 TO 2 AIR MILES NORTHWEST OF COMMUNITY OF FRIANT.

Detailed Location: MAPPED BY CNDDB AS 4 POLYGONS ACCORDING TO MAPS FROM 1991, 2008, AND 2010. NW COLONY: UPPER SLOPE OF ROADBANK IN SE 1/4 SE 1/4 SECTION 36. SE POLYGON: LARGE COLONY OF 7 SUBPOPULATIONS AT THIS SITE.

Ecological: GROWING IN NON-NATIVE VALLEY GRASSLAND ON UPPER SLOPE OF ROAD BANK. ASSOC W/ BROMUS DIANDRUS, B. RUBENS, ESCHSCHOLZIA LOBBII, AMSINCKIA INTERMEDIA, THYSANOCARPUS CURVIPES, ERODIUM BOTRYS, E. CICUTARIUM, GILIA TRICOLOR, LASTHENIA, ETC.

General: NW POLY: 0 PLANTS IN 1981, 80 IN 1990 & 1995, 0 IN 2010. 2 MIDDLE POLYS: 16,000+ IN 1991. SE POLY: EXTENSIVE POP DESPITE DISTURBANCES, ~18,000 IN 1989 & 1990, >10,000 IN 2004, 1,000S IN 2008, TENS OF THOUSANDS IN 2010. INCL FORMER OCC #26.

Owner/Manager: PVT

Tropidocarpum capparideum

Element Code: PDBRA2R010

caper-fruited tropidocarpum

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1.1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	ALKALINE CLAY. 0-455M.			

Occurrence No.	22	**Map Index:** 46277	**EO Index:**	64783	**Element Last Seen:**	1930-04-12
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:**	1930-04-12
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:**	2006-05-19

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accuracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB CENTERED ON THE CITY OF FRESNO, MAKING THE ASSUMPTION THAT THE SITE DESCRIPTION WAS REFERRING TO THE CITY OF FRESNO, NOT TO THE COUNTY OF FRESNO.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1930 COLLECTION BY DE FOREST. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Caulanthus californicus **Element Code:** PDBRA31010

California jewel-flower

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	CHENOPOD SCRUB, VALLEY AND FOOTHILL GRASSLAND, PINYON-JUNIPER WOODLAND.			
	Micro:	HISTORICAL FROM VARIOUS VALLEY HABITATS IN BOTH THE CENTRAL VALLEY AND CARRIZO PLAIN. 65-900M.			

Occurrence No.	38	**Map Index:** 46277	**EO Index:**	63230	**Element Last Seen:** XXXX-XX-XX
Occ. Rank:	None		**Presence:**	Extirpated	**Site Last Seen:** 1986-03-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 2005-11-09

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accurracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location:

Ecological:

General: NO HABITAT REMAINS IN VICINITY OF FRESNO. UNKNOWN WHEN ORIGINALLY COLLECTED BY DAVIDSON (SN NO DATE LAN).

Owner/Manager: UNKNOWN

Downingia pusilla

Element Code: PDCAM060C0

dwarf downingia

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2
	Other:	Rare Plant Rank - 2.2			
Habitat:	**General:**	VALLEY AND FOOTHILL GRASSLAND (MESIC SITES), VERNAL POOLS.			
	Micro:	VERNAL LAKE AND POOL MARGINS WITH A VARIETY OF ASSOCIATES. IN SEVERAL TYPES OF VERNAL POOLS. 1-485M.			

Occurrence No.	120	**Map Index:**	62482	**EO Index:**	62519	**Element Last Seen:**	1979-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1979-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-09-06

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.92310 / -119.70977	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4089772 E258626	**Elevation (ft):**	300
PLSS:	T12S, R21E, Sec. 05 (M)	**Acres:**	35.0

Location: AUBERRY ROAD, CIRCA 2 MILES NORTH OF COPPER ROAD, ON THE EAST SIDE OF THE ROAD.

Detailed Location: MAPPED ALONG AUBERRY ROAD APPROXIMATELY 2 MILES NORTH OF COPPER ROAD BY CNDDB.

Ecological: VERNAL POOLS WITH MIMULUS TRICOLOR AND PSILOCARPHUS TENELLA.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1979 COLLECTION BY TANOWITZ. THIS IS A NEW COUNTY FOR THIS SPECIES AND IS THE SOUTHERNMOST OCCURRENCE MAPPED BY CNDDB.

Owner/Manager: UNKNOWN

Leptosiphon serrulatus

Element Code: PDPLM09130

Madera leptosiphon

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1?
	State:	None		**State:**	S1?
	Other:	Rare Plant Rank - 1B.2, USFS_S-Sensitive			
Habitat:	**General:**	CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.			
	Micro:	DRY SLOPES; OFTEN ON DECOMPOSED GRANITE IN WOODLAND. 80-1575M.			

Occurrence No.	9	**Map Index:** 30838	**EO Index:** 3954	**Element Last Seen:**	1967-04-22
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1967-04-22
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2009-04-20

Quad Summary: Friant (3611986), Millerton Lake West (3711916)

County Summary: Fresno

Lat/Long:	37.00344 / -119.67156	**Accuracy:**	2/5 mile
UTM:	Zone-11 N4098591 E262281	**Elevation (ft):**	600
PLSS:	T11S, R21E, Sec. 03 (M)	**Acres:**	0.0

Location: EAST SIDE OF SOUTH BAY OF MILLERTON LAKE.

Detailed Location: 2 MILES NORTH OF BOAT RAMPS ON EAST SIDE OF SOUTH BAY.

Ecological: FOOTHILL WOODLAND ASSOCIATED WITH QUERCUS DOUGLASII, LUPINUS BICOLOR, L. PACHYLOBUS, GILIA TRICOLOR, ORTHOCARPUS ATTENUATUS, AND LITHOPHRAGMA SCABRELLA. ON DECOMPOSED GRANITE SOIL.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1967 BRADFORD COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	23	**Map Index:** 46277	**EO Index:** 75591	**Element Last Seen:**	1922-05-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1922-05-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2009-04-20

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accuracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: NEAR FRESNO.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS AROUND FRESNO.

Ecological: FOOTHILLS.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1922 MINTHORN COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Castilleja campestris ssp. succulenta

Element Code: PDSCR0D3Z1

succulent owl's-clover

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G4?T3
	State:	Endangered		**State:**	S3
	Other:	Rare Plant Rank - 1B.2			
Habitat:	**General:**	VERNAL POOLS, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	MOIST PLACES, OFTEN IN ACIDIC SOILS. 25-750M.			

Occurrence No.	1	**Map Index:**	14831	**EO Index:**	30719	**Element Last Seen:**	1995-04-25
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	2009-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.91133 / -119.71542	**Accuracy:**	80 meters
UTM:	Zone-11 N4088480 E258086	**Elevation (ft):**	407
PLSS:	T12S, R21E, Sec. 06 (M)	**Acres:**	0.0

Location:	EAST SIDE OF AUBERRY ROAD, ABOUT 1.1 MILES NORTH OF COPPER AVE AND ABOUT 5.5 AIR MILES SOUTH OF FRIANT.
Detailed Location:	MAPPED IN THE SOUTH 1/2 OF THE SE 1/4 OF SECTION 6.
Ecological:	SWALE-LIKE VERNAL POOL IN NONNATIVE GRASSLAND. ASSOCIATED WITH MIMULUS TRICOLOR, ERYNGIUM VASEYI, DOWNINGIA SP., PLAGIOBOTHRYS STIPITATUS, & PSILOCARPHUS BREVISSIMUS. SPADEFOOT TOAD ALSO REPORTED FROM THIS SITE.
General:	12 PLANTS OBSERVED IN 1986, SITE OVERGRAZED IN 1993 AND NO PLANTS FOUND. 20 PLANTS IN 1995. NO PLANTS IN 2009: POOL SEEMS TO BE DELIBERATELY DESTOYED, BUT IT DOES NOT APPEAR TO HAVE BEEN DEEP RIPPED; REMNANT VERNAL POOL SPECIES PRESENT.
Owner/Manager:	PVT

Occurrence No.	7	**Map Index:**	14708	**EO Index:**	17658	**Element Last Seen:**	1938-05-17
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1981-06-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-08-05

Quad Summary:	Fresno North (3611977)
County Summary:	Fresno

Lat/Long:	36.86577 / -119.78070	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4083592 E252122	**Elevation (ft):**	350
PLSS:	T12S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location:	FRIANT RD NORTH OF SP RR TRACKS, APPROXIMATELY 1.2 MILES NORTH OF JUNCTION FRIANT RD & BLACKSTONE, HWY 41.
Detailed Location:	
Ecological:	
General:	COLLECTED ON ROAD TO FRIANT, NEAR PINDALE BY HOOVER IN 1938. SITE COMPLETELY DISKED IN 1981.
Owner/Manager:	UNKNOWN

Occurrence No.	14	**Map Index:**	36544	**EO Index:**	361	**Element Last Seen:**	1995-04-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-04-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-12-22

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.96914 / -119.83461	**Accurracy:**	specific area
UTM:	Zone-11 N4095204 E247656	**Elevation (ft):**	375
PLSS:	T11S, R20E, Sec. 18 (M)	**Acres:**	39.4

Location:	NORTH OF AVENUE 15 AT JCT WITH AVENUE 39 1/2, NORTH OF LITTLE DRY CREEK, ABOUT 4.5 MILES WEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	MAPPED WITHIN THE SOUTH 1/2 OF THE SW 1/4 OF SECTION 18. ABOUT 50-60 YDS EAST OF THE FENCELINE ON THE WEST SIDE OF THE PROPERTY.
Ecological:	VERNAL POOLS ON HARD, LOAMY CLAY IN VALLEY GRASSLAND, ASSOCIATED WITH PLAGIOBOTHRYS STIPITATUS, LYTHRUM HYSSOPIFOLIUM, DOWNINGIA, LASTHENIA, ERYNGIUM VASEYI, AND THE RARE ORCUTTIA INAEQUALIS.
General:	250 INDIVIDUALS IN MAIN POOL COMPLEX IN 1982, 15 PLANTS SEEN IN ADDITIONAL POOL TO THE NORTH IN 1995. THIS COMPLEX OF POOLS CONTAINS MANY RARE AND ENDANGERED SPECIES.
Owner/Manager:	PVT

Occurrence No.	17	**Map Index:**	14850	**EO Index:**	21621	**Element Last Seen:**	1992-04-09
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1994-02-25

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.97077 / -119.70493	**Accurracy:**	specific area
UTM:	Zone-11 N4095049 E259208	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 17 (M)	**Acres:**	15.1

Location:	ABOUT ONE AIR MILE SOUTH OF TOWN OF FRIANT.
Detailed Location:	
Ecological:	VERNAL POOLS ON SANDY TO CLAY LOAM SOILS WITHIN VALLEY GRASSLAND. ASSOCIATED WITH ERYNGIUM, DOWNINGIA, PLAGIOBOTHRYS, MARSILEA, LASTHENIA, AND MIMULUS TRICOLOR.
General:	MORE THAN 1000 INDIVIDUALS IN 1984, ONLY 60 OBSERVED IN 1992.
Owner/Manager:	PVT

Occurrence No.	29	**Map Index:**	14683	**EO Index:**	6892	**Element Last Seen:**	2010-05-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-05-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-24

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94858 / -119.79170	**Accurracy:**	specific area
UTM:	Zone-11 N4092810 E251410	**Elevation (ft):**	405
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	38.0

Location: CALTRANS MADERA POOLS MITIGATION SITE; EAST SIDE OF HIGHWAY 41, APPROXIMATELY 0.5 TO 0.9 MILE SOUTH OF ROAD 204.

Detailed Location: OBSERVED IN BOTH NATURAL POOLS AS WELL AS CREATED/RESTORED/ENHANCED POOLS. MAPPED BY CNDDB AS 8 POLYGONS ACCORDING TO 2010 CALTRANS DIGITAL DATA.

Ecological: IN BASINS OF NORTHERN HARDPAN VERNAL POOLS. ASSOCIATED WITH DOWNINGIA BICORNUTA, ERYNGIUM SP., MIMULUS TRICOLOR, PSILOCARPHUS BREVISSIMUS, PLAGIOBOTHRYS SP., DESCHAMPSIA DANTHONIOIDES, GLYCERIA OCCIDENTALIS, ETC.

General: 200-400 PLANTS IN 1985, 10 IN 1993, HUNDREDS IN 1995, <20 IN 2009. ~2000 PLANTS OBSERVED IN AN EXTENSIVE SURVEY IN 2010 (NUMBERS INCLUDE PLANTS IN CREATED POOLS). LAND PURCHASED TO PRESERVE VERNAL POOLS AS A RESULT OF HWY 41 REALINGMENT.

Owner/Manager: CALTRANS

Occurrence No.	32	**Map Index:**	25122	**EO Index:**	28381	**Element Last Seen:**	1991-04-05
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1994-02-25

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.96195 / -119.71118	**Accurracy:**	80 meters
UTM:	Zone-11 N4094086 E258624	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 19 (M)	**Acres:**	0.0

Location: 1.5 MILES DUE SOUTH OF FRIANT.

Detailed Location: MAPPED 1.3 MILES DUE EAST OF THE SOUTHEAST CORNER OF LOST LAKE. SITE IS WITHIN THE SE 1/4 OF THE NE 1/4 OF SECTION 19.

Ecological: EXTENSIVE VERNAL POOL SYSTEM WITHIN VALLEY GRASSLAND COMMUNITY. ASSOCIATED WITH HORDEUM GENICULATUM, LASTHENIA FREMONTII, ERYNGIUM VASEYI, CRASSULA ERECTA, AND PSILOCARPHUS.

General: 40 PLANTS OBSERVED IN 1991. ALTHOUGH THE TAXON WAS OBSERVED IN ONLY ONE POOL IT IS LIKELY THAT IT OCCURS IN SOME OF THE OTHER HUNDREDS OF POOLS HERE. SITE SHOULD BE PROTECTED VIA RESTRICTING GRAZING, EASEMENTS, AND HYDROLOGY PRESERVATION.

Owner/Manager: PVT

Occurrence No.	33	**Map Index:**	25120	**EO Index:**	6231	**Element Last Seen:**	1992-04-28
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-08

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.93567 / -119.78684	**Accurracy:**	specific area
UTM:	Zone-11 N4091365 E251800	**Elevation (ft):**	395
PLSS:	T11S, R20E, Sec. 33 (M)	**Acres:**	2.0

Location: 600 METERS EAST OF HIGHWAY 41 AND 0.85 MILE NORTH OF AVENUE 12, NORTHWEST OF THE SAN JOAQUIN RIVER.

Detailed Location: TWO VERNAL POOLS ON TERRACE ABOVE AND TO THE SOUTH OF AN INTERMITTENT SWALE (CALTRANS ROUTE 41 NORTH PROJECT - POOLS #5-E-22, 5-E-19). MAPPED IN THE NE 1/4 OF THE NE 1/4 OF SECTION 33.

Ecological: VERNAL POOLS DOMINATED BY HORDEUM GENICULATA, PLAGIOBOTHRYS STIPITATUS, LYTHRUM HYSSOPIFOLIA, ERYNGIUM VASEYI, CRASSULA AQUATICA, AND PSILOCARPHUS BREVISSIMUS. CASTILLEJA MOSTLY ALONG THE EDGE OF THE POOL.

General: 20 PLANTS OBSERVED IN WESTERN COLONY AND 3 PLANTS IN EASTERN COLONY IN 1992. NO PLANTS OBSERVED IN 2009; OVERALL SITE QUALITY IS STILL GOOD, ABSENCE OF PLANTS POSSIBLY DUE TO LOW RAINFALL.

Owner/Manager: PVT

Occurrence No.	40	**Map Index:**	29049	**EO Index:**	30717	**Element Last Seen:**	1996-05-04
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1996-05-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-03-20

Quad Summary: Friant (3611986)

County Summary: Fresno

Lat/Long:	36.92871 / -119.72754	**Accurracy:**	specific area
UTM:	Zone-11 N4090439 E257062	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	9.9

Location: ABOUT 0.25 MILE EAST OF FRIANT ROAD AND 0.5 MILE SOUTH OF LITTLE DRY CREEK.

Detailed Location:

Ecological: LARGE (APPROX. 1 ACRE) VERNAL POOL IN NONNATIVE GRASSLAND. WITH ALOPECURUS HOWELLII, ORCUTTIA INAEQUALIS, LYTHRUM HYSSOPIFOLIUM, AND PSILOCARPHUS BREVISSIMUS. PROBABLE FAIRY SHRIMP SITE AND EXCELLENT AMPHIBIAN HABITAT.

General: 300 PLANTS IN 1996.

Owner/Manager: PVT

Sagittaria sanfordii

Element Code: PMALI040Q0

Sanford's arrowhead

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3
	Other:	Rare Plant Rank - 1B.2, BLM_S-Sensitive			
Habitat:	**General:**	MARSHES AND SWAMPS.			
	Micro:	IN STANDING OR SLOW-MOVING FRESHWATER PONDS, MARSHES, AND DITCHES. 0-610M.			

Occurrence No.	3	**Map Index:**	24423	**EO Index:**	7075	**Element Last Seen:**	1986-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1986-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-11-15

Quad Summary: Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.82288 / -119.72991	**Accurracy:**	nonspecific area
UTM:	Zone-11 N4078702 E256514	**Elevation (ft):**	345
PLSS:	T13S, R21E, Sec. 06 (M)	**Acres:**	39.7

Location: HELM CANAL NEAR BULLARD AVE, CLOVIS.

Detailed Location: NORTHEAST OF CSU FRESNO RODEO GROUNDS.

Ecological: GROWING IN A CANAL.

General: MORE INFORMATION NEEDED ON THE CONDITION AND HABITAT OF THIS POPULATION.

Owner/Manager: UNKNOWN

Occurrence No.	4	**Map Index:**	24425	**EO Index:**	7071	**Element Last Seen:**	1954-05-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-09-26

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.86067 / -119.78267	**Accurracy:**	2/5 mile
UTM:	Zone-11 N4083031 E251930	**Elevation (ft):**	360
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRIANT ROAD SOUTH OF SHEPHERD AVE, NORTHWEST OF PINEDALE.

Detailed Location: EXACT LOCATION UNKNOWN, COLLECTION LABEL GIVES: "RD TO FRIANT DAM AND FORT WASHINGTON BEFORE CURVE AT SHEPHERD AVE."

Ecological:

General: AREA SEARCHED BY C. TURNER IN 1980 BUT NO PLANTS WERE FOUND. SITE KNOWN FROM THREE COLLECTIONS; C. QUIBELL IN 1953 (FSC 7725), S. SIMONIAU ON MAY 16, 1953 (FSC 15910), AND S. SIMONIAU ON MAY 23, 1954 (FSC 13720).

Owner/Manager: UNKNOWN

Occurrence No.	5	**Map Index:**	24426	**EO Index:**	7068	**Element Last Seen:**	1958-10-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-07-27

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.79405 / -119.79838	**Accurracy:**	80 meters
UTM:	Zone-11 N4075679 E250313	**Elevation (ft):**	310
PLSS:	T13S, R20E, Sec. 16 (M)	**Acres:**	0.0

Location: CANAL NORTH OF ASHLAN AVE & EAST OF MAROA, FRESNO.

Detailed Location: ALONG NORTH SIDE OF ASHLAN AND 100 YARDS EAST OF MAROA.

Ecological: GROWING IN A CANAL.

General: AREA SEARCHED BY C. TURNER IN 1980 BUT NO PLANTS WERE FOUND. SITE KNOWN ONLY FROM SINGLE COLLECTION BY B. BROCK ON OCT. 9, 1958 (FSC 17769).

Owner/Manager: UNKNOWN

Occurrence No.	6	**Map Index:**	24428	**EO Index:**	7070	**Element Last Seen:**	1953-09-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-11-15

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.83710 / -119.86242	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4080626 E244740	**Elevation (ft):**	320
PLSS:	T12S, R19E, Sec. 35 (M)	**Acres:**	0.0

Location: HERNDON AVE AT BRAWLEY AVE, APPROXIMATELY 3 MILES WEST OF PINECREST.

Detailed Location: EXACT SITE UNKNOWN, SEVERAL CANALS IN AREA MAY PROVIDE APPROPRIATE HABITAT.

Ecological:

General: AREA SEARCHED BY C. TURNER IN 1980 BUT NO PLANTS WERE FOUND. SITE KNOWN FROM SINGLE COLLECTION BY S. SIMONIAU ON SEPT. 9, 1953 (FSC 15911).

Owner/Manager: UNKNOWN

Occurrence No.	7	**Map Index:**	24427	**EO Index:**	7069	**Element Last Seen:**	1953-06-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-09-26

Quad Summary: Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.80818 / -119.84118	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4077360 E246539	**Elevation (ft):**	310
PLSS:	T13S, R20E, Sec. 07 (M)	**Acres:**	0.0

Location: DITCH UNDER SANTA FE RAILROAD AT SHAW AVE, FRESNO.

Detailed Location: LOCATED IN DITCH SIPHON.

Ecological: GROWING IN A DITCH.

General: AREA SEARCHED BY C. TURNER IN 1980 BUT NO PLANTS WERE FOUND. SITE KNOWN FROM SINGLE COLLECTION BY C. QUIBELL ON JUNE 2, 1953 (FSC 8117).

Owner/Manager: UNKNOWN

Occurrence No.	38	**Map Index:**	30074	**EO Index:**	18565	**Element Last Seen:**	1993-09-23
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-09-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1994-08-03

Quad Summary: Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.79330 / -119.74407	**Accuracy:**	80 meters
UTM:	Zone-11 N4075456 E255157	**Elevation (ft):**	325
PLSS:	T13S, R20E, Sec. 24 (M)	**Acres:**	0.0

Location: LEAKY ACRES GROUNDWATER RECHARGE BASIN, SOUTH OF ASHLAN AVE & WEST OF SIERRA VISTA AVE, FRESNO.

Detailed Location: BASIN IS ABOUT 2 MILES NORTHWEST OF THE FRESNO AIR TERMINAL BUILDING. PLANTS FOUND IN NW CORNER OF PONDING BASIN 5A. WITHIN THE NW 1/4 OF THE NE 1/4 OF SECTION 24.

Ecological: GROWING IN A LARGE, SHALLOW FRESHWATER POND IN ABOUT 6" OF WATER. SAGITTARIA LATIFOLIA OCCURS NEARBY.

General: MORE THAN 100 PLANTS OBSERVED IN 1993. EMERGENT VEGETATION IS SCARCE AT THIS SITE.

Owner/Manager: CITY OF FRESNO

Imperata brevifolia

Element Code: PMPOA3D020

California satintail

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2.1
	Other:	Rare Plant Rank - 2.1, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL, RIPARIAN SCRUB, MOJAVEAN SCRUB, MEADOWS AND SEEPS (ALKALI).			
	Micro:	MESIC SITES, ALKALI SEEPS, RIPARIAN AREAS. 0-500M.			

Occurrence No.	22	**Map Index:** 46277	**EO Index:** 69854	**Element Last Seen:**	1893-07-31
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1893-07-31
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2007-04-26

Quad Summary: Malaga (3611966), Fresno South (3611967), Clovis (3611976), Fresno North (3611977)

County Summary: Fresno

Lat/Long:	36.77388 / -119.77951	**Accuracy:**	5 miles
UTM:	Zone-11 N4073392 E251931	**Elevation (ft):**	300
PLSS:	T13S, R20E, Sec. 27 (M)	**Acres:**	0.0

Location: FRESNO.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS A BEST GUESS AROUND FRESNO.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS AN 1893 COLLECTION BY WILSON, ET AL. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Orcuttia pilosa

Element Code: PMPOA4G040

hairy Orcutt grass

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	VERNAL POOLS.			
	Micro:	25-125M.			

Occurrence No.	28	**Map Index:**	14519	**EO Index:**	2301	**Element Last Seen:**	1986-08-10
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1986-08-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-08-10

Quad Summary:	Herndon (3611978)
County Summary:	Madera

Lat/Long:	36.87040 / -119.88708	**Accuracy:**	specific area
UTM:	Zone-11 N4084387 E242653	**Elevation (ft):**	310
PLSS:	T12S, R19E, Sec. 22 (M)	**Acres:**	9.6

Location:	VERNAL POOL NORTHEAST OF INTERSECTION OF AVENUE 8 AND ROAD 36, APPROX. 3 AIR MILES NORTHEAST OF HERNDON.
Detailed Location:	MAPPED IN THE NE 1/4 OF THE SW 1/4 OF SECTION 22.
Ecological:	VERNAL POOL WITH ASSOCIATES ERYNGIUM VASEYI, TRICHOSTEMA LANCEOLATUM, AND DOWNINGIA SP. SURROUNDED BY ANNUAL GRASSLAND.
General:	200 PLANTS OBSERVED IN 1986. OWNER WILL ALLOW ACCESS FOR FUTURE STUDIES.
Owner/Manager:	PVT

Occurrence No.	29	**Map Index:**	36530	**EO Index:**	2303	**Element Last Seen:**	1986-08-15
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1997-12-19

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.95009 / -119.79510	**Accuracy:**	80 meters
UTM:	Zone-11 N4092986 E251113	**Elevation (ft):**	410
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location:	WEST OF STATE ROUTE 41, 1.9 MILES NORTH OF INTERSECTION WITH AVENUE 12 AND 5.1 MILES NORTH OF LANES BRIDGE.
Detailed Location:	MAPPED IN SINGLE POOL, ABOUT 0.7 MILE SOUTH OF ROAD 204 AND 0.1 MILE WEST OF SR 41. WITHIN THE NE 1/4 OF THE NW 1/4 OF SECTION 28.
Ecological:	NORTHERN HARDPAN VERNAL POOL ON SAN JOAQUIN FINE SANDY LOAM. POOL SURROUNDED BY DRY-FARMED GRAINFIELD. ASSOCIATES INCLUDE ERYNGIUM VASEYI, TRICHOSTEMA SP., ELEOCHARIS PALUSTRIS, DOWNINGIA BICORNUTA, PLAGIOBOTHRYS STIPITATUS MICRANTHUS, ETC.
General:	2 PLANTS OBSERVED IN 1986, NONE FOUND IN 1992. SEED BED MAY STILL BE PRESENT; SHOULD BE FIELD CHECKED ANNUALLY. QUESTIONABLE ID; PLANTS ID'D IN 1986 AS O. PILOSA, IN 1992 ID'D AS O. INAEQUALIS. 1986 VOUCHER BY MARTIN WAS LOST.
Owner/Manager:	PVT

Occurrence No.	45	**Map Index:**	37744	**EO Index:**	32752	**Element Last Seen:**	1995-09-12
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-09-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-12-19

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94091 / -119.79305	**Accurracy:**	80 meters
UTM:	Zone-11 N4091962 E251265	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location: EAST SIDE OF HIGHWAY 41 ABOUT 1.2 MILES NORTH OF AVENUE 12, NORTH OF LANES BRIDGE.

Detailed Location: JUST NORTH OF EAST-WEST RUNNING TRANSMISSION LINES.

Ecological: SWALE-LIKE VERNAL POOL WITHIN NON-NATIVE GRASSLAND. ASSOCIATED WITH DOWNINGIA ORNATISSIMA, ERYNGIUM VASEYI, AND PLAGIOBOTHRYS STIPITATUS.

General: 50 PLANTS OBSERVED IN 1995. LAND WAS PURCHASED TO PRESERVE AND ENHANCE VERNAL POOLS AS MITIGATION FOR THOSE IMPACTED BY THE REALIGNMENT OF HIGHWAY 41.

Owner/Manager: CALTRANS

Occurrence No.	48	**Map Index:**	83415	**EO Index:**	84430	**Element Last Seen:**	2010-06-29
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-07-19

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.94797 / -119.78983	**Accurracy:**	specific area
UTM:	Zone-11 N4092737 E251574	**Elevation (ft):**	405
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	1.0

Location: EAST SIDE OF HIGHWAY 41, APPROXIMATELY 0.9 MILE SOUTH OF ROAD 204, NORTH OF FRESNO.

Detailed Location: MAPPED IN THE APPROXIMATE CENTER OF THE NE 1/4 OF SECTION 28 ACCORDING TO 2010 DIGITAL DATA PROVIDED BY CALTRANS.

Ecological: LARGE DRY RESTORED SECTION OF VERNAL POOL SURROUNDED BY ANNUAL GRASSLAND. ASSOC W/ EPILOBIUM CLEISTOGAMUM, ORCUTTIA INAEQUALIS, PSILOCARPHUS BREVISSIMUS, LYTHRUM HYSSOPIFOLIA, AND ERYNGIUM SPINOSEPALUM (LIKELY INTERMEDIATE W/ E. CASTRENSE).

General: 2 PLANTS OBSERVED IN 2010. CALTRANS IS IN THE PROCESS OF TRANSFERRING THIS PROPERTY TO DFG. THIS IS A NATURAL POPULATION, BUT IN 2009 THE SITE WAS UNDER CONSTRUCTION FOR THE CREATION, RESTORATION, AND ENHANCEMENT OF VERNAL POOLS AND SWALES.

Owner/Manager: CALTRANS

Orcuttia inaequalis

Element Code: PMPOA4G060

San Joaquin Valley Orcutt grass

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	VERNAL POOLS.			
	Micro:	30-755M.			

Occurrence No.	21	**Map Index:**	14687	**EO Index:**	22388	**Element Last Seen:**	1927-05-27
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1987-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-06-26

Quad Summary:	Fresno North (3611977), Lanes Bridge (3611987)
County Summary:	Fresno, Madera

Lat/Long:	36.86226 / -119.79161	**Accuracy:**	1 mile
UTM:	Zone-11 N4083231 E251138	**Elevation (ft):**	300
PLSS:	T12S, R20E, Sec. 28 (M)	**Acres:**	0.0

Location:	NEAR LANE'S BRIDGE NEAR FRIANT.
Detailed Location:	
Ecological:	
General:	THIS REGION HAS BEEN LEVELED AND IS NOW BEING DEVELOPED FOR RESIDENTIAL AND COMMERCIAL USES AS WELL AS RECREATION ACCORDING TO STEBBINS (1987).
Owner/Manager:	UNKNOWN

Occurrence No.	22	**Map Index:**	14887	**EO Index:**	22386	**Element Last Seen:**	1976-06-07
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1987-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-09-06

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.90022 / -119.68014	**Accuracy:**	1/5 mile
UTM:	Zone-11 N4087158 E261196	**Elevation (ft):**	395
PLSS:	T12S, R21E, Sec. 09 (M)	**Acres:**	0.0

Location:	NORTH OF COPPER AVE, ABOUT 0.5 MILE NORTHWEST OF JUNCTION OF COPPER & ARMSTRONG AVE.
Detailed Location:	EXACT LOCATION UNKNOWN. MAPPED BY CNDDB TO ENCOMPASS HISTORIC VERNAL POOLS IN VICINITY ACCORDING TO MAPS FROM 1981 AND 1988.
Ecological:	
General:	PLANTS SEEN IN 1976, DESPITE DROUGHT. NO PLANTS SEEN IN 1981, 83, 85 OR 87. ACCORDING TO STEBBINS, NO VIABLE HABITAT REMAINS DUE TO HYDROLOGIC ALTERATIONS TO A NEARBY STREAM PROJECT. SITE ALSO DAMAGED BY HORSEBACK RIDING AND ORVS.
Owner/Manager:	UNKNOWN

Occurrence No.	23	**Map Index:**	14577	**EO Index:**	22384	**Element Last Seen:**	1979-05-15
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1987-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-31

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.92605 / -119.85487	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4090476 E245709	**Elevation (ft):**	355
PLSS:	T11S, R19E, Sec. 36 (M)	**Acres:**	0.0

Location: NORTH OF AVENUE 12, EAST OF ROAD 38, 11 MILES ESE OF MADERA.

Detailed Location: IN 4 OF 6 POOLS IN THE SW 40 ACRES OF SECTION 36. MAPPED BY CNDDB TO ENCOMPASS HISTORIC VERNAL POOLS IN VICINITY ACCORDING TO MAPS FROM 1982 AND 1988.

Ecological:

General: THOUSANDS OF PLANTS OBSERVED IN 1979. THIS SITE HAS BEEN LEVELED AND PLOWED AND WAS IN DRYLAND WHEAT IN 1987 ACCORDING TO STEBBINS.

Owner/Manager: PVT

Occurrence No.	41	**Map Index:**	36544	**EO Index:**	6232	**Element Last Seen:**	1995-09-04
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-09-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-06-25

Quad Summary: Lanes Bridge (3611987)

County Summary: Madera

Lat/Long:	36.96914 / -119.83461	**Accurracy:**	specific area
UTM:	Zone-11 N4095204 E247656	**Elevation (ft):**	365
PLSS:	T11S, R20E, Sec. 18 (M)	**Acres:**	39.4

Location: ALONG NORTH SIDE OF AVENUE 15 ABOUT 0.35 MILE WEST OF ROAD 39 1/2, 4 MILES WEST OF LITTLE TABLE MOUNTAIN.

Detailed Location: MAPPED WITHIN THE S 1/2 OF THE SW 1/4 OF SECTION 18.

Ecological: GROWING ON DRY CRACKED CLAY IN CENTER OF VERNAL POOLS WITHIN VALLEY GRASSLAND. ASSOCIATED WITH ERYNGIUM, DOWNINGIA, PSILOCARPHUS BREVISSIMUS, PLAGIOBOTHRYS, CASTILLEJA CAMPESTRIS VAR. SUCCULENTA, PLAGIOBOTHRYS STIPITATA, AND VULPIA MYUROS.

General: APPROXIMATELY 200 PLANTS SEEN IN 1982; 400 PLANTS IN 1983 AND 1986. THIS IS THE ONLY GOOD POPULATION SOUTH OF MERCED COUNTY ACCORDING TO J. STEBBINS. 1100+ OBSERVED IN 1995. MANY OTHER RARE SPECIES OCCUR IN THESE POOLS AS WELL.

Owner/Manager: PVT

Occurrence No.	43	**Map Index:**	36547	**EO Index:**	2302	**Element Last Seen:**	2010-06-29
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Fluctuating	**Record Last Updated:**	2011-09-12

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.94625 / -119.79302	**Accurracy:**	specific area
UTM:	Zone-11 N4092555 E251285	**Elevation (ft):**	400
PLSS:	T11S, R20E, Sec. 28 (M)	**Acres:**	12.0

Location:	BOTH SIDES OF HIGHWAY 41 FROM ~1.4-2 MILES NORTH OF JUNCTION WITH AVENUE 12, 3 MILES SOUTHWEST OF LITTLE TABLE MOUNTAIN.
Detailed Location:	7 COLONIES TOTAL. W SIDE OF HWY 41: 3 POOLS, CALTRANS POOL #'S 210, 213, & 211. E SIDE OF HWY: 4 POOLS, 3 ALONG ROAD AND 1 ~0.2 MI E OF ROAD. A 1973 COLLECTION FROM "8 MI N OF PINEDALE ON HWY 41" ALSO ATTRIBUTED TO THIS SITE.
Ecological:	POOLS IN A LARGE DRY-FARMED GRAINFIELD. HIGH TERRACE SITE WITH HARDPAN SOILS MAPPED AS SAN JOAQUIN SANDY LOAM. W/ LYTHRUM HYSSOPIFOLIA, JUNCUS BUFONIUS, HEMIZONIA FITCHII, ERYNGIUM SP., PSILOCARPHUS BREVISSIMUS, DOWNINGIA ORNATISSIMA, ETC.
General:	POPULATION NUMBERS ARE FOR PARTS OF OCCURRENCE. W SIDE OF HWY: >1000 PLANTS SEEN IN 1986, >10,000 PLANTS IN 1992, NO PLANTS IN 2009 (DUE TO DROUGHT?). E SIDE OF HWY: ~100 PLANTS SEEN IN 1995 AND ~350 IN 2010. INCLUDES FORMER OCCURRENCE #52.
Owner/Manager:	PVT, CALTRANS

Occurrence No.	45	**Map Index:**	14573	**EO Index:**	9516	**Element Last Seen:**	1991-09-11
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-09-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-16

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.93331 / -119.85505	**Accurracy:**	specific area
UTM:	Zone-11 N4091283 E245717	**Elevation (ft):**	350
PLSS:	T11S, R19E, Sec. 36 (M)	**Acres:**	5.5

Location:	EAST OF MADERA RANCHOS SUBDIVISION, JUST NORTH OF MADERA CANAL, MADERA.
Detailed Location:	PLANTS UNDER PG&E POWER LINES IN THE WEST HALF OF THE NW 1/4 OF SECTION 36.
Ecological:	LARGE VERNAL POOLS IN ANNUAL GRASSLAND WITH ERYNGIUM VASEYI, TRICHOSTEMA, POLYPOGON, PSILOCARPHUS, AND BROMUS RUBENS.
General:	VIGOROUS POPULATION OF APPROXIMATELY 1000 PLANTS IN 1983, 60 PLANTS IN 1986, NONE SEEN IN 1987, 3000 IN 1991. NO PLANTS SEEN IN 2009, PROBABLY DUE TO DROUGHT.
Owner/Manager:	PVT

Occurrence No.	48	**Map Index:**	24646	**EO Index:**	6891	**Element Last Seen:**	1992-06-17
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-06-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-12-13

Quad Summary:	Lanes Bridge (3611987)
County Summary:	Madera

Lat/Long:	36.93595 / -119.79158	**Accurracy:**	80 meters
UTM:	Zone-11 N4091408 E251380	**Elevation (ft):**	390
PLSS:	T11S, R20E, Sec. 33 (M)	**Acres:**	0.0

Location:	0.9 MI N OF AVENUE 12, 0.1 MI E OF HWY 41.
Detailed Location:	POOL #5E-28 FOR CALTRANS RTE 41 NORTH PROJECT.
Ecological:	LARGE VERNAL POOL IN ANNUAL GRASSLAND WITH ERYNGIUM SP., PSILOCARPHUS BREVISSIMUS, EREMOCARPUS SETIGERUS.
General:	FEWER THAN 10 PLANTS IN 1992.
Owner/Manager:	PVT

Occurrence No.	53	**Map Index:**	29049	**EO Index:**	30718	**Element Last Seen:**	1996-05-25
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1996-05-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-03-20

Quad Summary:	Friant (3611986)
County Summary:	Fresno

Lat/Long:	36.92871 / -119.72754	**Accurracy:**	specific area
UTM:	Zone-11 N4090439 E257062	**Elevation (ft):**	400
PLSS:	T11S, R21E, Sec. 31 (M)	**Acres:**	9.9

Location:	ABOUT 0.25 MI E OF FRIANT ROAD AND 0.5 MI S OF LITTLE DRY CREEK.
Detailed Location:	
Ecological:	LARGE (APPROX. 1 ACRE) VERNAL POOL IN NONNATIVE GRASSLAND. WITH ALOPECURUS HOWELLII, CASTILLEJA CAMPESTRIS SUCCULENTA, LYTHRUM HYSSOPIFOLIUM, AND PSILOCARPHUS BREVISSIMUS. PROBABLE FAIRY SHRIMP SITE AND EXCELLENT AMPHIBIAN HABITAT.
General:	300 PLANTS IN 1996.
Owner/Manager:	PVT

Tuctoria greenei **Element Code:** PMPOA6N010

Greene's tuctoria

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Rare		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	VERNAL POOLS, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	DRY BOTTOMS OF VERNAL POOLS IN OPEN GRASSLANDS. 30-1065M.			

Occurrence No.	17	**Map Index:**	15131	**EO Index:**	22351	**Element Last Seen:**	1956-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1987-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-06-17

Quad Summary: Sanger (3611965), Round Mountain (3611975)

County Summary: Fresno

Lat/Long:	36.75022 / -119.55597	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4070210 E271816	**Elevation (ft):**	385
PLSS:	T13S, R22E, Sec. 34 (M)	**Acres:**	0.0

Location: 3 MILES NORTH OF SANGER.

Detailed Location: MAPPED NEAR INTERSECTION OF BELMONT ROAD AND ACADEMY AVENUE.

Ecological: BED OF DRIED POOL.

General: SITE ONLY KNOWN FROM 1956 COLLECTION BY HOWELL AND BARNEBY. AREA SURVEYED BY STEBBINS IN 1987, NO PLANTS FOUND; HABITAT ELIMINATED, SITE EXTIRPATED.

Owner/Manager: UNKNOWN

Occurrence No.	22	**Map Index:**	14941	**EO Index:**	22344	**Element Last Seen:**	1937-05-27
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1987-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-07-19

Quad Summary: Clovis (3611976)

County Summary: Fresno

Lat/Long:	36.85300 / -119.64264	**Accurracy:**	1/5 mile
UTM:	Zone-11 N4081825 E264392	**Elevation (ft):**	405
PLSS:	T12S, R21E, Sec. 26 (M)	**Acres:**	0.0

Location: 5 MILES NORTHEAST OF CLOVIS.

Detailed Location: MAPPED IN THE VICINITY OF TOLLHOUSE ROAD AND NEES AVENUE.

Ecological:

General: SITE KNOWN FROM 1937 COLLECTION BY HOOVER (#2317). AREA SEARCHED IN 1981, 1987 BUT NO PLANTS SEEN. ACC TO BIOSYSTEMS ANALYSIS, 1988, NO VERNAL POOL HABITAT REMAINS IN THIS AREA; HABITAT ELIMINATED, SITE EXTIRPATED.

Owner/Manager: PVT

Appendix D: Cultural Resources

D.1 - Paleontological Resources Review

Kenneth L. Finger, Ph.D.
Consulting Paleontologist

18208 Judy St., Castro Valley, CA 94546-2306 510.885.1585 klfpaleo@comcast.net

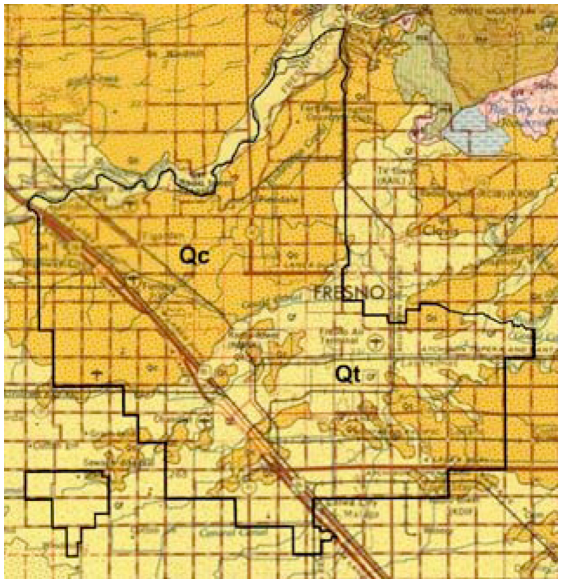
October 27, 2012

Michael Dice
First Carbon Solutions
Michael Brandman Associates
220 Commerce, Suite 200
Irvine, CA 92602-1326

Re: Paleontological Records Search for the City of Fresno General Plan and Development Code Update, Fresno County, California (MBA Project #31680016)

Dear Michael:

As per your request, I have conducted a thorough search of the University of California Museum of Paleontology (UCMP) vertebrate paleontology database for the City of Fresno General Plan and Development Code Update project. The geologic maps of Matthews and Burnett (1965), Page and LeBlanc (1969), and Marchand and Allwardt (1978) indicate that the entire area of concern consists of Quaternary alluvium. The portion of the Matthews and Burnett (1965) map shown here with the project area outlined differentiates surficial deposits as Pleistocene nonmarine (Qc, orange areas) and Quaternary nonmarine terrace (Qt, yellow areas). These two units are basically Pleistocene and undifferentiated Pleistocene-Holocene alluvial sediments, respectively. The late Pleistocene sediments have more recently been referred to the Riverbank Formation.



The UCMP database records three Pleistocene localities (V4401, V65100, and V81121) in Fresno County, all of which yielded elements of the Rancholabrean (late Pleistocene) fauna. V4401 ("Tranquility") accounts for 149 of the 151 specimens. Numerous specimens have been have been published, several of which are types for their species. The recovered faunal assemblage includes pond turtle (*Clemmys marmorata*, rattlesnake (*Crotalus*), loon (*Gavia*), broad-footed mole (*Scapanus latimanus*), jackrabbit (*Lepus*), vole (*Microtus*), wood rat (*Neotoma*), pocket gopher (*Thomomys*), badger (*Taxidea*), grey fox (*Urocyon*), true fox (*Vulpes*), coyote (*Canis latrans*), horse (*Equus*), bison (*Bison*), elk (*Cervus*), and mule deer (*Odocoileus*). Among these are type specimens of *Clemmys marmorata*, *Scapanus latimanus*, and *Canis latrans* that have been documented in scientific publication.

All undisturbed alluvium in the surface and subsurface of the target area have the potential of containing vertebrate fossils; therefore, any excavations of these deposits have the potential of impacting significant paleontological resources. This potential, however, is low because vertebrate fossils occurrences in alluvium tend to be spottily distributed, primarily in pointbar and floodplain deposits. Nevertheless, all Pleistocene alluvium should be considered as having a high paleontological sensitivity.

In accordance with CEQA guidelines, paleontological mitigation measures will be needed on all projects that involve excavations of previously undisturbed deposits. Pre-construction surveys by a professional paleontologist are recommended for those future project areas that include undisturbed terrain, especially where an alluvial section has been exposed by stream dissection. It would also be prudent to have a qualified cultural resources specialist monitor all project-related excavations. If any vertebrate fossils or potentially significant finds (e.g., numerous well-preserved invertebrate or plant fossils) are discovered by anyone working on a construction site, all activities in the immediate vicinity of the find are to cease until a qualified paleontologist evaluates the find for its scientific value. Paleontological resources deemed significant will be efficiently salvaged for deposition in an accredited and permanent scientific institution (e.g., UCMP) where they can be properly curated and preserved for the benefit of current and future generations.

If I can be of further assistance on this project, please do not hesitate to contact me.

Sincerely,

References Cited

Marchand, D.E, and Allwardt, A., 1978, Preliminary geologic map showing Quaternary deposits of the northeastern San Joaquin Valley, California. U.S. Geological Survey, Miscellaneous Field Studies Map MF-945, scale 1:125,000.

Matthews, R.A., and Burnett, J.L., 1965, Geologic map of California, Fresno sheet. Olaf P. Jenkins edition. Scale 1:250,000. California Division of Mines and Geology. Sacramento, CA.

Page, R.W., and LeBlanc, R.A., 1969, Geology, Page, R.W. and LeBlanc, R.A., 1969, Geology, hydrology, and water quality in the Fresno area, California. U.S. Geological Survey, Open-File Report OF-69-328, scale 1:126720.

D.2 - Native American Consultation

TRIBAL CONSULTATION LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax
E-mail -- nahc@pacbell.net

Project Title: City of Fresno General Plan and Master Environmental Impact Report Update

Local Government: City of Fresno, Development & Resource Management Department

Street Address: 2600 Fresno St., Room 3043 City: Fresno Zip: 93721-3604

Contact Person: Darrell Unruh, Planning Manager Phone: 559-621-8050 Fax: 559-498-1012

Email: Darrell.Unruh@fresno.gov

Project Location:

County: Fresno City/Community: Fresno

Local Action Type:

_X_ General Plan ___ General Plan Element ___ Specific Plan ___ General Plan Amendment

___ Specific Plan Amendment ___ Pre-Planning Outreach Activity

Project Description:

The City of Fresno recently retained Dyett and Bhatia and MW Steele Group, Inc. to assist the City in updating its General Plan and Master Environmental Impact Report (MEIR) which will guide physical development in the City through the year 2035. Note that the City is currently 112 square miles in area with roughly 505,000 inhabitants while the Council of Fresno County Governments has forecasted a population of 961,366 by the year 2035 within the City's Sphere of Influence (SOI) (157 sq. miles, please refer to the attached map). The City is not proposing to expand the SOI, rather it is anticipated that the City's General Plan update will provide strategies and implementation measures to accommodate projected growth within our existing Sphere of Influence.

A major step in the process of undertaking an update to the General Plan and MEIR will be the completion of a map-based existing conditions report with respect to public facilities, infrastructure and services. The report will provide important baseline information and will help us identify planning issues to be addressed in the updated General Plan. Your participation will be valuable in the preparation of a relevant and effective General Plan.

NAHC Use Only

Date Received: _____

Date Completed _____

Native American Tribal Consultation lists are only applicable for consulting with California Native American tribes per Government Code Section 65352.3.

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

October 14, 2010

Mr. Darrell Unruh, Planning Manager
CITY OF FRESNO DEVELOPMENT & RESOURCE MANAGEMENT DEPARTMENT
2600 Fresno Street, Room 3043
Fresno, CA 93721-3604

Sent by FAX to: (559) 498-1012
No. of Pages: 3

Re: Tribal Consultation Per Government Code §§ 65352.3, 65352.4 and 65560 (SB 18/Sacred Lands File Search) for Project- **City of Fresno GENERAL PLAN AMENDMENT and Master Environmental Impact Report Update;** located in the City of Fresno; Fresno County, California;

Dear Mr. Unruh:

Government Code §65352.3, .4 and .5 requires local governments to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose of protecting, and/or mitigating impacts to cultural places that might be impacted by a General Plan or Specific or modifications thereof. Attached is a Native American Tribal Consultation list of tribes with traditional lands or cultural places located within the requested plan boundaries of the City of Fresno, the Area of Potential Effect (APE).

As a part of consultation, the NAHC recommends that local governments conduct record searches through the NAHC and California Historic Resources Information System (CHRIS) (Contact Eric Allison at (916) 653-7278 to find the nearest CHRIS Information Center) to determine if there are any recorded archaeological sites are located within the area(s) affected by the proposed action, in the California Historical Resources Information System (CHRIS) Inventory.

A NAHC Sacred Lands File search was conducted based on the project site n information included in your request and **Native American cultural resources** were identified within the APE. Early contact with Native American tribes on the attached list will yield additional information about the cultural sites. Local governments should be aware that records searches do not preclude the existence of sacred sites or a cultural place. And a tribe or tribal members may be the only source of information regarding the existence of a sacred site or a cultural place.

If you have any questions, please contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Tribal Government Contacts

Native American Tribal Consultation List
FRESNO COUNTY
October 14, 2010

Big Sandy Rancheria of Mono Indians
Liz Hutchins Kipp, Chairperson
P.O. Box 337 / 37302
Auberry , CA 93602
(559) 855-4003
ck@bigsandyrancheria.com
Western Mono

Table Mountain Rancheria
Bob Pennell, Cultural Resources Director
P.O. Box 410
Friant , CA 93626-0177
(559) 325-0351
(559) 217-9718 - cell
Yokuts

Cold Springs Rancheria of Mono Indians
Travis Coleman, Chairperson
P.O. Box 209
Tollhouse , CA 93667
tcoleman@ca.ihs.gov
(559) 855-5043
Mono

Kings River Choinumni Farm Tribe
John Davis, Chairman
1064 Oxford Avenue
Clovis , CA 93612-2211
(669) 307-6430
Foothill Yokuts
Choinumni

North Fork Mono Tribe
Ron Goode, Chairperson
13396 Tollhouse Road
Clovis , CA 93619
eagleeye@cuip.net
(559) 299-3729 Home
Mono

Dunlap Band of Mono Historical Preservation Soc
Mandy Marine, Board Chairperson
P.O Box 18
Dunlap , CA 93621
mandy_marine@hotmail.
com
559-274-1705
Mono

Dumna Wo-Wah Tribal Goverment
Keith F. Turner, Tribal Contact
P.O. Box 306
Auberry , CA 93602
t'si-akimcorr@at.net
(559) 855-3128 Home
(559) 696-0191 (Cell)
Dumna/Foothill
Mono

Dumna Wo-Wah Tribal Government
Jim Redmoon - Cultural Resources Representative
724 W. Fountain
Fresno , CA 93705
559-824-0265
darkstarmoondog@yahoo.com
Dumna/Foothill
Choinumni

Sierra Nevada Native American Coalition
Lawrence Bill, Interim Chairperson
P.O. 125
Dunlap , CA 93621
(559) 338-2354
Mono
Foothill Yokuts
Choinumni

Chowchilla Tribe of Yokuts
Jerry Brown
10553 N. Rice Road
Fresno , CA 93720
559-434-3160
North Valley Yokuts

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable only for consultation with Native American tribes under Government Code Section 65352.3.

Native American Tribal Consultation List
FRESNO COUNTY
October 14, 2010

Traditional Choinumni Tribe
David Alvarez, Chairperson
2415 E. Houston Avenue
Fresno , CA 93720
davealvarez@sbcglobal.net Choinumni

(559) 323-6231

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable only for consultation with Native American tribes under Government Code Section 65352.3.

City of FRESNO

Development and Resource Management Department

2600 Fresno Street, Third Floor, Room 3044-05
Fresno, California 93721-3604
(559) 621-8092, FAX (559) 498-1026
Michelle.Zumwalt@fresno.gov

John M. Dugan, AICP
Director

July 16, 2014

David Alvarez, Chairperson
Traditional Choinumni Tribe
2415 E. Houston Avenue
Fresno, CA 93720

Dear Mr. Alvarez:

The City of Fresno has initiated the process of updating its General Plan. In order to provide Native American tribes with the opportunity to participate in local land use decisions at an early stage, in accordance with Senate Bill 18, we are seeking your comments on the proposed General Plan update.

The planning area includes Fresno, unincorporated Fresno County islands within the city limits, and adjacent agricultural land to the north, east, west, and south. The approximate boundaries are the San Joaquin River to the North, the City of Clovis to the Northeast, and in general, Locan Avenue to the east, American Avenue to the south and Garfield Avenue to the west. The Fresno Planning Area is shown on the enclosed map.

The General Plan sets a framework for decisions about the form of development, the location of new urban growth, and how to provide public services and facilities. It expresses community values and goals, gives a picture of the city in the future, and outlines steps to get there. State law requires that a general plan contain at least the seven following elements: Land Use, Transportation, Housing, Conservation, Open Space, Noise, and Safety. Fresno's general plan also covers economic development, sustainability, seismic safety, historic and cultural resource preservation, scenic highways, recreation and parks. Significant growth is projected to continue in Fresno in the coming years, and the General Plan will have an important influence on shaping it.

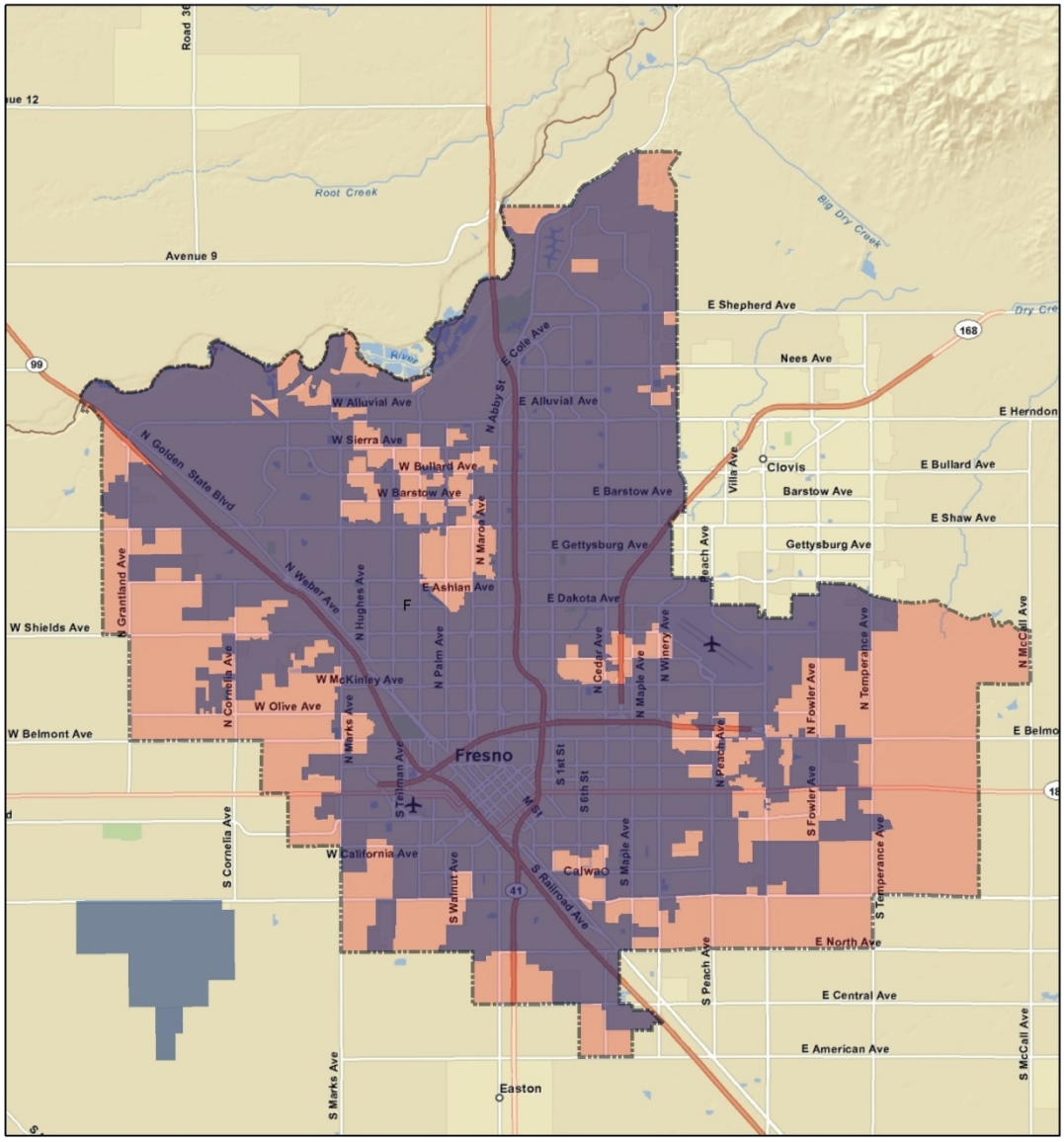
At our request, the Native American Heritage Commission (NAHC) has conducted a search of the Sacred Lands File for sites within the Planning Area. The Commission has notified us that Native American Cultural Resources sites were found within one-half mile of the Planning Area. NAHC also provided contact information for tribal representatives who may have knowledge about cultural resources in the area.

The City of Fresno is eager to understand tribal concerns regarding archaeological resources or traditional tribal cultural places in the Planning Area. If you have any concerns or information regarding archaeological resources or traditional tribal cultural places in the Planning Area, or if you would like to be involved in the planning process, please let us know. We would appreciate receiving your comments by April 26, 2011. Any responses received by that date will be included in the General Plan Draft EIR.

Thank you,

Michelle Zumwalt, Architect

City of Fresno
Planning Area Boundary



Legend

- City Limits
- Sphere Of Influence

N

Native American Consultations, General Plan and Downtown Plans

Tribal Group/NAHC	General Plan and MEIR Update	Responses for General Plan/MEIR	EIR/EIS Fulton Corr. and DNSP Specific Plan	Response Received	DEIR for Downtown Neighborhood Fulton Corridor and Downtown Development Code (federal) NOP	Responses received DEIR
Native American Heritage Commission	Letter sent **October 11, 2010** by Darrell Unruh	Response with NA contacts sent on October 14, **2010** by Dave Singleton		Response with NA contacts sent to Dana Slawson 4.22.**2011** by Dave Singleton		Response with NA Contacts sent to Wilma Quan April 6, **2012** by Dave Singleton
Big Sandy Racheria, Mono (Liz Hutchins Kipp)	Consult Letter sent February 9. 2011, Michelle Zumwalt architect	Follow-up telephone call from Karana Hattersley-Drayton and MZ 1.12.12 left message	Consult. Letter sent by Dana Slawson 4.27.11	Call back from Sharon Cotter 1.17.12; no new inform.	X	
Cold Springs Racheria, Robert Marquez	Letter sent 2.9.11 MZ	Telephone call 1.12.2012; left message with admin.	Letter 4.27.11	Telephone call 1.12.2012; left message with admin.	X	
North Fork Mono Ron Goode	Letter sent 2.9.11 MZ	1.12.2012 left message	Letter 4.27.11	1.12.2012 left message		
Dumna Wo-Wah Keith Turner	Letter sent 2.9.11 MZ	1.12.2012 left message	Letter 4.27.11	1.12.2012 left message	X	
Sierra Nevada Native American Coalition Lawrence Bill	Letter sent 2.9.11 MZ		Letter sent 4.27.11		X	

Table Mountain R. Pennell	Letter sent 2.9.11 MZ	Follow-up call 12.22.11 from Karana and Michelle Resent GP pdf, no further response	Letter send 4.27.11 (also to Lee Ann Walker Grant)	Letter from Bob Pennel June 16, 2011 decline participate at time, notify if discovery		
Kings River Choinumni John Davis	Letter sent 2.9.11 MZ	Telephone Call 12.22.11 from Karana and Michelle	Letter sent 4.27.11	Call 12.22.12 from Karana and Michelle	X	
Dunlap Band Mono Mandy Marine	Letter sent 2.9.11 MZ	Left telephone message 12.22.11	Letter sent 4.27.11	Left telephone message 12.22.12	X	
Dumna Wo-Wah Tribal CRM Jim Redmoon 4.12. Eric Smith John Ledger	Letter sent 2.9.11 MZ	Phones disc. Redmoon has moved to Colorado	Letter sent 4.27.11	Phones disc. Redmoon has moved to Colorado	XX	
Chowchilla Tribe, Yokuts Jerry Brown	Letter sent 2.9.11 MZ	Called 12.22.11 no answer, no message machine	Letter sent 4.27.11	Called 12.22.11 no answer, no message machine	X	
Traditional Choinumni David Alvarez	Letter sent 2.9.11 MZ	Called 12.22.11 Asked for additional copy of GP letter; very nice talk.	Letter sent 4.27.11	E-mail June 2, 2011 Project outside Historic land base	X	
Choinumni Tribe/Choinumni Mono Lorrie Planas	N.A.		Letter sent 4.27.11		X	

Choinumni Tribe Yokuts Rosemary Smith	N.A.		Letter sent 4.27.11	Called 12.22. phone # not correct	X	
Santa Rosa Tachi Rancheria Lalo Franco	N.A.		Letter sent 4.27.11		X	
Santa Rosea Racheria Rueben Barrios	N.A.		Letter sent 4.27.11			

Summary of Tirbal consultations, General Plan, Downtown and Fulton Corridor Specific Plans:

October 11, 2010: Letter sent by Darrell Unruh, DARM to the Native American Heritage Commission requesting Sacred Lands File/Tribal consultation for the "City of Fresno General Plan and Master Environmental Impact Report Update."

October 14, 2010: Response to Darrell Unruh from Dave Singleton (by Fax) NAHC with list of contacts.

February 9, 2011: Letters to 11 tribes regarding General Plan and MEIR as included in list of October 14, 2010; letters sent and signed by Michelle Zumwalt, Architect, City of Fresno.

April 22, 2011: Response to Dana Slawson, Greenwood and Associates from Dave Singleton, NAHC for Request for a Sacred Lands File Search and NA Contacts for the "Fulton Corridor and Downtown Neighborhoods Specific Plan CEQA Environmental Impact Report/federal NEPA Environmental Impact Statement (EIR/EIS) located in four USGS quadrangles…"

April 27, 2011: Letters from Dana Slawson, Greenwood and Associates, to 16 tribal contacts.

December 22, 2011 and January 12, 2012, Karana Hattersley-Drayton (Historic Preservation Project Manager) and Michelle Zumwalt (architect) made follow-up telephone calls to all tribal contacts for both the General Plan as well as the Downtown/Fulton Corridor Specific Plan EIS/EIR as a courtesy, due to the lack of responses to prior consultation letters. This followed a telephone call and e-mail(s) to Dave Singleton, Native American Heritage Commission.

April 6, 2012: Response to Wilma Quan from Dave Singleton, NAHC for "SCH#2012041009 CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the "Downtown Neighborhoods Community Plan; Fulton Corridor Specific Plan, and Downtown Development Code"…. [E-mail to Wilma 1.9.13, were letters to tribal contacts sent?]

1.9.13 khd

Appendix E: Geology and Soils

E.1 - Geologic Hazards Investigation

GEOLOGIC HAZARDS INVESTIGATION
FRESNO GENERAL PLAN UPDATE
CITY AND SPHERE OF INFLUENCE
FRESNO, FRESNO COUNTY, CALIFORNIA

PROJECT NO. 012-12054
JUNE 15, 2012

Prepared for:

MR. MICHAEL HOULIHAN
MICHAEL BRANDMAN ASSOCIATES
220 COMMERCE SUITE 200
IRVINE, CALIFORNIA 92602

Prepared by:

KRAZAN & ASSOCIATES, INC.
GEOLOGIC HAZARDS DIVISION
215 W. DAKOTA AVENUE
CLOVIS, CALIFORNIA 93612
(559) 348-2200

Krazan & ASSOCIATES, INC.
GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

June 15, 2012

KA Project No. 012-12054

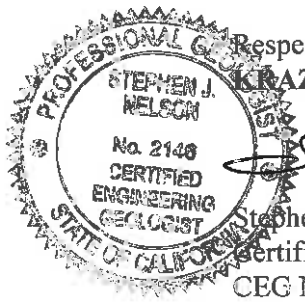
Mr. Michael Houlihan
Michael Brandman Associates
220 Commerce Suite 200
Irvine, California 92602

RE: Geologic Hazards Investigation
Fresno General Plan Update
City and Sphere of Influence
Fresno, Fresno County, California

Dear Mr. Houlihan:

In accordance with your request, we have completed a Geologic Hazards Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (559) 348-2200.



Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Stephen J. Nelson
Certified Engineering Geologist
CEG No. 2146

SJN:amk

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 PURPOSE AND SCOPE 1
3.0 PROPOSED DEVELOPMENT 2
4.0 SITE LOCATION 2
5.0 GEOLOGIC SETTING 3
5.1 General 3
5.2 Lithology 3
5.3 Structure and Faults 4
6.0 SITE DESCRIPTION/GEOLOGY 6
6.1 General/Surface Features 6
6.2 Aerial Photograph Interpretation 7
6.3 Subsurface Conditions 7
7.0 GEOLOGIC HAZARDS 8
7.1 Fault Rupture Hazard Zones in California 8
7.2 Seismic Hazard Zones in California 9
7.3 Characteristic Earthquake and Moment Magnitude 10
7.4 Maximum Considered Earthquake (MCE) 10
7.5 Upper-Bounds Earthquake (UBE) 10
7.6 Design-Basis Earthquake (DBE) 11
7.7 Historic Seismicity/Earthquake Epicenter Distribution 11
7.8 Geologic Subgrade 12
7.9 Soil Liquefaction 12
7.10 Seismic Settlement and Lateral Spread 13
7.11 Land Subsidence 13
7.12 Expansive Soils 13
7.13 Inundation Hazards 14
7.14 Tsunamis and Seiches 16
7.15 Slope Stability and Potential for Slope Failure 16
7.16 Volcanic Hazards 18
7.17 County Seismic Safety Element 19
8.0 BUILDING CODE DESIGN PARAMETERS 19
8.1 Seismic Parameters – 2010 CBC 19
9.0 CONCLUSIONS 19
10.0 LIMITATIONS 20

FIGURES

Community Plan Boundary Map ..... Figure 1
Vicinity Map ..... Figure 2
Regional Geologic Map ..... Figure 3
Regional Geologic Cross-Section ..... Figure 4
Fault Map ..... Figure 5
Epicenter Map ..... Figure 6

TABLE OF CONTENTS (CONT.)

TABLES

Seismic Sources ..... Table 1

APPENDICES

References ..... Appendix A
Earthquake Data File ..... Appendix B

June 15, 2012 Project No. 012-12054

GEOLOGIC HAZARDS INVESTIGATION
FRESNO GENERAL PLAN UPDATE
CITY AND SPHERE OF INFLUENCE
FRESNO, FRESNO COUNTY, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of our Geologic Hazards Investigation for the Fresno General Plan Update-Proposed City and Sphere of Influence located at the intersection of State Highway 99 and State Highway 180 in central Fresno County, California (refer to Vicinity Map, Figure 1). Discussions regarding regional and site geologic/seismic conditions are presented herein, together with an analysis and conclusions pertaining to potential geologic hazards. Krazan & Associates, Inc. reviewed information obtained from exploratory soil borings previously advanced within the City of Fresno and Sphere of Influence (SOI). Information obtained in conjunction with the previous exploratory soil borings is referenced herein. References cited and considered in preparation of this report are listed in Appendix A.

2.0 PURPOSE AND SCOPE

The purpose of the Geologic Hazards Investigation has been to assess potential geologic hazards at the subject site. Our scope of services was outlined in our proposal dated November 29, 2011 (Proposal No. P413-11) and included the following:

- A geologic reconnaissance to evaluate the surface conditions at the project site.
- A review of available subsurface data for evaluation of the subsurface conditions at the project site.
- Aerial photograph interpretation.
- A review of geologic and seismologic literature pertinent to the area of the site.
- Evaluation of potential geologic hazards.
- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

3.0 PROPOSED DEVELOPMENT

We understand that design of the proposed development is currently underway and some of the final details pertaining to the development are unavailable. On a preliminary basis, it is understood that the City of Fresno is preparing a new General plan for the City, along with the associated Environmental Impact Report. The General plan will cover the existing City and Sphere of Influence (SOI) consisting of approximately 166 square miles (refer to Community Plan Boundary Map, Figure 1). As part of the expanded Fresno SOI, the City of Fresno will be incorporating several area plans approved by Fresno County which would become part of the new General Plan. City staff will be preparing some General Plan Elements in-house, and has done some preliminary work. The City expects the revisions to the existing General Plan to provide an updated, unified planning document that addresses the existing City and Fresno SOI as a whole, while incorporating new policies and implementation measures that address the growth and development issues associated with the expanded planning area.

In the event that the general nature or location of the proposed construction changes from that described herein, we should be notified so that we may update this report as applicable.

4.0 SITE LOCATION

The subject site is located in Fresno County within the eastern portion of the San Joaquin Valley in California (refer to Vicinity Map, Figure 2). The Proposed Fresno SOI consists of approximately 160 acres and is located in the central portion of Fresno County. Sub-Communities to be included in this SOI include all or portions of Herndon, Townsite, Highway City, Pinedale, Sunnyside, and Calwa. The Fresno SOI is generally bounded on the east by Willow and Highland Avenues; on the south by American, Central, and North Avenues; on the west by Garfield, Grantland, and Marks Avenues; and on the north by the San Joaquin River. Portions of the Fresno SOI are included on the following United States Geological Survey, California, 7.5 Minute Series Topographic Quadrangle Maps:

Quadrangle Map	Dates
Clovis	1964, Photo-revised 1981, 2012
Fresno North	1965, Photo-revised 1981, 2012
Fresno South	1963, Photo-revised 1981, 2012
Friant	1964, 2012
Herndon	1964, Photo-revised 1978, 2012
Kearney Park	1963, Photo-revised 1981, 2012
Lanes Bridge	1964, Photo-Inspected 1973, 2012
Malaga	1964, Photo-revised 1981, 2012

Review of the topographic quadrangle maps indicate that surface elevations range from on the order of 260 feet above mean sea level (amsl) in the southwest portion of the Fresno SOI to 394 feet amsl in the northeast portion of the Fresno SOI. A major water course, identified as the San Joaquin River, trends along the northern edge of the Fresno SOI. Elevations in the river bottom range from 240 feet to 280 feet amsl within the SOI area. Numerous concrete lined canals and unlined canals trend throughout the entire SOI area. These canals are predominately used for agricultural irrigation and flood control. The Southern Pacific, Atchison-Topeka, and Santa Fe Railroads trend through the Fresno SOI area.

The Fresno SOI area and adjoining foothills are characterized by hot summers, mild winters and relatively low to moderate precipitation which occurs mostly during the winter. The southern portion of the San Joaquin Valley lies in the rain shadow of the Coast Ranges. Moisture-laden air moving eastward from the Pacific Ocean is cooled by the orographic effect of passing over the mountains west of the valley, resulting in condensation of water vapor and precipitation. Consequently, when the air masses have passed over the mountains and descend to cross the San Joaquin Valley, they contain less moisture, and a relatively smaller amount of rain falls on the valley floor.

5.0 GEOLOGIC SETTING

5.1 General

The Fresno SOI is located along the east margin of the southern San Joaquin Valley portion of the Great Valley Geomorphic Province of California. The San Joaquin Valley is bordered to the north by the Sacramento Valley portion of the Great Valley, to the east by the Sierra Nevada, to the west by the Coast Ranges, and to the south by the Transverse Ranges. The San Joaquin sedimentary basin is separated from the Sacramento basin to the north by the buried Stockton arch and associated Stockton Fault. The 450-mile long Great Valley is an asymmetric structural trough that has been filled with a prism of Mesozoic and Cenozoic sediments up to 5 miles thick.

The Sierra Nevada, located east of the San Joaquin Valley, is gently southwesterly tilted fault block comprised of igneous and metamorphic rocks of pre-Tertiary age that comprise the basement beneath the San Joaquin Valley. The Coast Ranges, located west of the San Joaquin Valley, are comprised of folded and faulted sedimentary and metasedimentary rocks of Mesozoic and Cenozoic age.

The San Joaquin River and the Kings River are the principal rivers in the area. Alluvial fans formed by these rivers are the predominant geomorphic features in the Fresno area. The area of the subject site is characterized by low alluvial fans and plains, which constitute a belt of coalescing alluvial fans of low relief between the dissected uplands, adjacent to the Sierra Nevada and the valley trough. According to the map entitled "Geomorphic Features of the Fresno Area, San Joaquin Valley, California" (Page and Leblanc, 1969), the site is located in the "Compound Alluvial fan of Intermittent Streams North of the Kings River Geomorphic Area". Recent alluvial fan deposits from streams emerging from highlands surrounding the Great Valley and Pleistocene non-marine sedimentary deposits (Riverbank Formation) composed of older alluvium and dissected fan deposits underlain the subject site area (refer to Regional Geologic Map, Figure 3 and Regional Geologic Cross Section, Figure 4).

5.2 Lithology

The thick accumulation of deposits within the San Joaquin Valley range in age from Jurassic to Holocene and include both marine and continental rocks and deposits. The 1965 Geologic Map of California, Fresno Sheet, indicates that the near-surface deposits in the area of the Fresno SOI consist of Quaternary recent fan deposits and Quaternary Older alluvium (Pleistocene Nonmarine Sedimentary deposits).

The subsurface information obtained in conjunction with previous subsurface Investigation(s) performed within the Fresno SOI indicates that the surface and near-surface deposits generally consist of sandy silts, silty sands, sands, clayey sands, sandy clays and clayey silts. These observed deposits are consistent with those mapped in the area, and are further described in Section 6.3 of this report.

5.3 Structure and Faults

The general area of the Fresno SOI is underlain by a homoclinal series of Cenozoic deposits dipping 4 degrees to 6 degrees to the southwest toward the center of the San Joaquin Valley. The contact between the Cenozoic and basement rocks dips nearly 8 degrees southwest, or at a slightly greater inclination than does the on-lapping homoclinal Cenozoic sequence. No active faults are mapped within the Fresno SOI area. Based on mapping and historical seismicity, the seismicity of the Fresno SOI area is considered low by the scientific community.

Adjacent to the San Joaquin Valley, the Sierra Nevada and Coast Ranges are geologically young mountain ranges that possess active and potentially active fault zones. Major active faults and fault zones occur at some distance to the east, west, and south of the Fresno SOI (refer to Fault Map, Figure 5). Table I is a listing of significant active faults within 90 miles of the Fresno SOI.

Numerous active faults are present within the central Coast Ranges west of the site including the San Andreas Fault located approximately 61 miles west of the subject site. The fault is considered active and is of primary concern in evaluating seismic hazards throughout western Fresno County. The 684-mile-long San Andreas Fault Zone is the principal element of the San Andreas Fault system, a network of faults with predominately dextral strike-slip displacement that collectively accommodates the majority of relative north-south motion between the North America and Pacific plates. The San Andreas Fault zone is the most extensively studied fault in California and perhaps the world. The creeping section of the San Andreas Fault is about 61 miles from the site at its closest point. The San Andreas Fault Zone is considered to be the Holocene and historically active dextral strike-slip fault that extends along most of coastal California from its complex junction with the Mendocino Fault zone on the north, southwest to the northern Transverse Range and inland to the Salton Sea, where a well defined zone of seismicity transfers the slip to the Imperial fault along a right-releasing step.

Two major surface-rupturing earthquakes have occurred on the San Andreas Fault in historic time: the 1857 Forth Tejon and 1906 San Francisco earthquakes. Additional historic surface rupturing earthquakes include the unnamed 1812 earthquake along the Mojave section and the northern part of the San Bernardino Mountains section, and a large earthquake in the San Francisco Bay area that occurred in 1838 that was probably on the Peninsula section. Historic fault creep rates are as high as 32 millimeters per year for the 82-mile-long creeping section in central California with creep rates gradually tapering to zero at the northwestern and southeastern ends of the section.

One of the nearest seismotectonic source is the Great Valley Fault Zone (Coast Ranges-Central Valley boundary zone), located approximately 34 miles west of the site. The Great Valley Fault zone is the geomorphic boundary of the Coast Ranges and the Central Valley and is underlain by a 300-mile long seismically active fold and thrust belt that has been the source of recent earthquakes, such as the 1983 magnitude 6.5 Coalinga and the 1985 magnitude 6.1 Kettleman Hills earthquakes. Nearly the entire thrust system is concealed or "blind". The basal detachment of this thrust system dips at a shallow angle to the west. East-directed thrusting over ramps in the detachment and west-directed thrusting on backthrusts are responsible for the uplift along the eastern range front of the Coast Ranges. Based on earthquake focal mechanisms, movement on the thrust zone is generally perpendicular to the strike of the geomorphic boundary and trend of the San Andreas Fault system. Shortening along the geomorphic

boundary is driven by a component of the Pacific-North American Plate motion that is normal to the plate boundary. The Great Valley Fault Zone is considered the dominant seismic feature with potential for affecting the Fresno SOI.

The Ortigalita Fault zone is a major Holocene dextral strike-slip fault in the central Coast Ranges that is an eastern part of the larger San Andreas Fault system. The Ortigalita Fault zone is about 54 miles west of the site. The Ortigalita Fault zone extends from about 12.4 miles northwest of San Luis Reservoir southeast to the vicinity of Panoche Valley. The Ortigalita Fault zone is characterized by echelon fault traces separated by pull-apart basins. The fault zone is divided into four sections. The Little Panoche Valley section is the southern most section and is closest to the site. The Little Panoche Valley section is late Holocene active. Late Quaternary slip rates and recurrence intervals are unknown, although the recurrence interval for the entire Ortigalita Fault zone is about 2,000 to 5,000 years.

Regional structure within the Western Sierra Nevada north of the subject site is complex and generally consists of blocks separated by steeply eastward-dipping, north and northwest striking reverse faults of the Foothills Fault system. The Foothills Fault system is located within approximately 32 miles north of the subject site. Based on mapping and historical seismicity, the seismicity of the Sierra Nevada foothills has been generally considered low by the scientific community. However, on August 1, 1975, a 5.7 Richter magnitude earthquake occurred near Oroville within the northern Sierra Nevada. Surface rupture along the Cleveland Hill Fault (part of the Foothills Fault System) was associated with 1975 Oroville earthquake. As a result of this event, numerous studies were undertaken to further evaluate the seismicity of the Sierra Nevada foothills. Of particular note are the geologic and seismicity studies conducted by Woodward-Clyde Consultants (WCC) to evaluate the proposed Auburn Dam site. Based on these studies, WCC concluded that seismic events in the Sierra Nevada foothills are associated with very small, geologically infrequent, incremental displacements having minor geomorphic surface expression.

In addition, the eastern border of the southern San Joaquin Valley is cut by a series of en-eschelon range-front faults. These faults are mainly northwest trending normal faults, down dropped to the west and with a near vertical dip. One of the range-front faults, the Clovis Fault, is mapped extending from an area just south of the San Joaquin River to a few miles south of Francher Creek approximately 6 miles northeast of the Fresno SOI. No evidence has been found of historic ground movement along this feature. These range-front faults have generally been considered inactive, with no recognized Quaternary displacement, however a September 1973 magnitude 4.4 earthquake that occurred approximately 4.3 miles north of the Fresno SOI may be related to this fault system.

The Nunez Fault is located approximately 6 to 7 miles northwest of Coalinga and is about 48 miles southwest of the Fresno SOI. The fault is about 2.6 miles long and is considered active based on surface rupture associated with the 1983 Coalinga earthquake. The fault is divided into two north and south trending segments. About 2.1 miles of right-reverse surface rupture occurred on the segments. Total displacement and timing of past fault movements are poorly constrained.

Tensional forces resulting in normal faults are reported to be related to crustal stress relief in the southeast portion of the San Joaquin Valley. Numerous relatively short, normal faults traverse this region. Creep activity is the prominent mode of slip on those faults in this region that are active. These movements have continued on an intermittent basis from the early Miocene to Recent time. This faulting

is directly related to and controls the accumulation of oil in several oil fields within the westerly portion of the valley. Most authors agree that current creep movements can be ascribed to subsidence promoted by extensive withdrawal of petroleum, and in some cases, groundwater. Those faults considered to be active in the southern valley are Kern Front and Pond Faults located at least 70 miles south of the Fresno SOI.

The Sierra Nevada and Owens Valley Fault Zones bound the eastern edge of the Sierra Nevada block more than 90 miles east of the site. The Owens Valley Fault zone branches to the east of the Sierra Nevada Fault zone about 2 miles south of the Alabama Hills. The Owens Valley Fault zone is approximately 75 miles long and extends to the west side of Owens Lake to a few miles north of Big Pine. The maximum width of the fault zone is approximately 2 miles. The Owens Valley Fault generated one of California's greatest historical earthquakes (Owens Valley Earthquake of 1872) and poses a significant hazard to the communities on the eastern side of the Sierra Nevada Mountains

The White Wolf Fault, responsible for a 1952 earthquake that caused extensive damage in the Bakersfield area, is located in the tectonically active Tehachapi Mountains at the southerly terminus of the valley, over 100 miles south of the Fresno SOI.

As noted above, several dominant faults with seisomgenic structures are located in the vicinity of the Fresno SOI. Table I is a listing of active faults or seismogenic structures within 90 miles of the Fresno SOI, and a Fault Map is provided on Figure 5.

6.0 SITE DESCRIPTION/GEOLOGY

6.1 General/Surface Features

Site reconnaissance was performed in April through June 2012. The Fresno SOI area encompasses an approximate 166 square miles, just south of the San Joaquin River, in the central portion of Fresno County, California (refer to Regional Geologic Map, Figure 3). The areas were observed to be predominately developed land consistent with the characteristics of historic and older, residential, commercial, and industrial areas in the downtown portion of the Fresno SOI. Further from the downtown area, single and two-story single family homes, single and multi-storied residential apartment complexes are located throughout the area. Areas not developed with structures generally contained paved streets, sidewalks, parking lots, parks, and landscaped areas. Commercial development generally was observed to be located along major thoroughfares.

The natural topography within the Fresno SOI area generally trends from the northeast towards the southwest. The historically natural, agricultural and manmade flow for drainage channels predominately follows the northeast to southwest trend. However, because the area was historically developed for agricultural use, there also many subchannels designed to transport water in a northwest-southeast direction. Within developed areas the natural surface runoff has been modified to flow along the curbs and gutters to a storm water collection system. Water is then piped underground to a storm water retention basin.

No evidence of surface faulting was observed on the property during our reconnaissance. The majority of the subject site and surrounding properties are relatively flat. However slopes associated with the San Joaquin River bluff were on the order 5 feet to greater than 100 feet high. The bluff slopes in the vicinity

of existing developments were generally well maintained and appeared to be relatively stable. However, the bluff slopes in predominately undeveloped and/or agricultural areas generally appeared to be in relatively good to poor condition with varying degrees of instability and disrepair.

6.2 Aerial Photograph Interpretation

Stereoscopic and monolithic aerial photographs, dated 1937 through 2011, of the subject site were examined (Scale: 1"=660' to 1"=2000; California State University – Fresno, Henry Madden Library). Site conditions shown on the more recent photographs are generally similar to those observed during our site reconnaissance. The central portion of the Fresno SOI area is occupied by predominately developed communities consisting of residential, commercial, and industrial developments. Along the edges of the Fresno SOI, the area predominately consists of agricultural land, and rural residential developments. With the exception of several lineal features identified as drainage channels, streets, and vehicle parking areas, no distinct lineaments, tonal variations, or other potential fault related features are shown on or adjacent to the property in the aerial photographs.

6.3 Subsurface Conditions

Subsurface investigations consisting of exploratory drilling has been performed by Krazan & Associates, Inc., within the Fresno SOI area for over 30 years. Subsurface soil conditions were explored by drilling hundreds of geotechnical borings to depths ranging from approximately 5 to 150 feet below existing site grade, using a truck-mounted drill rig. During drilling operations, penetration tests were performed at regular intervals to evaluate soil consistency and to obtain information regarding engineering properties of the subsoils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory testing program was formulated with emphasis on the evaluation of natural moisture, density, gradation, expansion potential, shear strength, consolidation potential, and moisture-density relationships of the materials encountered.

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the upper soils consisted of approximately 6 to 12 inches of very loose silty sand, silty sand with trace clay, sandy silt, clayey sand, or clayey gravel. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated.

Below the loose surface soils, approximately 2 to 4 feet of loose/soft to very dense/hard clays, silts, sands, and gravels are typically encountered. Field and laboratory tests suggest that these soils are typically moderately strong and slightly to moderately compressible. The clayey soils had a low to high expansion potential. Penetration resistance ranged from less than 5 to greater than 100 blows per foot. Dry densities ranged from 80 to 120 pcf. Representative soil samples typically consolidate approximately ½ to 12 percent under a 2 ksf load when saturated. Representative soil samples had angles of internal friction ranging from 11 to 40 degrees. Representative samples of the clayey soils had expansion indices ranging from 0 to 100+.

Below 3 to 5 feet, predominately clays, silts, sands, and gravels are usually encountered. Field and laboratory tests suggest that these soils are typically moderately strong and slightly compressible. Penetration resistance ranges from 10 to greater than 100+ blows per foot. Dry densities ranged from 90 to 140 pcf. Representative soil samples typically consolidate approximately 2 to 3 percent under a 2 ksf load when saturated. These soils usually have slightly stronger strength characteristics than the upper soils and extend to the termination depth of our borings.

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Groundwater was encountered near the surface in the vicinity of existing ponds, lakes, ditches, and canals, to depths greater than 100 feet below site grade during the field investigations. Review of groundwater elevation maps prepared by the Department of Water Resources dating from 1961 to 2012 indicates that depth to free groundwater in the vicinity of the site ranged from 1 foot to greater than 100 feet below site grade. It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions as well as other factors. Therefore, existing and historical high groundwater depths should be determined during site specific investigations on development projects.

7.0 GEOLOGIC HAZARDS

7.1 Fault Rupture Hazard Zones in California

The Alquist-Priolo Geologic Hazards Zones Act went into affect in March, 1973. Since that time, the act has been amended 10 times (Hart, 1994). The purpose of the Act, as provided in DMG Special Publication 42 (SP 42), is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." The act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994, and at that time, the originally designated "Special Studies Zones" was renamed the "Earthquake Fault Zones."

As indicated by SP 42, "the State Geologist is required to delineate "earthquake fault zones" (EFZs) along known active faults in California. Cities and counties affected by the zones must regulate certain development 'projects' within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. The State Mining and Geology Board provides additional regulations (Policies and Criteria) to guide the cities and counties in their implementation of the law (CCR, Title 14, Division 2)."

Special Publication 42 also provides definitions of certain terms, which are important to the evaluation of seismic hazards. These include the definitions for a fault and a fault trace. They also include the following:

Active Fault: One which has had surface displacement within Holocene time (about the last 11,000 years), hence constituting a potential hazard to structures that might be located across it.

Potentially Active Fault: Initially, faults were defined as *potentially active*, and were zoned, if they showed evidence of surface displacement during Quaternary time (last 1.6 million years). The term

"recently active" was not defined, as it was considered to be covered by the term "potentially active."...the term "potentially active" continued to be used as a descriptive term on map explanations on EFZ maps until 1988.

Sufficiently Active and Well-Defined: There are so many potentially active faults in the State that it would be meaningless to zone all of them. The State Geologist made a policy decision to zone only those potentially active faults that have a relatively high potential for ground rupture. To facilitate this, the terms "sufficiently active" and "well-defined," were defined for zoning faults other than the 4 named in the Act. These two terms constitute the present criteria used by the State Geologist in determining if a given fault should be zoned under the Alquist-Priolo Act.

Sufficiently active: A fault is deemed sufficiently active if there is evidence of Holocene surface displacement along one or more of its segments or branches. Holocene surface displacement may be directly observable or inferred.

Well-defined: A fault is considered well-defined if its trace is clearly detectable by a trained geologist as a physical feature at or just below the ground surface. The fault may be identified by direct observation or by indirect methods. The critical consideration is that the fault, or some part of it, can be located in the field with sufficient precision and confidence to indicate that the required site-specific investigations would meet with some success.

The Fresno SOI subject site area does not lie on a Fault Rupture Hazard Zones Map, and accordingly, the site is not within a Fault-Rupture Hazard Zone. The nearest zoned fault is a portion of the Nunez Fault located approximately 48 miles southwest of the Fresno SOI.

7.2 Seismic Hazard Zones in California

In 1990, the California State Legislature passed the Seismic Hazard Mapping Act to protect public safety from the effects of strong shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. The Act is codified in the Public Resources Code as Division 2, Chapter 7.8, Sections 2690-2699.6 and became operative on April 1, 1991. The program and actions mandated by the Seismic Hazards Mapping Act closely resemble those of the Alquist-Priolo Earthquake Fault Hazards Zones Act (described above in Section 7.1). The Act requires that the State Geologist delineate various seismic hazards zones on Seismic Hazards Zones Maps. Specifically, the maps identify areas where soil liquefaction and earthquake-induced landslides are most likely to occur. The Act directs cities, counties, and state agencies to use the maps in their land use planning and permitting processes. A site-specific geotechnical evaluation is required prior to permitting most urban developments within the mapped zones. The Act also requires sellers of real property within the zones to disclose this fact to potential buyers.

Due to the relatively recent promulgation of the Act, a limited number of Seismic Hazard Zone Maps have been prepared as of this writing. Areas covered by the maps released to date include portions of the immediate San Francisco Bay area and several areas in Los Angeles, Orange, and Ventura Counties. The Fresno SOI area is not included on any of the maps released to date.

7.3 Characteristic Earthquake and Moment Magnitude

It has been observed that faults or fault segments tend to generate a certain type of earthquake on a repeated basis. Fault rupture zones opposite weaker material will tend to generate low to moderate sized earthquakes while those in stronger materials accumulate energy and generate larger earthquakes when the accumulated energy becomes larger than the strength of the materials. The characteristic earthquake concept has direct implications to fault-specific recurrence relationships. Due to the tendency of a fault or fault segment to generate the characteristic earthquake, moderate-sized events will occur less frequently.

The use of moment magnitude, M_W, to describe energy released by a fault during an earthquake has replaced the more commonly known Richter magnitude. Due to saturation of energies, the Richter magnitude has difficulty in differentiating between larger earthquakes; that is, earthquakes with a magnitude greater than about 7.5. The moment magnitude is proportional to the area of the fault surface rupture. For this report, magnitudes used are reported as moment magnitude.

7.4 Maximum Considered Earthquake (MCE)

For most regions of the nation, the Maximum Considered Earthquake (MCE) ground motion is defined with a uniform probability of exceedance of 2 percent in 50 years (return period of about 2500 years). While stronger shaking than this could occur, it was judged that it would be economically impractical to design for such very rare ground motions and the selection of the 2 percent probability of exceedance in 50 years as the maximum considered earthquake ground motion would result in acceptable levels of seismic safety for the nation.

In regions of high seismicity, such as coastal California, the seismic hazard is typically controlled by large-magnitude events occurring on a limited number of well-defined fault systems. Groundshaking calculated at a 2 percent probability of exceedance in 50 years would be much larger than that which would be expected based on the characteristic magnitudes of earthquakes on these known active faults. This is because these major active faults can produce characteristic earthquakes every few hundred years. For these regions, it is considered more appropriate to directly determine maximum considered earthquake ground motions based on the characteristic earthquakes of these defined faults. In order to provide for an appropriate level of conservatism in the design process, when this approach to calculation of the maximum considered earthquake ground motion is used, the median estimate of ground motion resulting for the characteristic event is multiplied by 1.5.

7.5 Upper-Bounds Earthquake (UBE)

The Upper-Bounds Earthquake (UBE) ground motion is the largest rational and believable ground motion that can occur within the presently known tectonic framework. UBE is defined as, ≅the motion having a 10 percent probability of being exceed in a 100-year period or maximum level of motion which may ever be expected at the building site within the known geological framework.≅ The UBE has a statistical return period of about 1,000 years.

7.6 Design-Basis Earthquake (DBE)

The Design-Basis Earthquake ground motion (DBE) is synonymous with Maximum Probable Earthquake (MPE) and is defined to have a 10 percent chance of exceedance in 50 years, with a statistical return period of about 475 years.

7.7 Historic Seismicity/Earthquake Epicenter Distribution

The Fresno area has historically experienced a low to moderate degree of seismicity. A listing of historic earthquakes with magnitudes greater than 4.0 within approximately 60 miles (96 kilometers) of the subject site was obtained from the comprehensive California Geological Survey computerized earthquake catalog for the State of California, the Townley and Allen (1939) catalog and the U.S. Geological Survey Earthquake Data Base System. In addition, a listing of historic earthquakes with magnitudes greater than 5.0 within approximately 100 miles of the subject site was obtained. The listings include the date, time, location, depth, magnitude, and intensity all recorded events within the search radius between 1800 and 2012. A review of the literature for pre-1900 earthquakes (Toppozada, 1991) does not reveal any significant recorded seismic events in the vicinity of the subject site prior to the period covered by the above noted listings.

The historic earthquake listings are included in Appendix B. A plot of epicenters associated with historic earthquakes in the region of the site with magnitudes greater than 5 is shown on Figure 3, Epicenter Map. The earthquake data indicated that 114 events with magnitudes greater than 4.0 occurred within 60 miles of the subject site between 1800 and 2012. The data indicates that 136 events exceeded magnitudes 5.0 within 100 miles of the subject site. The nearest listed event was estimated to have occurred in 1864 with a magnitude of 4.3. The epicenter was estimated to be at Latitude 36.75 and Longitude -119.75, in the vicinity of formerly agricultural land, which is now in the neighborhood of Belmont Avenue, Boron Avenue, residential neighborhoods and commercial developments. The 1864 event may have occurred on a system of range-front faults which trend along the easterly margin of the San Joaquin Valley (described in Section 5.3 of this report). None of the listed earthquakes with magnitudes greater than 4.6 occurred within 20 miles of the site. Numerous earthquakes are listed with magnitudes between 5.0 and 6.0 beyond about 40 miles of the site. No events were recorded with magnitudes greater than 6.0 within 40 miles of the site.

The geologic literature indicates that groundshaking of VII intensity (Modified Mercalli Scale) was felt in Fresno from the 1872 Owens Valley Earthquake. This is the largest known earthquake event to have affected the Fresno area. The most recent earthquake significant to the Fresno area, was the Coalinga seismic event which occurred on May 2, 1983 within the Coast Ranges-Sierran Block Boundary Seismotectonic structure. The Coalinga seismic event had a magnitude of M_w 6.7. The initial shock had a Modified Mercalli Intensity of VII in the Fresno area. This earthquake and aftershocks had a substantial affect on Coalinga area but no significant damage, either architectural or structural, was reported in the area of the subject site.

7.8 Geologic Subgrade

Information obtained from the geologic literature, as well as data from the above-described Fresno SOI area, indicate the general soil profile within the Fresno SOI area consists predominately of silty sands, sandy silts, clayey sands, sandy clayey silts, and sands. With the exception of a limited occurrence of near-surface loose soils, penetration resistance and laboratory testing indicate that these materials are typically at least medium dense. The Site Class per Table 1613.5.2 of the 2010 California Building Code is based upon the site soil conditions. It is our opinion that Site Class D is most consistent with the Fresno SOI soil conditions. However, within isolated locations through the planning area, and in close proximity to water features such as: streams, ditches, canals, ponds and lakes, Site Class E conditions may be encountered.

7.9 Soil Liquefaction

Soil liquefaction is a state of soil particles suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs in soils such as sand in which the strength is purely friction. However, liquefaction has occurred in soils other than clean sand. Liquefaction usually occurs under vibratory conditions such as those induced by seismic event.

To evaluate the liquefaction potential of a site, the following items are evaluated:

1) Groundwater depth;
2) Soil type;
3) Relative density;
4) Initial confining pressure;
5) Intensity and duration of groundshaking.

The predominant soils anticipated to be encountered within the Fresno SOI consist of varying combinations of very loose/very soft to very dense/hard silts, clays, sands, and gravels. Moderate cohesion strength is associated with the clayey soils. Groundwater has been encountered near the surface during our exploratory drilling, in close proximity to water filled features such as canals, ditches, ponds, and lakes. Available groundwater depth mapping, as well as our experience within the Fresno SOI area, indicates that historically groundwater in the vicinity of the Fresno SOI area has been encountered at depths as shallow as 0 feet to greater than 100 feet below site grade.

Based on our findings, it is our opinion that the potential for soil liquefaction within the Fresno SOI area ranges from very low to moderate due to the variable density of the subsurface soils and the presence of shallow groundwater. Therefore, liquefaction analysis should be performed in areas where historical groundwater has been less than 50 feet in accordance with the State of California Department of Conservation, California Geological Survey, Special Publication 117A (March 2009) Guidelines for Evaluating and Mitigation Liquefaction in California.

7.10 Seismic Settlement and Lateral Spread

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on the nature of the subsurface materials, and the relatively low to moderate seismicity of the region, we would not expect seismic settlement or lateral spread to represent a significant geologic hazard to the majority of the Fresno SOI area. However, it is recommended that seismic settlement and lateral spread analysis be performed as needed as part of each development in the Fresno SOI area.

7.11 Land Subsidence

Portions of the San Joaquin Valley have been subject to land subsidence due to fluid withdrawal (groundwater and petroleum). Land subsidence affects 3,500 square miles of productive farm land in the San Joaquin Valley as intense pumping of groundwater continues. Over 20 feet of subsidence has occurred in western Fresno County. Subsidence was first recognized in the valley in 1935, when surveys discovered differential settlements in areas of intensive pumping. With the accelerated use of groundwater for agriculture, subsidence has continued to the present. Today one-third of the entire San Joaquin valley is subsiding and damage costs and remedial expenditures represent many millions of dollars. Damage caused by subsidence has been restricted principally to significant changes in gradients of canals, aqueducts, and drainage systems, and breakage of deep water-well casings.

Within the San Joaquin Valley, subsidence is concentrated in the southern part and west side of the valley where rainfall is sparse and groundwater recharge is minimal. The subsidence has been greatest in 3 areas. Maximum subsidence is an elongate trough close to the mountains west of Fresno, where more than 20 feet of subsidence occurred between 1920 and 1963 and total subsidence is about 28 feet. A second center is 30 miles south of Tulare, where more then 12 feet of subsidence has occurred. The third center, located south of Bakersfield, has subsided more then 8 feet. Subsidence rates vary greatly from year to year, Subsidence continues in all areas except south of Tulare where surface water imports have reversed the downward trends of water levels.

Although subsidence is a significant concern in western Fresno County, as well as other portions of the San Joaquin Valley, the Fresno SOI area is not known to be subject to such subsidence hazards.

7.12 Expansive Soils

The surface and near-surface soils observed throughout the SOI area consist of varying combinations of clays, silts, sands, gravels, and cobbles. The clayey soils are considered to be slightly to moderately expansive. Therefore, it is recommended that mitigation measures to reduce the potential problems associated with expansive soils be included, as needed, in subsequent Geotechnical Engineering Investigation Report(s) for specific development and redevelopment projects within the Fresno SOI area. We would not expect the expansive nature of these clayey soils to present a significant geologic hazard to developments within the Fresno SOI area, provided that the recommendations of previous and future Geotechnical Engineering Investigation(s) are followed.

7.13 Inundation Hazards

The Fresno SOI area receives inflows of regional runoff from a large watershed to the east and is in the path of natural drainage from the valley floor, the adjacent foothills, and the Sierra Nevada Range. The San Joaquin River comprises the northern boundary of the Fresno SOI area. Precipitation in the Fresno SOI comes in episodic storm events which may be severe and cause localized flooding. Due to a series of river floods in the 1980s and 1990s, the Federal Emergency Management Agency reevaluated and developed new National Flood Insurance Protection rate maps for the area

A review of Federal Emergency Management Agency (FEMA) Flood Insurance Mapping for the Fresno SOI indicates that 20 maps have become effective February 18, 2009. These maps cover Fresno County unincorporated areas and incorporated areas. The Community Panel Numbers that affect the Fresno SOI area include the following:

Community Panel No.	Community Panel No.
06019CIND0B	06019C1590H
06019C1020H	06019C1595H
06019C1040H	06019C2085H
06019C1535H	06019C2100H
06019C1545H	06019C2105H
06019C1555H	06019C2110H
06019C1560H	06019C2125H
06019C1565H	06019C2130H
06019C1570H	06019C2135H
06019C1580H	06019C2140H

Review of the Community Panels indicates that there is a potential for flooding throughout portions of the Fresno SOI area. These maps should be reviewed during the planning stages of development and redevelopment projects in the Fresno SOI area.

A review of the Office Of Emergency Services and Corps of Engineers Dam Inundation Mapping for the area of the subject site indicates that some portions of the Fresno SOI are within an "Inundation Area" should a failure occur at the Friant Dam, Pine Flat Dam, Red Bank-Francher Creek Project, or Big Dry Creek Dam located east of the Fresno SOI.

According to the California Department of Water Resources, there are 33 dams located within Fresno County. Four major dams that could cause substantial flooding in Fresno County in the event of a failure are Friant Dam, Big Dry Creek Dam, Pine Flat Dam, and Redbank-Fancher Creek Project Dam.

Friant Dam - The San Joaquin River is impounded at Friant Dam in Fresno County, forming Millerton Lake. Friant Dam is operated primarily as an irrigation facility of the Central Valley Project. Irrigation

waters are stored in Millerton Lake, and released through irrigation canals to irrigation districts. A 1992 Bureau of Reclamation study conducted in 1992 concluded that the structural classification for Friant Dam is "satisfactory."

The storage capacity at Millerton Lake (impounded by Friant Dam) is inadequate for full flood protection during wet years and emergency releases have resulted in levee breaks and flooding along the San Joaquin River. From Friant Dam to Gravelly Ford, the San Joaquin River is part of the Designated Floodway Program administered by the State Reclamation Board.

An inundation study completed in 1997 by the Bureau of Reclamation redefined a worst-case scenario dam break of Friant Dam to include inundation of a significant portion of the City of Fresno and a much larger portion of Fresno County than previously described. In addition, failure of upstream dams such as Shaver Lake, Lake Thomas A. Edison, Huntington, and Florence and Mammoth Pool Reservoir, Wishon, and Courtright Reservoir could contribute to flooding conditions on the San Joaquin and Kings Rivers, respectively, if downstream dam capacity of the major dams is exceeded. However, comprehensive analysis of the potential for dam failure and possible downstream effects for these upstream dams has not been undertaken.

Pine Flat Dam - completed in 1954 on the Kings River is operated by the Army Corps of Engineers (Corps) for the primary purpose of flood control and emergency spillage is usually avoided. During storm events, excess flows are diverted to sloughs and irrigation canals. Flow management on the Kings River is carefully coordinated and considers factors such as anticipated weather, upstream flows, and the ability of downstream users to receive water.

Redbank-Fancher Creek Projects - constructed by the Corps are managed by the Fresno Metropolitan Flood Control District. The project consists of two dams and three detention basins located in the Fresno-Clovis vicinity. The flooding potential from creeks and streams between the San Joaquin and Kings Rivers in the east has been substantially eliminated in the last few years with the completion of the Redbank-Fancher Creeks Flood Control Project. The Corps conducted a dam breach analysis of Redbank and Fancher Creek Projects and concluded that failure of either of these two facilities would result in a broad sheet flow of approximately two feet over much of north central and central Fresno SOI area. According to the Revised Public Review Draft Background Report of the Fresno County General Plan Update, dated 2000, the initial flood water would reach the area near the intersection of Sierra and Chestnut Avenues within 3 hours and the California State University, Fresno, campus in 4 hours and Fashion Fair Mall in 6 hours. Additional flooding would occur across the eastern portion of the community with flooding taking place at the Fresno Air Terminal within 10 hours.

Big Dry Creek Dam - impounds storm water runoff from Big Dry Creek in the Big Dry Creek Reservoir. The Dry Creek Reservoir is owned and operated by the Fresno County Metropolitan Flood Control District, and is intended primarily for flood control of winter runoff from the Dry Creek and Dog Creek watersheds. The reservoir has a storage capacity of approximately 30,000 ac-ft and a surface area of approximately 3,500 acres. The reservoir was designed for a 200-year standard project flood. The maximum height of the inundation pool is 432.7 feet above mean sea level.

Under wet weather conditions, the Dry Creek Reservoir captures runoff and controls releases into artificial ditches and canals, which drain into either Little Dry Creek, located north of the reservoir or in a southerly direction into Mill Ditch. Flows from Little Dry Creek and Mill Ditch eventually drain to the San Joaquin River. Flows from the Reservoir can also be diverted into Dog Creek, which also eventually drains to the San Joaquin River. During dry weather conditions, the reservoir does not discharge water and is normally empty with the exception of a 156 ac-ft residual pool. The top of the pool remains below the elevation of an existing discharge gate.

Dam failure can result from a number of natural or human activities, such as earthquakes, erosion, improper siting, rapidly rising flood waters, and structural and design flaws. Flooding due to dam failure can cause loss of life, damage to property, and other ensuing hazards. Damage to electric generating facilities and transmission lines associated with hydroelectric dams could also affect life support systems in communities outside the immediate hazard area. There is no historical data to support the effects of a flood from dam failure inundation. The likelihood of such an event affecting the Fresno SOI is extremely low. However, should such an event occur, the affect on areas of the Fresno SOI and Fresno County's surrounding communities would be substantial.

7.14 Tsunamis and Seiches

A tsunami is a series of ocean waves generated in the ocean by an impulsive disturbance. Due to the inland location of the Fresno SOI, tsunamis are not considered a threat to the area. Seiches are standing waves in a body of water such as a lake or reservoir. One of the largest recorded seiches was 1.2 feet high during the 1964 Alaska earthquake. Since this is less than wave heights that could be expected from wind-induced waves, earthquake-induced seiches are not considered a significant risk in the Fresno SOI area. Although unlikely due to the relatively low seismicity of the Fresno SOI area, any structure, dam, or levee located at the edge of a lake or reservoir has the potential to be affected by a seiche.

7.15 Slope Stability and Potential for Slope Failure

Landslides are the release of rock, soil, or other debris and its subsequent movement down a slope or hillside. They are generally caused or controlled by a combination of geology, topography, weather, and hydrology and can be influenced by development practices. Landslides vary greatly in size and composition: from a thin mass of soil a few yards wide to deep-seated bedrock slides miles across. The travel rate of a landslide can range from a few inches per month to many feet per second depending on the slope, type of materials, and moisture content.

California's proliferation of mountains and hills puts it at high risk for landslides. Any slope of 15 degrees or greater is susceptible to mud or landslides.

Landslides and other ground failures occur during earthquakes, triggered by the strain induced in soil and rock by groundshaking vibrations, and during non-earthquake conditions, moist frequently during the rainy season. Both natural and man-made factors contribute to these slope failures.

Ground failure occurs when stresses in the ground exceed the resistance of earth materials to deformation or rupture. This instability can be triggered by earthquake shaking, which instantaneously places high stresses on earth materials by loss of soil strength due to saturation or seismic shaking. Ground failure can also be triggered by man-man changes, such as loading a steep slope or unstable soils.

Landslides are perhaps the most common form of ground failure that is not caused by earthquakes. In areas where a severe slope stability problem exists, landslide damage can best be avoided by simply not building on the unstable ground. In some landslide-prone areas, landslides can be totally removed or stabilized. Through good planning and careful controlled design, landslide losses can be all but eliminated.

Although landslides due to slope failure are most frequent in "wet years" with above average rainfall, they can occur at any time. Landslides may also occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes, with old landslide deposits being the most likely to experience failure.

Slope failures are not expected to produce a disaster affecting hundreds or thousands of persons. Rather, there is a persistent risk of damage to public and private properly including individual residences, roads, canals, reservoirs, and other facilities. The two most important factors influencing the performance of slopes are the nature of the bedrock or surficial deposits and the slope angle. However, there are a number of other factors which have a profound effect on the stability of a particular hillside. These include the presence or absence of deep-rooted vegetation; surface and subsurface drainage conditions; thickness and engineering characteristics of soils and underlying weathered, partially decomposed rock; orientation of bedding; or locally high rainfall can exert a controlling effect on the intensity of natural processes occurring on a particular hillside.

City and County General Plans historically have recognized that major slope areas in excess of 26 percent are "not readily available" and "undevelopable," recognizing the cost and engineering difficulties of grading steep slopes as well as their inherent unsuitability. This development limit in general agrees with customary limits throughout the State, and varies only slightly from the 30 percent standard reference developed by the State Division of Mines and Geology as the maximum developable slope. This is a State-wide reference which does not reflect special conditions such as clayey soils.

Landslides and ground slippages are another form of ground failure which may be precipitated by significant ground motion produced by earthquakes. Areas that are subject to slides and slippages from other natural causes may be very hazardous under earthquake conditions. This is also to say that earthquake effects will be more extensive if a major earthquake occurs during the rainy season when ground conditions are favorable to landsliding and ground slippage.

Whether a landslide will or will not occur at any specific, presently stable slope usually cannot be predicted under "natural conditions" because of the range of natural conditions and changes which occur with time. However, land which has experienced landsliding in the past is believed to be generally more slide-prone, and also is more sensitive to man-induced changes, such as grading, watering, removing or changing the type of vegetation, and changing drainage patterns, among many possible factors.

There is no risk of large landslides in the valley area of the Fresno SOI due to its relatively flat topography. There is, however, the potential for small slides and slumping along the steep banks of rivers, creeks or drainage basins such as the San Joaquin River Bluff and the many unlined basins and canals that trend throughout the Fresno SOI area.

The City of Fresno Municipal Code requires special geotechnical engineering investigations be performed in the vicinity of the San Joaquin River Bluff prior to any new developments or modifications to the bluff area. These special investigations are identified as Bluff Zone I, II, and III Investigations which have specific requirements for evaluation of existing slope stability; post-development slope stability; documentation of existing conditions for rock falls, block caving, creep failures, shear failures, excessive erosion and sloughing; evaluation of slope angles, subsurface drainage, proposed grading, structures, utility trenches, potential rodent population, storm drain disposal, surface irrigation and drainage, erosion, traffic vibration, potential seismic hazards, on-site sewage disposal approximate to the bluffs; influence of future development and grading along the bluff toe for its effect on slope stability; and the adverse effect of increased surface and subsurface drainage.

Due to the generally flat-lying nature of the site and surrounding areas, problems from landslides are not anticipated to affect the majority of the Fresno SOI provided developments in the vicinity of the San Joaquin River Bluff, basins, and canals are constructed properly with an appropriate setback from the slope(s) edge.

7.16 Volcanic Hazards

The subject site is not within an area known to be affected by volcanic hazards (Miller, 1989, U.S. Geological Survey Bulletin, 1847). However, 2 mildly explosive volcanic vents of Holocene age (less than 11,000 years) are located about 55 miles northeast of the Fresno SOI, in the vicinity of Mammoth lakes, within Mono County, California. These 2 volcanic vents have previously erupted basaltic and basaltic-andesitic lavas. The Fresno SOI is outside the areas immediately affected by lava or debris flow hazards, However, in the event of an eruption, flows and/or debris from the vents would likely flow south and west toward the Middle Fork and North Fork of the San Joaquin River within Madera County. Within the northern most portion of Fresno County, lava flows or steam blasts could occur.

With increased distance from a volcano, there is decreased affect from volcanic eruption. However, should a volcanic eruption occur, it is likely that a significant amount of ash (volcanic debris less than 44 millimeters in diameter) would be released into the atmosphere. Geologists estimate up to 2 inches of ash could fall within 50 miles of an eruption.

According to the U.S. Geological Survey, historic wind directions and wind speeds suggest that, like smaller eruptions, most volcanic ash from large to very large eruptions in California would be deposited to the east of the volcanic events. The likelihood that ash would affect the Fresno SOI depends on the frequency with which winds at various heights above the volcano or vent blow toward the Fresno SOI. The thickness of ash that may fall within the Fresno SOI area is dependent on the volume of erupted ash and wind speed. The majority of ash beds from volcanic eruptions in California are deposited to the east of their source vents. This would suggest that ash would not likely deposit on the Fresno SOI.

7.17 County Seismic Safety Element

Documentation and mapping included in the Seismic Safety Element of the Fresno County General Plan, dated 1975 and Draft 2025 Fresno General Plan dated 2002 were reviewed. In addition, we reviewed the seismic safety supplement to the safety element (dated 1974) and the Draft Safety Element dated 2002. The seismic information contained within the Seismic Safety Element is somewhat dated and/or generalized and is superseded by more recent information and analyses described herein. The referenced documents generally indicate that the site area is subject to relatively low to moderate seismicity and related hazards.

8.0 BUILDING CODE DESIGN PARAMETERS

8.1 Seismic Parameters - 2010 California Building Code

The Fresno SOI is located between Longitudes of 119.6100° to 119.9334° West and Latitudes 36.6635° to 36.9105° North. The site class per Table 1613.5.2, 2010 California Building Code (CBC) is based upon the site soil conditions. Although other Site Classes were found, it is our opinion that Site Class D is most consistent with the soil conditions within the majority of the SOI area.

For seismic design of structures based on the seismic provisions of the 2010 CBC we determined the following range of seismic parameters assuming Site Class D conditions:

Seismic Parameters – 2010 CBC		
Seismic Item	**Value Range**	**CBC Reference**
Site Class	D	Table 1613.5.2
Site Coefficient F_a	1.334 to 1.431	Table 1613.5.3 (1)
S_s	0.462 to 0.583	Figure 1613.5 (3)
S_{MS}	0.661 to 0.742	Section 1613.5.3
S_{DS}	0.441 to 0.518	Section 1613.5.4
Site Coefficient F_v	1.924 to 1.978	Table 1613.5.3 (2)
S_1	0.211 to 0.238	Figure 1613.5 (4)
S_{M1}	0.417 to 0.457	Section 1613.5.3
S_{D1}	0.278 to 0.305	Section 1613.5.4

It is recommended that site specific Seismic Parameters be determined for each development site as needed in accordance with Chapter 16 of the 2010 California Building Code.

9.0 CONCLUSIONS

Krazan and Associates, Incorporated, has completed a Geologic Hazards Investigation for the Fresno General Plan – Sphere of Influence project located in Fresno, California. Based on our investigative work and that of others, no evidence has been found that would indicate that a fault or other geologic hazard exists on the site, which would preclude the intended construction or use of the subject site. Several slopes are located along the San Joaquin River bluff within the Fresno SOI. Special

geotechnical/geologic investigations will need to be performed for developments planned in the vicinity of these bluffs to determine appropriate mitigation measures and setback distances. Seismic ground shaking is expected to affect the site; however the seismicity of the region is considered relatively low. Provided that the proposed structures conform to current design criteria and the recommendations of current and future Geotechnical Engineering Investigation(s), we have found no geologic reason to discourage the proposed development within the Sphere of Influence.

10.0 LIMITATIONS

The above conclusions are based on conditions observed and geologic information available as of the date of this report. If future seismic occurrences show nearby fault activity other than that described above, if future events show geologic conditions differing from those indicated above, or if present state-of-the-art geologic information should change materially, then the conclusions of this report should be reviewed by a Certified Engineering Geologist, and the conclusions modified or approved in writing.

This report is applicable only to the Fresno General Plan – Sphere of Influence property as described herein, and should not be utilized for any other site.

If there are any questions or if we can be of further assistance, please do not hesitate to contact our office at (559) 348-2200.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

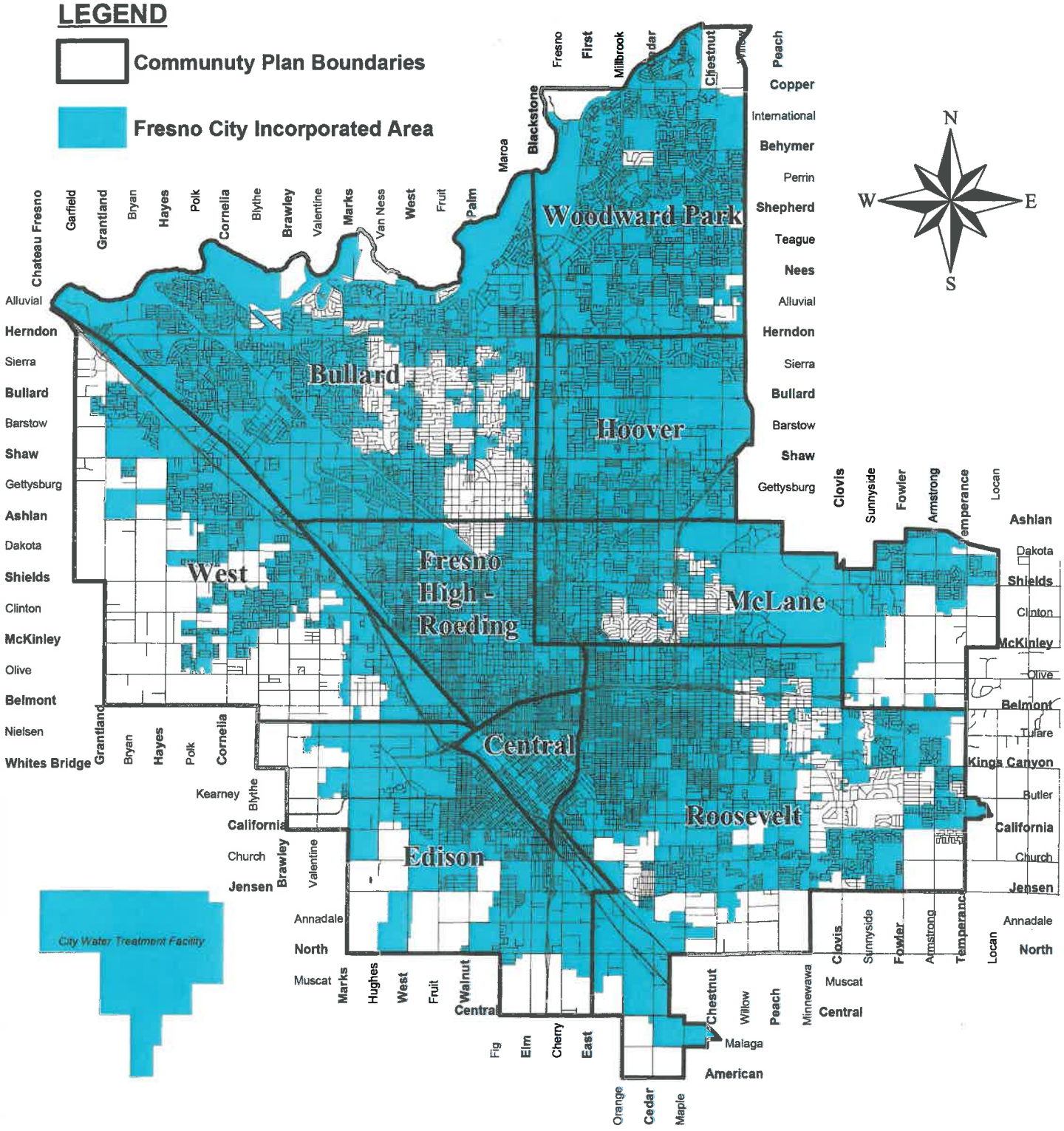
PROFESSIONAL GEOLOGIST
STEPHEN J. NELSON
No. 2146
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Stephen J. Nelson
Certified Engineering Geologist
CEG No. 2146

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ, II
NO. 2698
Expires June 30, 2010
GEOTECHNICAL
STATE OF CALIFORNIA

David R. Jarosz, II
Managing Engineer
RGE No. 2698/RCE No. 60185

SJN/DRJ:amk



COMMUNITY PLAN BOUNDARY MAP

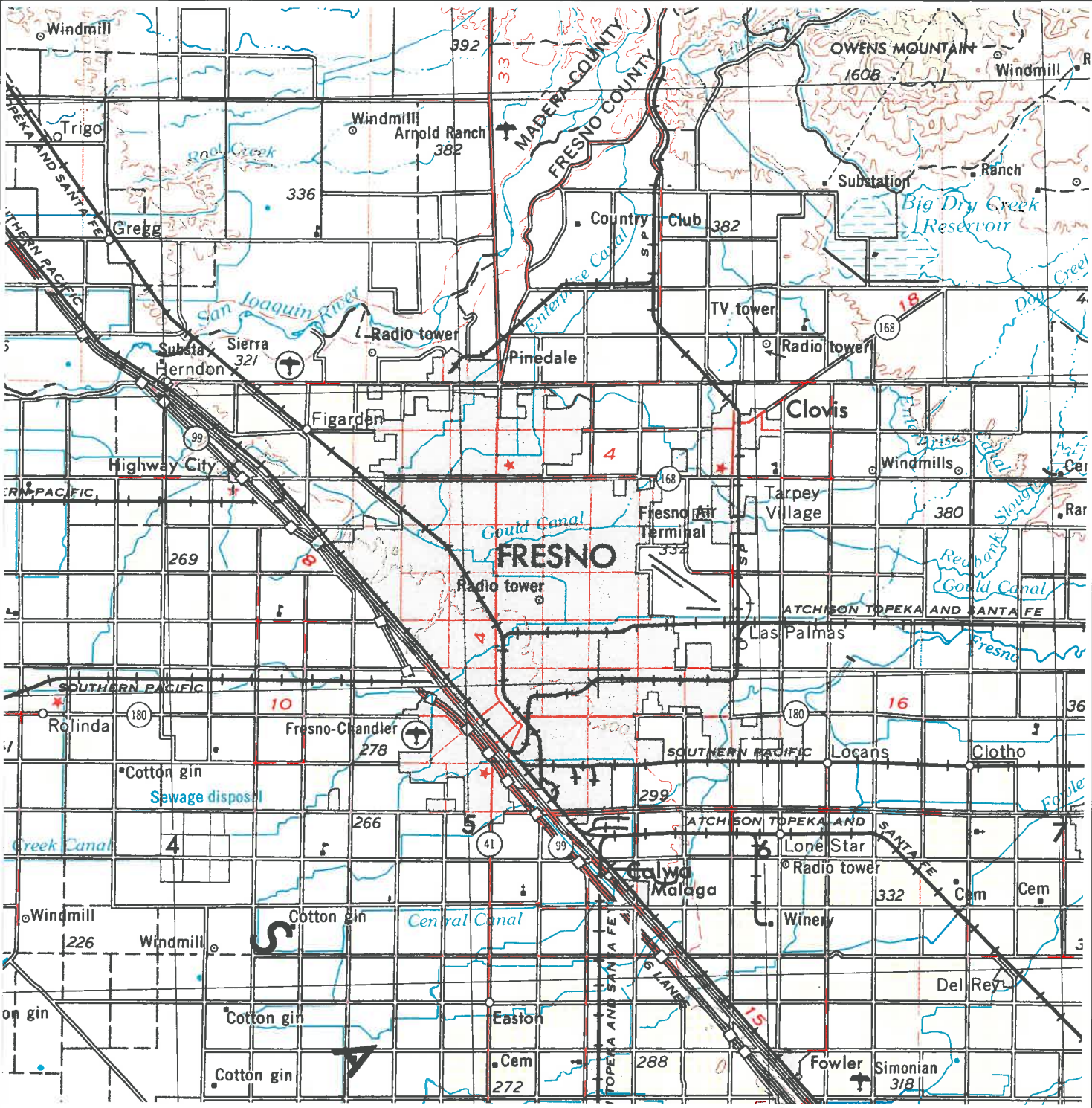
MAP SOURCE:

CITY OF FRESNO, COMMUNITY PLAN BOUNDARY MAP, PLANNING & DEVELOPMENT DEPARTMENT – PLANNING DIVISION, UPDATED: MARCH 2007

NORTH

GEOLOGIC HAZARDS INVESTIGATION FRESNO GENERAL PLAN UPDATE FRESNO CITY AND SPHERE OF INFLUENCE FRESNO COUNTY, CA	Scale: AS SHOWN Drawn by: MN Project No. 012-12054	Date: 7/12 Approved by: SN Figure No. 1

Krazan
ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS
Offices Serving the Western United States

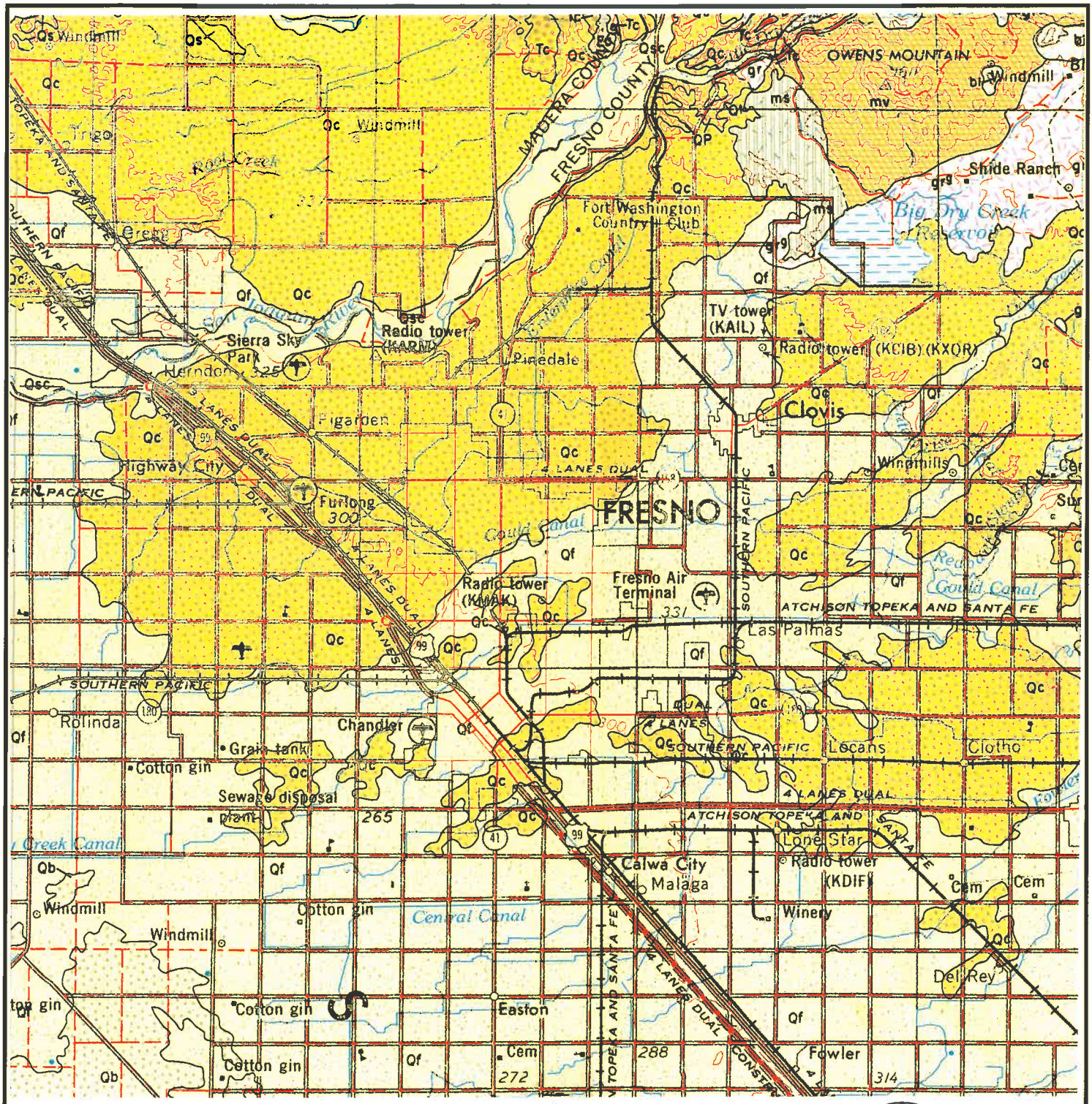


VICINITY MAP

MAP SOURCE:

MAP OF THE FRESNO, CALIFORNIA QUADRANGLE, U.S.G.S. 1:250,000 SERIES (TOPO), DATED: 1962, REVISED 1971

GEOLOGIC HAZARDS INVESTIGATION FRESNO GENERAL PLAN UPDATE FRESNO CITY AND SPHERE OF INFLUENCE FRESNO COUNTY, CA	Scale: AS SHOWN	Date: 7/12	Krazan ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS *Offices Serving the Western United States*
	Drawn by: MN	Approved by: SN	
	Project No. 012-12054	Figure No. 2	



REGIONAL GEOLOGIC MAP

NORTH

MAP SOURCE:

GEOLOGIC MAP OF CALIFORNIA – FRESNO SHEET, U.S.G.S. 1:250,000 SERIES (TOPO), COMPILATION BY JOHN L. BURNETT, DATED: 1965

0 3 6

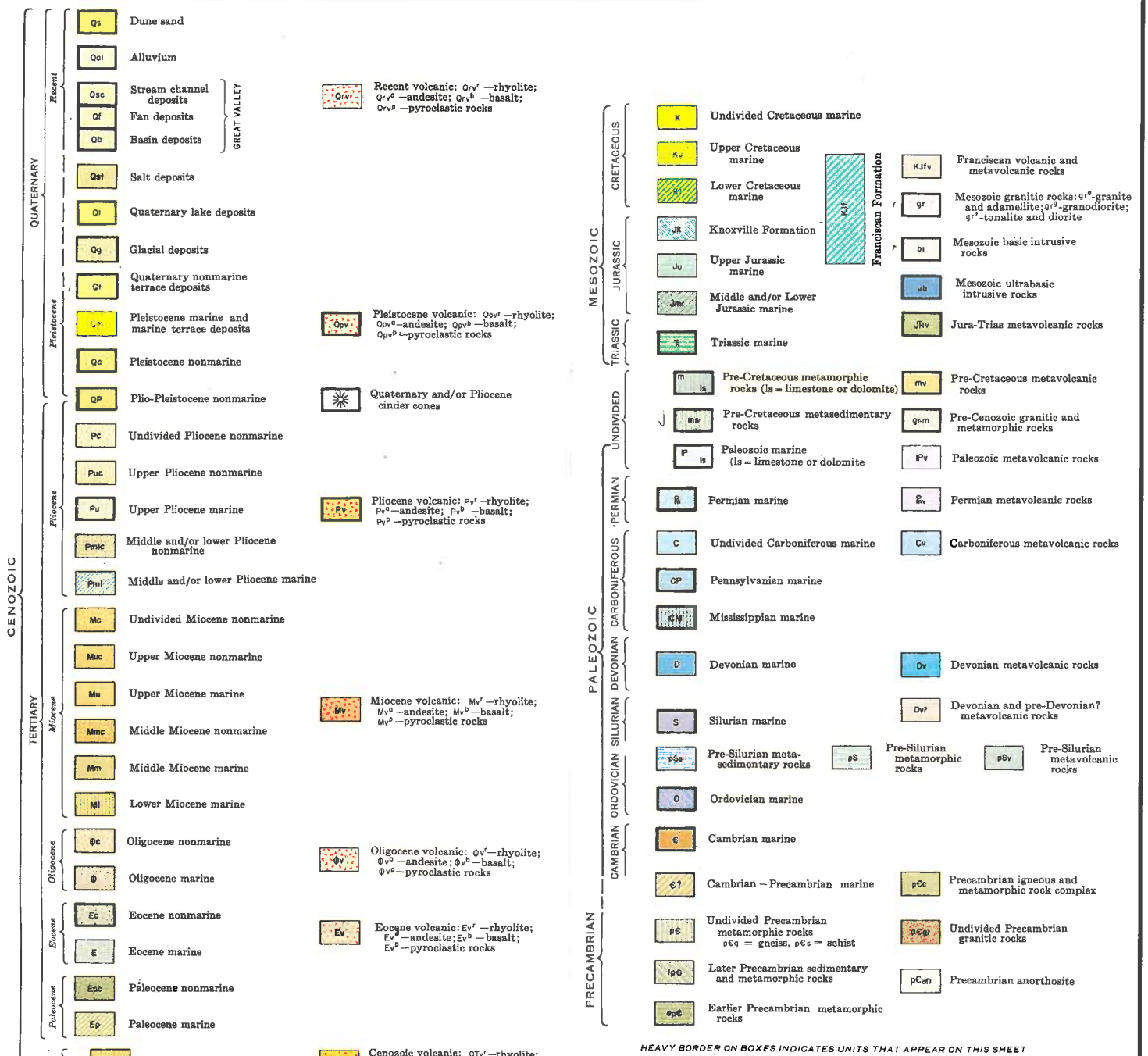
SCALE IN MILES (±)

GEOLOGIC HAZARDS INVESTIGATION FRESNO GENERAL PLAN UPDATE FRESNO CITY AND SPHERE OF INFLUENCE	Scale: AS SHOWN	Date: 7/12
	Drawn by: MN	Approved by: SN
FRESNO COUNTY, CA	Project No. 012-12054	Figure No. 3

Krazan

ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS

Offices Serving the Western United States

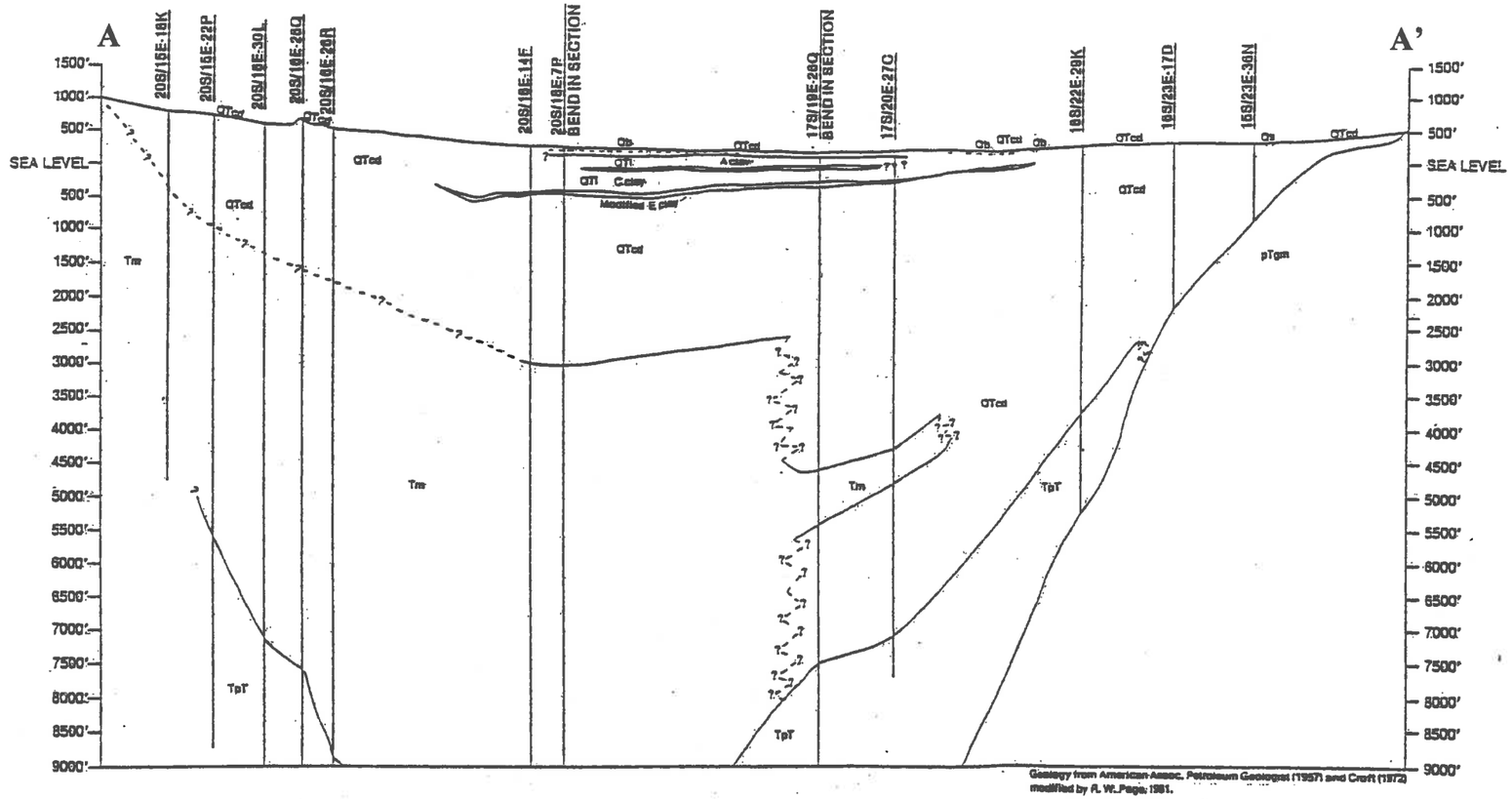


REGIONAL GEOLOGIC MAP

EXPLANATION

FROM:
GEOLOGIC MAP OF CALIFORNIA–FRESNO SHEET
U.S.G.S. 1:250,000 SERIES TOPO
COMPILATION BY JOHN L. BURNETT, DATED 1965

GEOLOGIC HAZARDS INVESTIGATION FRESNO GENERAL PLAN UPDATE CITY AND SPHERE OF INFLUENCE FRESNO COUNTY, CA	Scale: AS SHOWN	Date: 7/12	Krazan ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS *Offices Serving the Western United States*
	Drawn by: MN	Approved by: SN	
	Project No. 012–12054	Figure No. 3a	



Geology from American Assoc. Petroleum Geologist (1957) and Croft (1972) modified by R. W. Page, 1981.

EXPLANATION

Qs	*SAN DUNES (HOLOCENE) (HOLOCENE)*
Qb	*FLOOD BASIN DEPOSITS (HOLOCENE)*
QTl	*LACUSTRINE & MARSH DEPOSITS (PLIOCENE TO HOLOCENE)*
Qtcd	*CONTINENTAL ROCKS & DEPOSITS (OLIGOCENE TO HOLOCENE)*
Tm	*MARINE ROCKS & DEPOSITS (EOCENE, OLIGOCENE, MIOCENE, & PLIOCENE)*
TpT	*CONTINENTAL & MARINE ROCKS & DEPOSITS (PRE-TERTIARY TO OLIGOCENE)*
pTgm	*GRANITE & METAMORPHIC ROCKS (PRE-TERTIARY)*
	STRATIGRAPHIC UNIT CONTACT APPROXIMATELY LOCATED; QUERIED WHERE DATA ARE INCONCLUSIVE

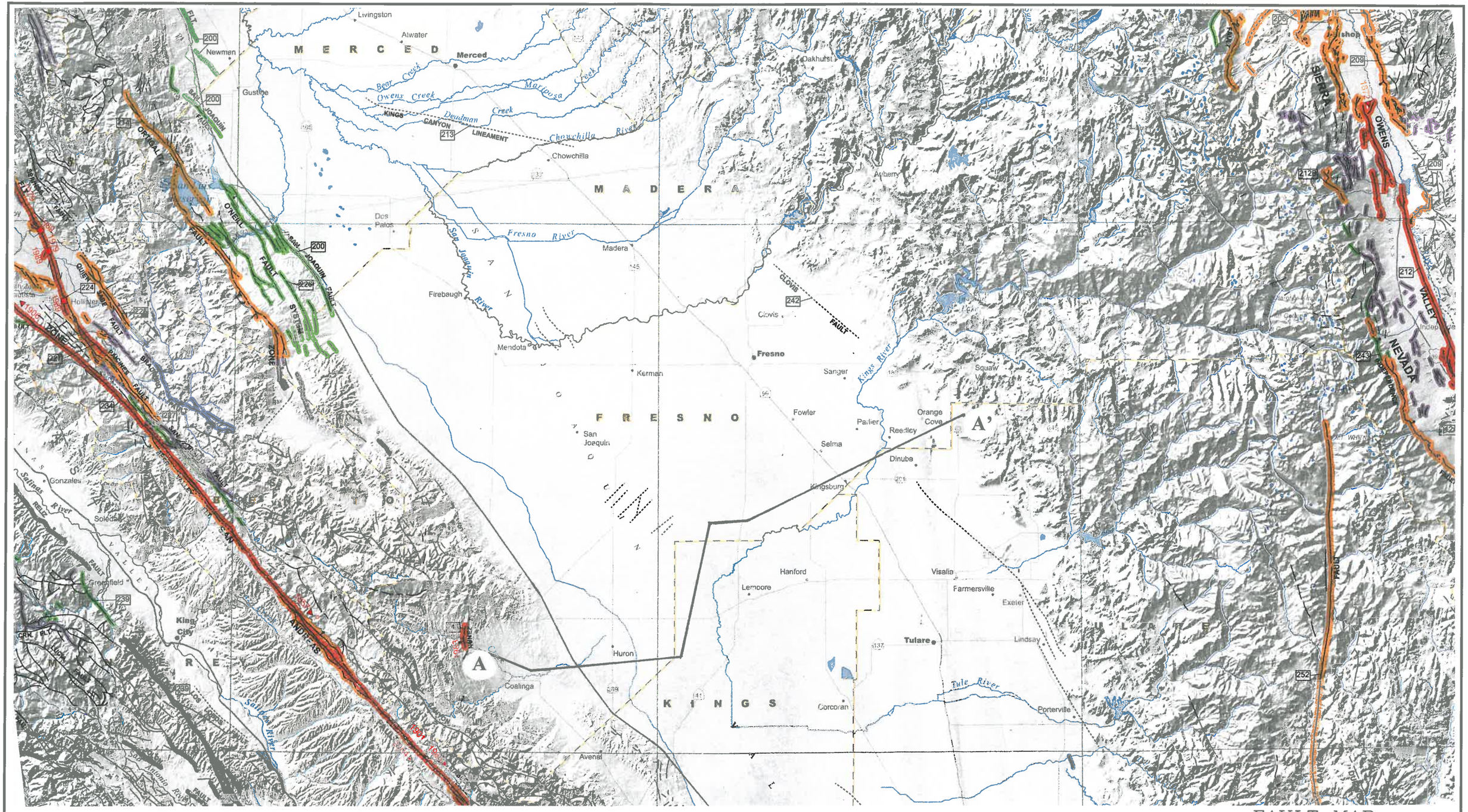
NOTE:

SEE FAULT MAP FOR LOCATION OF GEOLOGIC CROSS SECTION

REGIONAL GEOLOGIC CROSS-SECTION SHOWING THE SAN JOAQUIN VALLEY

SCALE
HORIZONTAL: 1" = 7.0 MILES
VERTICAL: 1" = 2,400 FEET

GEOLOGIC HAZARDS INVESTIGATION FRESNO GENERAL PLAN UPDATE FRESNO CITY AND SPHERE OF INFLUENCE FRESNO COUNTY, CA	Scale: AS SHOWN	Date: 7/12	Krazan ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS *Offices Serving the Western United States*
	Drawn by: MN	Approved by: SN	
	Project No. 012-12054	Figure No. 4	



FAULT MAP

PREPARED FROM THE C.G.S.
"FAULT ACTIVITY MAP OF CALIFORNIA"
JENNINGS AND BRYANT, 2010

FAULT TRACES ON LAND ARE INDICATED BY SOLID LINES WHERE WELL LOCATED, BY DASHED LINES WHERE APPROXIMATELY LOCATED OR INFERRED AND DOTTED LINES WHERE CONCEALED BY YOUNGER ROCKS OR BY LAKES OR BAYS. FAULT TRACES ARE QUERIED WHERE CONTINUATION OR EXISTENCE IS UNCERTAIN.

NORTH

0 12 24

SCALE IN MILESS (±)

GEOLOGIC HAZARDS INVESTIGATION
FRESNO GENERAL PLAN UPDATE
FRESNO CITY AND SPRERE OF INFLUENCE
FRESNO COUNTY, CA

Scale:	Date:
AS SHOWN	7/12
Drawn by:	Approved by:
MN	SN
Project No.	Figure No.
012-12054	5

Krazan
ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS
Offices Serving the Western United States

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.

(b) fault creep slippage - slow ground displacement usually without accompanying earthquakes.

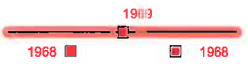
(c) displaced survey lines.

A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

Date bracketed by triangles indicates local fault break.

No triangle by date indicates an intermediate point along fault break.

Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.



Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.

Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement sometime during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissnce nature, or was not done with the object of dating fault displacements. Faults in this category are not necessarily inactive.

FAULT MAP EXPLANATION

PREPARED FROM THE C.G.S. "FAULT ACTIVITY MAP OF CALIFORNIA" JENNINGS AND BRYANT, 2010

FAULT TRACES ON LAND ARE INDICATED BY SOLID LINES WHERE WELL LOCATED, BY DASHED LINES WHERE APPROXIMATELY LOCATED OR INFERRED AND DOTTED LINES WHERE CONCEALED BY YOUNGER ROCKS OR BY LAKES OR BAYS. FAULT TRACES ARE QUERIED WHERE CONTINUATION OR EXISTENCE IS UNCERTAIN.

GEOLOGIC HAZARDS INVESTIGATION TAFT GENERAL PLAN UPDATE CITY AND SPHERE OF INFLUENCE FRESNO COUNTY, CA	Scale: AS SHOWN	Date: 7/12	Krazan ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS *Offices Serving the Western United States*
	Drawn by: MN	Approved by: SN	
	Project No. 012-12054	Figure No. 5a	

MARIN
SAN FRANCISCO
CONTRA COSTA
ALAMEDA
SAN MATEO
SANTA CRUZ
SANTA CLARA
SAN BENITO
MONTEREY
SAN LUIS OBISPO
SAN JOAQUIN
STANISLAUS
MERCED
MADERA
FRESNO
KINGS
TULARE
KERN
TUOLUMNE
MONO
MARIPOSA
INYO
38°
37°
118°
117°
06
68
38
65
89
40
85
57
72

EPICENTER MAP LEGEND

Period	1800 - 1868	1869 - 1931	1932 - 1999
Magnitude (M) ≥ 7.0			
6.5 - 6.9			
6.0 - 6.4			
5.5 - 5.9			
5.0 - 5.4			

Historical Faulting
Holocene Faulting
Highways (Major)
Highways (Minor)
Lakes
65 Last two digits of M ≥ 6.5 earthquake year

EPICENTER MAP

MAP SOURCE:
CGS MAP SHEET 49
EPICENTERS OF AND AREAS
DAMAGED BY M > 5 CALIFORNIA
EARTHQUAKES, 1800–1999
BY TOPPOZADA, BRANUM, PETERSEN,
HALLSTROM, CRAMER & REICHLE, 2000

NORTH

0 40 80
SCALE IN KILOMETERS (±)

GEOLOGIC HAZARDS INVESTIGATION
FRESNO GENERAL PLAN UPDATE
FRESNO CITY AND SPRERE OF INFLUENCE
FRESNO COUNTY, CA

Scale:	Date:
AS SHOWN	7/12
Drawn by:	Approved by:
MN	SN
Project No.	Figure No.
012–12054	6

Krazan
ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SPECIALISTS
Offices Serving the Western United States

USGS
science for a changing world

Earthquake Hazards Program

2008 National Seismic Hazard Maps - Fault Parameters

Output Selected Faults (Excel)

Output	Distance in Miles	Name	St Fault parallel slip rate	Preferred Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
☑	42.56	Great Valley 11	CA1.5	15	W	thrust	7	9.6	25
☑	42.64	Great Valley 12	CA1.5	15	W	thrust	7	9.6	17
☑	44.16	Great Valley 13 (Coalinga)	CA1.5	15	W	thrust	9.1	15.3	32
☑	49.62	Great Valley 10	CA1.5	15	W	thrust	7	9.6	22
☑	49.66	Great Valley 14 (Kettleman Hills)	CA1.5	22	W	thrust	8.1	22.3	24
☑	54.1	Great Valley 9	CA1.5	15	W	thrust	7	9.6	39
☑	62.33	Ortigalita	CA1	90	V	strike slip	0	11	70
☑	68.58	San Andreas fault - creeping segment	CA34	90	V	strike slip	0	12	125
☑	69.74	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	86		strike slip	0.1	13.1	479
☑	69.74	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	86		strike slip	0.1	13.1	549
☑	69.74	S. San Andreas;PK+CH+CC+BB	CA	90	V	strike slip	0.1	12.1	208
☑	69.74	S. San Andreas;PK+CH+CC+BB+NM	CA	90	V	strike slip	0.1	12.1	245
☑	69.74	S. San Andreas;PK+CH+CC+BB+NM+SM	CA	90	V	strike slip	0.1	13.1	343
☑	69.74	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	90	V	strike slip	0.1	13.1	378
☑	69.74	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	90	V	strike slip	0.1	13.1	422
☑	69.74	S. San Andreas;PK+CH+CC	CA	90	V	strike slip	0.2	11.2	158
☑	69.74	S. San Andreas;PK+CH	CA	90	V	strike slip	0.4	8.4	99
☑	69.74	S. San Andreas;PK	CA34	90	V	strike slip	4	6	36
☑	70.49	Great Valley 8	CA1.5	15	W	thrust	7	9.6	41
☑	70.85	Round Valley	CA1	50	E	normal	0	13	43
☑	72.71	Hartley Springs	CA0.5	50	E	normal	0	13	25
☑	73.99	Hilton Creek	CA2.5	50	E	normal	0	13	29
☑	77.32	S. San Andreas;CH	CA34	90	V	strike slip	0	12	63
☑	77.32	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	86		strike slip	0	14	443
☑	77.32	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	86		strike slip	0.1	13.1	512
☑	77.32	S. San Andreas;CH+CC	CA	90	V	strike slip	0	14	122
☑	77.32	S. San Andreas;CH+CC+BB	CA	90	V	strike slip	0	14	171
☑	77.32	S. San Andreas;CH+CC+BB+NM	CA	90	V	strike slip	0	14	208
☑	77.32	S. San Andreas;CH+CC+BB+NM+SM	CA	90	V	strike slip	0	14	306
☑	77.32	S. San Andreas;CH+CC+BB+NM+SM+NSB	CA	90	V	strike slip	0	14	342

77.32	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	90	V	strike slip	0	14	385
77.98	Birch Creek	CA0.7	50	E	normal	0	13	15
79.86	Quien Sabe	CA1	90	V	strike slip	0	10	23
80.35	Independence	CA0.2	50	E	normal	0	14.6	48
81.88	San Juan	CA1	90	V	strike slip	0	13	68
85.34	Owens Valley	CA1.5	90	V	strike slip	0	14	86
85.87	Fish Slough	CA0.2	50	E	normal	0	13	26
87.37	Mono Lake	CA2.5	50	E	normal	0	13	26
89.2	White Mountains	CA1	90	V	strike slip	0	13	111
89.4	Great Valley 7	CA1.5	15	W	thrust	7	9.6	45
89.55	Rinconada	CA1	90	V	strike slip	0	10	191
89.88	Calaveras;CN+CC+CS	CA	90	V	strike slip	2.2	7.2	123
89.88	Calaveras;CC+CS	CA15	90	V	strike slip	4.2	7.2	78
89.88	Calaveras;CS	CA15	90	V	strike slip	4.4	6.4	19
93.64	Zayante-Vergeles	CA0.1	90	V	strike slip	0	12	58
94.63	N. San Andreas;SAN+SAP+SAS	CA	90	V	strike slip	0.2	12.2	336
94.63	N. San Andreas;SAO+SAN+SAP+SAS	CA	90	V	strike slip	0.2	12.2	472
94.63	N. San Andreas;SAP+SAS	CA	90	V	strike slip	0.4	13.4	147
94.63	N. San Andreas;SAS	CA17	90	V	strike slip	0.8	14.8	62
94.78	Calaveras;CN+CC	CA	90	V	strike slip	2	8	104
94.78	Calaveras;CC	CA15	90	V	strike slip	4.2	7.2	59
99.3	Deep Springs	CA0.8	50	NW	normal	0	13	25

Share this page: Facebook Twitter Google Email

APPENDIX A

REFERENCES AND BACKGROUND SOURCES

012-12054

Association of Engineering Geologists, 2001, *Engineering Geology Practice in Northern California,* Special Publication 12 and California Geological Survey Bulletin 210.

Bartow, J.A., 1991, *The Cenozoic Evolution of the San Joaquin Valley, California*, U.S. Geological Survey Professional Paper 1501, 40p.

Bennett, J.H., and Sherbrune, R.W., editors, 1983, *The Coalinga, California Earthquakes*, Special Publication 66, California Division of Mines and Geology.

Bertoldi, G.L., R.H. Johnston, and K.D. Evenson. 1991. *Ground Water in the Central Valley*, California - *A Summary Report*. U.S. Geological Survey Professional Paper 1401-A.

Bray, J.D., and Sancio, R.B., 2006, *Assessment of the Liquefaction Susceptibility of Fine-Grained Soils*, A.S.C.E., Journal of Geotechnical and Geoenvironmental Engineering, v. 132, n. 9, p. 1165-1177.

California Building Standards Commission, 2010, California Code of Regulations, Title, 24, *California Building Code, 2010 edition*, Whittier, California

California Department of Water Resources, 2011, *Historical Groundwater Levels in Fresno County,* Internet Site, http://well.water.ca.gov/.

California Geological Survey, 2012, *Official Maps of Alquist-Priolo Earthquake Fault Zones of California,* Internet Site, http://www.conservation.ca.gov/cgs/rghm/ap/Pages/Index.aspx.

California Geological Survey, Note 48, *Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings,* January 2011.

California Division of Mines and Geology (CGS), 1965, *Geologic Map of California Fresno Sheet*, 1:250,000.

California Division of Mines and Geology (CGS), 2008, *Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A,* 98p.

California Division of Mines and Geology (CGS), 1988, *Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region,* Special Report 158.

California Division of Mines and Geology (CGS), 2008, *Update of Mineral Land Classification: Aggregate Materials in the Fresno-Consumption Region.* Open-File Report 99-02.

California State University, Fresno; Henry Madden Library; Maps and Government Information; Selected aerial photography of the Fresno County and City areas, various scales and flights, 1937-2011.

City of Fresno, 2025, *City of Fresno General Plan, - Safety Element*, February 1, 2002.

Davis, G.H., Green, J.H., Olmsted, F.H., and Brown, D.W., 1959, *Ground-Water Conditions and Storage Capacity in the San Joaquin Valley, California*: U.S. Geological Survey Water-Supply Paper 1469.

Eaton, J.P., 1986, *Tectonic Environment of the Vacaville/Winters Earthquake, and the Potential for Large Earthquake Along the Western Edge of the Sacramento Valley,* U.S. Geological Survey, Open-File Report 86-370.

Galloway, D; Jones, D.R.; and Ingebritsen, S.E., 2005 *Land Subsidence in the United States-San Joaquin Valley, California*, US Geological Survey Circular 1182.

Hart, E.W. and Bryant, W.A., Interim Revision 2007, *Fault-Rupture Hazard Zones in California: Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps,* California, Special Publication 42, 38p.

Hoots, H.W., 1930, *Geology and Oil Resources along the Southern Border of San Joaquin Valley, California*: U.S. Geological Survey Bulletin 812, p. 243-332.

Ireland, R.L., 1986, *Land Subsidence in the San Joaquin Valley, California as of 1983*, U.S. Geological Survey Water-Resources Investigations Report 85-4196.

Ireland, R.L., Poland, J.F., and Riley, F.S. 1984, *Land Subsidence in the San Joaquin Valley, California as of 1980*, U.S. Geological Survey Professional Paper 437-I.

Federal Emergency Management Agency, 2009, *FIRM Flood Insurance Rate Map, Fresno County, California and incorporated Areas,* Community Panel Number 06019CIND0B and 19 others listed in text, effective date: February 18, 2009.

Jennings, C.W. and Bryant, W.A., 2010, *Fault Activity Map of Californi:* California Geological Survey, California Geologic Data Map No. 6.

Matthews, R.A. and Burnet, J.L., 1965, *Geologic Map of California – Fresno Sheet,* 1:250,000.

May, J.C., and Hewitt, R.L., 1948, *The Basement Complex in Well Samples from the Sacramento and San Joaquin Valleys, California:* California Journal Mines and Geology, v44, no. 2

Page, R.W. 1986, *Geology of the Fresh Ground-Water Basin of the Central Valley, California,* U.S. Geological Survey Professional Paper 1404-C, 54p.

Page, R.W. and Le Blanc, R.A., 1969, *Geology, Hydrology, and Water Quality in the Fresno Areas, California,* U.S. Geological Survey Open File Report 69-328.

Peterson, Mark D. and Others, 2008, *Documentation for the 2008 Update of the United States Seismic Hazard Maps:* U.S. Geological Survey Open File Report 2008-1128, 61p.

Poland, J.F., B.E. Lofgren, R.L. Ireland, and R.G. Pugh, 1975, *Land Subsidence in the San Joaquin Valley, California, as of 1972*, U.S. Geological Survey Professional Paper 437-H.

Rymer, M.J., and Ellsworth, W.L., editors, 1990, *The Coalinga, California, Earthquake of May 2, 1983,* U.S. Geological Survey Professional Paper 1487.
Smith, A.R., 1964 *Geologic Map of California,* Olaf P. Jenkins Edition, Bakersfield sheet: California Div. Mines and Geog., California scale 1:24,000.

Southern California Earthquake Center, University of Southern California 1999, *Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigation Liquefaction in California.*

State of California, Department of Water Resources, Historical *Groundwater Levels in Fresno County, Internet Site,* http:well.water.ca.gov/

Tokimatsu, K., and Seed, H. Bolton, 1987, *Evaluation of Settlements in Sands Due to Earthquake Shaking,* ASCE Journal of Geotechnical Engineering, vol. 113, no. GT8, p. 861-878.

Toppozada, T., Branum, D., Peterson, M., Hallstrom, C. Cramer, C., Reichle, M., *2000 Epicenters of and Areas Damaged by M>5 California Earthquakes 1800-1999*, California: Geological Survey, Map Sheet 49.

Toppozada, T.R., 1987, *The 1892 Vacaville-Winters Earthquake and 1983 Coalinga Earthquake*, California Geology, December 1987 Volume 40, No. 12.

Toppozada, T.R., Real, C.R., and Parke, D.L., 1981, *Preparation of Isoseismal Maps and Summaries of Reported Effects for Pre-1900 California Earthquakes,* California Division of Mines and Geology, Open-File Report 81-11.

Vaughan, F.E., 1943, *Geophysical Studies in California, in Geologic Formations and Economic Development of the Oil and Gas Fields of California*: California Department National Resources, Division Mines Bulletin 118.

Unruh, J.R., and Moores, E.M., 1992, *Quaternary Blind Thrusting in the Southwestern Sacramento Valley:* Tectonics, Vol. 11.

Wagner, D.L., Bortugno, E.J., and McJunkin, R.D., 1990, *Geologic Map of the San Francisco – San Jose Quadrangle, California, Scale 1:250,000,* California Department of Conservation, Division of Mines and Geology, Regional Geologic Map Series.

Wallace, R.E., 1990, *The San Andreas Fault System, California*: U.S. Geological Survey Professional Paper 1515.

Williamson, A.K., Prudic, D.E. Swain, L.A., 1989, *Ground-Water Flow in the Central Valley, California:* U.S. Geological Survey Professional Paper 1401-D, 127 p.

Youd, T. Leslie., Hansen, Corbett M., and Bartlett, Steven F., 2002, *Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement*, ASCE Journal of Geotechnical and Geoenvironmental Engineering, vol. 128, no. 12, December 2002 issue, p. 1007-1017.

APPENDIX B

EARTHQUAKE DATA FILE

```
*************************
*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
*************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 01212054

DATE: 04-16-2012

JOB NAME: Fresno General Plan Update

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE: 4.00
   MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
   SITE LATITUDE: 36.7869
   SITE LONGITUDE: 119.7843

SEARCH DATES:
           START DATE: 1800
           END DATE: 2012

SEARCH RADIUS:
           60.0 mi
           96.6 km

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND: 0 Depth Source: A
   Basement Depth: 5.00 km   Campbell SSR: Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 0.0

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
T-A	36.7500	119.7500	08/16/1864	553 0.0	0.0	4.30	0.143	VIII	3.2(5.1)
T-A	37.0000	119.5000	07/14/1894	450 0.0	0.0	4.30	0.043	VI	21.5(34.6)
MGI	37.0000	120.0700	09/12/1928	120 0.0	0.0	4.60	0.050	VI	21.6(34.7)
DMG	36.6020	119.3750	09/15/1973	1 315.4	8.0	4.40	0.039	V	26.0(41.8)
DMG	36.5830	120.3330	11/30/1963	225548.0	0.0	4.50	0.034	V	33.5(53.9)
BRK	36.4600	120.3400	08/03/1975	638 0.0	0.0	4.40	0.029	V	38.2(61.4)
BRK	36.4600	120.3400	08/03/1975	63516.0	0.0	4.90	0.038	V	38.2(61.4)
BRK	36.4700	120.3500	08/03/1975	55717.0	0.0	4.00	0.024	IV	38.2(61.5)
BRK	36.5000	120.4000	08/15/1975	222751.0	0.0	4.60	0.032	V	39.4(63.5)
UNR	37.3730	119.9560	08/10/1975	51640.5	5.5	4.40	0.027	V	41.6(66.9)
PAS	36.2200	120.1360	09/24/1980	8 839.1	6.7	4.40	0.026	V	43.7(70.4)
BRK	36.3000	120.3100	05/03/1983	93947.0	0.0	4.00	0.021	IV	44.5(71.6)
PAS	36.2600	120.2590	05/03/1983	142656.0	1.2	4.10	0.022	IV	44.9(72.3)
PAS	36.2050	120.1760	05/03/1983	0 022.1	9.0	4.00	0.021	IV	45.7(73.5)
PAS	36.2500	120.2670	05/03/1983	01629.1	9.0	4.50	0.027	V	45.7(73.6)
BRK	36.1800	120.1200	08/12/1983	22 236.0	0.0	4.00	0.021	IV	45.9(73.8)
BRK	36.2500	120.2800	05/03/1983	018 1.0	0.0	4.40	0.025	V	46.2(74.3)
PAS	36.1510	120.0490	08/04/1985	12 156.0	6.0	5.80	0.053	VI	46.3(74.5)
BRK	36.2500	120.2900	05/03/1983	154142.0	0.0	4.80	0.031	V	46.5(74.8)
PAS	36.2740	120.3310	02/19/1984	94310.6	7.4	4.40	0.025	V	46.6(75.0)
BRK	36.2800	120.3400	05/04/1983	161120.0	0.0	4.30	0.024	IV	46.6(75.1)
BRK	36.2400	120.2800	05/03/1983	05034.0	0.0	4.00	0.020	IV	46.7(75.2)
PAS	36.1450	120.0520	08/04/1985	112915.4	6.0	4.30	0.024	IV	46.7(75.2)
BRK	36.2700	120.3300	05/03/1983	05745.0	0.0	4.80	0.031	V	46.8(75.3)
PAS	36.1310	119.9970	08/05/1985	144538.3	6.0	4.30	0.024	IV	46.8(75.3)
USG	36.2300	120.2710	05/19/1983	11 530.1	12.9	4.16	0.022	IV	47.0(75.6)
USG	36.2380	120.2850	05/03/1983	21514.9	8.8	4.08	0.021	IV	47.0(75.6)
BRK	36.2400	120.2900	05/09/1983	24912.0	0.0	5.20	0.038	V	47.0(75.7)
PAS	36.3130	120.3960	10/25/1982	231217.8	6.0	4.30	0.024	IV	47.1(75.8)
BRK	36.2500	120.3100	05/24/1983	9 219.0	0.0	4.60	0.028	V	47.2(75.9)
BRK	36.2200	120.2600	09/09/1983	91614.0	0.0	5.40	0.042	VI	47.2(76.0)
BRK	36.2300	120.2800	09/09/1983	92133.0	0.0	4.00	0.020	IV	47.3(76.1)
BRK	36.2600	120.3300	05/03/1983	43233.0	0.0	4.30	0.024	IV	47.3(76.2)
BRK	36.2600	120.3300	05/04/1983	72840.0	0.0	4.70	0.029	V	47.3(76.2)
PAS	36.1770	120.1750	05/03/1983	635 3.1	5.0	4.00	0.020	IV	47.4(76.2)
BRK	36.2800	120.3600	05/05/1983	102045.0	0.0	4.60	0.028	V	47.4(76.2)
PAS	36.2190	120.2640	05/08/1984	192113.1	15.3	4.20	0.022	IV	47.4(76.3)
PAS	36.1190	119.9890	08/04/1985	12 841.8	6.0	4.10	0.021	IV	47.5(76.4)
PAS	36.3210	120.4160	10/25/1982	231554.2	6.0	4.00	0.020	IV	47.6(76.5)
USG	36.2320	120.2990	05/03/1983	15546.4	6.9	4.00	0.020	IV	47.8(76.9)
DMG	37.0700	120.5800	11/01/1954	64240.0	0.0	4.00	0.020	IV	48.1(77.4)
BRK	36.2200	120.2900	05/02/1983	2346 6.0	0.0	5.60	0.046	VI	48.2(77.5)
BRK	36.2200	120.2900	05/02/1983	234239.0	0.0	6.70	0.082	VII	48.2(77.5)
USG	36.2910	120.4010	08/12/1983	11441.1	9.8	4.04	0.020	IV	48.4(77.9)
BRK	36.2200	120.3000	05/09/1983	32638.0	0.0	4.40	0.024	V	48.5(78.0)
DMG	36.2300	120.3200	08/13/1940	22 729.0	0.0	4.00	0.020	IV	48.6(78.2)
BRK	36.2900	120.4100	08/14/1983	124337.0	0.0	4.20	0.022	IV	48.8(78.5)
GSB	36.3000	120.4270	04/21/1994	163715.3	10.0	4.50	0.025	V	49.0(78.9)
PAS	36.2860	120.4130	10/25/1982	2226 4.0	6.0	5.60	0.045	VI	49.1(79.0)
DMG	36.2200	120.3300	10/22/1955	7 413.0	0.0	4.20	0.022	IV	49.5(79.6)
USG	36.1800	120.2600	05/03/1983	13 914.6	12.5	4.04	0.020	IV	49.5(79.7)
PAS	36.1820	120.2680	02/14/1987	72650.8	6.0	5.10	0.035	V	49.6(79.9)
T-A	36.1700	119.3200	07/25/1868	230 0.0	0.0	5.00	0.033	V	49.8(80.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSB	36.1920	120.2930	02/02/1997	022020.3	9.0	4.10	0.020	IV	49.8(80.2)
BRK	36.2600	120.4000	07/09/1983	74052.0	0.0	5.30	0.038	V	49.9(80.3)
BRK	36.1400	120.1900	05/22/1983	83923.0	0.0	4.00	0.019	IV	50.0(80.5)
USG	36.1800	120.2800	07/18/1983	1928 5.4	10.9	4.16	0.021	IV	50.1(80.7)
USG	36.1540	120.2320	05/02/1983	235529.1	8.6	4.24	0.022	IV	50.3(80.9)
BRK	36.2500	120.4000	05/03/1983	6 447.0	0.0	4.30	0.022	IV	50.4(81.1)
BRK	36.1400	120.2100	06/07/1983	51839.0	0.0	4.00	0.019	IV	50.5(81.3)
PAS	36.2400	120.3900	07/22/1983	24910.7	8.7	4.20	0.021	IV	50.5(81.3)
PAS	36.2400	120.3900	07/22/1983	24910.7	8.7	4.20	0.021	IV	50.5(81.3)
DMG	36.8000	120.7000	12/05/1937	137 0.0	0.0	4.00	0.019	IV	50.6(81.5)
BRK	36.1300	120.1900	05/03/1983	14147.0	0.0	4.50	0.025	V	50.6(81.5)
T-A	37.5000	120.0000	01/22/1857	0 0 0.0	0.0	4.30	0.022	IV	50.6(81.5)
DMG	37.5000	120.0000	08/23/1937	032 0.0	0.0	4.00	0.019	IV	50.6(81.5)
BRK	36.2300	120.3800	09/11/1983	1148 7.0	0.0	4.30	0.022	IV	50.7(81.6)
BRK	36.2100	120.3500	05/03/1983	03947.0	0.0	4.20	0.021	IV	50.7(81.6)
GSP	36.1810	120.3010	03/31/1994	195959.7	10.0	4.40	0.024	IV	50.7(81.6)
USG	36.1340	120.2040	05/05/1983	43748.6	11.2	4.01	0.019	IV	50.7(81.7)
GSB	36.1720	120.2880	03/31/1994	200229.7	9.0	4.20	0.021	IV	50.8(81.8)
GSB	36.1740	120.2920	12/16/2006	061405.0	9.0	4.20	0.021	IV	50.8(81.8)
BRK	36.1500	120.2500	05/12/1983	1341 8.0	0.0	4.50	0.025	V	51.0(82.1)
UNR	37.4650	119.4120	11/18/1981	161548.5	10.1	4.20	0.021	IV	51.1(82.2)
BRK	36.3000	120.4800	08/26/1983	32118.0	0.0	4.00	0.019	IV	51.2(82.4)
BRK	36.1100	120.1600	01/14/1976	214359.0	0.0	4.90	0.030	V	51.2(82.4)
GSB	36.1630	120.2870	04/24/1984	045251.5	10.0	4.00	0.019	IV	51.3(82.6)
GSB	36.1580	120.2800	05/11/1985	085923.8	5.0	4.00	0.019	IV	51.4(82.7)
PAS	36.1760	120.3220	01/03/1985	112228.0	7.8	4.30	0.022	IV	51.7(83.2)
BRK	36.2100	120.3800	07/25/1983	223140.0	0.0	5.10	0.034	V	51.8(83.3)
PAS	36.2450	120.4310	07/22/1983	329 2.3	3.0	4.10	0.020	IV	51.8(83.4)
PAS	36.2450	120.4310	07/22/1983	329 2.3	3.0	4.10	0.020	IV	51.8(83.4)
PAS	36.0520	119.9780	08/04/1985	151539.5	6.0	4.40	0.023	IV	51.9(83.5)
DMG	36.1700	120.3200	12/27/1926	919 0.0	0.0	5.00	0.032	V	51.9(83.6)
BRK	36.2200	120.4000	07/22/1983	23955.0	0.0	6.00	0.054	VI	52.0(83.6)
DMG	36.3000	120.5000	11/30/1943	215718.0	0.0	4.00	0.019	IV	52.0(83.7)
PAS	36.1760	120.3370	01/03/1985	104522.8	6.0	4.10	0.020	IV	52.2(83.9)
BRK	36.1300	120.2500	05/03/1983	855 3.0	0.0	4.50	0.024	V	52.2(84.0)
BRK	36.1000	120.1800	05/03/1983	01557.0	0.0	4.00	0.019	IV	52.3(84.1)
BRK	36.1000	120.1800	05/03/1983	01537.0	0.0	4.20	0.021	IV	52.3(84.1)
BRK	36.1400	120.2800	05/03/1983	0 924.0	0.0	4.00	0.019	IV	52.5(84.4)
DMG	36.5300	120.6800	08/19/1974	124719.1	0.0	4.40	0.023	IV	52.7(84.8)
DMG	36.4170	120.6170	04/15/1963	841 2.3	0.0	4.70	0.027	V	52.7(84.9)
DMG	36.4200	120.6200	04/15/1962	841 2.3	21.0	4.70	0.027	V	52.8(85.0)
BRK	36.2000	120.4000	07/22/1983	343 2.0	0.0	5.00	0.031	V	53.0(85.3)
BRK	36.2500	120.4700	06/11/1983	3 954.0	0.0	5.10	0.033	V	53.1(85.5)
GSG	36.0460	120.0420	01/28/2005	130326.3	10.0	4.00	0.018	IV	53.1(85.5)
DMG	36.7800	120.7500	04/22/1932	0 816.0	0.0	4.00	0.018	IV	53.4(85.9)
PAS	36.0910	120.2080	08/04/1985	112924.5	6.0	4.30	0.021	IV	53.5(86.1)
PAS	36.0760	120.1820	05/03/1983	6 456.2	5.0	4.10	0.019	IV	53.8(86.6)
PAS	36.0620	120.1630	01/14/1976	214259.4	7.0	4.70	0.026	V	54.3(87.4)
BRK	36.0700	120.1900	12/21/1983	18 4 9.0	0.0	4.20	0.020	IV	54.4(87.5)
GSB	36.0070	119.9400	09/27/1992	165914.1	13.0	4.00	0.018	IV	54.5(87.8)
PAS	36.0270	120.0560	08/07/1985	016 3.5	6.0	4.40	0.022	IV	54.6(87.9)
GSB	36.0030	119.9160	09/16/1992	061433.4	11.0	4.30	0.021	IV	54.6(87.9)
BRK	36.1000	120.2900	06/12/1983	13128.0	0.0	4.00	0.018	IV	55.1(88.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	36.0000	120.0000	11/08/1964	11919.0	14.0	4.00	0.018	IV	55.6(89.5)
DMG	36.2000	120.5000	02/25/1947	114518.0	0.0	4.20	0.019	IV	56.7(91.3)
DMG	35.9800	120.0400	09/19/1965	1542 7.8	0.0	4.80	0.026	V	57.5(92.5)
DMG	36.6000	120.8000	07/25/1926	175749.0	15.0	5.00	0.029	V	57.7(92.8)
MGI	36.3300	120.6700	07/31/1919	2131 0.0	0.0	4.00	0.017	IV	58.4(93.9)
BRK	36.6800	120.8500	02/05/1983	12 127.0	0.0	4.20	0.019	IV	59.4(95.6)
PAS	37.4510	119.0880	05/25/1980	44938.0	4.0	4.00	0.017	IV	59.8(96.2)
GSB	36.7770	120.8670	01/06/1988	224948.3	6.0	4.20	0.019	IV	59.9(96.4)

****

-END OF SEARCH- 114 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2012

LENGTH OF SEARCH TIME: 213 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 3.2 MILES (5.1 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 6.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.143 g

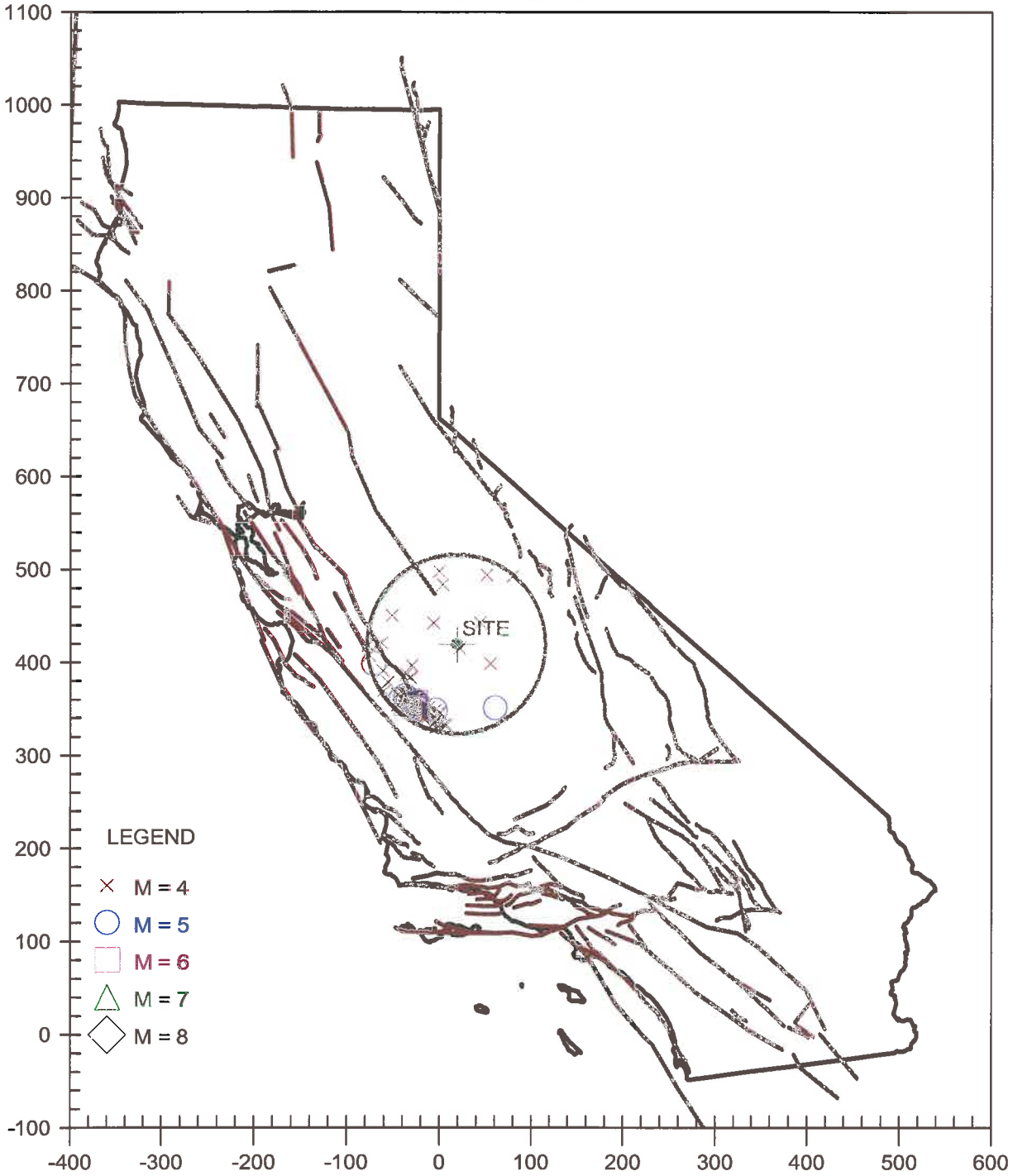
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 3.169
b-value= 0.869
beta-value= 2.001

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	114	0.53774
4.5	34	0.16038
5.0	15	0.07075
5.5	5	0.02358
6.0	2	0.00943
6.5	1	0.00472

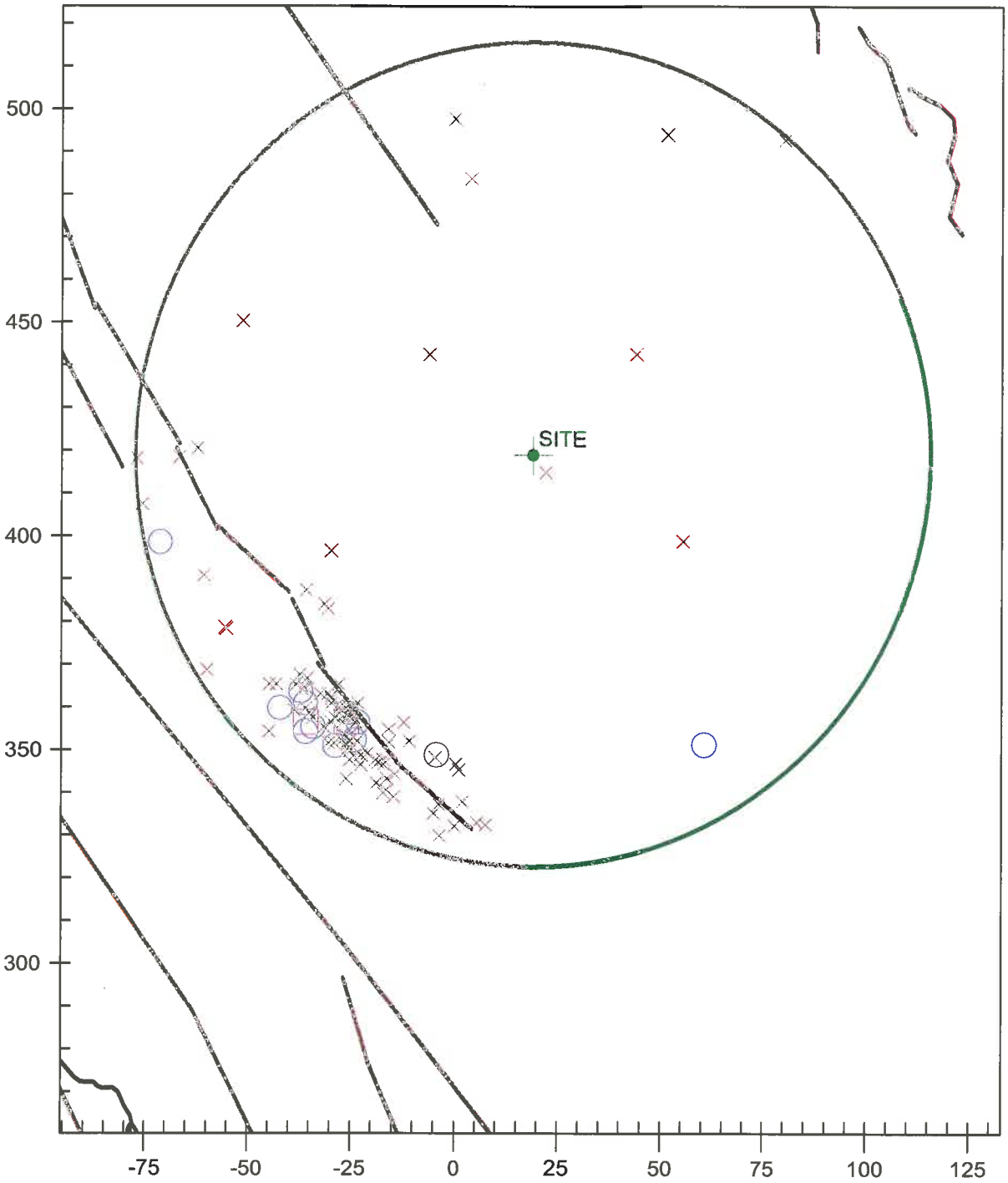
EARTHQUAKE EPICENTER MAP

Fresno General Plan Update



EARTHQUAKE EPICENTER MAP

Fresno General Plan Update



```
*************************
*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
*************************

      ESTIMATION OF
  PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 01212054
                                                DATE: 04-16-2012

JOB NAME: Fresno General Plan Update

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  36.7869
   SITE LONGITUDE:  119.7843

SEARCH DATES:
           START DATE:   1800
           END DATE:   2012

SEARCH RADIUS:
           100.0 mi
           160.9 km

ATTENUATION RELATION:   3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  0.0
```

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	36.1510	120.0490	08/04/1985	12 156.0	6.0	5.80	0.053	VI	46.3(74.5)
BRK	36.2400	120.2900	05/09/1983	24912.0	0.0	5.20	0.038	V	47.0(75.7)
BRK	36.2200	120.2600	09/09/1983	91614.0	0.0	5.40	0.042	VI	47.2(76.0)
BRK	36.2200	120.2900	05/02/1983	2346 6.0	0.0	5.60	0.046	VI	48.2(77.5)
BRK	36.2200	120.2900	05/02/1983	234239.0	0.0	6.70	0.082	VII	48.2(77.5)
PAS	36.2860	120.4130	10/25/1982	2226 4.0	6.0	5.60	0.045	VI	49.1(79.0)
PAS	36.1820	120.2680	02/14/1987	72650.8	6.0	5.10	0.035	V	49.6(79.9)
T-A	36.1700	119.3200	07/25/1868	230 0.0	0.0	5.00	0.033	V	49.8(80.1)
BRK	36.2600	120.4000	07/09/1983	74052.0	0.0	5.30	0.038	V	49.9(80.3)
BRK	36.2100	120.3800	07/25/1983	223140.0	0.0	5.10	0.034	V	51.8(83.3)
DMG	36.1700	120.3200	12/27/1926	919 0.0	0.0	5.00	0.032	V	51.9(83.6)
BRK	36.2200	120.4000	07/22/1983	23955.0	0.0	6.00	0.054	VI	52.0(83.6)
BRK	36.2000	120.4000	07/22/1983	343 2.0	0.0	5.00	0.031	V	53.0(85.3)
BRK	36.2500	120.4700	06/11/1983	3 954.0	0.0	5.10	0.033	V	53.1(85.5)
DMG	36.6000	120.8000	07/25/1926	175749.0	15.0	5.00	0.029	V	57.7(92.8)
DMG	36.2300	120.6500	02/05/1947	614 0.0	0.0	5.00	0.028	V	61.5(99.0)
PAS	37.5090	119.0430	06/11/1980	441 1.1	14.1	5.00	0.027	V	64.4(103.7)
DMG	37.2000	118.7000	09/30/1889	520 0.0	0.0	5.60	0.036	V	66.2(106.6)
DMG	36.0000	120.5000	03/03/1901	745 0.0	0.0	5.50	0.034	V	67.3(108.4)
DMG	36.0000	120.5000	02/02/1881	011 0.0	0.0	5.60	0.036	V	67.3(108.4)
DMG	35.9700	120.5000	06/28/1966	4 856.2	0.0	5.10	0.027	V	69.0(111.1)
DMG	35.9500	120.4700	11/16/1956	323 9.0	0.0	5.00	0.025	V	69.2(111.4)
GSB	35.9530	120.5020	09/29/2004	171004.0	11.0	5.10	0.027	V	70.0(112.7)
DMG	35.9500	120.5000	06/28/1966	42613.4	0.0	5.50	0.033	V	70.2(112.9)
PAS	37.4640	118.8230	05/27/1980	145057.1	2.4	6.30	0.050	VI	70.6(113.6)
DMG	35.9300	120.4800	12/24/1934	1626 0.0	0.0	5.00	0.025	V	70.7(113.8)
GSB	35.9170	120.4650	12/20/1994	102747.2	8.0	5.00	0.025	V	71.0(114.2)
DMG	35.9500	120.5300	06/29/1966	195325.9	0.0	5.00	0.025	V	71.1(114.4)
USG	37.4980	118.8380	06/06/1980	141817.2	2.0	5.27	0.029	V	71.6(115.2)
UNR	37.5580	118.9110	06/19/1980	71931.5	0.4	5.00	0.025	V	71.7(115.4)
USG	37.5420	118.8830	06/05/1980	20 452.3	1.6	5.05	0.025	V	72.0(115.8)
PAS	37.5540	118.8970	08/01/1980	163856.3	4.7	5.40	0.030	V	72.0(115.9)
DMG	36.0800	118.8200	05/29/1915	646 0.0	0.0	5.00	0.024	V	72.5(116.6)
UNR	37.5160	118.8370	06/18/1980	185537.7	6.3	5.30	0.029	V	72.5(116.6)
DMG	36.4000	121.0000	04/12/1885	4 5 0.0	0.0	6.20	0.046	VI	72.5(116.7)
UNR	37.5360	118.8510	06/20/1980	152459.6	8.7	5.30	0.029	V	72.9(117.3)
USG	37.5610	118.8740	08/01/1980	164745.9	1.9	5.15	0.026	V	73.2(117.9)
PAS	37.4860	118.7830	05/25/1980	164930.3	4.7	5.80	0.037	V	73.3(117.9)
GSG	37.5290	118.8170	05/15/1999	132210.7	5.0	5.60	0.033	V	73.9(118.9)
PAS	37.6640	119.0080	01/07/1983	32419.1	5.0	5.60	0.033	V	74.1(119.2)
GSB	35.8190	120.3640	09/28/2004	171524.2	8.0	6.00	0.041	V	74.2(119.4)
DMG	35.8000	120.3300	06/05/1934	2148 0.0	0.0	5.00	0.024	V	74.6(120.0)
DMG	35.8000	120.3300	12/28/1939	121538.0	0.0	5.00	0.024	V	74.6(120.0)
DMG	35.8000	120.3300	06/08/1934	430 0.0	0.0	5.00	0.024	V	74.6(120.0)
DMG	35.8000	120.3300	06/08/1934	447 0.0	0.0	6.00	0.041	V	74.6(120.0)
DMG	37.5000	118.7500	09/18/1927	2 7 7.0	0.0	6.00	0.040	V	75.3(121.1)
DMG	37.4170	118.6670	02/02/1961	0 742.0	0.0	5.10	0.025	V	75.4(121.3)
GSG	37.5640	118.8050	07/15/1998	045319.2	6.0	5.10	0.025	V	76.0(122.4)
PAS	37.6220	118.8810	09/30/1981	115327.0	6.0	5.80	0.036	V	76.1(122.5)
USG	37.5270	118.7590	06/08/1980	61139.6	1.3	5.12	0.025	V	76.1(122.5)
DMG	35.7500	120.2500	03/10/1922	112120.0	0.0	6.50	0.052	VI	76.1(122.5)
PAS	37.5560	118.7910	05/25/1980	194452.2	6.4	6.50	0.052	VI	76.2(122.6)
PAS	37.6560	118.9290	01/07/1983	13810.6	5.7	5.70	0.034	V	76.2(122.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	37.5170	118.7430	05/26/1980	122427.3	2.0	5.20	0.026	V	76.3(122.8)
DMG	37.5170	118.7330	06/05/1960	747 7.0	0.0	5.20	0.026	V	76.7(123.5)
PAS	37.4490	118.6530	11/26/1984	162141.4	6.0	5.50	0.030	V	77.3(124.3)
PAS	37.6080	118.8210	05/25/1980	163344.8	3.7	6.40	0.049	VI	77.6(124.9)
GSB	37.5890	118.7950	06/09/1998	052440.2	6.0	5.20	0.026	V	77.6(124.9)
MGI	36.6000	118.4000	09/04/1868	0 0 0.0	0.0	5.00	0.023	IV	77.7(125.1)
DMG	35.7500	120.3300	08/18/1922	512 0.0	0.0	5.00	0.023	IV	77.8(125.1)
UNR	37.6360	118.8470	06/19/1980	14430.2	8.3	5.20	0.026	V	78.1(125.6)
DMG	37.4500	118.6330	02/02/1961	0 416.0	0.0	5.30	0.027	V	78.2(125.8)
PAS	37.4230	118.6080	11/23/1984	191235.3	6.0	5.40	0.028	V	78.3(125.9)
DMG	37.3500	118.5500	08/04/1959	73659.0	0.0	5.20	0.026	V	78.3(126.0)
PAS	37.5370	118.7130	05/25/1980	203551.0	5.0	5.50	0.030	V	78.5(126.3)
DMG	36.5800	121.1800	07/29/1951	105345.0	0.0	5.00	0.023	IV	78.6(126.5)
DMG	36.9000	121.2000	03/06/1882	2145 0.0	0.0	5.70	0.033	V	78.6(126.5)
PAS	37.5140	118.6830	10/04/1978	164248.7	5.6	5.80	0.035	V	78.7(126.6)
DMG	37.5670	118.7330	09/14/1941	182118.7	0.0	5.50	0.030	V	79.0(127.2)
DMG	37.5670	118.7330	09/14/1941	183911.9	0.0	6.00	0.039	V	79.0(127.2)
DMG	37.5670	118.7330	12/31/1941	64844.0	0.0	5.40	0.028	V	79.0(127.2)
DMG	37.5670	118.7330	09/14/1941	164331.8	0.0	5.80	0.035	V	79.0(127.2)
DMG	37.5670	118.7330	09/14/1941	2116 1.0	0.0	5.00	0.023	IV	79.0(127.2)
PAS	37.6040	118.7700	05/27/1980	19 1 8.3	3.8	5.00	0.023	IV	79.3(127.7)
GSB	36.6030	121.2010	04/23/1995	084136.6	7.0	5.00	0.023	IV	79.4(127.9)
DMG	37.4530	118.6040	12/03/1938	174252.6	10.0	5.70	0.033	V	79.6(128.1)
PAS	37.5380	118.6750	10/04/1978	1739 3.3	6.3	5.30	0.027	V	80.1(128.9)
DMG	36.5780	121.2090	02/24/1972	155651.0	7.5	5.10	0.024	IV	80.2(129.0)
PAS	37.4700	118.5970	11/23/1984	18 825.6	6.0	6.20	0.042	VI	80.6(129.7)
DMG	36.6700	121.2500	08/06/1916	1938 0.0	0.0	5.50	0.029	V	81.5(131.2)
T-A	36.6700	121.2500	04/01/1857	1135 0.0	0.0	5.00	0.022	IV	81.5(131.2)
PAS	37.4480	118.5450	03/25/1985	16 513.6	6.0	5.00	0.022	IV	82.1(132.1)
DMG	36.7000	118.3000	08/17/1896	1130 0.0	0.0	5.90	0.036	V	82.3(132.5)
GSB	36.8100	121.2750	01/26/1986	192051.2	7.0	5.50	0.029	V	82.4(132.6)
DMG	36.0000	120.9200	11/02/1955	1940 6.0	0.0	5.20	0.024	V	83.3(134.0)
GSB	36.8030	121.3020	02/20/1988	083957.5	9.0	5.30	0.026	V	83.9(135.0)
DMG	37.3300	118.4200	05/06/1910	1640 0.0	0.0	5.50	0.028	V	84.0(135.2)
DMG	37.3300	118.4200	01/05/1912	354 0.0	0.0	5.50	0.028	V	84.0(135.2)
DMG	36.7000	121.3000	04/09/1961	72541.0	0.0	5.50	0.028	V	84.1(135.3)
DMG	36.7000	121.3000	03/31/1885	756 0.0	0.0	5.50	0.028	V	84.1(135.3)
DMG	36.6800	121.3000	04/09/1961	72316.0	0.0	5.60	0.030	V	84.2(135.5)
DMG	36.4500	121.2500	09/27/1938	1223 0.0	0.0	5.00	0.022	IV	84.5(136.0)
DMG	37.5670	118.5830	12/28/1951	24927.0	0.0	5.20	0.024	V	85.3(137.2)
DMG	37.5000	118.5000	04/11/1872	19 0 0.0	0.0	6.60	0.050	VI	86.1(138.6)
DMG	36.0000	121.0000	02/26/1932	1658 0.0	0.0	5.00	0.021	IV	86.7(139.5)
T-A	38.0000	120.2500	04/11/1872	12 0 0.0	0.0	5.00	0.021	IV	87.6(140.9)
DMG	36.9000	118.2000	03/26/1872	14 6 0.0	0.0	6.50	0.046	VI	87.9(141.4)
DMG	36.9000	118.1900	11/28/1929	1949 0.0	0.0	5.50	0.027	V	88.4(142.3)
DMG	37.0000	118.2000	04/03/1872	1215 0.0	0.0	6.10	0.037	V	88.7(142.8)
T-A	36.8300	118.1700	07/12/1871	330 0.0	0.0	5.00	0.021	IV	89.3(143.7)
T-A	36.8300	118.1700	02/28/1895	825 0.0	0.0	5.00	0.021	IV	89.3(143.7)
DMG	36.8000	121.4000	04/02/1885	1525 0.0	0.0	5.40	0.026	V	89.3(143.8)
PAS	37.5420	118.4440	07/21/1986	144226.7	6.0	5.90	0.033	V	90.3(145.3)
MGI	37.0000	118.1700	12/08/1929	1245 0.0	0.0	5.30	0.024	V	90.3(145.4)
MGI	37.0000	118.1700	12/02/1929	7 0 0.0	0.0	5.30	0.024	V	90.3(145.4)
DMG	36.8300	121.4200	12/31/1910	1211 0.0	0.0	5.00	0.021	IV	90.5(145.6)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	36.7800	121.4300	01/20/1960	32553.0	0.0	5.00	0.021	IV	91.0(146.4)
PAS	37.4730	118.3720	07/31/1986	72240.5	6.0	5.90	0.033	V	91.0(146.5)
PAS	37.5830	118.4500	07/20/1986	142946.3	6.0	5.90	0.033	V	91.7(147.6)
DMG	36.8000	121.4500	06/24/1939	13 2 0.0	0.0	5.50	0.026	V	92.1(148.2)
PAS	37.6470	118.5020	07/21/1986	22 718.7	6.0	5.40	0.025	V	92.2(148.3)
GSB	36.7550	121.4640	08/12/1998	141025.1	8.0	5.40	0.025	V	92.9(149.5)
DMG	36.7000	118.1000	03/26/1872	1030 0.0	0.0	7.80	0.088	VII	93.4(150.3)
GSB	38.0470	119.1570	10/24/1990	061520.7	12.0	5.70	0.029	V	93.6(150.6)
GSB	37.0250	121.4580	01/16/1993	062934.9	5.0	5.30	0.023	IV	93.9(151.0)
DMG	36.9100	121.4800	11/28/1974	23 124.7	0.0	5.20	0.022	IV	94.1(151.4)
MGI	36.6000	118.1000	05/17/1872	21 0 0.0	0.0	5.00	0.020	IV	94.1(151.5)
DMG	36.8000	121.5000	11/13/1892	1245 0.0	0.0	5.60	0.027	V	94.9(152.7)
DMG	37.0200	121.4800	03/09/1949	122839.0	0.0	5.20	0.022	IV	95.0(152.9)
MGI	36.5800	118.0800	07/06/1917	11 1 0.0	0.0	5.70	0.029	V	95.4(153.6)
PAS	37.6200	118.3980	07/22/1986	134859.0	6.0	5.20	0.022	IV	95.5(153.7)
DMG	37.0000	121.5000	06/20/1897	2014 0.0	0.0	6.20	0.037	V	95.9(154.3)
T-A	36.5800	118.0700	08/13/1882	0 0 0.0	0.0	5.00	0.020	IV	96.0(154.5)
T-A	36.5800	118.0700	04/18/1872	0 0 0.0	0.0	5.00	0.020	IV	96.0(154.5)
PAS	37.6270	118.3860	07/22/1986	133358.9	6.0	5.00	0.020	IV	96.3(155.0)
DMG	37.6100	118.3680	05/10/1936	174013.2	10.0	5.00	0.020	IV	96.4(155.2)
DMG	37.5000	121.3000	07/15/1866	630 0.0	0.0	5.80	0.030	V	96.9(155.9)
BRK	37.1000	121.5000	08/06/1979	17 522.0	0.0	5.80	0.030	V	97.1(156.3)
PAS	37.5990	118.3200	07/21/1986	1451 8.8	6.0	5.40	0.024	IV	98.1(157.9)
DMG	37.4000	121.4000	04/10/1881	10 0 0.0	0.0	5.90	0.031	V	98.5(158.6)
DMG	35.6000	118.8000	06/30/1926	1331 0.0	0.0	5.00	0.019	IV	98.6(158.7)
T-A	36.8300	121.5700	10/18/1800	0 0 0.0	0.0	7.00	0.055	VI	98.8(158.9)
DMG	37.2000	121.5000	07/06/1899	2010 0.0	0.0	5.80	0.029	V	98.8(159.0)
T-A	37.0000	121.5700	03/25/1859	0 0 0.0	0.0	5.00	0.019	IV	99.7(160.4)
MGI	37.0000	121.5700	01/09/1928	250 0.0	0.0	5.30	0.022	IV	99.7(160.4)
MGI	35.5000	120.6000	01/01/1830	0 0 0.0	0.0	5.00	0.019	IV	99.8(160.6)

****

-END OF SEARCH- 136 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2012

LENGTH OF SEARCH TIME: 213 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 46.3 MILES (74.5 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.8

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.088 g

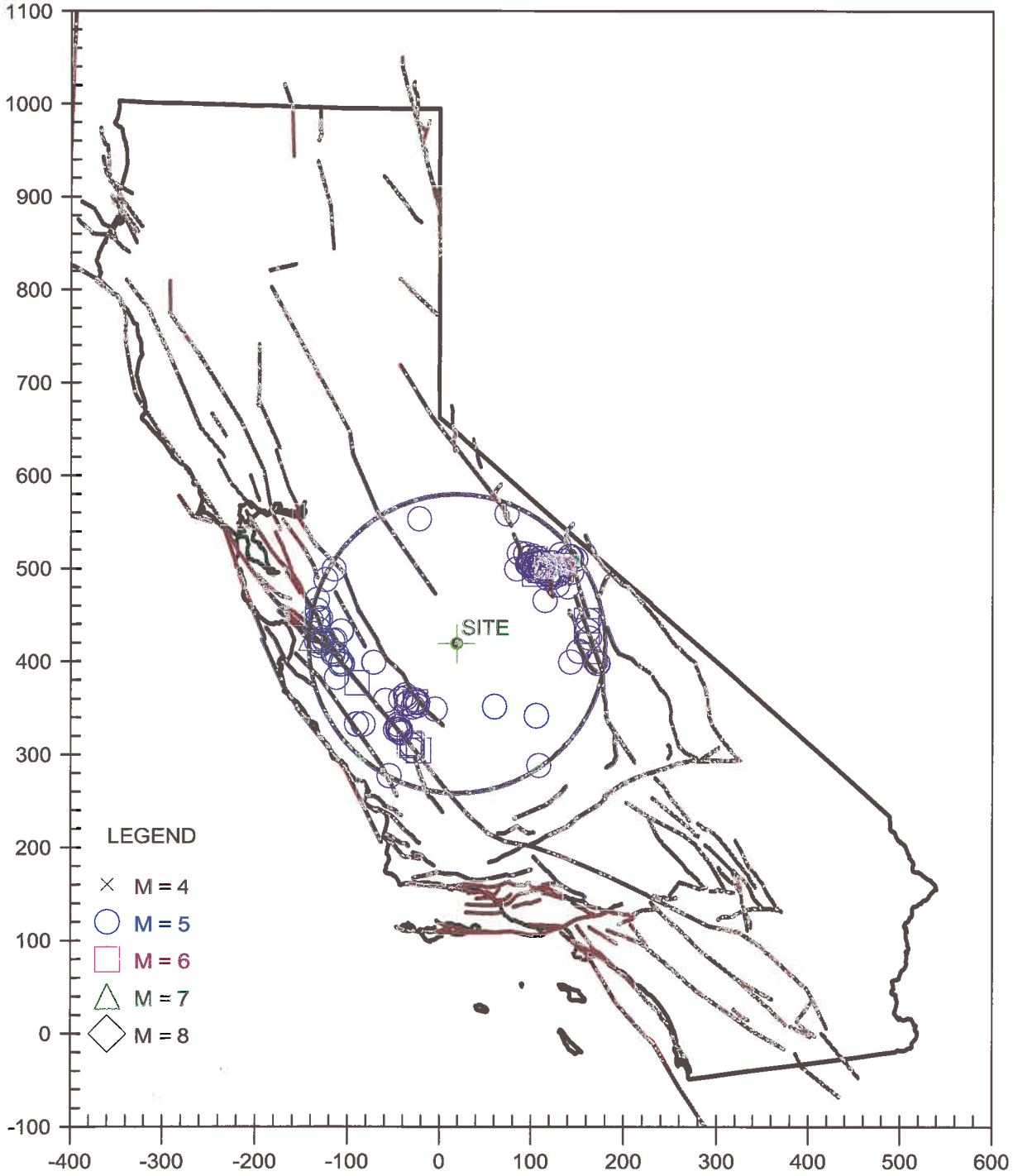
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.688
b-value= 0.427
beta-value= 0.983

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	136	0.64151
4.5	136	0.64151
5.0	136	0.64151
5.5	57	0.26887
6.0	18	0.08491
6.5	7	0.03302
7.0	2	0.00943
7.5	1	0.00472

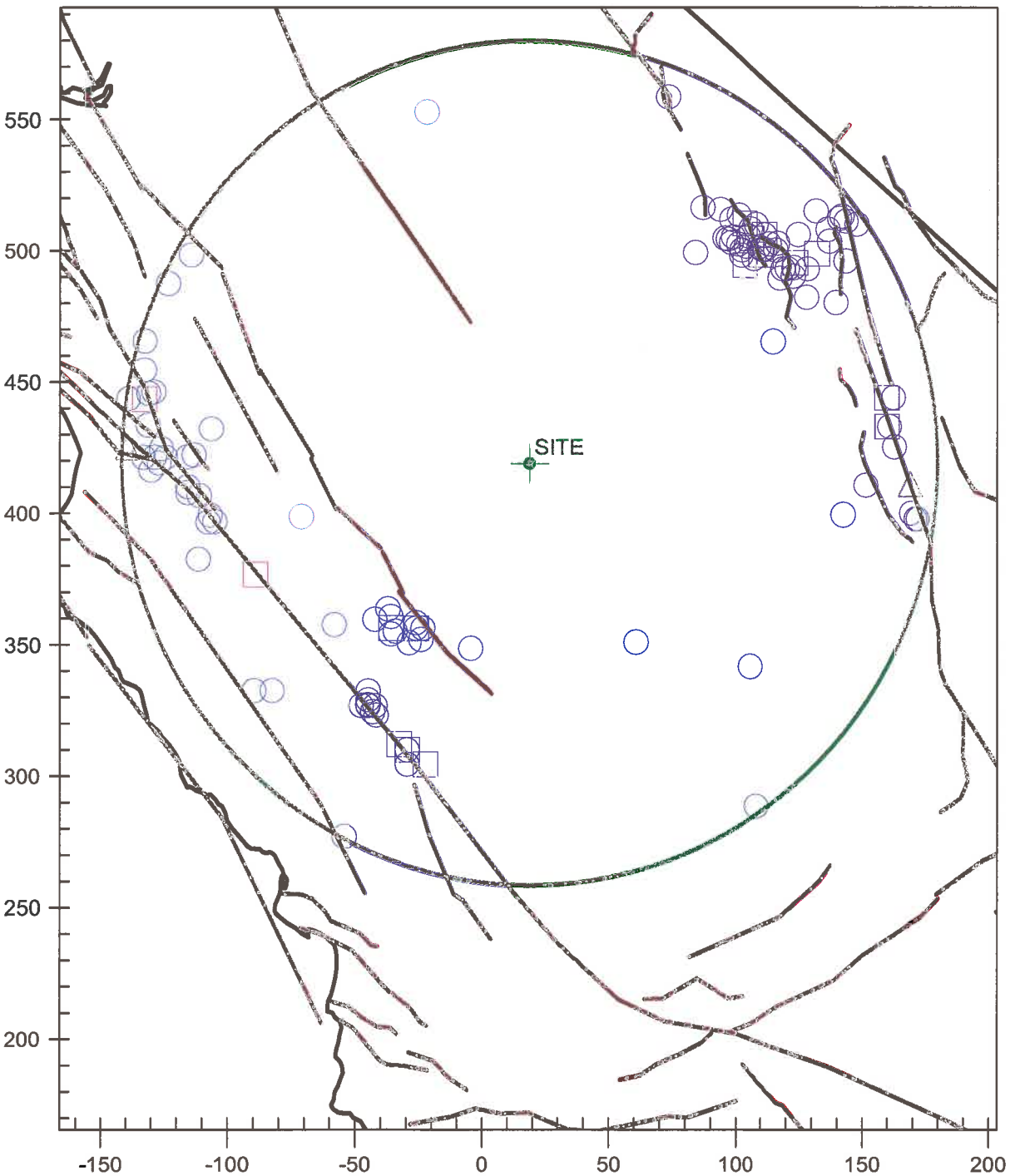
EARTHQUAKE EPICENTER MAP

Fresno General Plan Update

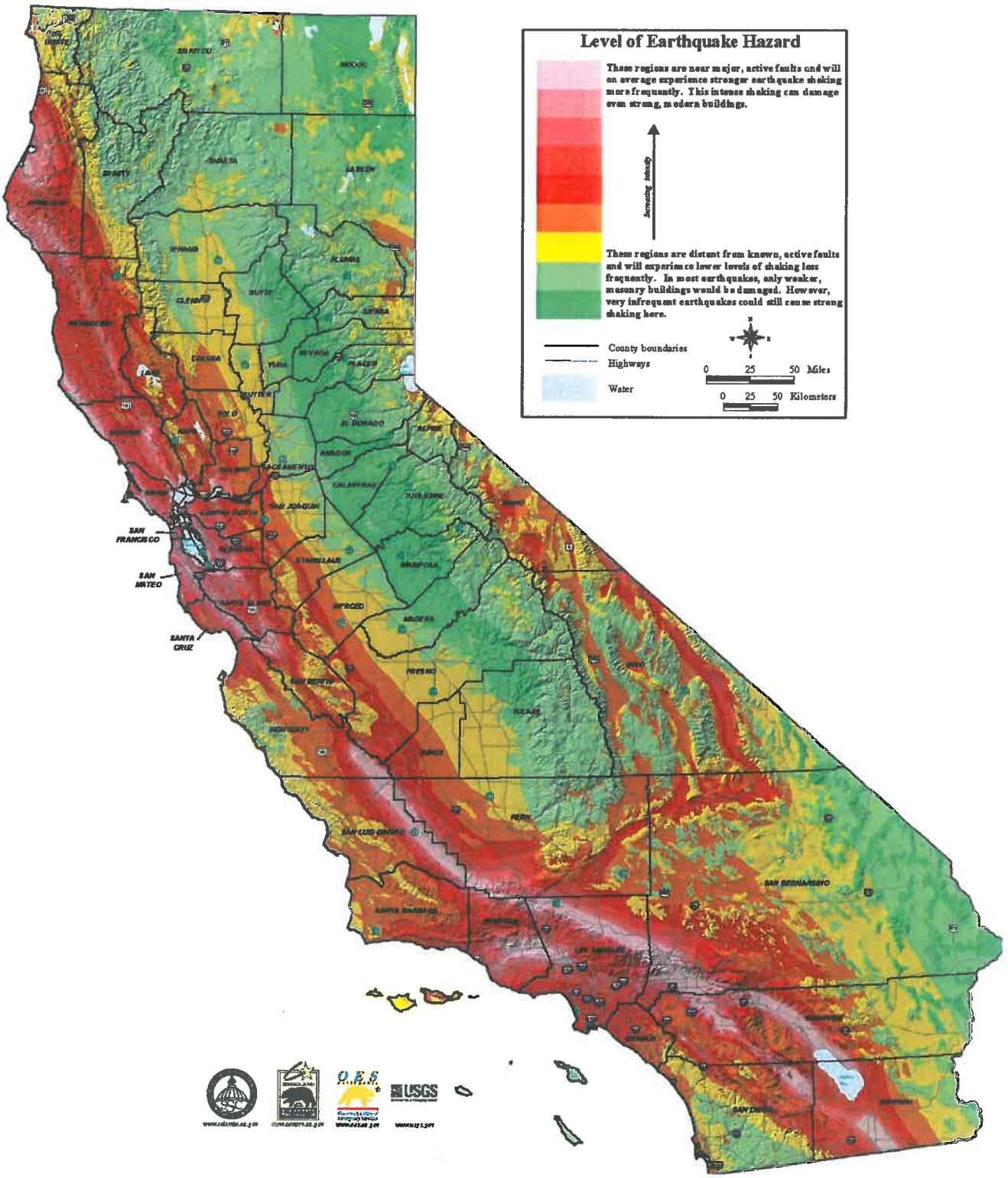


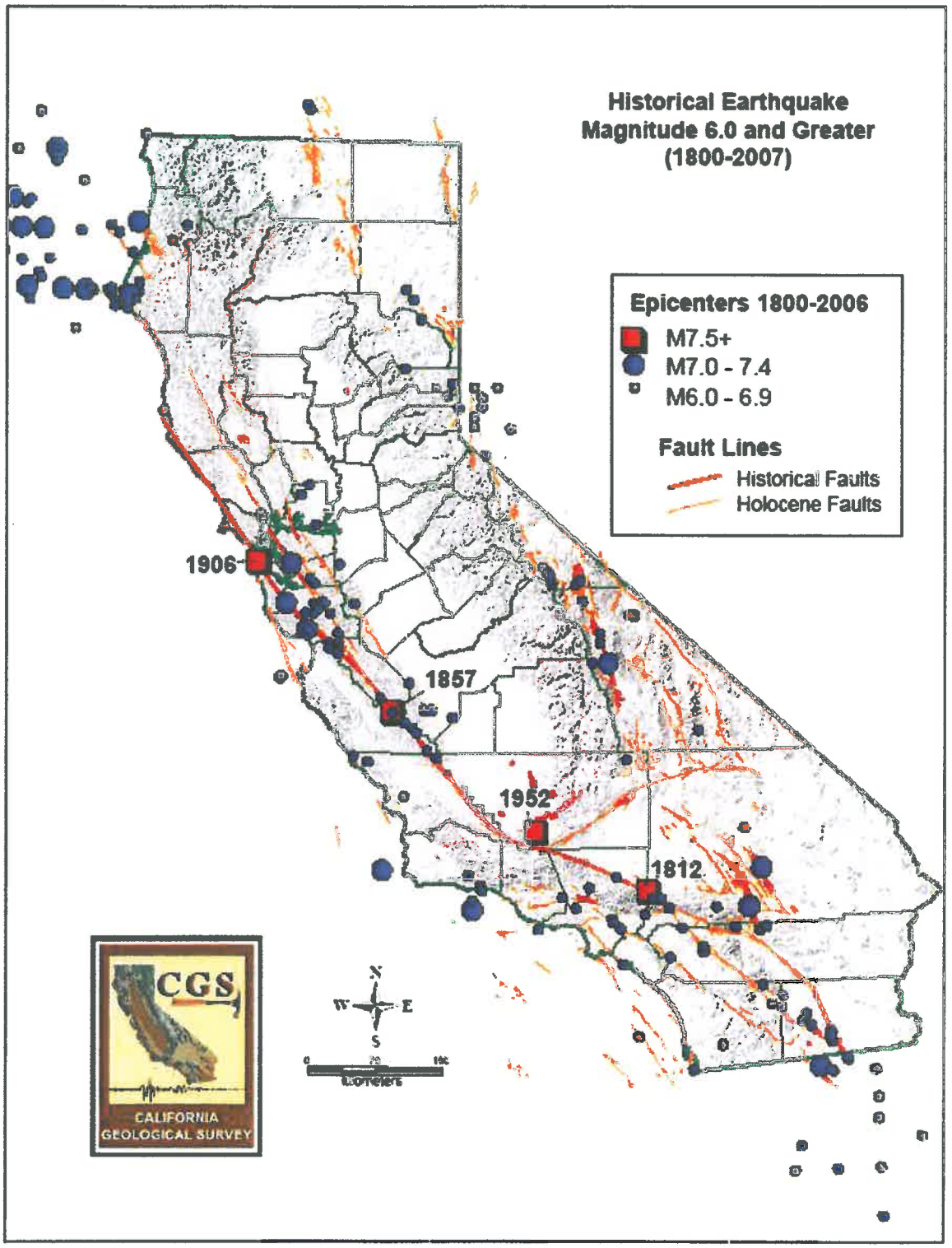
EARTHQUAKE EPICENTER MAP

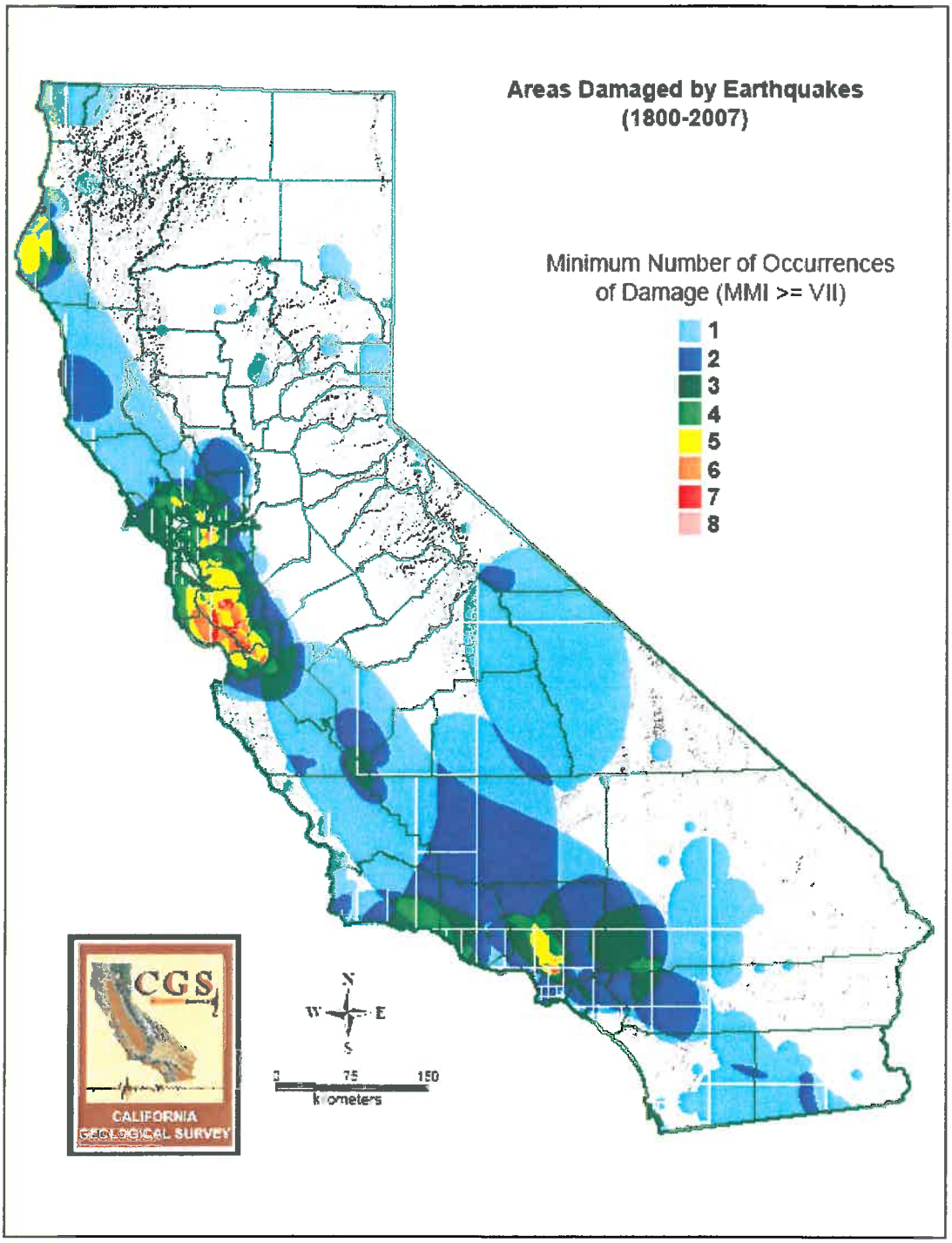
Fresno General Plan Update



Levels of Earthquake Hazards in California

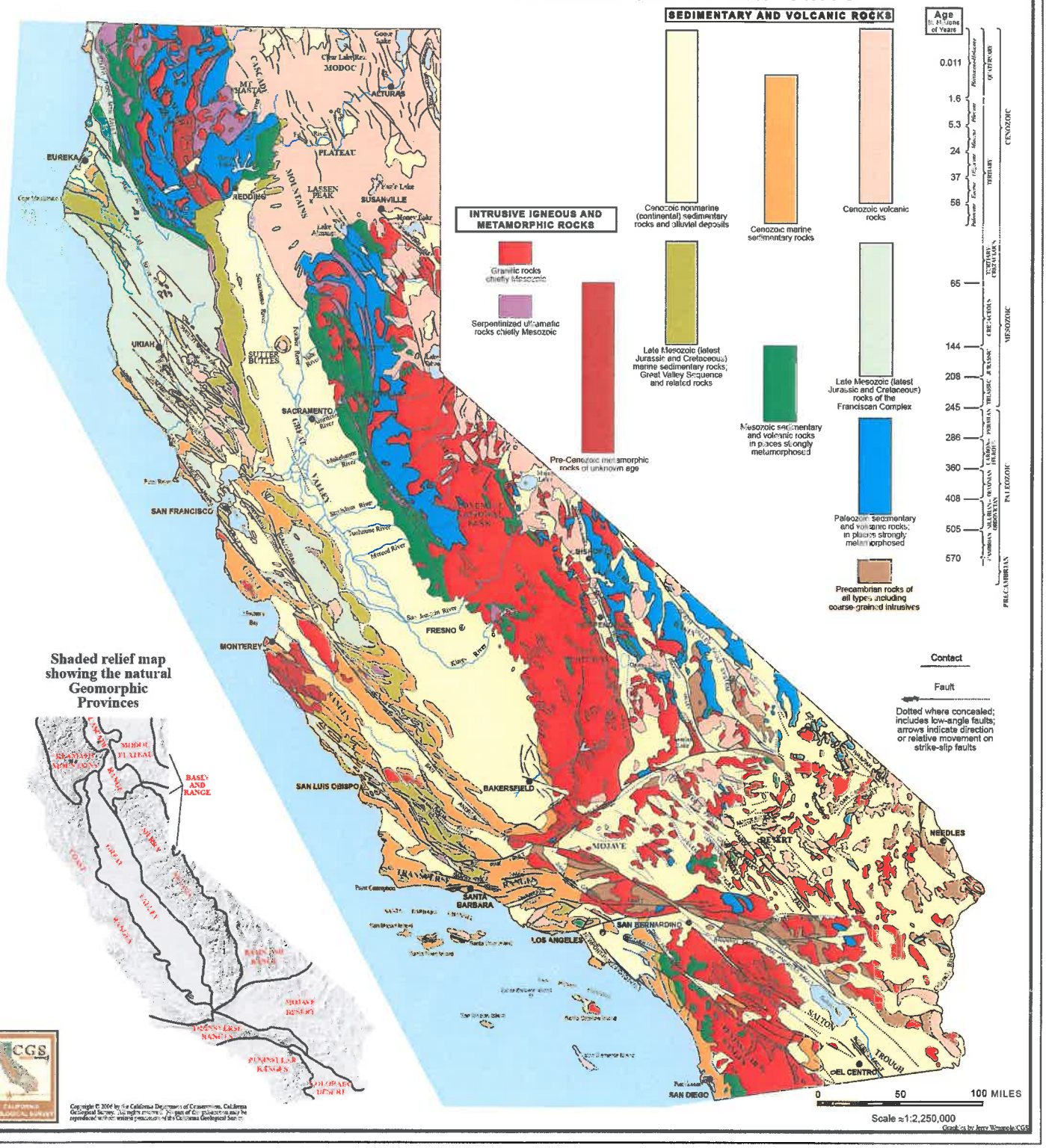



Historical Earthquake
Magnitude 6.0 and Greater
(1800-2007)
Epicenters 1800-2006
M7.5+
M7.0 - 7.4
M6.0 - 6.9
Fault Lines
Historical Faults
Holocene Faults
1906
1857
1952
1812
CGS
CALIFORNIA
GEOLOGICAL SURVEY
N
W
E
S


Areas Damaged by Earthquakes
(1800-2007)
Minimum Number of Occurrences
of Damage (MMI >= VII)
1
2
3
4
5
6
7
8
CGS
CALIFORNIA
GEOLOGICAL SURVEY
N
W
E
S
75
150
kilometers

SIMPLIFIED GEOLOGIC MAP OF CALIFORNIA

CORRELATION OF MAP UNITS



Copyright © 2006 by the California Department of Conservation, California Geological Survey. All rights reserved. No part of this publication may be reproduced without written permission of the California Geological Survey.

Graphics by Jerry Wemple/CGS

Appendix F: Greenhouse Gas

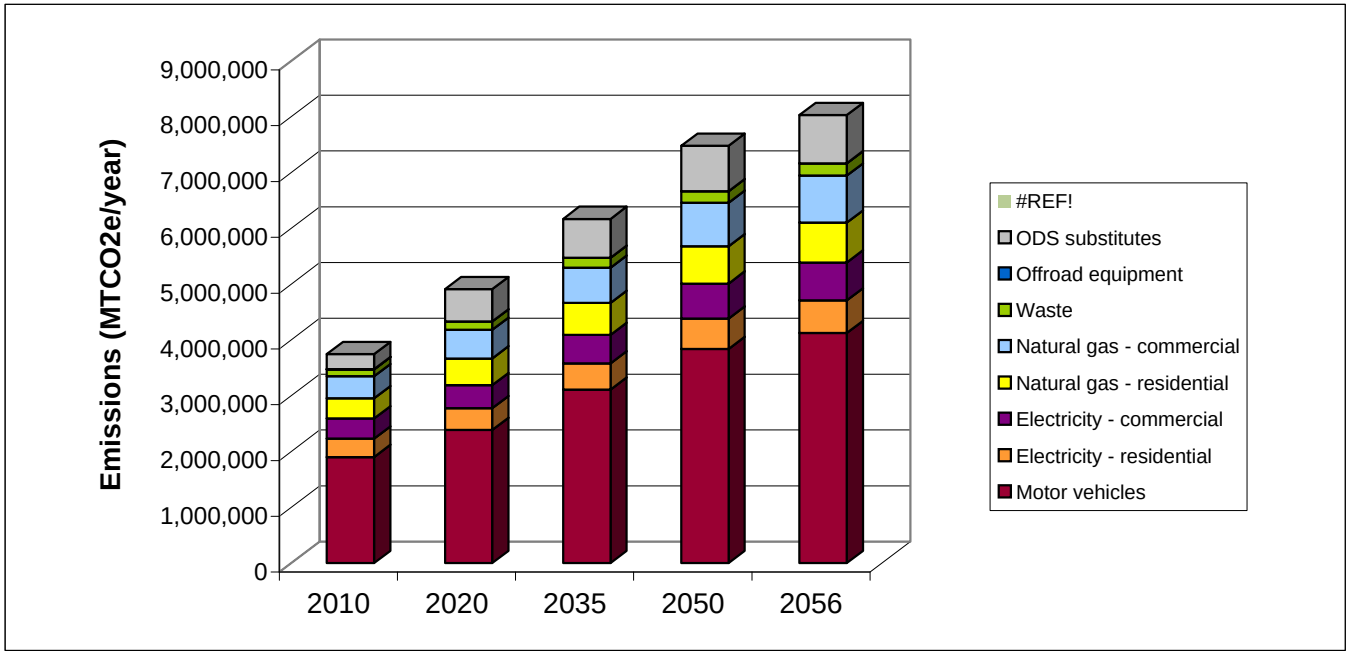
F.1 - Greenhouse Gas Emission Reduction and Modeling Results

Community Greenhouse Gas Business as Usual Inventory

Summary

Prepared by Michael Brandman Associates

Source	2010	2020	2035	2050	2056
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447
Electricity - commercial	361,836	415,012	509,781	626,137	679,888
Natural gas - residential	362,832	476,679	573,160	670,082	712,228
Natural gas - commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	3,745,115	4,905,399	6,166,049	7,475,346	8,026,499



Emission Reduction from Local Measures

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	2,383,023.0	1,828,249.0	1,745,490.1	**637,532.9**
Reduction		554,774.0		26.75%

Reductions from Land Use Strategy 2020

	Reduction Percentage	Emissions MTCO2e
2020 Lt Duty Vehicle Emissions without Local Measures		1,069,681.4
SB 375 Land Use Strategy	4.70%	**50,275**
Emissions after reduction		1,019,406

Source: ARB Staff Report Update on Senate Bill 375 Implementation in the San Joaquin Valley, January 15, 2013

Reductions from TDM

	Percentage Reduction	Emissions MTCO2e
2020 Lt Duty Emissions with SB 375		1,069,681.4
Rule 9410 TDM Emission Reductior	1.60%	**17,115**
Emissions after reduction		1,052,567

Source: SJVAPCD 2012 Rule 9410 Staff Report
Reductions include increases in travel by carpool, vanpool, transit, bicycling, and walking for commute trips

2035 Emission Emissions without Local Measures

Mobile Source Emissions	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Motor Vehicles	3,107,859.0	2,205,408.7	1,782,755.6	**1,325,103.4**
Reduction		902,450.3		42.64%

Reductions from Land Use Strategy 2035		
	Reduction Percentage	**Emissions MTCO2e**
2035 Light Duty Emissions without Local Measures		1,075,445.3
SB 375 Land Use Strategy	7.60%	**81,734**
Lt Duty Emissions after reduction		993,711

Source: ARB Staff Report Update on Senate Bill 375 Implementation in the San Joaquin Valley, January 15, 2013

Reductions from TDM 2035		
	Percentage Reduction	**Emissions MTCO2e**
2035 Emissions with SB 375		1,075,445.3
Rule 9410 TDM Emission Reductior	1.60%	**17,207**
Lt Duty Emissions after reduction		1,058,238

Source: SJVAPCD 2012 Rule 9410 Staff Report
Reductions include increases in travel by carpool, vanpool, transit, bicycling, and walking for commute trips

Water Use	Population	Water Use (gal/day)	Mgal/Day	Mgal/year	20% Reduction	25% Reduction
Per capita water use 2009 (gal)		275				
Population 2010	545,000	149,875,000	149.88	54,704.4		
Population 2020	649,200	178,530,000	178.53	65,163.5	13,032.7	
Population 2035	780,600	214,665,000	214.67	78,352.7		19,588.2
Population 2050	912,600	250,965,000	250.97	91,602.2		22,900.6
Population 2056	970,000	266,750,000	266.75	97,363.8		24,340.9

Electric Intensity Factors	kWh/mgal	2020 Energy Savings (kWh)	2035 Energy Savings (kWh)
Supply	2,117	27,590,205	41,468,180
Treatment	111	1,446,629	2,174,288
Distribution	1,272	16,577,582	24,916,167
Total		45,614,415	68,558,634

Emission Reductions from Water Use	PG&E Emissions Rate (MTCO2/MWh	Emission Reductions (MTCO2e)
2020 Reductions	0.131	5,975.5
2035 Reductions	0.131	8,981.2

Project Reduction Potential From Land Use and Transportation Measures

Land Use and Transportation		Reduction Range (percent)	Global Maximum Suburban (percent)	Global Max Suburban Center (percent)
Compact Development	LUT-1, LUT-2	1.5 to 30		
Mixed Use Development	LUT-3	9 to 30		
Pedestrian Orientation	LUT-4, TST-2	6.7 to 20		
Bicycle Infrastructure	LUT-8, TST-5	Not quantified		
Transit Service Enhancements	TST-3, TST-4	0.02 to 8.2		
TDM Programs at Commercial	TRT-1, TRT-2, TRT-3	1 to 21		
TDM Measures at Commm	TRT-4 through TRT-11, TRT-14, TRT-15	0.3 to 21		
Maximum Combined Reduction			**15**	**20**

Source: Reductions from CAPCOA 2010

Energy Related		
Exceed Title 24		1-100
Water Conservation		1-20
Solid Waste Reduction		
Alternative Energy Gen		0-100
Programs for Existing Sources		
Infrastructure benefiting Existing Development		
Improve Traffic Flow	RPT-2	0-45

Source: CAPCOA 2010 Table 6.2

This information represents the range of reductions that can be achieved by individual projects implementing the General Plan

Solid Waste		
Reductions from Diversion and Recycling		Per Capita (lbs/day)
2005 Waste Generation (tons)	505,910	6.6
2010 Waste Generation (tons)	333,098	3.7
Emissions MTCO2e	123,945	
Emission Rate (MTCO2e/ton)	0.37	
2020 Target (75% Diversion) tons		1.65
2020 Emission at 75% Diversion		1.65

	Population	Target	Waste Gen (lbs/day)	Waste Gen (tons/year)	Waste Emissions MTCO2e	BAU Emissions MTCO2e	Emission Reduction MTCO2e
Population 2020	649,200	1.65	1,071,180	195,490	72,742	147,628	74,886
Population 2035	780,600	1.65	1,287,990	235,058	87,465	177,508	90,043
BAU Emissions							

Local Reduction Summary			
Sector		**2020 (MTCO2e)**	**2035 MTCO2e**
Motor Vehicles	Land Use and Transportation Str	50,275	81,734
	TDM (Rule 9410)	17,115	17,207
	Subtotal	**67,390**	**98,941**
Electricity	Water Conservation	5,975	8,981
	Subtotal	**5,975**	**8,981**
Waste	75% Waste Diversion Target	74,886	90,043
	Subtotal	**74,886**	**90,043**
Total all Sectors		**148,252**	**197,966**

		Per Capita Emission
2020 BAU	4,905,399	
2020 Adj BAU	3,591,513	
2020 Local Reductions	148,252	
2020 w/all Reductions	3,443,261	5.30
Percent Reduction from BAU	29.81%	

		Per Capita Emissions
2035 BAU	6,166,049	
2035 Adj BAU	3,881,781	
2035 Local Reductions	197,966	
2035 w/all Reductions	3,683,815	4.72
Percent Reduction from BAU	40.26%	
2035 Interim Target	3,699,629	4.74
Additional Reductions Needed	-15,814	-0.02

Reductions from State Measures

Targets based on State Reductions for AB 32

State Inventory 2010 MTCO2e	451.6
New State Inventory 2020 BAU MTCO2e	**545.0**
State Inventory 2020 Reduced MTCO2e	507.0
AB 32 target - 1990 EI MTCO2e	427.0
Reductions Required from BAU MTCO2e	118.0
Percent Reduction Rqd BAU	**21.7**
Reduction from 2010	24.6
Percent Reduction from 2010	5.4

2020 Emission Reduction Calculations				
	Emissions	**Population**	**Per Capita**	**Reduction**
Fresno 2010 Inventory	3,745,116	545,000	6.87	
Fresno 2020 BAU Inventory	4,905,399	649,200	7.56	
Fresno 2020 Target	**3,843,313**	649,200	**5.92**	**21.65%**
Reduction Required from BAU	1,062,086			
Reductions Achieved	1,313,886			
Emissions with Reductions	3,591,513		5.53	**26.78%**

Offroad Emissions Alternative Estimate using State Inventory for 2010	
California 2010 MTCO2e	2,030,000
California Population	37,309,404
Per Capita Emissions MT/Person/Year	0.054
Fresno Population 2010	545,000
Fresno Offroad Emissions	29,653.4

	2020 BAU	**2020 w/Pavley I**	**2020 w/LEV III and Other Regs**	**Reduction from BAU**
Mobile Source Emissions				
Motor Vehicles	2,383,023.0	1,828,249.0	1,748,773.1	**634,250**
Reduction		554,774.0	79,475.9	26.62%

Fleet VMT Fractions in 2020		**CO2 tons/year**	**MTCO2e/year**
Gasoline Vehicles			
LDA	0.436	701,792.9	
LDT1	0.064	118,436.2	
LDT2	0.163	356,767.2	
Total	0.663	1,176,996.3	
LEV III 2020 Reduction 3%		35,309.9	
Diesel Vehicles			
LDA	0.0012	1,856.6	
LDT1	0.0001	131.0	
LDT2	0.0001	118.2	
Total	0.0014	2,105.8	
LEV III 2020 Reduction 3%		63.2	
Total Inventory 2020		**1,179,102.1**	1,069,681.4
LEV III 2020 Reduction 3%			**32,090.4**
ARB estimate of LEV Reductions from 2016 to 2020			

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	1,179,102.1	1,069,681.4	1,069,681.4

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2020 Reductions	
California Reductions in MMT CO2e	0.93	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0041	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction in HD emissions MTCO2e	**9,836.7**	

Med/HDT Hybridization	2020 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction in HD emissions MTCO2e	**5,288.6**	**15,125.3**

Light Duty Vehicle Efficiency Measures	2020 Reductions	Fresno Reduction MTCO2e
Tire Pressure Regulation	0.55	5,817.4
Tire Tread Standard	0.3	3,173.1
Low Friction Oil	2.2	23,269.6
Total	3.05	**32,260.2**
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.013537506	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	**32,260.2**	
Total Reductions all Measures	**47,385.5**	

Mobile Reductions Summary	MTCO2e/ year
LEV III	32,090.4
Vehicle Efficiency	47,385.5
	79,475.9

Energy Emissions	2020 EI MTCO2e	2020 w/RPS	RPS Reduction
2020 Electricity Residential	390,488	226,011	164,477
2020 Electricity Commercial	415,012	240,205	174,807
Total	805,500	466,216	339,284

	2020 MTCO2e	T24 Reductions	2020 w/T24
2020 Natural Gas Residential	476,679	7,983	468,696
2020 Natural Gas Commercia	514,647	17,530	497,117
	991,326	**25,513**	965,813

PG&E Portfolio	Percent
2010 Pecentage	17.7
2020 Mandate Percentage	33
Reduction	15.3

Included in Emission Factor from PG&E in spreadsheets

Title 24 Reductions 2008 and 2013 Updates

	2020 BAU MTCO2e	2010 BAU MTCO2e	Increase 2010 to 2020	Emission Reduction
Electricity Residential	390,488	327,813	62,675	16,833
Electricity Commercial	415,012	361,836	53,176	9,614
Total	805,500	689,649	115,851	**26,447**
Natural Gas Residential	476,679	362,832	113,847	7,983
Natural Gas Commercial	514,647	394,417	120,230	17,530
	991,326	757,250	234,076	**25,513**
Title 24 Totals				**51,960**

Commercial reductions include 3 years reductions at 2008 standard and 7 years at 2013 standard.

2008 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	8,659	0.227	1,966
Multi-Family	0.539	10,143	0.197	1,998
Total 2020 Residential Electricity Reductions				**3,964**

2008 Title 24 Fresno Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	15,729	0.1	1,573
Multi-Family	0.539	18,425	0.07	1,290
Total 2020 Residential Natural Gas Reductions				**2,863**

2008 Standards provide reductions from 2010-2013
Reductions from CEC 2008

2013 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	20,204	0.364	7,354
Multi-Family	0.539	23,668	0.233	5,515
Total 2020 Residential Electricity Reductions				**12,869**

2013 Title 24 Fresno Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	36,701	0.065	2,386
Multi-Family	0.539	42,992	0.038	1,634
Total 2020 Residential Natural Gas Reductions				**4,019**

Emission Reductions from CEC 2012 Impact Analysis of 2013 T24 Standards
Reductions based on development from 2014-2020.

	2020 Adj EI MTCO2e	Title 24 Reductions	2020 EI W/T24	2020 BAU	Reduction from BAU
2020 Electricity Residential	226,011	16,833	209,178	390,488	181,310
2020 Electricity Commercial	240,205	9,614	230,591	415,012	184,421
Total	466,216	**26,447**	439,769		
2020 Nat Gas Residential	476,679	**7,983**	468,696	476,679	7,983
2020 Nat Gas Commercial	514,647	**17,530**	497,117	514,647	17,530
Total	991,326	25,513	965,813		

Ozone Depleting Substances	
	MTCO2e
2020 BAU Emissions	576,784
ARB Refrigerant Management Program Reduction 50%	0.5
2020 Reduction	**288,392**

Emission reductions estimates from ARB Appendix B. California Facilitites and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

Emissions (MTCO2e/year)		2020 BAU	Reductions in 2020	Adj BAU 2020	Percent Reduction
	Motor vehicles	2,383,023	634,250	1,748,773	26.62%
	Electricity - residential	390,488	181,310	209,178	46.43%
	Electricity - commercial	415,012	184,421	230,591	44.44%
	Natural gas - residential	476,679	7,983	468,696	1.67%
	Natural gas - commercial	514,647	17,530	497,117	3.41%
	Waste	147,628	0	147,628	0.00%
	Offroad equipment	1,138	0	1,138	0.00%
	ODS substitutes	576,784	288,392	288,392	50.00%
	Total	4,905,399	1,313,886	3,591,513	26.78%

BAU assumes 2005 emission rates to eliminate the effect of controls

Source Group	State Measures	Emissions (MTCO2e/year) 2020	
Motor vehicles	Pavley and Low Carbon Fuel Standard	554,774	
	Low Emission Vehicle Program III	32,090	
	Tire Tread Program	3,173	
	Tire Pressure Program	5,817	
	Low Friction Oil	23,270	
	Aerodynamic Efficiency/Hybridization	15,125	
	Subtotal	**634,250**	
Electricity - residential	Renewable Portfolio Standards	164,477	
	Title 24 Energy Efficiency Standards	16,833	
Electricity – commercial	Renewable Portfolio Standards	174,807	
	Title 24 Energy Efficiency Standards	9,614	
	Subtotal	**365,731**	
Natural Gas-Residential	Title 24 Energy Efficiency Standards	7,983	
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	17,530	
	Subtotal	**25,513**	
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	288,392	
	Total	**1,313,886**	

Source: Michael Brandman Associates

Emission Summary BAU and Regulations All Years

Business as Usual Modeling Results

	2010 BAU	2020 BAU	2035 BAU	2050 BAU	2056 BAU
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447
Electricity - commercial	361,836	415,012	509,781	626,137	679,888
Natural gas - residential	362,832	476,679	573,160	670,082	712,228
Natural gas - commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	***3,745,116***	***4,905,399***	***6,166,049***	***7,475,346***	***8,026,498***
Per Capita Emissions		7.556067612	7.89911452		

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Motor vehicles	1,795,666	1,828,249	2,205,409	2,711,894	2,914,488
Electricity - residential	289,745	226,011	271,756	317,710	337,694
Electricity - commercial	319,817	240,205	295,057	362,433	393,513
Natural gas - residential	400,169	476,679	519,166	670,082	712,228
Natural gas - commercial	448,706	514,647	564,560	776,525	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	***3,652,521***	***4,011,341***	***4,729,504***	***5,859,698***	***6,286,229***

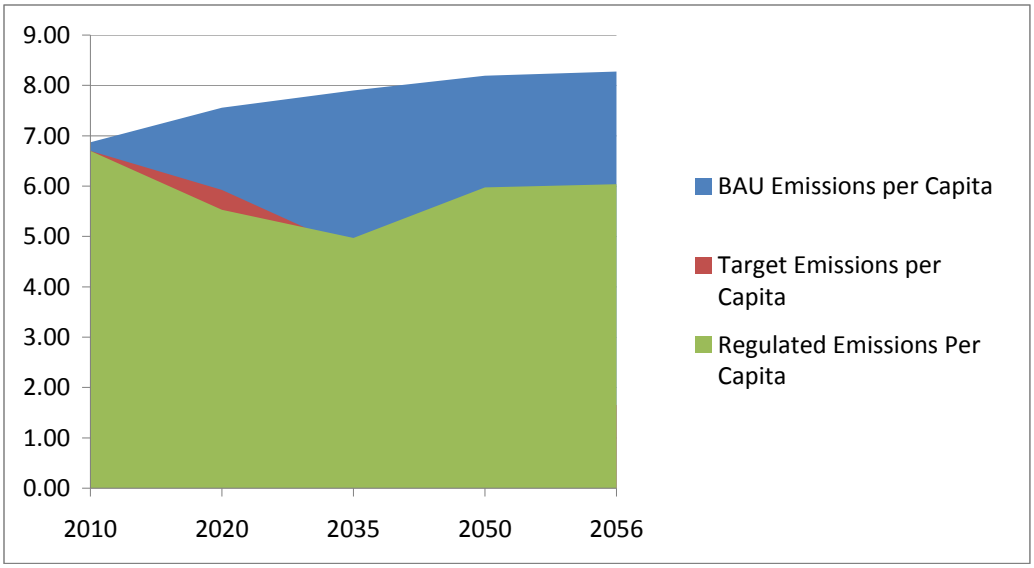
Adjusted BAU with Off Model Reductions from Title 24 and LEV III

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Motor vehicles	1,795,666	1,748,773	1,745,843	2,711,894	2,914,488
Electricity - residential	289,745	209,178	258,766	317,710	337,694
Electricity - commercial	319,817	230,591	290,861	362,433	393,513
Natural gas - residential	400,169	468,696	506,670	670,082	712,228
Natural gas - commercial	448,706	497,117	553,452	776,525	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	288,392	347,367	406,107	431,650
Total	***3,652,521***	***3,591,513***	***3,881,781***	***5,453,591***	***5,854,579***
Per Capita Emissions	6.70	5.53	4.97	5.98	6.04

Target Inventories

	2010	2020	2035	2050	2056
BAU Inventory	3,745,116	4,905,399	6,166,049	7,475,346	8,026,498
Target Inventories	3,495,422	3,843,380	3,699,629	1,495,069	1,605,300
Inventories with Regulations	3,652,521	3,591,513	3,881,781	5,453,591	5,854,579
Planning Area Population	545,000	649,200	780,600	912,600	970,000

	2010	2020	2035	2050	2056
BAU Emissions per Capita	6.87	7.56	7.90	8.19	8.27
Target Emissions per Capita	6.70	5.92	4.74	1.64	1.65
Regulated Emissions Per Capi	6.70	5.53	4.97	5.98	6.04



2020 Target	21.6 percent below 2020 BAU
2035 Target	40 percent below 2020 Target (1990 levels)
2050 Target	80 percent below 2020 Target (1990 levels)

2035 Emission Reduction Estimates

	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Mobile Source Emissions				
Motor Vehicles	3,107,859.0	2,205,408.7	1,745,842.7	**1,362,016.3**
Reduction		902,450.3		43.82%

LEV III Reduction Estimates

Gasoline Vehicles	Fleet VMT Fractions in 2035	MTCO2e tons/year
LDA	0.439	968,384.4
LDT1	0.065	143,734.1
LDT2	0.162	358,158.0
Total	0.667	1,470,276.5
LEV III 2035 Gas Reduction 27%		**396,974.7**

2035 Emfac Fleet Fractions

	GAS	DSL
LDA	0.439	0.001
LDT1	0.065	0.000
LDT2	0.162	0.000

Diesel Vehicles		
LDA	0.001	2,584.1
LDT1	0.000	190.7
LDT2	0.000	161.4
Total	0.0013	2,936.2
LEV III 2035 Diesel Reduction 27%		**792.8**
Total Light Duty Cars and Trucks with LEV III		**1,075,445.3**
LEV Reductions in 2035		**397,767.4**

	MTCO2e/ year
LEV III Reduction	397,767.4

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2035 Reductions
California Reductions in MMT CO2e	0.93
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0041
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0
Reduction in HD emissions MTCO2e	**12,828.7**

Med/HDT Hybridization	2035 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0	
Reduction in HD emissions MTCO2e	**6,897.2**	**19,725.9**

Light Duty Vehicle Efficiency Measures	2035 Reductions	Fresno Reduction MTCO2e
Tire Pressure Regulation MMTCO2e	0.55	7,586.9
Tire Tread Standard MMTCO2e	0.3	4,138.3
Low Friction Oil MMTCO2e	2.2	30,347.5
Total (MMTCO2e)	3.05	**42,072.7**
California 2020 BAU EI Transportation MMTCO2e	225.3	
Percent Reduction in Transportation	0.013537506	
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	**42,072.7**	
Total Reductions all Measures	**61,798.5**	

Reduction based on ARB Scoping Plan reductions from Efficiency Measures

Total Reductions for Motor Vehicles	**1,362,016.3**

Energy Emissions

Electricity	2035 EI MTCO2e	2035 w/RPS	RPS Reduction	T24 Reduction	Total Reduction
2035 Electricity Residential	426,350	271,576	154,774	12,810	167,584
2035 Electricity Commercia	455,261	295,057	160,204	4,196	164,400
Total	881,611	566,633	314,978		331,985

Reduction estimates from inventory spreadheets and CEC Title 24 Report for 2008 and 2013

Natural Gas

	2035 MTCO2e	T24 Reductions	2035 w/T24
2035 Natural Gas Resident	519,166	12,496	506,670
2035 Natural Gas Commer	564,560	11,108	553,452
	1,083,726	**23,603**	1,060,123

Reduction estimates from inventory spreadheets and CEC Title 24 Reports for 2008 and 2013

Title 24 Reductions

	2010 MTCO2e	2035 MTCO2e	Increase 2010 to 2035	Emission Reduction	Residential	Commercial
Electricity Residential	205,228	271,576	66,348	12,810	12,810	
Electricity Commercial	219,145	295,057	75,912	4,196		4,196
Total	424,373	566,633	142,260	**17,007**		
Natural Gas Residential	431,774	519,166	87,392	12,496	12,496	
Natural Gas Commercial	469,526	564,560	95,034	11,108		11,108
	901,300	1,083,726	182,426	**23,603**		
Title 24 Totals				**40,610**	25,306	15,304

2008 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	3,667	0.227	832
Multi-Family	0.539	4,295	0.197	846
Total 2020 Residential Electricity Reductions				**1,678**

2008 Title 24 Fresno Residential Development Projections Natural Gas				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	4,830	0.1	483
Multi-Family	0.539	5,657	0.07	396
Total 2020 Residential Natural Gas Reductions				**879**

2008 Standards provide reductions from 2010-2013
Reductions from CEC 2008

2013 Title 24 Fresno Residential Development Projections Electricity				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	26,888	0.25	6,722
Multi-Family	0.539	31,498	0.14	4,410
Total 2035 Residential Electricity Reductions				**11,132**

2013 Title 24 Fresno Residential Development Projections Natural Gas				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	35,417	0.2	7,083
Multi-Family	0.539	41,488	0.09	3,734
Total 2035 Residential Natural Gas Reductions				**10,817**

Emission Reductions from CEC 2012
Reductions based on development from 2014-2035.

	2035 EI MTCO2e w/RPS	Title 24 Reductions	2035 EI W/T24
2035 Electricity Residential	271,576	12,810	258,766
2035 Electricity Commercia	295,057	4,196	290,861
Total	566,633	**17,007**	549,626

Ozone Depleting Substances

	MTCO2e
2035 BAU Emissions	694,734
ARB Refrigerant Management Program Reduction 50%	0.5
2035 Reduction	**347,367**

Emission reductions estimates from ARB Appendix B. California Facilitites and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

Emission Reduction Summary

	Emissions (MTCO2e/year)			
	2035 BAU	**Reductions in 2035**	**Adj BAU 2035**	**Percent Reduction**
Motor vehicles	3,107,859	1,362,016	1,745,843	43.82%
Electricity - residential	469,524	167,584	301,940	35.69%
Electricity - commercial	509,781	164,400	345,381	32.25%
Natural gas - residential	573,160	12,496	560,664	2.18%
Natural gas - commercial	632,169	11,108	621,061	1.76%
Waste	177,508	0	177,508	0.00%
Offroad equipment	1,314	0	1,314	0.00%
ODS substitutes	694,734	347,367	347,367	50.00%
Total	6,166,049	2,064,971	4,101,078	33.49%

Transportation and Distribution Losses
Business as Usual Modeling Results

	2010 BAU	2020 BAU	2035 BAU	2050 BAU	2056 BAU
Electricity - residential	297,705	354,581	426,350	498,446	529,796
Electricity - commercial	317,868	378,626	455,261	532,246	565,723
Total E	615,573	733,207	881,611	1,030,692	1,095,519
T&D Loss	42,105	50,151	60,302	70,499	74,934

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Electricity - residential	263,134	205,228	246,767	288,496	306,641
Electricity - commercial	280,954	219,145	263,501	308,059	327,435
Total E	544,088	424,374	510,268	596,555	634,076
T&D Loss	37,216	29,027	34,902	40,804	43,371

T&D Loss for Western Region in 2010 is 6.84%
No rates were found for future years, so assumed constant rate.
T&D losses are expected to decline with increases in local production from solar or other distributed generation.

Community Greenhouse Gas Inventory

Summary

Year: 2010

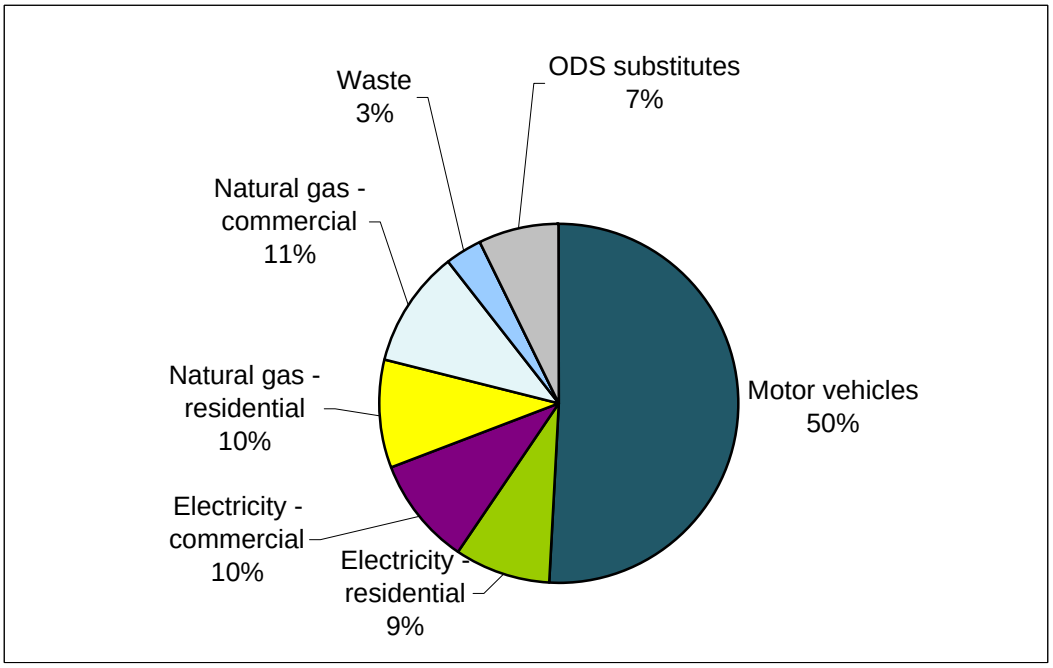
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	545,000	Fresno COG
Employment	209,261	Census 2011
County Information		
Population	930,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

- U.S. Census Bureau. 2011. 2009-2001 American Community Survey 3-Year Estimates Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%

Sources	**MTCO2e**
Motor vehicles	1,899,799
Electricity - residential	327,813
Electricity - commercial	361,836
Natural gas - residential	362,832
Natural gas - commercial	394,417
Waste	123,945
Offroad equipment	1,051
ODS substitutes	273,422
Total	***3,745,116***



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated		
Tons / year (instate)	333,099	
Percent Waste		
Mixed MSW	48.2	
Newspaper	1.3	
Office paper	10.1	
Corrugated cardboard	4.8	
Magazines/third class mail	1.2	
Food scraps	15.5	
Grass	1.9	
Leaves	1.9	
Branches	0.6	
Dimensional lumber	14.5	
Waste Emissions		
Emissions (MTCO2e)	123,945	SEEC 2013
Emissions (MTCO2e/person)	0.2274	Divide emissions by population

Sources:
Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility, Accessed July 31, 2013.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: Statewide Energy Efficiency Collaborative (SEEC). July 2013. Climate and Energy Management Suite. Version 2. Website: cems.californiaseec.org. Model run by Michael Brandman Associates/FirstCarbon Solutions, output contained in Appendix. Note: it was assumed that the landfills have methane capture. According to the County of Fresno Agenda Item 21, March 11, 2008 regarding the Feasibility Study on Gas to Energy Conversion at Southeast Regional Disposal Site and Amercian Avenue Disposal Site, Amercian Avenue Disposal site had methane capture at that time; that site collects 83 percent of the waste for the City (http://www2.co.fresno.ca.us/0110a/Questys_Agenda/MG151925/AS151956/AS151970/AI151985/DO152036/DO_152036.PDF).

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 9,162,734 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 3,344,397,910 Source: VMT per day * 365 days/year
Annual VMT Growth Rate 2.48%

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	733	213297	5785	34575	133039	129247	819333	365979	393776	199720	762678	697704	48	0	0
LDT1	102	29789	808	4829	18580	18051	114428	51113	54995	27893	106516	97442	7	0	0
LDT2	291	84691	2297	13728	52824	51318	325321	145315	156351	79300	302827	277028	19	0	0
LHD1	49	14123	383	2289	8809	8558	54252	24233	26074	13224	50501	46198	3	0	0
LHD2	5	1566	42	254	977	949	6014	2686	2890	1466	5598	5121	0	0	0
MCY	10	2891	78	469	1803	1752	11105	4960	5337	2707	10337	9456	1	0	0
MDV	353	102724	2786	16652	64072	62245	394592	176256	189643	96185	367307	336015	23	0	0
MH	3	804	22	130	502	487	3090	1380	1485	753	2877	2632	0	0	0
OBUS	2	537	15	87	335	325	2063	921	991	503	1920	1756	0	0	0
SBUS	0	114	3	19	71	69	439	196	211	107	409	374	0	0	0
T6	3	939	25	152	586	569	3608	1611	1734	879	3358	3072	0	0	0
T7	0	133	4	22	83	81	512	229	246	125	477	436	0	0	0
UBUS	1	293	8	48	183	178	1127	503	542	275	1049	959	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	578	16	94	360	350	2220	992	1067	541	2067	1891	0	0	0
LDT1	0	45	1	7	28	27	174	78	84	42	162	148	0	0	0
LDT2	0	40	1	6	25	24	153	68	73	37	142	130	0	0	0
LHD1	35	10132	275	1642	6320	6140	38921	17385	18705	9487	36229	33143	2	0	0
LHD2	8	2418	66	392	1508	1465	9289	4149	4464	2264	8646	7910	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	47	1	8	29	28	179	80	86	44	167	152	0	0	0
MH	0	144	4	23	90	87	553	247	266	135	515	471	0	0	0
OBUS	3	739	20	120	461	448	2837	1267	1363	692	2641	2416	0	0	0
SBUS	2	466	13	75	290	282	1789	799	860	436	1665	1523	0	0	0
T6	33	9535	259	1546	5947	5778	36627	16360	17603	8928	34094	31190	2	0	0
T7	150	43624	1183	7072	27210	26434	167573	74851	80536	40847	155986	142697	10	0	0
UBUS	2	678	18	110	423	411	2605	1163	1252	635	2424	2218	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	329	71,500	1,498	7,091	22,639	18,929	107,280	44,364	45,944	23,278	92,165	90,658	7	0	0	**525,353**
LDT1	52	11,398	239	1,131	3,612	3,020	17,113	7,078	7,330	3,714	14,704	14,466	1	0	0	**83,806**
LDT2	180	39,128	820	3,881	12,391	10,361	58,717	24,283	25,148	12,741	50,447	49,623	4	0	0	**287,545**
LHD1	49	11,546	214	925	2,716	2,128	11,498	4,624	4,732	2,412	9,781	0	0	0	0	**50,577**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	5	1,280	24	103	301	236	1,275	513	525	267	1,084	0	0	0	0	**5,607**
MCY	1	237	6	29	99	87	508	212	217	107	401	368	0	0	0	**2,271**
MDV	271	59,008	1,236	5,852	18,683	15,622	88,533	36,611	37,915	19,210	76,059	74,815	6	0	0	**433,550**
MH	3	658	12	53	155	121	655	263	270	137	557	572	0	0	0	**3,453**
OBUS	2	439	8	35	103	81	437	176	180	92	372	382	0	0	0	**2,305**
SBUS	0	93	2	7	22	17	93	37	38	20	79	81	0	0	0	**490**
T6	3	768	14	61	181	142	765	307	315	160	650	668	0	0	0	**4,031**
T7	0	109	2	9	26	20	109	44	45	23	92	95	0	0	0	**572**
UBUS	1	240	4	19	56	44	239	96	98	50	203	208	0	0	0	**1,259**
Total	**898**	**196,404**	**4,079**	**19,197**	**60,983**	**50,809**	**287,220**	**118,609**	**122,757**	**62,212**	**246,596**	**231,935**	**18**	**0**	**0**	**1,401,716**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	84	2	14	53	51	323	144	155	79	301	275	0	0	0	**1,483**
LDT1	0	7	0	1	4	4	26	12	13	6	24	22	0	0	0	**120**
LDT2	0	6	0	1	4	4	23	10	11	6	21	19	0	0	0	**104**
LHD1	7	2,167	59	351	1,351	1,313	8,322	3,717	4,000	2,029	7,747	0	0	0	0	**31,056**
LHD2	2	519	14	84	324	315	1,995	891	959	486	1,857	0	0	0	0	**7,443**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	7	0	1	4	4	27	12	13	6	25	23	0	0	0	**122**
MH	0	125	3	14	47	43	258	110	114	56	213	195	0	0	0	**1,177**
OBUS	3	737	16	82	295	279	1,743	723	790	389	1,442	1,152	0	0	0	**7,648**
SBUS	2	409	9	43	154	141	844	360	373	185	697	639	0	0	0	**3,854**
T6	34	8,290	185	870	3,125	2,850	17,086	7,284	7,559	3,742	14,126	12,943	1	0	0	**78,060**
T7	242	58,248	1,297	6,121	21,957	20,023	120,045	51,177	53,112	26,292	99,248	90,939	6	0	0	**548,464**
UBUS	2	715	19	116	446	433	2,748	1,227	1,321	670	2,558	2,340	0	0	0	**12,593**
Total	**294**	**71,315**	**1,605**	**7,699**	**27,765**	**25,459**	**153,438**	**65,667**	**68,419**	**33,945**	**128,258**	**108,548**	**7**	**0**	**0**	**692,418**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,094,134	1,899,799	1,899,799

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,422,450,000	2,610	358457	22.0	7.8	327,813
Commercial	1,570,085,283	7,503	395661	24.3	8.6	361,836
Industrial	*					0
Total	**2,992,535,283**		**754,119**	**46.4**	**16.5**	**689,649**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	68,192,726	125	398,927	37.5	0.8	362,832
Commercial	74,128,922	354	433,654	40.8	0.8	394,417
Industrial	*					0
Total	**142,321,648**		**832,582**	**78.3**	**1.6**	**757,250**

Notes and Sources:

*The Industrial kWH/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	1,019	0.1600	0.0100	930
Fresno	545,000	597	0	0	545
Percent Fresno/Fresno County	58.6%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	920	0.360	0.08000	864
Fresno	545,000	539	0	0	506
Percent Fresno/Fresno County	58.6%				

Total Fresno **1,051**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California

Emissions (MMTCO2e)	18.69
Population	37,253,956
Emissions (MTCO2e per person)	0.50

Fresno

Population	545,000
Emissions (MTCO2e per person)	273,422

(estimated by using California per person emissions)

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website: http://quickfacts.census.gov/qfd/states/06000.html. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

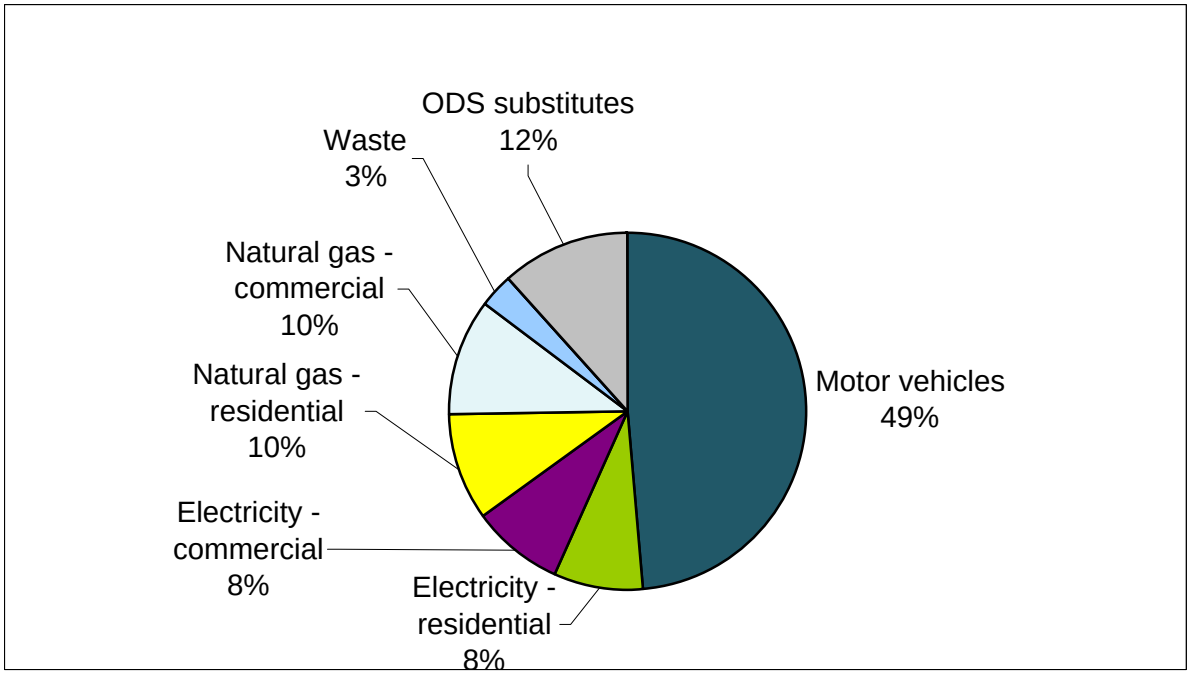
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,383,023	2,383,023
Electricity - residential	390,488	
Electricity - commercial	415,012	
Natural gas - residential	476,679	
Natural gas - commercial	514,647	
Waste	147,628	
Offroad equipment	1,138	
ODS substitutes	576,784	
Total	***4,905,399***	



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,195,062,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	919	267550	7257	43370	166878	162121	1027734	459069	493935	250520	956669	875168	60	0	0
LDT1	128	37366	1014	6057	23306	22642	143534	64114	68983	34988	133609	122226	8	0	0
LDT2	365	106233	2881	17220	66260	64371	408069	182276	196120	99470	379852	347491	24	0	0
LHD1	61	17716	481	2872	11050	10735	68051	30397	32706	16588	63346	57949	4	0	0
LHD2	7	1964	53	318	1225	1190	7544	3370	3626	1839	7022	6424	0	0	0
MCY	12	3626	98	588	2262	2197	13929	6222	6695	3395	12966	11862	1	0	0
MDV	443	128852	3495	20887	80369	78078	494958	221088	237880	120651	460733	421482	29	0	0
MH	3	1009	27	164	629	611	3876	1731	1863	945	3608	3301	0	0	0
OBUS	2	674	18	109	420	408	2587	1156	1243	631	2408	2203	0	0	0
SBUS	0	143	4	23	89	87	550	246	265	134	512	469	0	0	0
T6	4	1178	32	191	735	714	4525	2021	2175	1103	4212	3853	0	0	0
T7	1	167	5	27	104	101	642	287	309	157	598	547	0	0	0
UBUS	1	368	10	60	229	223	1413	631	679	345	1316	1204	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	725	20	118	452	439	2785	1244	1338	679	2592	2371	0	0	0
LDT1	0	57	2	9	35	34	219	98	105	53	203	186	0	0	0
LDT2	0	50	1	8	31	30	192	86	92	47	178	163	0	0	0
LHD1	44	12709	345	2060	7927	7701	48820	21807	23463	11900	45444	41573	3	0	0
LHD2	10	3033	82	492	1892	1838	11651	5204	5600	2840	10846	9922	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	58	2	9	36	35	224	100	108	55	209	191	0	0	0
MH	1	181	5	29	113	109	694	310	333	169	646	591	0	0	0
OBUS	3	926	25	150	578	561	3558	1590	1710	867	3312	3030	0	0	0
SBUS	2	584	16	95	364	354	2244	1002	1078	547	2089	1911	0	0	0
T6	41	11960	324	1939	7460	7247	45943	20522	22080	11199	42766	39123	3	0	0
T7	188	54720	1484	8870	34131	33158	210196	93890	101021	51237	195661	178993	12	0	0
UBUS	3	851	23	138	530	515	3267	1459	1570	796	3041	2782	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	413	89,687	1,879	8,895	28,397	23,744	134,567	55,648	57,630	29,199	115,608	113,717	9	0	0	**658,979**
LDT1	66	14,297	299	1,419	4,530	3,788	21,465	8,879	9,195	4,659	18,445	18,145	1	0	0	**105,122**
LDT2	226	49,080	1,028	4,868	15,543	12,996	73,652	30,460	31,544	15,982	63,278	62,245	5	0	0	**360,683**
LHD1	61	14,483	269	1,160	3,407	2,670	14,422	5,800	5,936	3,026	12,269	0	0	0	0	**63,442**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,606	30	129	378	296	1,599	643	658	335	1,360	0	0	0	0	**7,033**
MCY	1	298	7	36	124	109	638	266	272	134	503	461	0	0	0	**2,849**
MDV	341	74,017	1,551	7,340	23,435	19,595	111,052	45,923	47,559	24,096	95,405	93,844	7	0	0	**543,825**
MH	3	825	15	66	194	152	821	330	338	172	699	717	0	0	0	**4,331**
OBUS	2	551	10	44	130	102	548	221	226	115	466	479	0	0	0	**2,891**
SBUS	0	117	2	9	28	22	117	47	48	24	99	102	0	0	0	**615**
T6	4	963	18	77	227	178	959	386	395	201	816	837	0	0	0	**5,056**
T7	1	137	3	11	32	25	136	55	56	29	116	119	0	0	0	**718**
UBUS	1	301	6	24	71	55	300	120	123	63	255	262	0	0	0	**1,579**
Total	**1,127**	**246,360**	**5,116**	**24,079**	**76,495**	**63,732**	**360,276**	**148,778**	**153,982**	**78,036**	**309,319**	**290,928**	**22**	**0**	**0**	**1,758,250**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	106	3	17	66	64	406	181	195	99	378	346	0	0	0	**1,860**
LDT1	0	9	0	1	5	5	33	15	16	8	30	28	0	0	0	**150**
LDT2	0	7	0	1	5	5	29	13	14	7	27	24	0	0	0	**131**
LHD1	9	2,718	74	441	1,695	1,647	10,439	4,663	5,017	2,545	9,717	0	0	0	0	**38,955**
LHD2	2	651	18	106	406	395	2,502	1,118	1,202	610	2,329	0	0	0	0	**9,336**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	9	0	1	5	5	33	15	16	8	31	28	0	0	0	**152**
MH	1	157	3	17	59	54	323	138	143	71	267	245	0	0	0	**1,477**
OBUS	4	925	20	103	370	350	2,186	907	991	487	1,808	1,445	0	0	0	**9,594**
SBUS	2	513	11	54	194	176	1,058	451	468	232	875	802	0	0	0	**4,835**
T6	43	10,399	232	1,092	3,920	3,575	21,431	9,137	9,482	4,694	17,718	16,235	1	0	0	**97,915**
T7	304	73,063	1,627	7,678	27,542	25,116	150,579	64,194	66,621	32,979	124,492	114,070	8	0	0	**687,969**
UBUS	3	897	24	145	560	544	3,446	1,539	1,656	840	3,208	2,935	0	0	0	**15,796**
Total	**369**	**89,454**	**2,013**	**9,657**	**34,827**	**31,934**	**192,466**	**82,370**	**85,821**	**42,579**	**160,881**	**136,158**	**9**	**0**	**0**	**868,539**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,626,789	2,383,023	2,383,023

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,195,062,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	919	267550	7257	43370	166878	162121	1027734	459069	493935	250520	956669	875168	60	0	0
LDT1	128	37366	1014	6057	23306	22642	143534	64114	68983	34988	133609	122226	8	0	0
LDT2	365	106233	2881	17220	66260	64371	408069	182276	196120	99470	379852	347491	24	0	0
LHD1	61	17716	481	2872	11050	10735	68051	30397	32706	16588	63346	57949	4	0	0
LHD2	7	1964	53	318	1225	1190	7544	3370	3626	1839	7022	6424	0	0	0
MCY	12	3626	98	588	2262	2197	13929	6222	6695	3395	12966	11862	1	0	0
MDV	443	128852	3495	20887	80369	78078	494958	221088	237880	120651	460733	421482	29	0	0
MH	3	1009	27	164	629	611	3876	1731	1863	945	3608	3301	0	0	0
OBUS	2	674	18	109	420	408	2587	1156	1243	631	2408	2203	0	0	0
SBUS	0	143	4	23	89	87	550	246	265	134	512	469	0	0	0
T6	4	1178	32	191	735	714	4525	2021	2175	1103	4212	3853	0	0	0
T7	1	167	5	27	104	101	642	287	309	157	598	547	0	0	0
UBUS	1	368	10	60	229	223	1413	631	679	345	1316	1204	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	725	20	118	452	439	2785	1244	1338	679	2592	2371	0	0	0
LDT1	0	57	2	9	35	34	219	98	105	53	203	186	0	0	0
LDT2	0	50	1	8	31	30	192	86	92	47	178	163	0	0	0
LHD1	44	12709	345	2060	7927	7701	48820	21807	23463	11900	45444	41573	3	0	0
LHD2	10	3033	82	492	1892	1838	11651	5204	5600	2840	10846	9922	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	58	2	9	36	35	224	100	108	55	209	191	0	0	0
MH	1	181	5	29	113	109	694	310	333	169	646	591	0	0	0
OBUS	3	926	25	150	578	561	3558	1590	1710	867	3312	3030	0	0	0
SBUS	2	584	16	95	364	354	2244	1002	1078	547	2089	1911	0	0	0
T6	41	11960	324	1939	7460	7247	45943	20522	22080	11199	42766	39123	3	0	0
T7	188	54720	1484	8870	34131	33158	210196	93890	101021	51237	195661	178993	12	0	0
UBUS	3	851	23	138	530	515	3267	1459	1570	796	3041	2782	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	413	89,687	1,879	8,895	28,397	23,744	134,567	55,648	57,630	29,199	115,608	113,717	9	0	0	**658,979**
LDT1	66	14,297	299	1,419	4,530	3,788	21,465	8,879	9,195	4,659	18,445	18,145	1	0	0	**105,122**
LDT2	226	49,080	1,028	4,868	15,543	12,996	73,652	30,460	31,544	15,982	63,278	62,245	5	0	0	**360,683**
LHD1	61	14,483	269	1,160	3,407	2,670	14,422	5,800	5,936	3,026	12,269	0	0	0	0	**63,442**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,606	30	129	378	296	1,599	643	658	335	1,360	0	0	0	0	**7,033**
MCY	1	298	7	36	124	109	638	266	272	134	503	461	0	0	0	**2,849**
MDV	341	74,017	1,551	7,340	23,435	19,595	111,052	45,923	47,559	24,096	95,405	93,844	7	0	0	**543,825**
MH	3	825	15	66	194	152	821	330	338	172	699	717	0	0	0	**4,331**
OBUS	2	551	10	44	130	102	548	221	226	115	466	479	0	0	0	**2,891**
SBUS	0	117	2	9	28	22	117	47	48	24	99	102	0	0	0	**615**
T6	4	963	18	77	227	178	959	386	395	201	816	837	0	0	0	**5,056**
T7	1	137	3	11	32	25	136	55	56	29	116	119	0	0	0	**718**
UBUS	1	301	6	24	71	55	300	120	123	63	255	262	0	0	0	**1,579**
Total	**1,127**	**246,360**	**5,116**	**24,079**	**76,495**	**63,732**	**360,276**	**148,778**	**153,982**	**78,036**	**309,319**	**290,928**	**22**	**0**	**0**	**1,758,250**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	106	3	17	66	64	406	181	195	99	378	346	0	0	0	**1,860**
LDT1	0	9	0	1	5	5	33	15	16	8	30	28	0	0	0	**150**
LDT2	0	7	0	1	5	5	29	13	14	7	27	24	0	0	0	**131**
LHD1	9	2,718	74	441	1,695	1,647	10,439	4,663	5,017	2,545	9,717	0	0	0	0	**38,955**
LHD2	2	651	18	106	406	395	2,502	1,118	1,202	610	2,329	0	0	0	0	**9,336**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	9	0	1	5	5	33	15	16	8	31	28	0	0	0	**152**
MH	1	157	3	17	59	54	323	138	143	71	267	245	0	0	0	**1,477**
OBUS	4	925	20	103	370	350	2,186	907	991	487	1,808	1,445	0	0	0	**9,594**
SBUS	2	513	11	54	194	176	1,058	451	468	232	875	802	0	0	0	**4,835**
T6	43	10,399	232	1,092	3,920	3,575	21,431	9,137	9,482	4,694	17,718	16,235	1	0	0	**97,915**
T7	304	73,063	1,627	7,678	27,542	25,116	150,579	64,194	66,621	32,979	124,492	114,070	8	0	0	**687,969**
UBUS	3	897	24	145	560	544	3,446	1,539	1,656	840	3,208	2,935	0	0	0	**15,796**
Total	**369**	**89,454**	**2,013**	**9,657**	**34,827**	**31,934**	**192,466**	**82,370**	**85,821**	**42,579**	**160,881**	**136,158**	**9**	**0**	**0**	**868,539**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,626,789	2,383,023	2,383,023

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	426992	26.3	9.3	390,488
Commercial	1,800,825,042	7,503	453808	27.9	9.9	415,012
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**880,800**	**54.2**	**19.2**	**805,500**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

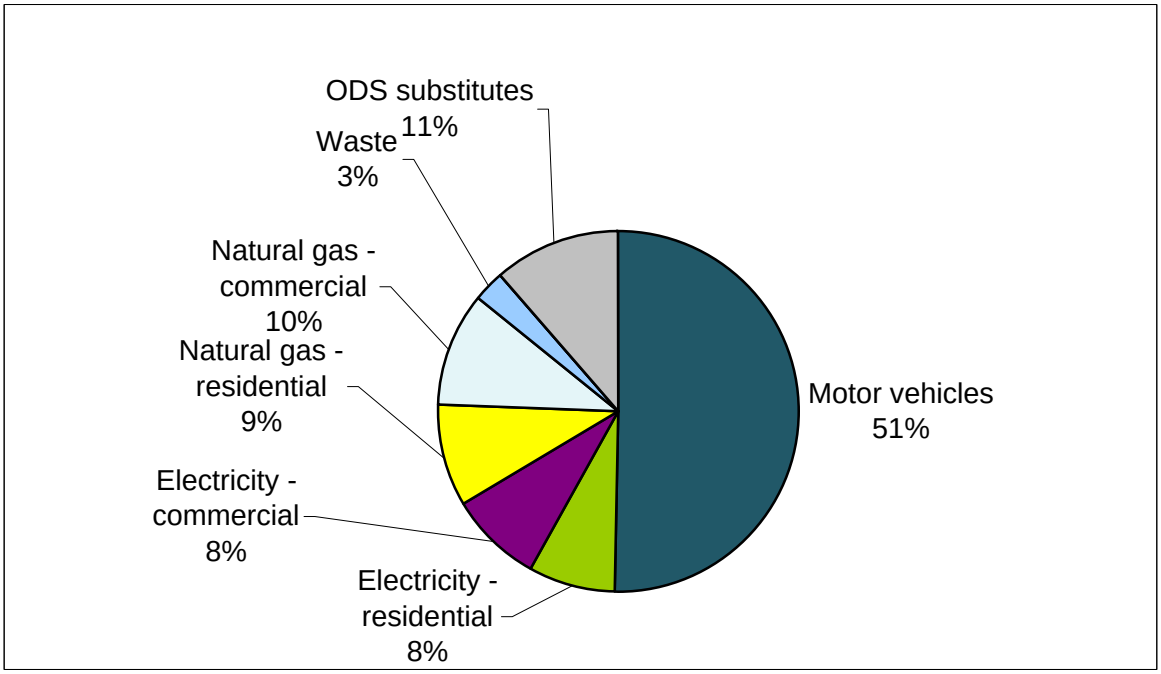
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,107,859	3,107,859
Electricity - residential	469,524	
Electricity - commercial	509,781	
Natural gas - residential	573,160	
Natural gas - commercial	632,169	
Waste	177,508	
Offroad equipment	1,314	
ODS substitutes	694,734	
Total	***6,166,049***	



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1199	348930	9464	56561	217637	211433	1340336	598702	644174	326719	1247656	1141366	78	0	0
LDT1	167	48732	1322	7899	30395	29529	187192	83615	89966	45630	174248	159404	11	0	0
LDT2	476	138545	3758	22458	86414	83951	532189	237719	255773	129726	495390	453187	31	0	0
LHD1	79	23104	627	3745	14411	14000	88750	39643	42654	21634	82613	75575	5	0	0
LHD2	9	2561	69	415	1598	1552	9839	4395	4729	2398	9158	8378	1	0	0
MCY	16	4729	128	767	2950	2866	18166	8114	8731	4428	16910	15469	1	0	0
MDV	577	168045	4558	27240	104814	101826	645508	288336	310235	157348	600873	549683	38	0	0
MH	5	1316	36	213	821	797	5055	2258	2430	1232	4706	4305	0	0	0
OBUS	3	878	24	142	548	532	3374	1507	1622	822	3141	2873	0	0	0
SBUS	1	187	5	30	117	113	718	321	345	175	668	611	0	0	0
T6	5	1536	42	249	958	931	5902	2636	2836	1439	5494	5026	0	0	0
T7	1	218	6	35	136	132	838	374	403	204	780	713	0	0	0
UBUS	2	480	13	78	299	291	1843	823	886	449	1716	1570	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	945	26	153	590	573	3632	1622	1746	885	3381	3093	0	0	0
LDT1	0	74	2	12	46	45	285	127	137	69	265	243	0	0	0
LDT2	0	65	2	11	41	39	250	112	120	61	233	213	0	0	0
LHD1	57	16575	450	2687	10338	10044	63670	28440	30600	15520	59267	54218	4	0	0
LHD2	14	3956	107	641	2467	2397	15195	6787	7303	3704	14145	12940	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	76	2	12	48	46	293	131	141	71	273	249	0	0	0
MH	1	236	6	38	147	143	905	404	435	221	842	770	0	0	0
OBUS	4	1208	33	196	754	732	4641	2073	2230	1131	4320	3952	0	0	0
SBUS	3	762	21	123	475	462	2926	1307	1406	713	2724	2492	0	0	0
T6	54	15598	423	2528	9729	9452	59917	26764	28797	14605	55774	51023	4	0	0
T7	245	71364	1936	11568	44512	43243	274130	122449	131749	66822	255175	233436	16	0	0
UBUS	4	1109	30	180	692	672	4261	1903	2048	1039	3966	3628	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	538	116,967	2,451	11,600	37,034	30,966	175,497	72,575	75,160	38,080	150,772	148,306	11	0	0	**859,419**
LDT1	86	18,645	390	1,851	5,908	4,940	27,995	11,580	11,992	6,076	24,055	23,664	2	0	0	**137,097**
LDT2	295	64,009	1,341	6,349	20,270	16,949	96,055	39,724	41,139	20,843	82,525	81,178	6	0	0	**470,391**
LHD1	80	18,888	350	1,513	4,444	3,482	18,809	7,564	7,742	3,946	16,001	0	0	0	0	**82,739**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,094	39	168	493	386	2,085	839	858	437	1,774	0	0	0	0	**9,172**
MCY	1	388	9	47	162	143	832	347	355	174	656	602	0	0	0	**3,715**
MDV	444	96,530	2,022	9,573	30,563	25,555	144,830	59,892	62,025	31,426	124,424	122,389	9	0	0	**709,239**
MH	5	1,076	20	86	253	198	1,071	431	441	225	911	935	0	0	0	**5,648**
OBUS	3	718	13	58	169	132	715	288	294	150	608	624	0	0	0	**3,770**
SBUS	1	153	3	12	36	28	152	61	63	32	129	133	0	0	0	**802**
T6	5	1,256	23	101	295	232	1,251	503	515	262	1,064	1,092	0	0	0	**6,594**
T7	1	178	3	14	42	33	178	71	73	37	151	155	0	0	0	**936**
UBUS	2	392	7	31	92	72	391	157	161	82	332	341	0	0	0	**2,059**
Total	**1,469**	**321,295**	**6,673**	**31,403**	**99,762**	**83,117**	**469,860**	**194,032**	**200,818**	**101,772**	**403,403**	**379,419**	**29**	**0**	**0**	**2,293,051**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	138	4	22	86	83	529	236	254	129	493	451	0	0	0	**2,425**
LDT1	0	11	0	2	7	7	43	19	21	10	40	36	0	0	0	**196**
LDT2	0	10	0	2	6	6	37	17	18	9	35	32	0	0	0	**171**
LHD1	12	3,544	96	575	2,211	2,148	13,615	6,081	6,543	3,319	12,673	0	0	0	0	**50,804**
LHD2	3	849	23	138	530	515	3,263	1,457	1,568	795	3,037	0	0	0	0	**12,176**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	11	0	2	7	7	43	19	21	11	40	37	0	0	0	**199**
MH	1	204	5	22	77	70	421	180	186	92	348	319	0	0	0	**1,926**
OBUS	5	1,206	27	135	483	456	2,851	1,183	1,293	636	2,359	1,885	0	0	0	**12,512**
SBUS	3	670	15	70	252	230	1,380	588	611	302	1,141	1,045	0	0	0	**6,305**
T6	56	13,562	302	1,424	5,112	4,662	27,950	11,916	12,366	6,121	23,108	21,173	1	0	0	**127,698**
T7	396	95,287	2,122	10,014	35,920	32,755	196,380	83,720	86,885	43,010	162,358	148,766	10	0	0	**897,226**
UBUS	4	1,170	32	190	730	709	4,495	2,008	2,160	1,096	4,184	3,828	0	0	0	**20,600**
Total	**481**	**116,663**	**2,626**	**12,595**	**45,420**	**41,647**	**251,008**	**107,424**	**111,926**	**55,531**	**209,815**	**177,572**	**12**	**0**	**0**	**1,132,719**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,425,770	3,107,859	3,107,859

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1199	348930	9464	56561	217637	211433	1340336	598702	644174	326719	1247656	1141366	78	0	0
LDT1	167	48732	1322	7899	30395	29529	187192	83615	89966	45630	174248	159404	11	0	0
LDT2	476	138545	3758	22458	86414	83951	532189	237719	255773	129726	495390	453187	31	0	0
LHD1	79	23104	627	3745	14411	14000	88750	39643	42654	21634	82613	75575	5	0	0
LHD2	9	2561	69	415	1598	1552	9839	4395	4729	2398	9158	8378	1	0	0
MCY	16	4729	128	767	2950	2866	18166	8114	8731	4428	16910	15469	1	0	0
MDV	577	168045	4558	27240	104814	101826	645508	288336	310235	157348	600873	549683	38	0	0
MH	5	1316	36	213	821	797	5055	2258	2430	1232	4706	4305	0	0	0
OBUS	3	878	24	142	548	532	3374	1507	1622	822	3141	2873	0	0	0
SBUS	1	187	5	30	117	113	718	321	345	175	668	611	0	0	0
T6	5	1536	42	249	958	931	5902	2636	2836	1439	5494	5026	0	0	0
T7	1	218	6	35	136	132	838	374	403	204	780	713	0	0	0
UBUS	2	480	13	78	299	291	1843	823	886	449	1716	1570	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	945	26	153	590	573	3632	1622	1746	885	3381	3093	0	0	0
LDT1	0	74	2	12	46	45	285	127	137	69	265	243	0	0	0
LDT2	0	65	2	11	41	39	250	112	120	61	233	213	0	0	0
LHD1	57	16575	450	2687	10338	10044	63670	28440	30600	15520	59267	54218	4	0	0
LHD2	14	3956	107	641	2467	2397	15195	6787	7303	3704	14145	12940	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	76	2	12	48	46	293	131	141	71	273	249	0	0	0
MH	1	236	6	38	147	143	905	404	435	221	842	770	0	0	0
OBUS	4	1208	33	196	754	732	4641	2073	2230	1131	4320	3952	0	0	0
SBUS	3	762	21	123	475	462	2926	1307	1406	713	2724	2492	0	0	0
T6	54	15598	423	2528	9729	9452	59917	26764	28797	14605	55774	51023	4	0	0
T7	245	71364	1936	11568	44512	43243	274130	122449	131749	66822	255175	233436	16	0	0
UBUS	4	1109	30	180	692	672	4261	1903	2048	1039	3966	3628	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	538	116,967	2,451	11,600	37,034	30,966	175,497	72,575	75,160	38,080	150,772	148,306	11	0	0	**859,419**
LDT1	86	18,645	390	1,851	5,908	4,940	27,995	11,580	11,992	6,076	24,055	23,664	2	0	0	**137,097**
LDT2	295	64,009	1,341	6,349	20,270	16,949	96,055	39,724	41,139	20,843	82,525	81,178	6	0	0	**470,391**
LHD1	80	18,888	350	1,513	4,444	3,482	18,809	7,564	7,742	3,946	16,001	0	0	0	0	**82,739**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,094	39	168	493	386	2,085	839	858	437	1,774	0	0	0	0	**9,172**
MCY	1	388	9	47	162	143	832	347	355	174	656	602	0	0	0	**3,715**
MDV	444	96,530	2,022	9,573	30,563	25,555	144,830	59,892	62,025	31,426	124,424	122,389	9	0	0	**709,239**
MH	5	1,076	20	86	253	198	1,071	431	441	225	911	935	0	0	0	**5,648**
OBUS	3	718	13	58	169	132	715	288	294	150	608	624	0	0	0	**3,770**
SBUS	1	153	3	12	36	28	152	61	63	32	129	133	0	0	0	**802**
T6	5	1,256	23	101	295	232	1,251	503	515	262	1,064	1,092	0	0	0	**6,594**
T7	1	178	3	14	42	33	178	71	73	37	151	155	0	0	0	**936**
UBUS	2	392	7	31	92	72	391	157	161	82	332	341	0	0	0	**2,059**
Total	**1,469**	**321,295**	**6,673**	**31,403**	**99,762**	**83,117**	**469,860**	**194,032**	**200,818**	**101,772**	**403,403**	**379,419**	**29**	**0**	**0**	**2,293,051**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	138	4	22	86	83	529	236	254	129	493	451	0	0	0	**2,425**
LDT1	0	11	0	2	7	7	43	19	21	10	40	36	0	0	0	**196**
LDT2	0	10	0	2	6	6	37	17	18	9	35	32	0	0	0	**171**
LHD1	12	3,544	96	575	2,211	2,148	13,615	6,081	6,543	3,319	12,673	0	0	0	0	**50,804**
LHD2	3	849	23	138	530	515	3,263	1,457	1,568	795	3,037	0	0	0	0	**12,176**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	11	0	2	7	7	43	19	21	11	40	37	0	0	0	**199**
MH	1	204	5	22	77	70	421	180	186	92	348	319	0	0	0	**1,926**
OBUS	5	1,206	27	135	483	456	2,851	1,183	1,293	636	2,359	1,885	0	0	0	**12,512**
SBUS	3	670	15	70	252	230	1,380	588	611	302	1,141	1,045	0	0	0	**6,305**
T6	56	13,562	302	1,424	5,112	4,662	27,950	11,916	12,366	6,121	23,108	21,173	1	0	0	**127,698**
T7	396	95,287	2,122	10,014	35,920	32,755	196,380	83,720	86,885	43,010	162,358	148,766	10	0	0	**897,226**
UBUS	4	1,170	32	190	730	709	4,495	2,008	2,160	1,096	4,184	3,828	0	0	0	**20,600**
Total	**481**	**116,663**	**2,626**	**12,595**	**45,420**	**41,647**	**251,008**	**107,424**	**111,926**	**55,531**	**209,815**	**177,572**	**12**	**0**	**0**	**1,132,719**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,425,770	3,107,859	3,107,859

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

		Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
	(kWh/year)		CO2	CH4	N2O	MTCO2e
Residential	2,037,366,000	2,610	513416	31.6	11.2	469,524
Commercial	2,212,049,466	7,503	557436	34.3	12.2	509,781
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**1,070,853**	**65.9**	**23.4**	**979,305**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

		Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
	(therms/year)		CO2	CH4	N2O	MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

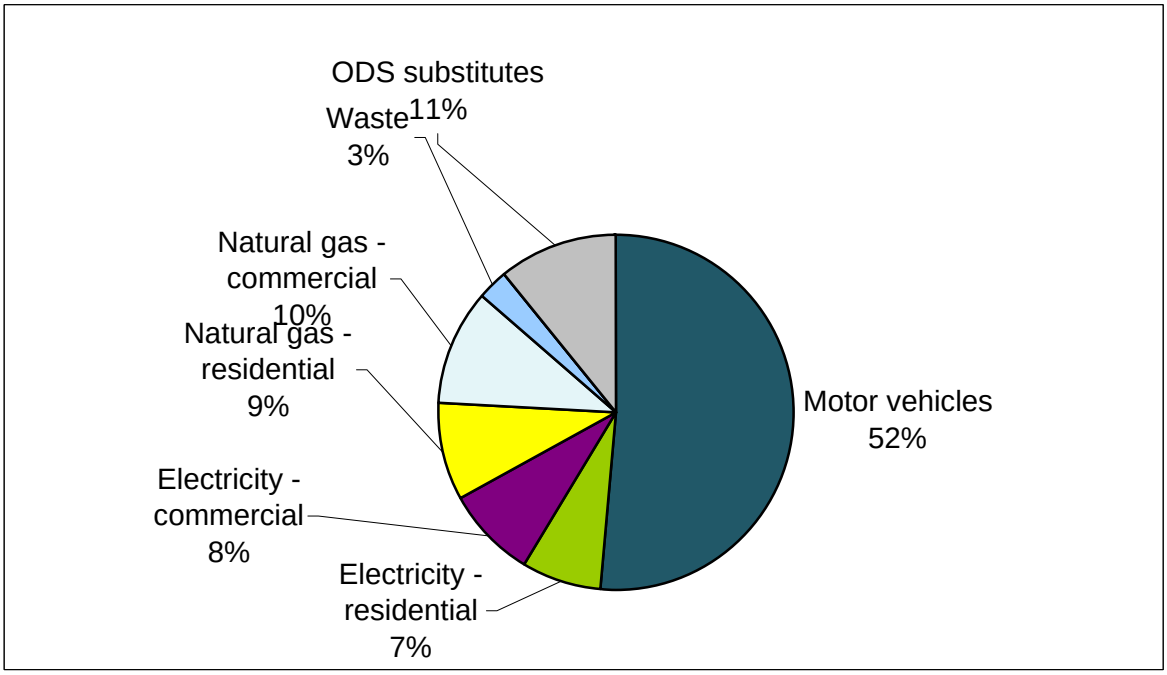
Summary
Year: 2050
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	912,600	Fresno COG
Employment	362,114	
County Information		
Population	1,521,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,832,694	3,832,694
Electricity - residential	548,921	
Electricity - commercial	626,137	
Natural gas - residential	670,082	
Natural gas - commercial	776,459	
Waste	207,525	
Offroad equipment	1,314	
ODS substitutes	812,214	
Total	***7,475,346***	



Community Greenhouse Gas Inventory

Waste

Year: **2050**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	207,525	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1479	430310	11672	69753	268396	260745	1652939	738335	794413	402919	1538643	1407563	97	0	0
LDT1	207	60097	1630	9742	37484	36416	230850	103116	110948	56272	214888	196581	14	0	0
LDT2	587	170857	4634	27696	106568	103530	656310	293161	315427	159982	610928	558882	38	0	0
LHD1	98	28493	773	4619	17772	17265	109449	48889	52602	26679	101881	93202	6	0	0
LHD2	11	3159	86	512	1970	1914	12133	5420	5831	2958	11294	10332	1	0	0
MCY	20	5832	158	945	3638	3534	22403	10007	10767	5461	20854	19077	1	0	0
MDV	712	207238	5621	33593	129260	125575	796057	355583	382590	194046	741013	677884	47	0	0
MH	6	1623	44	263	1012	983	6234	2785	2996	1520	5803	5309	0	0	0
OBUS	4	1083	29	176	676	656	4161	1859	2000	1014	3873	3543	0	0	0
SBUS	1	230	6	37	144	140	885	395	426	216	824	754	0	0	0
T6	7	1895	51	307	1182	1148	7278	3251	3498	1774	6775	6198	0	0	0
T7	1	269	7	44	168	163	1033	461	496	252	961	880	0	0	0
UBUS	2	592	16	96	369	359	2273	1015	1092	554	2116	1936	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1166	32	189	727	707	4479	2001	2153	1092	4169	3814	0	0	0
LDT1	0	92	2	15	57	55	352	157	169	86	327	299	0	0	0
LDT2	0	80	2	13	50	49	308	138	148	75	287	262	0	0	0
LHD1	70	20441	554	3313	12750	12386	78519	35073	37737	19140	73090	66863	5	0	0
LHD2	17	4878	132	791	3043	2956	18739	8370	9006	4568	17443	15957	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	94	3	15	59	57	361	161	174	88	336	307	0	0	0
MH	1	290	8	47	181	176	1116	498	536	272	1039	950	0	0	0
OBUS	5	1490	40	242	929	903	5723	2556	2751	1395	5327	4874	0	0	0
SBUS	3	940	25	152	586	569	3609	1612	1734	880	3359	3073	0	0	0
T6	66	19236	522	3118	11998	11656	73892	33006	35513	18012	68782	62922	4	0	0
T7	302	88008	2387	14266	54893	53328	338065	151007	162476	82406	314689	287880	20	0	0
UBUS	5	1368	37	222	853	829	5254	2347	2525	1281	4891	4474	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	664	144,247	3,022	14,305	45,672	38,189	216,428	89,501	92,689	46,962	185,936	182,895	14	0	0	**1,059,859**
LDT1	106	22,994	481	2,282	7,286	6,092	34,524	14,280	14,789	7,493	29,665	29,183	2	0	0	**169,072**
LDT2	363	78,938	1,654	7,830	24,998	20,902	118,457	48,989	50,734	25,705	101,772	100,111	8	0	0	**580,098**
LHD1	99	23,293	432	1,866	5,480	4,294	23,196	9,328	9,547	4,867	19,733	0	0	0	0	**102,036**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	11	2,582	48	207	608	476	2,571	1,034	1,058	539	2,188	0	0	0	0	**11,311**
MCY	2	479	11	58	200	176	1,025	428	438	215	808	742	0	0	0	**4,582**
MDV	548	119,044	2,494	11,806	37,691	31,515	178,608	73,860	76,491	38,755	153,443	150,933	12	0	0	**874,652**
MH	6	1,327	25	106	312	245	1,321	531	544	277	1,124	1,154	0	0	0	**6,966**
OBUS	4	886	16	71	208	163	882	355	363	185	750	770	0	0	0	**4,649**
SBUS	1	188	3	15	44	35	188	75	77	39	160	164	0	0	0	**989**
T6	7	1,549	29	124	364	286	1,542	620	635	324	1,312	1,347	0	0	0	**8,132**
T7	1	220	4	18	52	41	219	88	90	46	186	191	0	0	0	**1,154**
UBUS	2	484	9	39	114	89	482	194	198	101	410	421	0	0	0	**2,540**
Total	**1,812**	**396,229**	**8,229**	**38,727**	**123,029**	**102,502**	**579,444**	**239,285**	**247,654**	**125,507**	**497,488**	**467,910**	**36**	**0**	**0**	**2,827,852**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	170	5	28	106	103	653	292	314	159	607	556	0	0	0	**2,991**
LDT1	0	14	0	2	9	8	53	24	25	13	49	45	0	0	0	**241**
LDT2	0	12	0	2	7	7	46	21	22	11	43	39	0	0	0	**210**
LHD1	15	4,371	119	709	2,726	2,649	16,790	7,500	8,069	4,093	15,629	0	0	0	0	**62,653**
LHD2	4	1,048	28	170	653	635	4,024	1,797	1,934	981	3,746	0	0	0	0	**15,016**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	9	8	53	24	26	13	50	46	0	0	0	**245**
MH	1	252	6	28	95	87	520	222	230	114	430	394	0	0	0	**2,375**
OBUS	6	1,488	33	166	595	562	3,516	1,459	1,594	784	2,909	2,325	0	0	0	**15,430**
SBUS	3	826	18	87	311	284	1,702	726	753	373	1,407	1,289	0	0	0	**7,776**
T6	70	16,725	372	1,756	6,305	5,749	34,469	14,695	15,250	7,549	28,497	26,111	2	0	0	**157,480**
T7	489	117,510	2,617	12,349	44,297	40,394	242,181	103,245	107,149	53,041	200,224	183,462	13	0	0	**1,106,484**
UBUS	5	1,443	39	234	900	874	5,543	2,476	2,664	1,351	5,160	4,720	0	0	0	**25,405**
Total	**593**	**143,872**	**3,238**	**15,532**	**56,013**	**51,361**	**309,549**	**132,478**	**138,030**	**68,482**	**258,750**	**218,987**	**15**	**0**	**0**	**1,396,900**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,224,751	3,832,694	3,832,694

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1479	430310	11672	69753	268396	260745	1652939	738335	794413	402919	1538643	1407563	97	0	0
LDT1	207	60097	1630	9742	37484	36416	230850	103116	110948	56272	214888	196581	14	0	0
LDT2	587	170857	4634	27696	106568	103530	656310	293161	315427	159982	610928	558882	38	0	0
LHD1	98	28493	773	4619	17772	17265	109449	48889	52602	26679	101881	93202	6	0	0
LHD2	11	3159	86	512	1970	1914	12133	5420	5831	2958	11294	10332	1	0	0
MCY	20	5832	158	945	3638	3534	22403	10007	10767	5461	20854	19077	1	0	0
MDV	712	207238	5621	33593	129260	125575	796057	355583	382590	194046	741013	677884	47	0	0
MH	6	1623	44	263	1012	983	6234	2785	2996	1520	5803	5309	0	0	0
OBUS	4	1083	29	176	676	656	4161	1859	2000	1014	3873	3543	0	0	0
SBUS	1	230	6	37	144	140	885	395	426	216	824	754	0	0	0
T6	7	1895	51	307	1182	1148	7278	3251	3498	1774	6775	6198	0	0	0
T7	1	269	7	44	168	163	1033	461	496	252	961	880	0	0	0
UBUS	2	592	16	96	369	359	2273	1015	1092	554	2116	1936	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1166	32	189	727	707	4479	2001	2153	1092	4169	3814	0	0	0
LDT1	0	92	2	15	57	55	352	157	169	86	327	299	0	0	0
LDT2	0	80	2	13	50	49	308	138	148	75	287	262	0	0	0
LHD1	70	20441	554	3313	12750	12386	78519	35073	37737	19140	73090	66863	5	0	0
LHD2	17	4878	132	791	3043	2956	18739	8370	9006	4568	17443	15957	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	94	3	15	59	57	361	161	174	88	336	307	0	0	0
MH	1	290	8	47	181	176	1116	498	536	272	1039	950	0	0	0
OBUS	5	1490	40	242	929	903	5723	2556	2751	1395	5327	4874	0	0	0
SBUS	3	940	25	152	586	569	3609	1612	1734	880	3359	3073	0	0	0
T6	66	19236	522	3118	11998	11656	73892	33006	35513	18012	68782	62922	4	0	0
T7	302	88008	2387	14266	54893	53328	338065	151007	162476	82406	314689	287880	20	0	0
UBUS	5	1368	37	222	853	829	5254	2347	2525	1281	4891	4474	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	664	144,247	3,022	14,305	45,672	38,189	216,428	89,501	92,689	46,962	185,936	182,895	14	0	0	**1,059,859**
LDT1	106	22,994	481	2,282	7,286	6,092	34,524	14,280	14,789	7,493	29,665	29,183	2	0	0	**169,072**
LDT2	363	78,938	1,654	7,830	24,998	20,902	118,457	48,989	50,734	25,705	101,772	100,111	8	0	0	**580,098**
LHD1	99	23,293	432	1,866	5,480	4,294	23,196	9,328	9,547	4,867	19,733	0	0	0	0	**102,036**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	11	2,582	48	207	608	476	2,571	1,034	1,058	539	2,188	0	0	0	0	**11,311**
MCY	2	479	11	58	200	176	1,025	428	438	215	808	742	0	0	0	**4,582**
MDV	548	119,044	2,494	11,806	37,691	31,515	178,608	73,860	76,491	38,755	153,443	150,933	12	0	0	**874,652**
MH	6	1,327	25	106	312	245	1,321	531	544	277	1,124	1,154	0	0	0	**6,966**
OBUS	4	886	16	71	208	163	882	355	363	185	750	770	0	0	0	**4,649**
SBUS	1	188	3	15	44	35	188	75	77	39	160	164	0	0	0	**989**
T6	7	1,549	29	124	364	286	1,542	620	635	324	1,312	1,347	0	0	0	**8,132**
T7	1	220	4	18	52	41	219	88	90	46	186	191	0	0	0	**1,154**
UBUS	2	484	9	39	114	89	482	194	198	101	410	421	0	0	0	**2,540**
Total	**1,812**	**396,229**	**8,229**	**38,727**	**123,029**	**102,502**	**579,444**	**239,285**	**247,654**	**125,507**	**497,488**	**467,910**	**36**	**0**	**0**	**2,827,852**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	170	5	28	106	103	653	292	314	159	607	556	0	0	0	**2,991**
LDT1	0	14	0	2	9	8	53	24	25	13	49	45	0	0	0	**241**
LDT2	0	12	0	2	7	7	46	21	22	11	43	39	0	0	0	**210**
LHD1	15	4,371	119	709	2,726	2,649	16,790	7,500	8,069	4,093	15,629	0	0	0	0	**62,653**
LHD2	4	1,048	28	170	653	635	4,024	1,797	1,934	981	3,746	0	0	0	0	**15,016**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	9	8	53	24	26	13	50	46	0	0	0	**245**
MH	1	252	6	28	95	87	520	222	230	114	430	394	0	0	0	**2,375**
OBUS	6	1,488	33	166	595	562	3,516	1,459	1,594	784	2,909	2,325	0	0	0	**15,430**
SBUS	3	826	18	87	311	284	1,702	726	753	373	1,407	1,289	0	0	0	**7,776**
T6	70	16,725	372	1,756	6,305	5,749	34,469	14,695	15,250	7,549	28,497	26,111	2	0	0	**157,480**
T7	489	117,510	2,617	12,349	44,297	40,394	242,181	103,245	107,149	53,041	200,224	183,462	13	0	0	**1,106,484**
UBUS	5	1,443	39	234	900	874	5,543	2,476	2,664	1,351	5,160	4,720	0	0	0	**25,405**
Total	**593**	**143,872**	**3,238**	**15,532**	**56,013**	**51,361**	**309,549**	**132,478**	**138,030**	**68,482**	**258,750**	**218,987**	**15**	**0**	**0**	**1,396,900**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,224,751	3,832,694	3,832,694

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2050

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,381,886,000	2,610	600235	36.9	13.1	548,921
Commercial	2,716,941,342	7,503	684669	42.1	14.9	626,137
Industrial	0		0	0.0	0.0	0
Total	**5,098,827,342**		**1,284,904**	**79.0**	**28.0**	**1,175,058**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	125,938,800	138	736,742	69.3	1.4	670,082
Commercial	145,931,942	403	853,702	80.3	1.6	776,459
Industrial	0		0	0.0	0.0	0
Total	**271,870,742**		**1,590,444**	**149.5**	**3.0**	**1,446,540**

Notes and Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
*OFFROAD only provides emissions rates up to 2040. Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	912,600
	Emissions (MTCO2e per person)	812,214
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

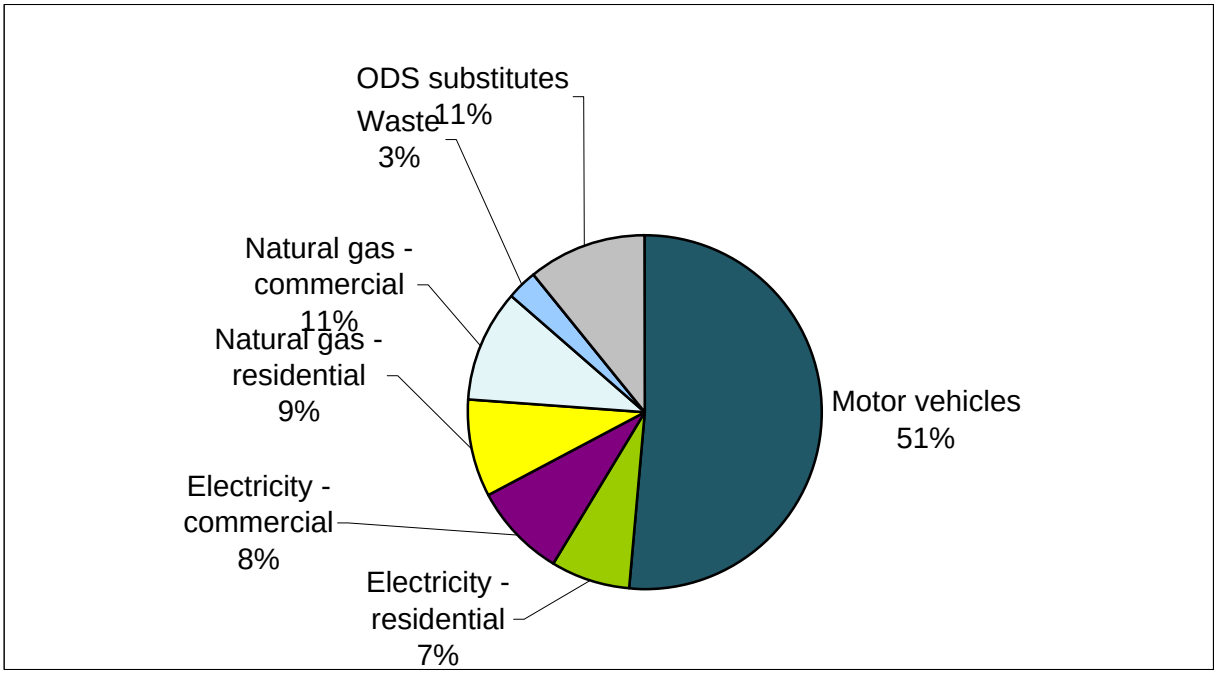
Summary
Year: 2056
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	970,000	Fresno COG
Employment	393,200	
County Information		
Population	1,616,667	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	4,122,629	4,122,629
Electricity - residential	583,447	
Electricity - commercial	679,888	
Natural gas - residential	712,228	
Natural gas - commercial	843,115	
Waste	220,578	
Offroad equipment	1,314	
ODS substitutes	863,300	
Total	***8,026,498***	



Community Greenhouse Gas Inventory

Waste

Year: **2056**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	220,578	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1590	462862	12555	75029	288699	280469	1777980	794189	854508	433399	1655038	1514041	104	0	0
LDT1	222	64643	1753	10479	40320	39170	248313	110917	119341	60529	231143	211452	15	0	0
LDT2	632	183782	4985	29791	114630	111362	705959	315338	339288	172084	657144	601160	41	0	0
LHD1	105	30648	831	4968	19116	18571	117729	52587	56581	28697	109588	100252	7	0	0
LHD2	12	3398	92	551	2119	2059	13051	5830	6272	3181	12149	11114	1	0	0
MCY	22	6273	170	1017	3913	3801	24098	10764	11581	5874	22431	20520	1	0	0
MDV	766	222915	6046	36134	139038	135074	856277	382482	411532	208725	797068	729164	50	0	0
MH	6	1746	47	283	1089	1058	6706	2995	3223	1635	6242	5710	0	0	0
OBUS	4	1165	32	189	727	706	4476	1999	2151	1091	4166	3811	0	0	0
SBUS	1	248	7	40	155	150	952	425	458	232	886	811	0	0	0
T6	7	2038	55	330	1271	1235	7829	3497	3763	1908	7287	6667	0	0	0
T7	1	289	8	47	180	175	1111	496	534	271	1034	946	0	0	0
UBUS	2	637	17	103	397	386	2445	1092	1175	596	2276	2082	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1254	34	203	782	760	4818	2152	2315	1174	4485	4103	0	0	0
LDT1	0	98	3	16	61	60	378	169	182	92	352	322	0	0	0
LDT2	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
LHD1	76	21987	596	3564	13714	13323	84459	37726	40592	20588	78619	71921	5	0	0
LHD2	18	5247	142	851	3273	3180	20157	9004	9687	4913	18763	17164	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	101	3	16	63	61	388	173	187	95	361	331	0	0	0
MH	1	312	8	51	195	189	1200	536	577	293	1117	1022	0	0	0
OBUS	6	1603	43	260	1000	971	6156	2750	2959	1501	5731	5242	0	0	0
SBUS	3	1011	27	164	630	612	3882	1734	1866	946	3614	3306	0	0	0
T6	71	20691	561	3354	12906	12538	79481	35503	38199	19374	73985	67682	5	0	0
T7	325	94666	2568	15345	59046	57363	363639	162430	174767	88640	338494	309657	21	0	0
UBUS	5	1471	40	239	918	892	5652	2525	2716	1378	5261	4813	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	714	155,159	3,251	15,388	49,127	41,078	232,800	96,271	99,700	50,514	200,001	196,731	15	0	0	**1,140,034**
LDT1	114	24,733	518	2,455	7,837	6,553	37,135	15,361	15,907	8,059	31,909	31,391	2	0	0	**181,861**
LDT2	391	84,909	1,779	8,422	26,889	22,484	127,418	52,695	54,572	27,649	109,471	107,684	8	0	0	**623,981**
LHD1	106	25,055	465	2,007	5,895	4,619	24,950	10,034	10,270	5,235	21,226	0	0	0	0	**109,755**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	12	2,778	52	222	653	512	2,766	1,112	1,138	580	2,353	0	0	0	0	**12,167**
MCY	2	515	12	63	215	189	1,103	461	471	231	870	798	0	0	0	**4,928**
MDV	589	128,049	2,683	12,699	40,542	33,899	192,120	79,448	82,278	41,687	165,051	162,351	12	0	0	**940,817**
MH	6	1,427	26	114	336	263	1,421	572	585	298	1,209	1,241	0	0	0	**7,493**
OBUS	4	953	18	76	224	176	949	381	390	199	807	828	0	0	0	**5,001**
SBUS	1	203	4	16	48	37	202	81	83	42	172	176	0	0	0	**1,064**
T6	7	1,666	31	133	392	307	1,659	667	683	348	1,411	1,449	0	0	0	**8,747**
T7	1	236	4	19	56	44	235	95	97	49	200	206	0	0	0	**1,241**
UBUS	2	520	10	42	122	96	518	208	213	109	441	452	0	0	0	**2,732**
Total	**1,949**	**426,203**	**8,851**	**41,657**	**132,336**	**110,256**	**623,277**	**257,386**	**266,388**	**135,002**	**535,121**	**503,306**	**39**	**0**	**0**	**3,041,772**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	183	5	30	114	111	702	314	337	171	653	598	0	0	0	**3,217**
LDT1	0	15	0	2	9	9	57	25	27	14	53	48	0	0	0	**260**
LDT2	0	13	0	2	8	8	49	22	24	12	46	42	0	0	0	**226**
LHD1	16	4,702	128	762	2,932	2,849	18,060	8,067	8,680	4,402	16,811	0	0	0	0	**67,393**
LHD2	4	1,127	31	183	703	683	4,328	1,933	2,080	1,055	4,029	0	0	0	0	**16,151**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	15	0	2	9	9	58	26	28	14	54	49	0	0	0	**264**
MH	1	271	6	30	102	93	559	238	247	122	462	423	0	0	0	**2,555**
OBUS	7	1,600	35	178	640	605	3,782	1,569	1,715	843	3,129	2,501	0	0	0	**16,597**
SBUS	4	888	20	93	335	305	1,831	780	810	401	1,514	1,387	0	0	0	**8,364**
T6	75	17,990	401	1,889	6,782	6,184	37,076	15,806	16,404	8,120	30,653	28,087	2	0	0	**169,393**
T7	526	126,400	2,815	13,284	47,648	43,450	260,502	111,056	115,254	57,054	215,371	197,341	14	0	0	**1,190,187**
UBUS	5	1,552	42	252	968	941	5,962	2,663	2,866	1,453	5,550	5,077	0	0	0	**27,327**
Total	**638**	**154,755**	**3,483**	**16,707**	**60,251**	**55,246**	**332,966**	**142,500**	**148,471**	**73,662**	**278,324**	**235,553**	**16**	**0**	**0**	**1,502,572**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,544,344	4,122,629	4,122,629

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1590	462862	12555	75029	288699	280469	1777980	794189	854508	433399	1655038	1514041	104	0	0
LDT1	222	64643	1753	10479	40320	39170	248313	110917	119341	60529	231143	211452	15	0	0
LDT2	632	183782	4985	29791	114630	111362	705959	315338	339288	172084	657144	601160	41	0	0
LHD1	105	30648	831	4968	19116	18571	117729	52587	56581	28697	109588	100252	7	0	0
LHD2	12	3398	92	551	2119	2059	13051	5830	6272	3181	12149	11114	1	0	0
MCY	22	6273	170	1017	3913	3801	24098	10764	11581	5874	22431	20520	1	0	0
MDV	766	222915	6046	36134	139038	135074	856277	382482	411532	208725	797068	729164	50	0	0
MH	6	1746	47	283	1089	1058	6706	2995	3223	1635	6242	5710	0	0	0
OBUS	4	1165	32	189	727	706	4476	1999	2151	1091	4166	3811	0	0	0
SBUS	1	248	7	40	155	150	952	425	458	232	886	811	0	0	0
T6	7	2038	55	330	1271	1235	7829	3497	3763	1908	7287	6667	0	0	0
T7	1	289	8	47	180	175	1111	496	534	271	1034	946	0	0	0
UBUS	2	637	17	103	397	386	2445	1092	1175	596	2276	2082	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1254	34	203	782	760	4818	2152	2315	1174	4485	4103	0	0	0
LDT1	0	98	3	16	61	60	378	169	182	92	352	322	0	0	0
LDT2	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
LHD1	76	21987	596	3564	13714	13323	84459	37726	40592	20588	78619	71921	5	0	0
LHD2	18	5247	142	851	3273	3180	20157	9004	9687	4913	18763	17164	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	101	3	16	63	61	388	173	187	95	361	331	0	0	0
MH	1	312	8	51	195	189	1200	536	577	293	1117	1022	0	0	0
OBUS	6	1603	43	260	1000	971	6156	2750	2959	1501	5731	5242	0	0	0
SBUS	3	1011	27	164	630	612	3882	1734	1866	946	3614	3306	0	0	0
T6	71	20691	561	3354	12906	12538	79481	35503	38199	19374	73985	67682	5	0	0
T7	325	94666	2568	15345	59046	57363	363639	162430	174767	88640	338494	309657	21	0	0
UBUS	5	1471	40	239	918	892	5652	2525	2716	1378	5261	4813	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	714	155,159	3,251	15,388	49,127	41,078	232,800	96,271	99,700	50,514	200,001	196,731	15	0	0	**1,140,034**
LDT1	114	24,733	518	2,455	7,837	6,553	37,135	15,361	15,907	8,059	31,909	31,391	2	0	0	**181,861**
LDT2	391	84,909	1,779	8,422	26,889	22,484	127,418	52,695	54,572	27,649	109,471	107,684	8	0	0	**623,981**
LHD1	106	25,055	465	2,007	5,895	4,619	24,950	10,034	10,270	5,235	21,226	0	0	0	0	**109,755**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	12	2,778	52	222	653	512	2,766	1,112	1,138	580	2,353	0	0	0	0	**12,167**
MCY	2	515	12	63	215	189	1,103	461	471	231	870	798	0	0	0	**4,928**
MDV	589	128,049	2,683	12,699	40,542	33,899	192,120	79,448	82,278	41,687	165,051	162,351	12	0	0	**940,817**
MH	6	1,427	26	114	336	263	1,421	572	585	298	1,209	1,241	0	0	0	**7,493**
OBUS	4	953	18	76	224	176	949	381	390	199	807	828	0	0	0	**5,001**
SBUS	1	203	4	16	48	37	202	81	83	42	172	176	0	0	0	**1,064**
T6	7	1,666	31	133	392	307	1,659	667	683	348	1,411	1,449	0	0	0	**8,747**
T7	1	236	4	19	56	44	235	95	97	49	200	206	0	0	0	**1,241**
UBUS	2	520	10	42	122	96	518	208	213	109	441	452	0	0	0	**2,732**
Total	**1,949**	**426,203**	**8,851**	**41,657**	**132,336**	**110,256**	**623,277**	**257,386**	**266,388**	**135,002**	**535,121**	**503,306**	**39**	**0**	**0**	**3,041,772**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	183	5	30	114	111	702	314	337	171	653	598	0	0	0	**3,217**
LDT1	0	15	0	2	9	9	57	25	27	14	53	48	0	0	0	**260**
LDT2	0	13	0	2	8	8	49	22	24	12	46	42	0	0	0	**226**
LHD1	16	4,702	128	762	2,932	2,849	18,060	8,067	8,680	4,402	16,811	0	0	0	0	**67,393**
LHD2	4	1,127	31	183	703	683	4,328	1,933	2,080	1,055	4,029	0	0	0	0	**16,151**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	15	0	2	9	9	58	26	28	14	54	49	0	0	0	**264**
MH	1	271	6	30	102	93	559	238	247	122	462	423	0	0	0	**2,555**
OBUS	7	1,600	35	178	640	605	3,782	1,569	1,715	843	3,129	2,501	0	0	0	**16,597**
SBUS	4	888	20	93	335	305	1,831	780	810	401	1,514	1,387	0	0	0	**8,364**
T6	75	17,990	401	1,889	6,782	6,184	37,076	15,806	16,404	8,120	30,653	28,087	2	0	0	**169,393**
T7	526	126,400	2,815	13,284	47,648	43,450	260,502	111,056	115,254	57,054	215,371	197,341	14	0	0	**1,190,187**
UBUS	5	1,552	42	252	968	941	5,962	2,663	2,866	1,453	5,550	5,077	0	0	0	**27,327**
Total	**638**	**154,755**	**3,483**	**16,707**	**60,251**	**55,246**	**332,966**	**142,500**	**148,471**	**73,662**	**278,324**	**235,553**	**16**	**0**	**0**	**1,502,572**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,544,344	4,122,629	4,122,629

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,531,700,000	2,610	637988	39.2	13.9	583,447
Commercial	2,950,179,600	7,503	743445	45.7	16.2	679,888
Industrial	0		0	0.0	0.0	0
Total	**5,481,879,600**		**1,381,434**	**85.0**	**30.2**	**1,263,335**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	133,860,000	138	783,081	73.6	1.5	712,228
Commercial	158,459,600	403	926,989	87.2	1.7	843,115
Industrial	0		0	0.0	0.0	0
Total	**292,319,600**		**1,710,070**	**160.8**	**3.2**	**1,555,342**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population in 2035

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2056
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	970,000
	Emissions (MTCO2e per person)	863,300
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

Summary

Year: 2010

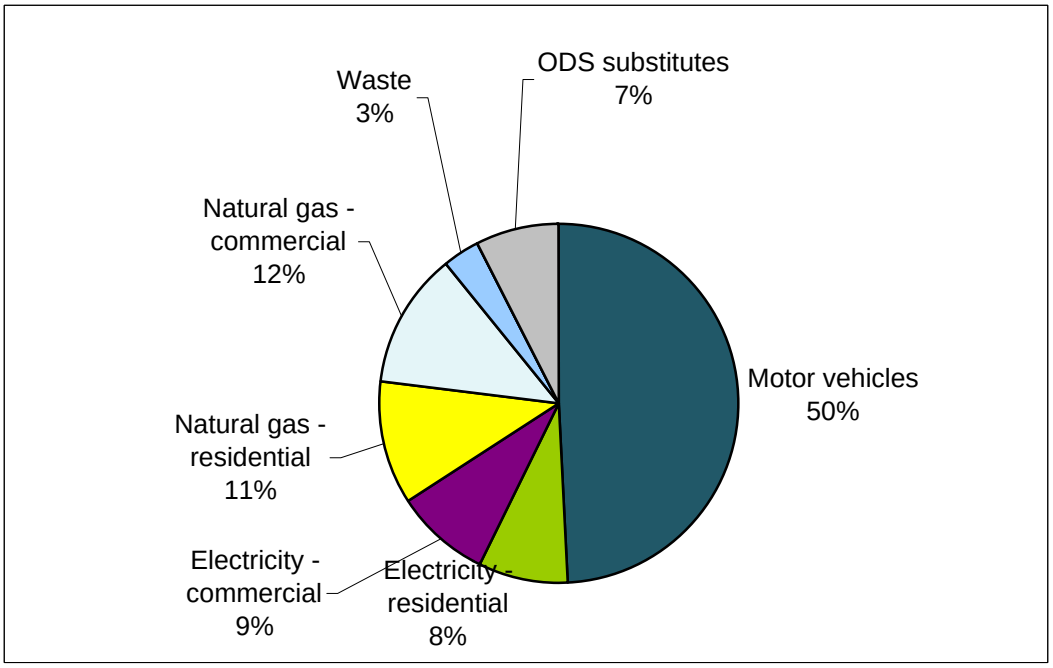
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	545,000	Fresno COG
Employment	209,261	Census 2011
County Information		
Population	930,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

- U.S. Census Bureau. 2011. 2009-2001 American Community Survey 3-Year Estimates Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%

Sources	**MTCO2e**
Motor vehicles	1,795,666
Electricity - residential	289,745
Electricity - commercial	319,817
Natural gas - residential	400,169
Natural gas - commercial	448,706
Waste	123,945
Offroad equipment	1,051
ODS substitutes	273,422
Total	***3,652,521***



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated		
Tons / year (instate)	333,099	
Percent Waste		
Mixed MSW	48.2	
Newspaper	1.3	
Office paper	10.1	
Corrugated cardboard	4.8	
Magazines/third class mail	1.2	
Food scraps	15.5	
Grass	1.9	
Leaves	1.9	
Branches	0.6	
Dimensional lumber	14.5	
Waste Emissions		
Emissions (MTCO2e)	123,945	SEEC 2013
Emissions (MTCO2e/person)	0.2274	Divide emissions by population

Sources:
Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility, Accessed July 31, 2013.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: Statewide Energy Efficiency Collaborative (SEEC). July 2013. Climate and Energy Management Suite. Version 2. Website: cems.californiaseec.org. Model run by Michael Brandman Associates/FirstCarbon Solutions, output contained in Appendix. Note: it was assumed that the landfills have methane capture. According to the County of Fresno Agenda Item 21, March 11, 2008 regarding the Feasibility Study on Gas to Energy Conversion at Southeast Regional Disposal Site and Amercian Avenue Disposal Site, Amercian Avenue Disposal site had methane capture at that time; that site collects 83 percent of the waste for the City (http://www2.co.fresno.ca.us/0110a/Questys_Agenda/MG151925/AS151956/AS151970/AI151985/DO152036/DO_152036.PDF).

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 9,162,734 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 3,344,397,910 Source: VMT per day * 365 days/year
Annual VMT Growth Rate 2.48%

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.53%	0.10%
LDT1	6.25%	0.01%
LDT2	16.43%	0.01%
LHD1	2.91%	1.81%
LHD2	0.28%	0.48%
MCY	0.67%	0.00%
MDV	18.58%	0.01%
MH	0.16%	0.04%
OBUS	0.11%	0.11%
SBUS	0.02%	0.06%
T6	0.22%	1.31%
T7	0.04%	6.68%
UBUS	0.06%	0.14%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.5%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.2%	LDA, MCY
DSL	Heavy duty	8.3%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.3%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1119	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1283	958	740	586	486	419	374	347	334	333	345	371	415	445	0
LDT2	1533	1145	884	700	581	500	447	414	398	398	413	444	496	531	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	240	220	189	165	147	134	125	119	117	117	120	127	139	158	0
MDV	1926	1438	1111	880	730	628	562	520	501	500	519	558	623	668	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	404	389	366	351	341	335	333	334	338	346	358	376	404	444	0
LDT1	397	388	375	366	360	357	355	356	358	363	370	381	397	420	0
LDT2	394	384	369	359	353	349	347	348	350	356	364	376	393	420	0
LHD1	527	527	527	527	527	527	527	527	527	527	527	0	0	0	0
LHD2	527	527	527	527	527	527	527	527	527	527	527	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	453	422	376	345	325	314	309	310	319	334	359	397	452	534	0
MH	2377	2158	1772	1454	1304	1224	1158	1105	1066	1040	1028	1030	1045	0	0
OBUS	3053	2459	2002	1695	1580	1538	1519	1410	1434	1390	1350	1175	1355	0	0
SBUS	2639	2180	1790	1412	1317	1237	1169	1116	1077	1051	1039	1040	0	0	0
T6	2610	2156	1771	1397	1303	1223	1157	1104	1065	1039	1028	1029	1044	0	0
T7	4024	3324	2729	2152	2009	1886	1783	1702	1642	1602	1584	1587	1610	0	0
UBUS	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	778	226524	6144	36720	141289	137261	870141	388675	418195	212105	809974	740970	51	0	0
LDT1	112	32536	883	5274	20294	19715	124980	55826	60066	30465	116338	106427	7	0	0
LDT2	294	85491	2319	13858	53323	51803	328396	146688	157829	80050	305689	279646	19	0	0
LHD1	52	15159	411	2457	9455	9186	58231	26011	27986	14194	54205	49587	3	0	0
LHD2	5	1482	40	240	924	898	5692	2542	2735	1387	5298	4847	0	0	0
MCY	12	3463	94	561	2160	2098	13301	5941	6392	3242	12381	11326	1	0	0
MDV	332	96692	2623	15674	60309	58590	371420	165906	178506	90537	345737	316283	22	0	0
MH	3	808	22	131	504	489	3103	1386	1491	756	2888	2642	0	0	0
OBUS	2	556	15	90	347	337	2137	954	1027	521	1989	1820	0	0	0
SBUS	0	119	3	19	74	72	458	204	220	112	426	390	0	0	0
T6	4	1124	30	182	701	681	4317	1928	2075	1052	4019	3676	0	0	0
T7	1	191	5	31	119	115	732	327	352	178	681	623	0	0	0
UBUS	1	292	8	47	182	177	1123	502	540	274	1046	957	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	524	14	85	327	318	2014	900	968	491	1875	1715	0	0	0
LDT1	0	32	1	5	20	19	123	55	59	30	114	105	0	0	0
LDT2	0	33	1	5	21	20	126	56	61	31	118	108	0	0	0
LHD1	32	9392	255	1522	5858	5691	36078	16115	17339	8794	33584	30723	2	0	0
LHD2	9	2518	68	408	1571	1526	9673	4321	4649	2358	9004	8237	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	74	2	12	46	45	285	127	137	69	265	242	0	0	0
MH	1	190	5	31	119	115	730	326	351	178	680	622	0	0	0
OBUS	2	559	15	91	349	339	2147	959	1032	523	1998	1828	0	0	0
SBUS	1	321	9	52	200	195	1234	551	593	301	1148	1051	0	0	0
T6	23	6794	184	1101	4238	4117	26099	11658	12543	6362	24294	22224	2	0	0
T7	119	34752	943	5633	21676	21058	133493	59629	64157	32540	124262	113676	8	0	0
UBUS	2	721	20	117	450	437	2769	1237	1331	675	2578	2358	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	349	75,988	1,592	7,535	24,057	20,115	114,001	47,142	48,821	24,736	97,937	96,334	7	0	0	**558,266**
LDT1	58	12,512	262	1,242	3,964	3,314	18,781	7,768	8,044	4,076	16,137	15,874	1	0	0	**91,974**
LDT2	181	39,290	823	3,897	12,442	10,403	58,957	24,382	25,250	12,793	50,652	49,824	4	0	0	**288,718**
LHD1	53	12,393	230	993	2,916	2,285	12,341	4,963	5,080	2,589	10,499	0	0	0	0	**54,287**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	5	1,211	22	97	285	223	1,206	485	496	253	1,026	0	0	0	0	**5,306**
MCY	1	307	7	37	128	113	668	285	299	152	597	579	0	0	0	**3,171**
MDV	257	55,838	1,170	5,538	17,681	14,784	83,785	34,649	35,883	18,181	71,982	70,806	5	0	0	**410,303**
MH	3	660	12	53	155	122	658	264	271	138	559	574	0	0	0	**3,467**
OBUS	2	455	8	36	107	84	453	182	186	95	385	395	0	0	0	**2,388**
SBUS	0	97	2	8	23	18	97	39	40	20	83	85	0	0	0	**511**
T6	4	919	17	74	216	169	915	368	377	192	778	799	0	0	0	**4,824**
T7	1	156	3	12	37	29	155	62	64	33	132	135	0	0	0	**818**
UBUS	1	239	4	19	56	44	238	96	98	50	203	208	0	0	0	**1,255**
Total	**914**	**200,065**	**4,153**	**19,541**	**62,065**	**51,703**	**292,256**	**120,685**	**124,910**	**63,307**	**250,970**	**235,613**	**18**	**0**	**0**	**1,426,202**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	82	2	12	45	43	269	121	131	68	269	259	0	0	0	**1,302**
LDT1	0	5	0	1	3	3	18	8	8	4	17	16	0	0	0	**83**
LDT2	0	5	0	1	3	3	18	8	9	4	17	16	0	0	0	**84**
LHD1	7	1,987	54	322	1,239	1,204	7,632	3,409	3,668	1,860	7,104	0	0	0	0	**28,479**
LHD2	2	533	14	86	332	323	2,048	915	984	499	1,906	0	0	0	0	**7,641**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	13	0	2	6	6	35	16	17	9	38	39	0	0	0	**181**
MH	1	165	4	18	62	57	340	145	150	74	281	257	0	0	0	**1,552**
OBUS	2	552	12	62	221	209	1,310	543	594	292	1,083	862	0	0	0	**5,740**
SBUS	1	281	6	30	106	97	579	247	256	127	479	439	0	0	0	**2,647**
T6	24	5,882	131	618	2,217	2,022	12,123	5,168	5,364	2,655	10,023	9,184	1	0	0	**55,387**
T7	193	46,382	1,033	4,868	17,484	15,944	95,590	40,751	42,292	20,936	79,029	72,413	5	0	0	**436,726**
UBUS	3	744	20	121	464	451	2,857	1,276	1,373	696	2,659	2,433	0	0	0	**13,094**
Total	**233**	**56,630**	**1,277**	**6,139**	**22,183**	**20,360**	**122,817**	**52,606**	**54,847**	**27,226**	**102,906**	**85,918**	**6**	**0**	**0**	**553,147**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	1,979,350	1,795,666	1,795,666

EMFAC 2011
2010 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2010, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LDA	GAS	5	693	1118.51	1112.61	0.003%
Fresno	2010	LDA	DSL	5	2	403.71	399.40	0.000%
Fresno	2010	LDA	GAS	10	1884	835.50	831.08	0.008%
Fresno	2010	LDA	DSL	10	4	388.74	384.86	0.000%
Fresno	2010	LDA	GAS	15	1788	645.40	641.99	0.008%
Fresno	2010	LDA	DSL	15	4	366.25	362.99	0.000%
Fresno	2010	LDA	GAS	20	464306	511.10	508.40	2.031%
Fresno	2010	LDA	DSL	20	1075	351.09	348.26	0.005%
Fresno	2010	LDA	GAS	25	56285	424.07	421.84	0.246%
Fresno	2010	LDA	DSL	25	130	341.24	338.69	0.001%
Fresno	2010	LDA	GAS	30	172555	365.00	363.07	0.755%
Fresno	2010	LDA	DSL	30	399	335.48	333.09	0.002%
Fresno	2010	LDA	GAS	35	672123	326.31	324.59	2.940%
Fresno	2010	LDA	DSL	35	1556	333.12	330.79	0.007%
Fresno	2010	LDA	GAS	40	1261393	302.09	300.50	5.518%
Fresno	2010	LDA	DSL	40	2920	333.89	331.54	0.013%
Fresno	2010	LDA	GAS	45	1084869	290.77	289.23	4.746%
Fresno	2010	LDA	DSL	45	2511	337.89	335.43	0.011%
Fresno	2010	LDA	GAS	50	1492167	290.46	288.93	6.527%
Fresno	2010	LDA	DSL	50	3454	345.57	342.89	0.015%
Fresno	2010	LDA	GAS	55	1064211	301.16	299.57	4.655%
Fresno	2010	LDA	DSL	55	2464	357.86	354.83	0.011%
Fresno	2010	LDA	GAS	60	1286323	323.81	322.10	5.627%
Fresno	2010	LDA	DSL	60	2978	376.34	372.80	0.013%
Fresno	2010	LDA	GAS	65	1270026	361.82	359.91	5.556%
Fresno	2010	LDA	DSL	65	2940	403.61	399.31	0.013%
Fresno	2010	LDA	GAS	70	1123104	387.82	385.77	4.913%
Fresno	2010	LDA	DSL	70	2600	443.84	438.41	0.011%
Fresno	2010	LDT1	GAS	5	100	1283.31	1276.59	0.000%
Fresno	2010	LDT1	DSL	5	0	396.83	393.67	0.000%
Fresno	2010	LDT1	GAS	10	271	957.84	952.82	0.001%
Fresno	2010	LDT1	DSL	10	0	388.06	385.22	0.000%
Fresno	2010	LDT1	GAS	15	257	739.63	735.75	0.001%
Fresno	2010	LDT1	DSL	15	0	374.89	372.50	0.000%
Fresno	2010	LDT1	GAS	20	66689	586.30	583.23	0.292%
Fresno	2010	LDT1	DSL	20	65	366.01	363.94	0.000%
Fresno	2010	LDT1	GAS	25	8084	486.45	483.90	0.035%
Fresno	2010	LDT1	DSL	25	8	360.24	358.37	0.000%
Fresno	2010	LDT1	GAS	30	24784	418.68	416.49	0.108%
Fresno	2010	LDT1	DSL	30	24	356.87	355.11	0.000%
Fresno	2010	LDT1	GAS	35	96538	374.28	372.32	0.422%
Fresno	2010	LDT1	DSL	35	95	355.49	353.78	0.000%
Fresno	2010	LDT1	GAS	40	181176	346.55	344.74	0.793%
Fresno	2010	LDT1	DSL	40	178	355.94	354.22	0.001%
Fresno	2010	LDT1	GAS	45	155822	333.56	331.81	0.682%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LDT1	DSL	45	153	358.28	356.48	0.001%
Fresno	2010	LDT1	GAS	50	214323	333.21	331.46	0.938%
Fresno	2010	LDT1	DSL	50	210	362.78	360.81	0.001%
Fresno	2010	LDT1	GAS	55	152854	345.47	343.66	0.669%
Fresno	2010	LDT1	DSL	55	150	369.97	367.76	0.001%
Fresno	2010	LDT1	GAS	60	184757	371.49	369.54	0.808%
Fresno	2010	LDT1	DSL	60	181	380.80	378.21	0.001%
Fresno	2010	LDT1	GAS	65	182416	415.06	412.89	0.798%
Fresno	2010	LDT1	DSL	65	179	396.77	393.62	0.001%
Fresno	2010	LDT1	GAS	70	161313	444.88	442.55	0.706%
Fresno	2010	LDT1	DSL	70	158	420.33	416.35	0.001%
Fresno	2010	LDT2	GAS	5	262	1532.90	1523.22	0.001%
Fresno	2010	LDT2	DSL	5	0	393.55	388.32	0.000%
Fresno	2010	LDT2	GAS	10	711	1144.66	1137.43	0.003%
Fresno	2010	LDT2	DSL	10	0	383.77	379.04	0.000%
Fresno	2010	LDT2	GAS	15	675	884.09	878.51	0.003%
Fresno	2010	LDT2	DSL	15	0	369.05	365.09	0.000%
Fresno	2010	LDT2	GAS	20	175232	700.40	695.98	0.767%
Fresno	2010	LDT2	DSL	20	67	359.13	355.69	0.000%
Fresno	2010	LDT2	GAS	25	21242	581.13	577.46	0.093%
Fresno	2010	LDT2	DSL	25	8	352.69	349.58	0.000%
Fresno	2010	LDT2	GAS	30	65123	500.18	497.02	0.285%
Fresno	2010	LDT2	DSL	30	25	348.92	346.01	0.000%
Fresno	2010	LDT2	GAS	35	253663	447.15	444.33	1.110%
Fresno	2010	LDT2	DSL	35	98	347.37	344.54	0.000%
Fresno	2010	LDT2	GAS	40	476057	413.99	411.37	2.082%
Fresno	2010	LDT2	DSL	40	183	347.88	345.02	0.001%
Fresno	2010	LDT2	GAS	45	409436	398.47	395.95	1.791%
Fresno	2010	LDT2	DSL	45	158	350.49	347.50	0.001%
Fresno	2010	LDT2	GAS	50	563153	398.05	395.53	2.463%
Fresno	2010	LDT2	DSL	50	217	355.52	352.26	0.001%
Fresno	2010	LDT2	GAS	55	401639	412.70	410.09	1.757%
Fresno	2010	LDT2	DSL	55	155	363.56	359.88	0.001%
Fresno	2010	LDT2	GAS	60	485466	443.76	440.96	2.124%
Fresno	2010	LDT2	DSL	60	187	375.65	371.35	0.001%
Fresno	2010	LDT2	GAS	65	479315	495.83	492.70	2.097%
Fresno	2010	LDT2	DSL	65	185	393.49	388.26	0.001%
Fresno	2010	LDT2	GAS	70	423866	531.46	528.10	1.854%
Fresno	2010	LDT2	DSL	70	163	419.81	413.21	0.001%
Fresno	2010	LHD1	GAS	5	18900	2513.50	2513.50	0.083%
Fresno	2010	LHD1	DSL	5	7256	526.86	526.86	0.032%
Fresno	2010	LHD1	GAS	10	49284	2036.13	2036.13	0.216%
Fresno	2010	LHD1	DSL	10	24129	526.86	526.86	0.106%
Fresno	2010	LHD1	GAS	15	112226	1392.43	1392.43	0.491%
Fresno	2010	LHD1	DSL	15	52256	526.86	526.86	0.229%
Fresno	2010	LHD1	GAS	20	129676	1006.07	1006.07	0.567%
Fresno	2010	LHD1	DSL	20	57290	526.86	526.86	0.251%
Fresno	2010	LHD1	GAS	25	99891	768.01	768.01	0.437%
Fresno	2010	LHD1	DSL	25	61315	526.86	526.86	0.268%
Fresno	2010	LHD1	GAS	30	88336	619.43	619.43	0.386%
Fresno	2010	LHD1	DSL	30	51758	526.86	526.86	0.226%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LHD1	GAS	35	33008	527.85	527.85	0.144%
Fresno	2010	LHD1	DSL	35	27315	526.86	526.86	0.119%
Fresno	2010	LHD1	GAS	40	9743	475.23	475.23	0.043%
Fresno	2010	LHD1	DSL	40	14995	526.86	526.86	0.066%
Fresno	2010	LHD1	GAS	45	11995	452.06	452.06	0.052%
Fresno	2010	LHD1	DSL	45	16184	526.86	526.86	0.071%
Fresno	2010	LHD1	GAS	50	88567	454.32	454.32	0.387%
Fresno	2010	LHD1	DSL	50	62493	526.86	526.86	0.273%
Fresno	2010	LHD1	GAS	55	24360	482.42	482.42	0.107%
Fresno	2010	LHD1	DSL	55	37634	526.86	526.86	0.165%
Fresno	2010	LHD2	GAS	5	1847	2513.50	2513.50	0.008%
Fresno	2010	LHD2	DSL	5	1945	527.22	527.22	0.009%
Fresno	2010	LHD2	GAS	10	4817	2036.13	2036.13	0.021%
Fresno	2010	LHD2	DSL	10	6469	527.22	527.22	0.028%
Fresno	2010	LHD2	GAS	15	10969	1392.43	1392.43	0.048%
Fresno	2010	LHD2	DSL	15	14011	527.22	527.22	0.061%
Fresno	2010	LHD2	GAS	20	12675	1006.07	1006.07	0.055%
Fresno	2010	LHD2	DSL	20	15360	527.22	527.22	0.067%
Fresno	2010	LHD2	GAS	25	9764	768.01	768.01	0.043%
Fresno	2010	LHD2	DSL	25	16439	527.22	527.22	0.072%
Fresno	2010	LHD2	GAS	30	8634	619.43	619.43	0.038%
Fresno	2010	LHD2	DSL	30	13877	527.22	527.22	0.061%
Fresno	2010	LHD2	GAS	35	3226	527.85	527.85	0.014%
Fresno	2010	LHD2	DSL	35	7323	527.22	527.22	0.032%
Fresno	2010	LHD2	GAS	40	952	475.23	475.23	0.004%
Fresno	2010	LHD2	DSL	40	4020	527.22	527.22	0.018%
Fresno	2010	LHD2	GAS	45	1172	452.06	452.06	0.005%
Fresno	2010	LHD2	DSL	45	4339	527.22	527.22	0.019%
Fresno	2010	LHD2	GAS	50	8657	454.32	454.32	0.038%
Fresno	2010	LHD2	DSL	50	16755	527.22	527.22	0.073%
Fresno	2010	LHD2	GAS	55	2381	482.42	482.42	0.010%
Fresno	2010	LHD2	DSL	55	10090	527.22	527.22	0.044%
Fresno	2010	MCY	GAS	5	11	240.29	240.29	0.000%
Fresno	2010	MCY	GAS	10	29	220.49	220.49	0.000%
Fresno	2010	MCY	GAS	15	27	188.67	188.67	0.000%
Fresno	2010	MCY	GAS	20	7097	164.91	164.91	0.031%
Fresno	2010	MCY	GAS	25	860	147.22	147.22	0.004%
Fresno	2010	MCY	GAS	30	2638	134.27	134.27	0.012%
Fresno	2010	MCY	GAS	35	10274	125.16	125.16	0.045%
Fresno	2010	MCY	GAS	40	19281	119.33	119.33	0.084%
Fresno	2010	MCY	GAS	45	16583	116.51	116.51	0.073%
Fresno	2010	MCY	GAS	50	22809	116.66	116.66	0.100%
Fresno	2010	MCY	GAS	55	16267	120.03	120.03	0.071%
Fresno	2010	MCY	GAS	60	19662	127.21	127.21	0.086%
Fresno	2010	MCY	GAS	65	19413	139.27	139.27	0.085%
Fresno	2010	MCY	GAS	70	17167	157.99	157.99	0.075%
Fresno	2010	MDV	GAS	5	296	1926.06	1919.59	0.001%
Fresno	2010	MDV	DSL	5	0	452.63	448.28	0.000%
Fresno	2010	MDV	GAS	10	804	1438.32	1433.48	0.004%
Fresno	2010	MDV	DSL	10	1	422.15	418.22	0.000%
Fresno	2010	MDV	GAS	15	763	1110.93	1107.19	0.003%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	MDV	DSL	15	1	376.32	373.03	0.000%
Fresno	2010	MDV	GAS	20	198189	880.06	877.10	0.867%
Fresno	2010	MDV	DSL	20	152	345.44	342.58	0.001%
Fresno	2010	MDV	GAS	25	24025	730.19	727.74	0.105%
Fresno	2010	MDV	DSL	25	18	325.38	322.80	0.000%
Fresno	2010	MDV	GAS	30	73655	628.47	626.36	0.322%
Fresno	2010	MDV	DSL	30	56	313.64	311.22	0.000%
Fresno	2010	MDV	GAS	35	286896	561.85	559.96	1.255%
Fresno	2010	MDV	DSL	35	220	308.83	306.48	0.001%
Fresno	2010	MDV	GAS	40	538426	520.17	518.42	2.355%
Fresno	2010	MDV	DSL	40	413	310.41	308.04	0.002%
Fresno	2010	MDV	GAS	45	463076	500.67	498.99	2.026%
Fresno	2010	MDV	DSL	45	355	318.54	316.06	0.002%
Fresno	2010	MDV	GAS	50	636932	500.15	498.46	2.786%
Fresno	2010	MDV	DSL	50	488	334.19	331.48	0.002%
Fresno	2010	MDV	GAS	55	454258	518.55	516.81	1.987%
Fresno	2010	MDV	DSL	55	348	359.22	356.17	0.002%
Fresno	2010	MDV	GAS	60	549067	557.58	555.71	2.402%
Fresno	2010	MDV	DSL	60	421	396.88	393.31	0.002%
Fresno	2010	MDV	GAS	65	542110	623.01	620.92	2.371%
Fresno	2010	MDV	DSL	65	415	452.43	448.08	0.002%
Fresno	2010	MDV	GAS	70	479397	667.78	665.53	2.097%
Fresno	2010	MDV	DSL	70	367	534.37	528.90	0.002%
Fresno	2010	MH	GAS	5	307	2513.50	2513.50	0.001%
Fresno	2010	MH	DSL	5	67	2376.97	2376.97	0.000%
Fresno	2010	MH	GAS	10	1543	2036.13	2036.13	0.007%
Fresno	2010	MH	DSL	10	334	2158.29	2158.29	0.001%
Fresno	2010	MH	GAS	15	1949	1392.43	1392.43	0.009%
Fresno	2010	MH	DSL	15	451	1772.14	1772.14	0.002%
Fresno	2010	MH	GAS	20	2021	1006.07	1006.07	0.009%
Fresno	2010	MH	DSL	20	479	1454.25	1454.25	0.002%
Fresno	2010	MH	GAS	25	2252	768.01	768.01	0.010%
Fresno	2010	MH	DSL	25	499	1304.38	1304.38	0.002%
Fresno	2010	MH	GAS	30	2547	619.43	619.43	0.011%
Fresno	2010	MH	DSL	30	599	1224.35	1224.35	0.003%
Fresno	2010	MH	GAS	35	3165	527.85	527.85	0.014%
Fresno	2010	MH	DSL	35	707	1157.94	1157.94	0.003%
Fresno	2010	MH	GAS	40	3940	475.23	475.23	0.017%
Fresno	2010	MH	DSL	40	877	1105.14	1105.14	0.004%
Fresno	2010	MH	GAS	45	3593	452.06	452.06	0.016%
Fresno	2010	MH	DSL	45	718	1065.96	1065.96	0.003%
Fresno	2010	MH	GAS	50	3497	454.32	454.32	0.015%
Fresno	2010	MH	DSL	50	804	1040.39	1040.39	0.004%
Fresno	2010	MH	GAS	55	4573	482.42	482.42	0.020%
Fresno	2010	MH	DSL	55	1178	1028.44	1028.44	0.005%
Fresno	2010	MH	GAS	60	5278	541.21	541.21	0.023%
Fresno	2010	MH	DSL	60	1416	1030.10	1030.10	0.006%
Fresno	2010	MH	GAS	65	825	641.50	641.50	0.004%
Fresno	2010	MH	DSL	65	223	1045.37	1045.37	0.001%
Fresno	2010	OBUS	GAS	5	211	2513.50	2513.50	0.001%
Fresno	2010	OBUS	DSL	5	143	3052.65	3052.65	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	OBUS	GAS	10	1062	2036.13	2036.13	0.005%
Fresno	2010	OBUS	DSL	10	660	2459.32	2459.32	0.003%
Fresno	2010	OBUS	GAS	15	1342	1392.43	1392.43	0.006%
Fresno	2010	OBUS	DSL	15	869	2001.78	2001.78	0.004%
Fresno	2010	OBUS	GAS	20	1392	1006.07	1006.07	0.006%
Fresno	2010	OBUS	DSL	20	1157	1695.25	1695.25	0.005%
Fresno	2010	OBUS	GAS	25	1551	768.01	768.01	0.007%
Fresno	2010	OBUS	DSL	25	1201	1580.12	1580.12	0.005%
Fresno	2010	OBUS	GAS	30	1754	619.43	619.43	0.008%
Fresno	2010	OBUS	DSL	30	1673	1537.77	1537.77	0.007%
Fresno	2010	OBUS	GAS	35	2179	527.85	527.85	0.010%
Fresno	2010	OBUS	DSL	35	2467	1519.45	1519.45	0.011%
Fresno	2010	OBUS	GAS	40	2713	475.23	475.23	0.012%
Fresno	2010	OBUS	DSL	40	2636	1410.01	1410.01	0.012%
Fresno	2010	OBUS	GAS	45	2474	452.06	452.06	0.011%
Fresno	2010	OBUS	DSL	45	2945	1434.26	1434.26	0.013%
Fresno	2010	OBUS	GAS	50	2408	454.32	454.32	0.011%
Fresno	2010	OBUS	DSL	50	3146	1390.38	1390.38	0.014%
Fresno	2010	OBUS	GAS	55	3149	482.42	482.42	0.014%
Fresno	2010	OBUS	DSL	55	4126	1350.21	1350.21	0.018%
Fresno	2010	OBUS	GAS	60	3634	541.21	541.21	0.016%
Fresno	2010	OBUS	DSL	60	2801	1175.03	1175.03	0.012%
Fresno	2010	OBUS	GAS	65	568	641.50	641.50	0.002%
Fresno	2010	OBUS	DSL	65	727	1355.23	1355.23	0.003%
Fresno	2010	SBUS	GAS	5	52	2513.50	2513.50	0.000%
Fresno	2010	SBUS	DSL	5	140	2638.70	2638.70	0.001%
Fresno	2010	SBUS	GAS	10	182	2036.13	2036.13	0.001%
Fresno	2010	SBUS	DSL	10	490	2179.77	2179.77	0.002%
Fresno	2010	SBUS	GAS	15	363	1392.43	1392.43	0.002%
Fresno	2010	SBUS	DSL	15	979	1789.78	1789.78	0.004%
Fresno	2010	SBUS	GAS	20	493	1006.07	1006.07	0.002%
Fresno	2010	SBUS	DSL	20	1329	1411.96	1411.96	0.006%
Fresno	2010	SBUS	GAS	25	779	768.01	768.01	0.003%
Fresno	2010	SBUS	DSL	25	2098	1317.39	1317.39	0.009%
Fresno	2010	SBUS	GAS	30	934	619.43	619.43	0.004%
Fresno	2010	SBUS	DSL	30	2518	1236.57	1236.57	0.011%
Fresno	2010	SBUS	GAS	35	959	527.85	527.85	0.004%
Fresno	2010	SBUS	DSL	35	2584	1169.50	1169.50	0.011%
Fresno	2010	SBUS	GAS	40	647	475.23	475.23	0.003%
Fresno	2010	SBUS	DSL	40	1744	1116.18	1116.18	0.008%
Fresno	2010	SBUS	GAS	45	311	452.06	452.06	0.001%
Fresno	2010	SBUS	DSL	45	837	1076.60	1076.60	0.004%
Fresno	2010	SBUS	GAS	50	156	454.32	454.32	0.001%
Fresno	2010	SBUS	DSL	50	419	1050.78	1050.78	0.002%
Fresno	2010	SBUS	GAS	55	231	482.42	482.42	0.001%
Fresno	2010	SBUS	DSL	55	624	1038.71	1038.71	0.003%
Fresno	2010	SBUS	GAS	60	129	541.21	541.21	0.001%
Fresno	2010	SBUS	DSL	60	347	1040.39	1040.39	0.002%
Fresno	2010	T6	GAS	5	427	2513.50	2513.50	0.002%
Fresno	2010	T6	DSL	5	2401	2610.34	2610.34	0.011%
Fresno	2010	T6	GAS	10	2146	2036.13	2036.13	0.009%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	T6	DSL	10	11950	2156.35	2156.35	0.052%
Fresno	2010	T6	GAS	15	2711	1392.43	1392.43	0.012%
Fresno	2010	T6	DSL	15	16128	1770.55	1770.55	0.071%
Fresno	2010	T6	GAS	20	2812	1006.07	1006.07	0.012%
Fresno	2010	T6	DSL	20	17104	1396.79	1396.79	0.075%
Fresno	2010	T6	GAS	25	3134	768.01	768.01	0.014%
Fresno	2010	T6	DSL	25	17813	1303.23	1303.23	0.078%
Fresno	2010	T6	GAS	30	3543	619.43	619.43	0.015%
Fresno	2010	T6	DSL	30	21419	1223.28	1223.28	0.094%
Fresno	2010	T6	GAS	35	4403	527.85	527.85	0.019%
Fresno	2010	T6	DSL	35	25256	1156.93	1156.93	0.110%
Fresno	2010	T6	GAS	40	5482	475.23	475.23	0.024%
Fresno	2010	T6	DSL	40	31351	1104.18	1104.18	0.137%
Fresno	2010	T6	GAS	45	4999	452.06	452.06	0.022%
Fresno	2010	T6	DSL	45	25673	1065.04	1065.04	0.112%
Fresno	2010	T6	GAS	50	4865	454.32	454.32	0.021%
Fresno	2010	T6	DSL	50	28732	1039.49	1039.49	0.126%
Fresno	2010	T6	GAS	55	6363	482.42	482.42	0.028%
Fresno	2010	T6	DSL	55	42104	1027.55	1027.55	0.184%
Fresno	2010	T6	GAS	60	7343	541.21	541.21	0.032%
Fresno	2010	T6	DSL	60	50595	1029.21	1029.21	0.221%
Fresno	2010	T6	GAS	65	1147	641.50	641.50	0.005%
Fresno	2010	T6	DSL	65	7962	1044.47	1044.47	0.035%
Fresno	2010	T7	GAS	5	30	2513.50	2513.50	0.000%
Fresno	2010	T7	DSL	5	5509	4024.00	4024.00	0.024%
Fresno	2010	T7	GAS	10	149	2036.13	2036.13	0.001%
Fresno	2010	T7	DSL	10	21043	3324.13	3324.13	0.092%
Fresno	2010	T7	GAS	15	163	1392.43	1392.43	0.001%
Fresno	2010	T7	DSL	15	25736	2729.40	2729.40	0.113%
Fresno	2010	T7	GAS	20	278	1006.07	1006.07	0.001%
Fresno	2010	T7	DSL	20	63851	2152.43	2152.43	0.279%
Fresno	2010	T7	GAS	25	363	768.01	768.01	0.002%
Fresno	2010	T7	DSL	25	58129	2009.01	2009.01	0.254%
Fresno	2010	T7	GAS	30	662	619.43	619.43	0.003%
Fresno	2010	T7	DSL	30	98137	1885.76	1885.76	0.429%
Fresno	2010	T7	GAS	35	1178	527.85	527.85	0.005%
Fresno	2010	T7	DSL	35	176552	1783.48	1783.48	0.772%
Fresno	2010	T7	GAS	40	1026	475.23	475.23	0.004%
Fresno	2010	T7	DSL	40	166614	1702.16	1702.16	0.729%
Fresno	2010	T7	GAS	45	1086	452.06	452.06	0.005%
Fresno	2010	T7	DSL	45	233270	1641.82	1641.82	1.020%
Fresno	2010	T7	GAS	50	1136	454.32	454.32	0.005%
Fresno	2010	T7	DSL	50	242595	1602.44	1602.44	1.061%
Fresno	2010	T7	GAS	55	1668	482.42	482.42	0.007%
Fresno	2010	T7	DSL	55	295829	1584.02	1584.02	1.294%
Fresno	2010	T7	GAS	60	412	541.21	541.21	0.002%
Fresno	2010	T7	DSL	60	90120	1586.58	1586.58	0.394%
Fresno	2010	T7	GAS	65	221	641.50	641.50	0.001%
Fresno	2010	T7	DSL	65	49361	1610.11	1610.11	0.216%
Fresno	2010	UBUS	GAS	5	127	2513.50	2513.50	0.001%
Fresno	2010	UBUS	DSL	5	314	2569.78	2569.78	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	Percent of Total VMT (Pa
Fresno	2010	UBUS	GAS	10	457	2036.13	2036.13	0.002%
Fresno	2010	UBUS	DSL	10	1126	2569.78	2569.78	0.005%
Fresno	2010	UBUS	GAS	15	914	1392.43	1392.43	0.004%
Fresno	2010	UBUS	DSL	15	2253	2569.78	2569.78	0.010%
Fresno	2010	UBUS	GAS	20	1206	1006.07	1006.07	0.005%
Fresno	2010	UBUS	DSL	20	2973	2569.78	2569.78	0.013%
Fresno	2010	UBUS	GAS	25	1816	768.01	768.01	0.008%
Fresno	2010	UBUS	DSL	25	4478	2569.78	2569.78	0.020%
Fresno	2010	UBUS	GAS	30	2273	619.43	619.43	0.010%
Fresno	2010	UBUS	DSL	30	5604	2569.78	2569.78	0.025%
Fresno	2010	UBUS	GAS	35	2228	527.85	527.85	0.010%
Fresno	2010	UBUS	DSL	35	5492	2569.78	2569.78	0.024%
Fresno	2010	UBUS	GAS	40	1606	475.23	475.23	0.007%
Fresno	2010	UBUS	DSL	40	3959	2569.78	2569.78	0.017%
Fresno	2010	UBUS	GAS	45	700	452.06	452.06	0.003%
Fresno	2010	UBUS	DSL	45	1726	2569.78	2569.78	0.008%
Fresno	2010	UBUS	GAS	50	356	454.32	454.32	0.002%
Fresno	2010	UBUS	DSL	50	877	2569.78	2569.78	0.004%
Fresno	2010	UBUS	GAS	55	441	482.42	482.42	0.002%
Fresno	2010	UBUS	DSL	55	1087	2569.78	2569.78	0.005%
Fresno	2010	UBUS	GAS	60	722	541.21	541.21	0.003%
Fresno	2010	UBUS	DSL	60	1779	2569.78	2569.78	0.008%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	Used 2010 emission factor estimated by PG&E
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,422,450,000	2,610	316495	22.0	7.8	289,745
Commercial	1,570,085,283	7,503	349344	24.3	8.6	319,817
Industrial	*					0
Total	**2,992,535,283**		**665,839**	**46.4**	**16.5**	**609,562**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	75,210,000	138	439,979	41.4	0.8	400,169
Commercial	84,332,183	403	493,343	46.4	0.9	448,706
Industrial	*					0
Total	**159,542,183**		**933,322**	**87.7**	**1.8**	**848,875**

Notes and Sources:

*The Industrial kWH/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage and emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	1,019	0.1600	0.0100	930
Fresno	545,000	597	0	0	545
Percent Fresno/Fresno County	58.6%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	920	0.360	0.08000	864
Fresno	545,000	539	0	0	506
Percent Fresno/Fresno County	58.6%				

Total Fresno **1,051**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California

Emissions (MMTCO2e)	18.69
Population	37,253,956
Emissions (MTCO2e per person)	0.50

Fresno

Population	545,000
Emissions (MTCO2e per person)	273,422

(estimated by using California per person emissions)

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website: http://quickfacts.census.gov/qfd/states/06000.html. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

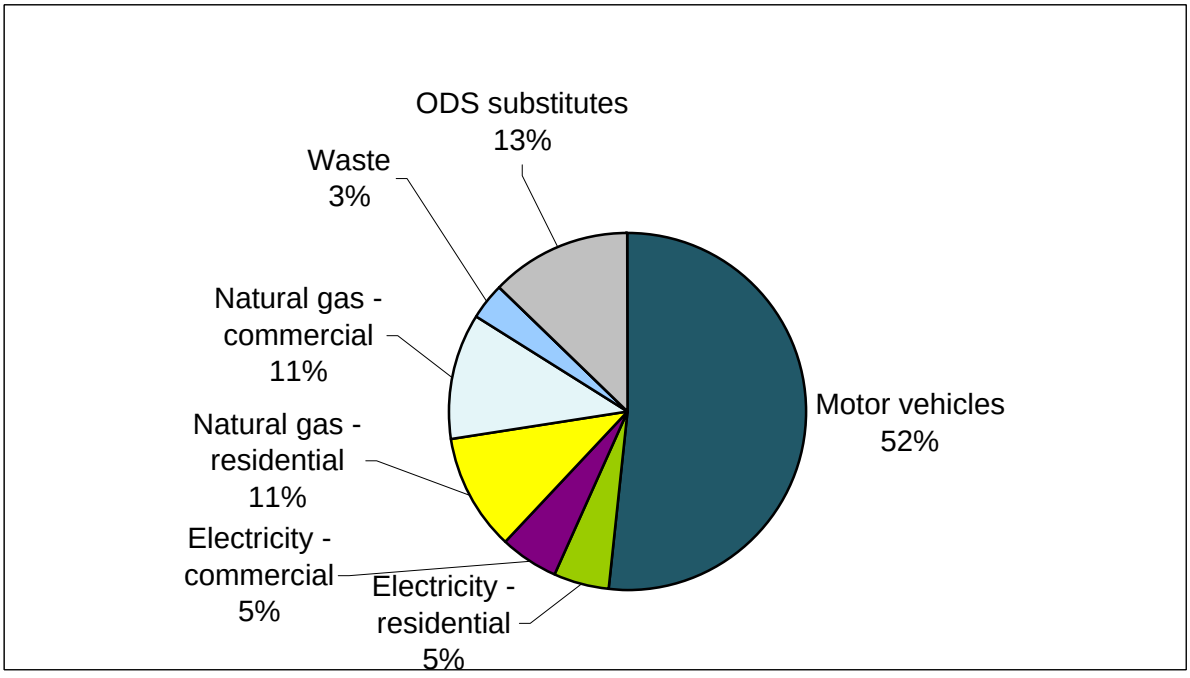
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,337,015	1,828,249
Electricity - residential	226,011	226,011
Electricity - commercial	240,205	240,205
Natural gas - residential	476,679	476,679
Natural gas - commercial	514,647	514,647
Waste	147,628	147,628
Offroad equipment	1,138	1,138
ODS substitutes	576,784	576,784
Total	***4,520,107***	4,011,341



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,149,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,069,502,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1130	835	641	514	428	368	328	304	292	292	303	326	364	390	0
LDT1	1305	964	741	594	495	425	379	351	338	337	350	376	420	451	0
LDT2	1536	1135	872	699	582	500	446	413	397	397	412	443	495	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	264	240	203	177	159	147	140	137	139	145	158	177	206	251	0
MDV	1957	1446	1111	890	742	637	569	526	506	506	525	564	630	676	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	487	444	378	335	306	289	282	285	296	319	354	408	487	603	0
LDT1	486	444	380	338	310	293	287	289	300	322	357	409	486	600	0
LDT2	484	441	378	335	308	291	285	287	298	320	354	407	483	597	0
LHD1	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
LHD2	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	490	446	380	336	307	290	283	285	297	319	355	410	490	608	0
MH	2390	2170	1782	1462	1312	1231	1164	1111	1072	1046	1034	1036	1051	0	0
OBUS	3024	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164	1344	0	0
SBUS	2632	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038	0	0	0
T6	2578	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016	1031	0	0
T7	3978	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568	1592	0	0
UBUS	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1	143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2	366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1	60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2	6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY	15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV	381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH	3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS	2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS	0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6	7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7	1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS	1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1	0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2	0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1	36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2	10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH	1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS	3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS	1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6	37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7	185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS	3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	444	95,444	1,988	9,526	30,550	25,468	144,160	59,580	61,685	31,272	123,830	121,830	9	0	0	**705,341**
LDT1	75	16,108	336	1,608	5,154	4,298	24,327	10,055	10,411	5,278	20,898	20,561	2	0	0	**119,035**
LDT2	226	48,522	1,011	4,843	15,528	12,946	73,283	30,289	31,360	15,898	62,951	61,935	5	0	0	**358,571**
LHD1	60	14,215	264	1,139	3,344	2,620	14,155	5,693	5,826	2,970	12,042	0	0	0	0	**62,268**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,453	27	116	342	268	1,447	582	596	304	1,231	0	0	0	0	**6,365**
MCY	2	417	10	50	173	155	934	409	446	237	979	1,006	0	0	0	**4,816**
MDV	299	64,398	1,341	6,427	20,607	17,181	97,257	40,199	41,620	21,099	83,547	82,199	6	0	0	**475,881**
MH	3	820	15	66	193	151	817	328	336	171	695	713	0	0	0	**4,305**
OBUS	2	487	9	39	115	90	485	195	200	102	412	423	0	0	0	**2,556**
SBUS	0	111	2	9	26	20	110	44	45	23	94	96	0	0	0	**580**
T6	7	1,653	31	132	389	305	1,646	662	678	345	1,400	1,437	0	0	0	**8,679**
T7	1	234	4	19	55	43	233	94	96	49	198	203	0	0	0	**1,227**
UBUS	1	271	5	22	64	50	270	109	111	57	230	236	0	0	0	**1,424**
Total	**1,127**	**244,134**	**5,042**	**23,994**	**76,539**	**63,595**	**359,124**	**148,240**	**153,409**	**77,803**	**308,508**	**290,640**	**22**	**0**	**0**	**1,752,177**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	140	3	17	60	56	344	155	173	94	401	422	0	0	0	**1,866**
LDT1	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**132**
LDT2	0	9	0	1	4	4	22	10	11	6	25	27	0	0	0	**119**
LHD1	8	2,218	60	360	1,384	1,344	8,521	3,806	4,095	2,077	7,931	0	0	0	0	**31,796**
LHD2	2	595	16	96	371	360	2,285	1,021	1,098	557	2,127	0	0	0	0	**8,528**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	16	0	2	7	6	38	17	19	10	44	47	0	0	0	**205**
MH	1	187	4	20	70	64	384	164	170	84	318	291	0	0	0	**1,757**
OBUS	3	736	16	82	295	279	1,749	725	794	390	1,447	1,150	0	0	0	**7,664**
SBUS	1	313	7	33	118	107	644	275	285	141	532	488	0	0	0	**2,943**
T6	39	9,278	207	974	3,497	3,189	19,121	8,152	8,460	4,188	15,808	14,485	1	0	0	**87,360**
T7	295	70,843	1,578	7,442	26,705	24,352	146,004	62,243	64,597	31,977	120,709	110,604	8	0	0	**667,062**
UBUS	3	802	22	130	500	486	3,080	1,376	1,480	751	2,867	2,622	0	0	0	**14,114**
Total	**351**	**85,146**	**1,914**	**9,159**	**33,016**	**30,252**	**182,216**	**77,953**	**81,194**	**40,283**	**152,239**	**130,166**	**9**	**0**	**0**	**823,898**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,576,074	2,337,015	2,337,015

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,435,514 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,173,962,610 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	796	0	**796**	5
5 - 10 MPH	661	774	0	**1,435**	5
10 - 15 MPH	128,951	166,457	354,011	**649,418**	10
15 - 20 MPH	4,357	6,447	6,811	**17,615**	15
20 - 25 MPH	19,066	31,870	54,334	**105,270**	20
25 - 30 MPH	77,876	103,120	224,064	**405,060**	25
30 - 35 MPH	86,309	136,586	170,618	**393,513**	30
35 - 40 MPH	508,418	658,756	1,327,422	**2,494,596**	35
40 - 45 MPH	227,365	277,442	609,480	**1,114,287**	40
45 - 50 MPH	193,416	254,865	750,637	**1,198,918**	45
50 - 55 MPH	104,609	147,771	355,701	**608,081**	50
55 - 60 MPH	464,301	552,054	1,305,747	**2,322,102**	55
60 - 65 MPH	445,111	552,939	1,126,227	**2,124,277**	60
65 - 70 MPH	25	32	89	**146**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,260,464**	**2,889,911**	**6,285,139**	**11,435,514**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2232	649418	17615	105270	405060	393513	2494596	1114287	1198918	608081	2322102	2124277	146	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	766	566	434	348	290	249	222	206	198	198	205	221	246	264	0
LDT1	926	684	525	421	351	301	269	249	240	239	248	267	298	320	0
LDT2	1144	845	649	520	434	372	332	308	296	296	307	330	368	395	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	237	216	183	160	143	132	126	124	125	131	142	159	186	225	0
MDV	1526	1128	866	694	579	497	443	410	395	395	409	440	491	527	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	330	301	258	230	211	200	195	197	205	219	243	278	330	406	0
LDT1	324	297	256	229	211	201	197	198	205	219	241	275	324	396	0
LDT2	353	323	278	248	228	216	212	213	221	237	261	298	353	433	0
LHD1	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
LHD2	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	377	344	294	260	238	225	220	221	230	247	275	316	377	467	0
MH	2151	1953	1604	1316	1180	1108	1048	1000	965	942	931	932	946	0	0
OBUS	2721	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047	1209	0	0
SBUS	2369	1957	1607	1268	1183	1110	1050	1002	967	943	933	934	0	0	0
T6	2320	1917	1574	1241	1158	1087	1028	981	947	924	913	915	928	0	0
T7	3580	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412	1432	0	0
UBUS	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	974	283335	7685	45928	176724	171686	1088370	486153	523077	265300	1013113	926803	64	0	0
LDT1	142	41390	1123	6709	25816	25080	158991	71018	76412	38756	147998	135389	9	0	0
LDT2	364	105917	2873	17169	66063	64180	406857	181735	195538	99175	378724	346459	24	0	0
LHD1	59	17301	469	2804	10791	10483	66457	29685	31939	16199	61861	56591	4	0	0
LHD2	6	1769	48	287	1103	1072	6793	3035	3265	1656	6324	5785	0	0	0
MCY	15	4308	117	698	2687	2610	16547	7391	7952	4033	15402	14090	1	0	0
MDV	379	110346	2993	17887	68826	66864	423870	189334	203715	103322	394561	360947	25	0	0
MH	3	998	27	162	622	605	3834	1712	1843	935	3569	3265	0	0	0
OBUS	2	593	16	96	370	359	2276	1017	1094	555	2119	1938	0	0	0
SBUS	0	135	4	22	84	82	517	231	248	126	481	440	0	0	0
T6	7	2012	55	326	1255	1219	7729	3452	3714	1884	7194	6581	0	0	0
T7	1	285	8	46	177	172	1093	488	525	266	1017	931	0	0	0
UBUS	1	330	9	54	206	200	1268	567	610	309	1181	1080	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	785	21	127	489	475	3014	1346	1449	735	2806	2567	0	0	0
LDT1	0	55	1	9	34	33	211	94	101	51	196	179	0	0	0
LDT2	0	50	1	8	31	30	191	86	92	47	178	163	0	0	0
LHD1	36	10542	286	1709	6575	6388	40494	18088	19462	9871	37694	34483	2	0	0
LHD2	10	2828	77	458	1764	1714	10863	4852	5221	2648	10112	9251	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
MH	1	213	6	35	133	129	818	366	393	199	762	697	0	0	0
OBUS	3	749	20	121	467	454	2877	1285	1383	701	2678	2450	0	0	0
SBUS	1	356	10	58	222	216	1368	611	658	333	1274	1165	0	0	0
T6	37	10797	293	1750	6734	6542	41473	18525	19932	10109	38605	35316	2	0	0
T7	184	53427	1449	8660	33324	32374	205227	91671	98633	50026	191036	174761	12	0	0
UBUS	3	814	22	132	508	493	3127	1397	1503	762	2910	2662	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	299	64,357	1,340	6,423	20,598	17,172	97,203	40,174	41,593	21,086	83,497	82,148	6	0	0	**475,598**
LDT1	53	11,371	237	1,135	3,638	3,034	17,172	7,098	7,349	3,725	14,751	14,514	1	0	0	**84,024**
LDT2	167	35,950	749	3,588	11,504	9,592	54,294	22,441	23,234	11,778	46,640	45,887	4	0	0	**265,661**
LHD1	54	12,729	236	1,020	2,995	2,346	12,676	5,098	5,217	2,659	10,784	0	0	0	0	**55,760**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,301	24	104	306	240	1,296	521	533	272	1,102	0	0	0	0	**5,700**
MCY	1	374	9	45	154	139	836	367	399	212	877	901	0	0	0	**4,313**
MDV	232	49,971	1,041	4,987	15,990	13,332	75,468	31,193	32,296	16,372	64,829	63,783	5	0	0	**369,266**
MH	3	734	14	59	173	135	731	294	301	153	622	638	0	0	0	**3,855**
OBUS	2	436	8	35	103	80	434	175	179	91	369	379	0	0	0	**2,289**
SBUS	0	99	2	8	23	18	99	40	41	21	84	86	0	0	0	**520**
T6	6	1,480	27	119	348	273	1,474	593	607	309	1,254	1,287	0	0	0	**7,772**
T7	1	209	4	17	49	39	208	84	86	44	177	182	0	0	0	**1,099**
UBUS	1	243	5	19	57	45	242	97	100	51	206	211	0	0	0	**1,275**
Total	**826**	**179,254**	**3,695**	**17,557**	**55,939**	**46,445**	**262,133**	**108,174**	**111,934**	**56,774**	**225,193**	**210,018**	**16**	**0**	**0**	**1,277,958**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	95	2	12	41	38	237	106	119	65	273	286	0	0	0	**1,274**
LDT1	0	7	0	1	3	3	17	7	8	5	19	20	0	0	0	**89**
LDT2	0	6	0	1	3	3	16	7	8	4	19	20	0	0	0	**87**
LHD1	7	1,986	54	322	1,239	1,204	7,630	3,408	3,667	1,860	7,102	0	0	0	0	**28,472**
LHD2	2	533	14	86	332	323	2,046	914	984	499	1,905	0	0	0	0	**7,636**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	12	0	1	5	5	29	13	15	8	34	36	0	0	0	**158**
MH	1	167	4	18	63	57	344	147	152	75	285	261	0	0	0	**1,574**
OBUS	3	659	15	74	264	250	1,566	649	711	349	1,296	1,030	0	0	0	**6,863**
SBUS	1	280	6	29	105	96	577	246	255	126	477	437	0	0	0	**2,635**
T6	35	8,308	185	872	3,132	2,856	17,122	7,300	7,576	3,750	14,156	12,971	1	0	0	**78,229**
T7	264	63,438	1,413	6,664	23,914	21,807	130,742	55,737	57,845	28,635	108,092	99,043	7	0	0	**597,336**
UBUS	2	718	19	116	448	435	2,758	1,232	1,325	672	2,567	2,348	0	0	0	**12,639**
Total	**315**	**76,209**	**1,713**	**8,198**	**29,550**	**27,076**	**163,085**	**69,767**	**72,664**	**36,048**	**136,224**	**116,451**	**8**	**0**	**0**	**737,308**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,015,266	1,828,249	1,828,249

EMFAC 2011
2020 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2020, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1097.601204	1129.5953	765.503158	0.004%
Fresno	2020	LDA	DSL	5	3.039576937	487.08109	329.765357	0.000%
Fresno	2020	LDA	GAS	10	19368.49589	834.77968	565.727079	0.068%
Fresno	2020	LDA	DSL	10	53.63699778	443.70668	301.292224	0.000%
Fresno	2020	LDA	GAS	15	9051.364273	640.94058	434.371007	0.032%
Fresno	2020	LDA	DSL	15	25.06585843	378.48579	258.477977	0.000%
Fresno	2020	LDA	GAS	20	570961.7421	513.96372	348.309075	2.019%
Fresno	2020	LDA	DSL	20	1581.159357	334.54556	229.633409	0.006%
Fresno	2020	LDA	GAS	25	115652.1287	428.38541	290.303306	0.409%
Fresno	2020	LDA	DSL	25	320.2743836	306.00044	210.894972	0.001%
Fresno	2020	LDA	GAS	30	266829.8871	367.60468	249.119316	0.943%
Fresno	2020	LDA	DSL	30	738.9295648	289.29397	199.928012	0.003%
Fresno	2020	LDA	GAS	35	920286.3609	328.24025	222.443474	3.254%
Fresno	2020	LDA	DSL	35	2548.5404	282.45305	195.437288	0.009%
Fresno	2020	LDA	GAS	40	1530953.789	303.70517	205.819413	5.413%
Fresno	2020	LDA	DSL	40	4239.656111	284.69426	196.908534	0.015%
Fresno	2020	LDA	GAS	45	1340675.525	292.23901	198.049009	4.740%
Fresno	2020	LDA	DSL	45	3712.720433	296.27271	204.509208	0.013%
Fresno	2020	LDA	GAS	50	1834855.081	292.10301	197.955884	6.487%
Fresno	2020	LDA	DSL	50	5081.247577	318.53069	219.120456	0.018%
Fresno	2020	LDA	GAS	55	1221758.238	302.89634	205.27008	4.319%
Fresno	2020	LDA	DSL	55	3383.404003	354.16085	242.509876	0.012%
Fresno	2020	LDA	GAS	60	1512183.811	325.75529	220.762098	5.346%
Fresno	2020	LDA	DSL	60	4187.676879	407.75495	277.691718	0.015%
Fresno	2020	LDA	GAS	65	1544869.267	363.73237	246.499166	5.462%
Fresno	2020	LDA	DSL	65	4278.192318	486.79924	329.580336	0.015%
Fresno	2020	LDA	GAS	70	1451953.777	390.01281	264.308173	5.133%
Fresno	2020	LDA	DSL	70	4020.882357	603.41836	406.134954	0.014%
Fresno	2020	LDT1	GAS	5	160.3399232	1304.7967	925.652415	0.001%
Fresno	2020	LDT1	DSL	5	0.212505042	486.45442	323.971419	0.000%
Fresno	2020	LDT1	GAS	10	2829.391349	964.45342	684.23582	0.010%
Fresno	2020	LDT1	DSL	10	3.749907629	444.12974	296.951752	0.000%
Fresno	2020	LDT1	GAS	15	1322.24271	740.61424	525.449186	0.005%
Fresno	2020	LDT1	DSL	15	1.752421886	380.48738	256.32308	0.000%
Fresno	2020	LDT1	GAS	20	83407.31561	593.77137	421.24901	0.295%
Fresno	2020	LDT1	DSL	20	110.5431162	337.6106	228.950955	0.000%
Fresno	2020	LDT1	GAS	25	16894.71195	494.765	350.98776	0.060%
Fresno	2020	LDT1	DSL	25	22.39124832	309.75632	211.169055	0.000%
Fresno	2020	LDT1	GAS	30	38979.08188	424.63836	301.25086	0.138%
Fresno	2020	LDT1	DSL	30	51.6605658	293.45418	200.761924	0.000%
Fresno	2020	LDT1	GAS	35	134437.4047	379.17701	269.000862	0.475%
Fresno	2020	LDT1	DSL	35	178.1753487	286.77884	196.500452	0.001%
Fresno	2020	LDT1	GAS	40	223644.9863	350.87622	248.929757	0.791%
Fresno	2020	LDT1	DSL	40	296.4058539	288.9658	197.896581	0.001%
Fresno	2020	LDT1	GAS	45	195848.7412	337.63129	239.533452	0.692%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDT1	DSL	45	259.5663607	300.26399	205.109234	0.001%
Fresno	2020	LDT1	GAS	50	268039.5871	337.46078	239.410422	0.948%
Fresno	2020	LDT1	DSL	50	355.2437845	321.98332	218.97465	0.001%
Fresno	2020	LDT1	GAS	55	178477.0744	349.92509	248.252412	0.631%
Fresno	2020	LDT1	DSL	55	236.5429175	356.75116	241.170106	0.001%
Fresno	2020	LDT1	GAS	60	220903.0487	376.34322	266.996146	0.781%
Fresno	2020	LDT1	DSL	60	292.7718184	409.04819	274.556024	0.001%
Fresno	2020	LDT1	GAS	65	225677.8211	420.22158	298.126155	0.798%
Fresno	2020	LDT1	DSL	65	299.1000053	486.17935	323.795817	0.001%
Fresno	2020	LDT1	GAS	70	212104.5317	450.56841	319.653386	0.750%
Fresno	2020	LDT1	DSL	70	281.110744	599.97604	396.44253	0.001%
Fresno	2020	LDT2	GAS	5	410.3073308	1536.0292	1143.76708	0.001%
Fresno	2020	LDT2	DSL	5	0.193123223	483.63558	352.949647	0.000%
Fresno	2020	LDT2	GAS	10	7240.367106	1135.2759	845.371167	0.026%
Fresno	2020	LDT2	DSL	10	3.40789224	441.45895	322.997862	0.000%
Fresno	2020	LDT2	GAS	15	3383.597905	871.73757	649.13865	0.012%
Fresno	2020	LDT2	DSL	15	1.59258996	378.03921	277.960266	0.000%
Fresno	2020	LDT2	GAS	20	213437.9851	698.95406	520.466327	0.755%
Fresno	2020	LDT2	DSL	20	100.4608962	335.3124	247.617766	0.000%
Fresno	2020	LDT2	GAS	25	43233.29642	582.47638	433.722102	0.153%
Fresno	2020	LDT2	DSL	25	20.34902432	307.5556	227.906247	0.000%
Fresno	2020	LDT2	GAS	30	99746.85881	499.88306	372.227237	0.353%
Fresno	2020	LDT2	DSL	30	46.94879405	291.3105	216.369771	0.000%
Fresno	2020	LDT2	GAS	35	344023.1716	446.36108	332.374045	1.216%
Fresno	2020	LDT2	DSL	35	161.9246321	284.65849	211.645838	0.001%
Fresno	2020	LDT2	GAS	40	572303.9925	413.02584	307.554824	2.023%
Fresno	2020	LDT2	DSL	40	269.3717451	286.83782	213.193489	0.001%
Fresno	2020	LDT2	GAS	45	501173.8359	397.43382	295.94458	1.772%
Fresno	2020	LDT2	DSL	45	235.8922431	298.09651	221.188859	0.001%
Fresno	2020	LDT2	GAS	50	685909.0183	397.23953	295.798871	2.425%
Fresno	2020	LDT2	DSL	50	322.8433094	319.73983	236.558891	0.001%
Fresno	2020	LDT2	GAS	55	456719.9404	411.91427	306.725826	1.615%
Fresno	2020	LDT2	DSL	55	214.9687115	354.38602	261.162921	0.001%
Fresno	2020	LDT2	GAS	60	565287.3873	443.00751	329.879711	1.999%
Fresno	2020	LDT2	DSL	60	266.0691583	406.50012	298.171814	0.001%
Fresno	2020	LDT2	GAS	65	577505.9743	494.65656	368.339783	2.042%
Fresno	2020	LDT2	DSL	65	271.8201986	483.36142	352.754954	0.001%
Fresno	2020	LDT2	GAS	70	542772.0652	530.38611	394.944181	1.919%
Fresno	2020	LDT2	DSL	70	255.4716835	596.75996	433.28506	0.001%
Fresno	2020	LHD1	GAS	5	21384.31271	2513.4972	2262.14749	0.076%
Fresno	2020	LHD1	DSL	5	8073.831436	521.44003	469.296029	0.029%
Fresno	2020	LHD1	GAS	10	55761.32258	2036.1281	1832.51532	0.197%
Fresno	2020	LHD1	DSL	10	26849.16852	521.44005	469.296042	0.095%
Fresno	2020	LHD1	GAS	15	126976.0519	1392.4297	1253.1867	0.449%
Fresno	2020	LHD1	DSL	15	58147.60848	521.44	469.296003	0.206%
Fresno	2020	LHD1	GAS	20	146719.8434	1006.0686	905.461733	0.519%
Fresno	2020	LHD1	DSL	20	63748.56088	521.43999	469.295993	0.225%
Fresno	2020	LHD1	GAS	25	113019.5197	768.01205	691.210844	0.400%
Fresno	2020	LHD1	DSL	25	68227.96575	521.44	469.295996	0.241%
Fresno	2020	LHD1	GAS	30	99946.34197	619.4336	557.490237	0.353%
Fresno	2020	LHD1	DSL	30	57593.04709	521.44001	469.296005	0.204%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LHD1	GAS	35	37346.32043	527.84649	475.061842	0.132%
Fresno	2020	LHD1	DSL	35	30394.08805	521.44001	469.296012	0.107%
Fresno	2020	LHD1	GAS	40	11023.78163	475.23318	427.709861	0.039%
Fresno	2020	LHD1	DSL	40	16685.3603	521.44002	469.296021	0.059%
Fresno	2020	LHD1	GAS	45	13571.24509	452.05583	406.850248	0.048%
Fresno	2020	LHD1	DSL	45	18008.9918	521.44002	469.296015	0.064%
Fresno	2020	LHD1	GAS	50	100208.1816	454.3218	408.889624	0.354%
Fresno	2020	LHD1	DSL	50	69538.42058	521.44004	469.296036	0.246%
Fresno	2020	LHD1	GAS	55	27561.98152	482.41547	434.173925	0.097%
Fresno	2020	LHD1	DSL	55	41876.66483	521.43999	469.295994	0.148%
Fresno	2020	LHD2	GAS	5	2185.999834	2513.4972	2262.14751	0.008%
Fresno	2020	LHD2	DSL	5	2165.940834	521.32551	469.192959	0.008%
Fresno	2020	LHD2	GAS	10	5700.171632	2036.1281	1832.51531	0.020%
Fresno	2020	LHD2	DSL	10	7202.740987	521.32545	469.192908	0.025%
Fresno	2020	LHD2	GAS	15	12980.05837	1392.4297	1253.18673	0.046%
Fresno	2020	LHD2	DSL	15	15599.07284	521.32548	469.192929	0.055%
Fresno	2020	LHD2	GAS	20	14998.35728	1006.0684	905.461596	0.053%
Fresno	2020	LHD2	DSL	20	17101.62232	521.3255	469.192951	0.060%
Fresno	2020	LHD2	GAS	25	11553.35919	768.01208	691.210875	0.041%
Fresno	2020	LHD2	DSL	25	18303.29766	521.32547	469.192927	0.065%
Fresno	2020	LHD2	GAS	30	10216.96052	619.4336	557.490236	0.036%
Fresno	2020	LHD2	DSL	30	15450.30236	521.32548	469.192934	0.055%
Fresno	2020	LHD2	GAS	35	3817.707199	527.84656	475.061906	0.013%
Fresno	2020	LHD2	DSL	35	8153.724442	521.32547	469.192923	0.029%
Fresno	2020	LHD2	GAS	40	1126.900176	475.23317	427.709853	0.004%
Fresno	2020	LHD2	DSL	40	4476.12821	521.32553	469.192978	0.016%
Fresno	2020	LHD2	GAS	45	1387.31323	452.05583	406.850248	0.005%
Fresno	2020	LHD2	DSL	45	4831.21426	521.32552	469.192968	0.017%
Fresno	2020	LHD2	GAS	50	10243.72797	454.32179	408.889615	0.036%
Fresno	2020	LHD2	DSL	50	18654.84861	521.32553	469.192974	0.066%
Fresno	2020	LHD2	GAS	55	2817.508813	482.4155	434.173947	0.010%
Fresno	2020	LHD2	DSL	55	11234.11873	521.32552	469.192971	0.040%
Fresno	2020	MCY	GAS	5	16.68688392	263.60959	237.248635	0.000%
Fresno	2020	MCY	GAS	10	294.4601557	239.987	215.988302	0.001%
Fresno	2020	MCY	GAS	15	137.6083261	203.31025	182.979225	0.000%
Fresno	2020	MCY	GAS	20	8680.359343	177.28794	159.559145	0.031%
Fresno	2020	MCY	GAS	25	1758.264929	159.11187	143.200685	0.006%
Fresno	2020	MCY	GAS	30	4056.627639	147.00431	132.303882	0.014%
Fresno	2020	MCY	GAS	35	13991.15637	139.89607	125.906467	0.049%
Fresno	2020	MCY	GAS	40	23275.16288	137.24882	123.523938	0.082%
Fresno	2020	MCY	GAS	45	20382.35374	138.97664	125.078975	0.072%
Fresno	2020	MCY	GAS	50	27895.39084	145.4486	130.903738	0.099%
Fresno	2020	MCY	GAS	55	18574.45022	157.57522	141.817698	0.066%
Fresno	2020	MCY	GAS	60	22989.80272	177.00467	159.304207	0.081%
Fresno	2020	MCY	GAS	65	23486.72339	206.48665	185.837981	0.083%
Fresno	2020	MCY	GAS	70	22074.1257	250.51598	225.464381	0.078%
Fresno	2020	MDV	GAS	5	427.4652288	1956.688	1525.97278	0.002%
Fresno	2020	MDV	DSL	5	0.333527873	490.28924	377.108778	0.000%
Fresno	2020	MDV	GAS	10	7543.139266	1446.2357	1127.90657	0.027%
Fresno	2020	MDV	DSL	10	5.885501367	446.28971	343.748967	0.000%
Fresno	2020	MDV	GAS	15	3525.090445	1110.5412	866.11421	0.012%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	DSL	15	2.75043645	380.1288	293.586725	0.000%
Fresno	2020	MDV	GAS	20	222363.35	890.39433	694.407181	0.786%
Fresno	2020	MDV	DSL	20	173.4980433	335.55537	259.791799	0.001%
Fresno	2020	MDV	GAS	25	45041.19318	741.97753	578.642654	0.159%
Fresno	2020	MDV	DSL	25	35.14319288	306.59881	237.837356	0.000%
Fresno	2020	MDV	GAS	30	103917.9823	636.78632	496.616032	0.367%
Fresno	2020	MDV	DSL	30	81.08154619	289.65159	224.98822	0.000%
Fresno	2020	MDV	GAS	35	358409.259	568.60891	443.447127	1.267%
Fresno	2020	MDV	DSL	35	279.6472728	282.71202	219.726732	0.001%
Fresno	2020	MDV	GAS	40	596236.1499	526.15478	410.342796	2.108%
Fresno	2020	MDV	DSL	40	465.2106216	284.9856	221.450527	0.002%
Fresno	2020	MDV	GAS	45	522131.5284	506.29265	394.85277	1.846%
Fresno	2020	MDV	DSL	45	407.3908075	296.73091	230.355656	0.001%
Fresno	2020	MDV	GAS	50	714591.7653	506.04172	394.655526	2.526%
Fresno	2020	MDV	DSL	50	557.5570769	319.30972	247.474579	0.002%
Fresno	2020	MDV	GAS	55	475818.7393	524.73439	409.233126	1.682%
Fresno	2020	MDV	DSL	55	371.2554625	355.45334	274.878147	0.001%
Fresno	2020	MDV	GAS	60	588926.1182	564.34648	440.127202	2.082%
Fresno	2020	MDV	DSL	60	459.5070332	409.81987	316.098065	0.002%
Fresno	2020	MDV	GAS	65	601655.6237	630.1431	491.441651	2.127%
Fresno	2020	MDV	DSL	65	469.4391087	490.00332	376.891997	0.002%
Fresno	2020	MDV	GAS	70	565469.2796	675.65501	526.934139	1.999%
Fresno	2020	MDV	DSL	70	441.2049752	608.30305	466.585136	0.002%
Fresno	2020	MH	GAS	5	375.9017657	2513.4973	2262.14753	0.001%
Fresno	2020	MH	DSL	5	74.62377466	2390.0672	2151.06044	0.000%
Fresno	2020	MH	GAS	10	1889.661497	2036.1283	1832.51547	0.007%
Fresno	2020	MH	DSL	10	371.4490664	2170.188	1953.16921	0.001%
Fresno	2020	MH	GAS	15	2386.966339	1392.4297	1253.18671	0.008%
Fresno	2020	MH	DSL	15	501.3272751	1781.9066	1603.71592	0.002%
Fresno	2020	MH	GAS	20	2475.870442	1006.0686	905.461738	0.009%
Fresno	2020	MH	DSL	20	531.6758273	1462.2599	1316.03391	0.002%
Fresno	2020	MH	GAS	25	2758.692156	768.01205	691.210843	0.010%
Fresno	2020	MH	DSL	25	553.719262	1311.5663	1180.40971	0.002%
Fresno	2020	MH	GAS	30	3119.094445	619.43361	557.490248	0.011%
Fresno	2020	MH	DSL	30	665.8025648	1231.0993	1107.98936	0.002%
Fresno	2020	MH	GAS	35	3876.560955	527.84661	475.061951	0.014%
Fresno	2020	MH	DSL	35	785.0689398	1164.3217	1047.88949	0.003%
Fresno	2020	MH	GAS	40	4825.918952	475.2332	427.709878	0.017%
Fresno	2020	MH	DSL	40	974.5408363	1111.2334	1000.11009	0.003%
Fresno	2020	MH	GAS	45	4400.908252	452.05585	406.850268	0.016%
Fresno	2020	MH	DSL	45	798.019717	1071.8346	964.651153	0.003%
Fresno	2020	MH	GAS	50	4282.988184	454.32186	408.889674	0.015%
Fresno	2020	MH	DSL	50	893.1138315	1046.1252	941.512654	0.003%
Fresno	2020	MH	GAS	55	5601.758146	482.41557	434.174012	0.020%
Fresno	2020	MH	DSL	55	1308.777391	1034.1051	930.694616	0.005%
Fresno	2020	MH	GAS	60	6464.173618	541.20922	487.088296	0.023%
Fresno	2020	MH	DSL	60	1572.715418	1035.7744	932.196962	0.006%
Fresno	2020	MH	GAS	65	1010.10891	641.49794	577.348142	0.004%
Fresno	2020	MH	DSL	65	247.5006536	1051.1334	946.020045	0.001%
Fresno	2020	OBUS	GAS	5	223.1933909	2513.4974	2262.14768	0.001%
Fresno	2020	OBUS	DSL	5	189.4743925	3023.7787	2721.40084	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	OBUS	GAS	10	1121.995179	2036.1283	1832.51547	0.004%
Fresno	2020	OBUS	DSL	10	873.8793826	2435.1748	2191.65732	0.003%
Fresno	2020	OBUS	GAS	15	1417.27225	1392.4297	1253.18671	0.005%
Fresno	2020	OBUS	DSL	15	1150.490893	1981.8507	1783.66567	0.004%
Fresno	2020	OBUS	GAS	20	1470.059473	1006.0686	905.461718	0.005%
Fresno	2020	OBUS	DSL	20	1535.69351	1680.0018	1512.00159	0.005%
Fresno	2020	OBUS	GAS	25	1637.986093	768.01209	691.210882	0.006%
Fresno	2020	OBUS	DSL	25	1593.312243	1565.8826	1409.29435	0.006%
Fresno	2020	OBUS	GAS	30	1851.976584	619.43366	557.490296	0.007%
Fresno	2020	OBUS	DSL	30	2222.551712	1524.477	1372.02928	0.008%
Fresno	2020	OBUS	GAS	35	2301.725777	527.84661	475.061952	0.008%
Fresno	2020	OBUS	DSL	35	3281.369258	1506.8029	1356.12259	0.012%
Fresno	2020	OBUS	GAS	40	2865.411437	475.23323	427.709905	0.010%
Fresno	2020	OBUS	DSL	40	3502.618858	1398.0016	1258.20144	0.012%
Fresno	2020	OBUS	GAS	45	2613.059424	452.05584	406.850252	0.009%
Fresno	2020	OBUS	DSL	45	3919.848541	1422.5072	1280.25645	0.014%
Fresno	2020	OBUS	GAS	50	2543.043925	454.32186	408.889677	0.009%
Fresno	2020	OBUS	DSL	50	4186.335389	1378.9402	1241.04618	0.015%
Fresno	2020	OBUS	GAS	55	3326.069877	482.41555	434.173991	0.012%
Fresno	2020	OBUS	DSL	55	5486.643759	1338.9738	1205.07644	0.019%
Fresno	2020	OBUS	GAS	60	3838.132886	541.2092	487.088281	0.014%
Fresno	2020	OBUS	DSL	60	3711.118326	1163.509	1047.15807	0.013%
Fresno	2020	OBUS	GAS	65	599.756791	641.49795	577.348151	0.002%
Fresno	2020	OBUS	DSL	65	966.0730169	1343.8417	1209.45751	0.003%
Fresno	2020	SBUS	GAS	5	58.03696424	2513.497	2262.14732	0.000%
Fresno	2020	SBUS	DSL	5	153.6039937	2632.2332	2369.0099	0.001%
Fresno	2020	SBUS	GAS	10	203.4165827	2036.1281	1832.5153	0.001%
Fresno	2020	SBUS	DSL	10	538.3741248	2174.4303	1956.98731	0.002%
Fresno	2020	SBUS	GAS	15	406.8331817	1392.4295	1253.18659	0.001%
Fresno	2020	SBUS	DSL	15	1076.74825	1785.3958	1606.85622	0.004%
Fresno	2020	SBUS	GAS	20	552.2098641	1006.0685	905.461668	0.002%
Fresno	2020	SBUS	DSL	20	1461.510625	1408.4997	1267.64973	0.005%
Fresno	2020	SBUS	GAS	25	871.7004002	768.0121	691.21089	0.003%
Fresno	2020	SBUS	DSL	25	2307.092737	1314.1617	1182.74553	0.008%
Fresno	2020	SBUS	GAS	30	1045.811315	619.43358	557.490219	0.004%
Fresno	2020	SBUS	DSL	30	2767.904718	1233.5395	1110.18552	0.010%
Fresno	2020	SBUS	GAS	35	1073.393783	527.84651	475.061863	0.004%
Fresno	2020	SBUS	DSL	35	2840.905979	1166.633	1049.96972	0.010%
Fresno	2020	SBUS	GAS	40	724.5975211	475.23316	427.709842	0.003%
Fresno	2020	SBUS	DSL	40	1917.761723	1113.4423	1002.09811	0.007%
Fresno	2020	SBUS	GAS	45	347.6444581	452.05579	406.850211	0.001%
Fresno	2020	SBUS	DSL	45	920.0959117	1073.9674	966.570693	0.003%
Fresno	2020	SBUS	GAS	50	174.1108852	454.32177	408.889594	0.001%
Fresno	2020	SBUS	DSL	50	460.811981	1048.2083	943.387475	0.002%
Fresno	2020	SBUS	GAS	55	259.1529318	482.41547	434.173922	0.001%
Fresno	2020	SBUS	DSL	55	685.8891861	1036.165	932.548455	0.002%
Fresno	2020	SBUS	GAS	60	144.2307875	541.2091	487.088192	0.001%
Fresno	2020	SBUS	DSL	60	381.7295431	1037.8374	934.05363	0.001%
Fresno	2020	T6	GAS	5	757.7971042	2513.4975	2262.14774	0.003%
Fresno	2020	T6	DSL	5	3782.072492	2577.8739	2320.08648	0.013%
Fresno	2020	T6	GAS	10	3809.452781	2036.1283	1832.51547	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	T6	DSL	10	18825.7321	2129.5253	1916.57274	0.067%
Fresno	2020	T6	GAS	15	4811.99169	1392.4297	1253.18675	0.017%
Fresno	2020	T6	DSL	15	25408.20417	1748.5248	1573.67236	0.090%
Fresno	2020	T6	GAS	20	4991.217479	1006.0686	905.46177	0.018%
Fresno	2020	T6	DSL	20	26946.3239	1379.4122	1241.47096	0.095%
Fresno	2020	T6	GAS	25	5561.370137	768.01215	691.210939	0.020%
Fresno	2020	T6	DSL	25	28063.52768	1287.0224	1158.32015	0.099%
Fresno	2020	T6	GAS	30	6287.921467	619.43362	557.49026	0.022%
Fresno	2020	T6	DSL	30	33744.11845	1208.0651	1087.25862	0.119%
Fresno	2020	T6	GAS	35	7814.932614	527.84653	475.061878	0.028%
Fresno	2020	T6	DSL	35	39788.75993	1142.5404	1028.28635	0.141%
Fresno	2020	T6	GAS	40	9728.784867	475.23324	427.709914	0.034%
Fresno	2020	T6	DSL	40	49391.55144	1090.4482	981.403359	0.175%
Fresno	2020	T6	GAS	45	8871.986895	452.05589	406.850299	0.031%
Fresno	2020	T6	DSL	45	40445.13139	1051.7885	946.609636	0.143%
Fresno	2020	T6	GAS	50	8634.26726	454.32179	408.889615	0.031%
Fresno	2020	T6	DSL	50	45264.67932	1026.5613	923.905185	0.160%
Fresno	2020	T6	GAS	55	11292.83405	482.4156	434.174038	0.040%
Fresno	2020	T6	DSL	55	66331.28571	1014.7667	913.290006	0.235%
Fresno	2020	T6	GAS	60	13031.41533	541.20926	487.088332	0.046%
Fresno	2020	T6	DSL	60	79708.15566	1016.4046	914.764098	0.282%
Fresno	2020	T6	GAS	65	2036.323575	641.49801	577.34821	0.007%
Fresno	2020	T6	DSL	65	12543.79741	1031.475	928.327461	0.044%
Fresno	2020	T7	GAS	5	45.14811148	2513.4971	2262.14736	0.000%
Fresno	2020	T7	DSL	5	8396.704746	3977.8081	3580.02731	0.030%
Fresno	2020	T7	GAS	10	220.662119	2036.1283	1832.51544	0.001%
Fresno	2020	T7	DSL	10	32075.80037	3285.9804	2957.38233	0.113%
Fresno	2020	T7	GAS	15	240.6355065	1392.4297	1253.18671	0.001%
Fresno	2020	T7	DSL	15	39228.96626	2698.0747	2428.26726	0.139%
Fresno	2020	T7	GAS	20	411.241983	1006.0685	905.461655	0.001%
Fresno	2020	T7	DSL	20	97100.08386	2129.5835	1916.62514	0.343%
Fresno	2020	T7	GAS	25	536.6970104	768.01215	691.210933	0.002%
Fresno	2020	T7	DSL	25	88604.77385	1985.9498	1787.35483	0.313%
Fresno	2020	T7	GAS	30	980.1093934	619.43364	557.490278	0.003%
Fresno	2020	T7	DSL	30	149589.5276	1864.1142	1677.70278	0.529%
Fresno	2020	T7	GAS	35	1743.255924	527.84661	475.061945	0.006%
Fresno	2020	T7	DSL	35	269115.3006	1763.0057	1586.70517	0.951%
Fresno	2020	T7	GAS	40	1519.637782	475.23317	427.709849	0.005%
Fresno	2020	T7	DSL	40	253966.6678	1682.6245	1514.36201	0.898%
Fresno	2020	T7	GAS	45	1607.939024	452.0558	406.850223	0.006%
Fresno	2020	T7	DSL	45	355569.7933	1622.9703	1460.67329	1.257%
Fresno	2020	T7	GAS	50	1682.35955	454.3218	408.889618	0.006%
Fresno	2020	T7	DSL	50	369783.8463	1584.0433	1425.63901	1.307%
Fresno	2020	T7	GAS	55	2469.579288	482.41551	434.173958	0.009%
Fresno	2020	T7	DSL	55	450928.7666	1565.8435	1409.25918	1.594%
Fresno	2020	T7	GAS	60	609.4964239	541.20921	487.088286	0.002%
Fresno	2020	T7	DSL	60	137368.6558	1568.3709	1411.53379	0.486%
Fresno	2020	T7	GAS	65	326.6774339	641.49796	577.348164	0.001%
Fresno	2020	T7	DSL	65	75239.57125	1591.6254	1432.46284	0.266%
Fresno	2020	UBUS	GAS	5	142.5170016	2513.497	2262.14729	0.001%
Fresno	2020	UBUS	DSL	5	351.317801	2440.8645	2196.77806	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	UBUS	GAS	10	511.5367803	2036.1283	1832.51547	0.002%
Fresno	2020	UBUS	DSL	10	1260.986146	2440.8645	2196.77804	0.004%
Fresno	2020	UBUS	GAS	15	1023.073523	1392.4297	1253.18671	0.004%
Fresno	2020	UBUS	DSL	15	2521.972627	2440.8642	2196.77781	0.009%
Fresno	2020	UBUS	GAS	20	1350.100402	1006.0686	905.461701	0.005%
Fresno	2020	UBUS	DSL	20	3328.12413	2440.8647	2196.77822	0.012%
Fresno	2020	UBUS	GAS	25	2033.347957	768.01208	691.210868	0.007%
Fresno	2020	UBUS	DSL	25	5012.394	2440.8646	2196.77812	0.018%
Fresno	2020	UBUS	GAS	30	2544.884591	619.43361	557.490252	0.009%
Fresno	2020	UBUS	DSL	30	6273.37969	2440.8644	2196.77797	0.022%
Fresno	2020	UBUS	GAS	35	2493.975603	527.84654	475.061885	0.009%
Fresno	2020	UBUS	DSL	35	6147.88385	2440.8645	2196.77802	0.022%
Fresno	2020	UBUS	GAS	40	1797.928884	475.23316	427.709842	0.006%
Fresno	2020	UBUS	DSL	40	4432.06321	2440.8647	2196.77821	0.016%
Fresno	2020	UBUS	GAS	45	783.7715293	452.05586	406.850272	0.003%
Fresno	2020	UBUS	DSL	45	1932.070593	2440.8644	2196.77797	0.007%
Fresno	2020	UBUS	GAS	50	398.2134972	454.3218	408.889617	0.001%
Fresno	2020	UBUS	DSL	50	981.633661	2440.8646	2196.77811	0.003%
Fresno	2020	UBUS	GAS	55	493.7042317	482.41551	434.173958	0.002%
Fresno	2020	UBUS	DSL	55	1217.027328	2440.8644	2196.77795	0.004%
Fresno	2020	UBUS	GAS	60	808.0757296	541.20919	487.088268	0.003%
Fresno	2020	UBUS	DSL	60	1991.982525	2440.8644	2196.778	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	Used 2020 emission factor projected by PG&E
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	245690	26.3	9.3	226,011
Commercial	1,800,825,042	7,503	261120	27.9	9.9	240,205
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**506,809**	**54.2**	**19.2**	**466,216**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

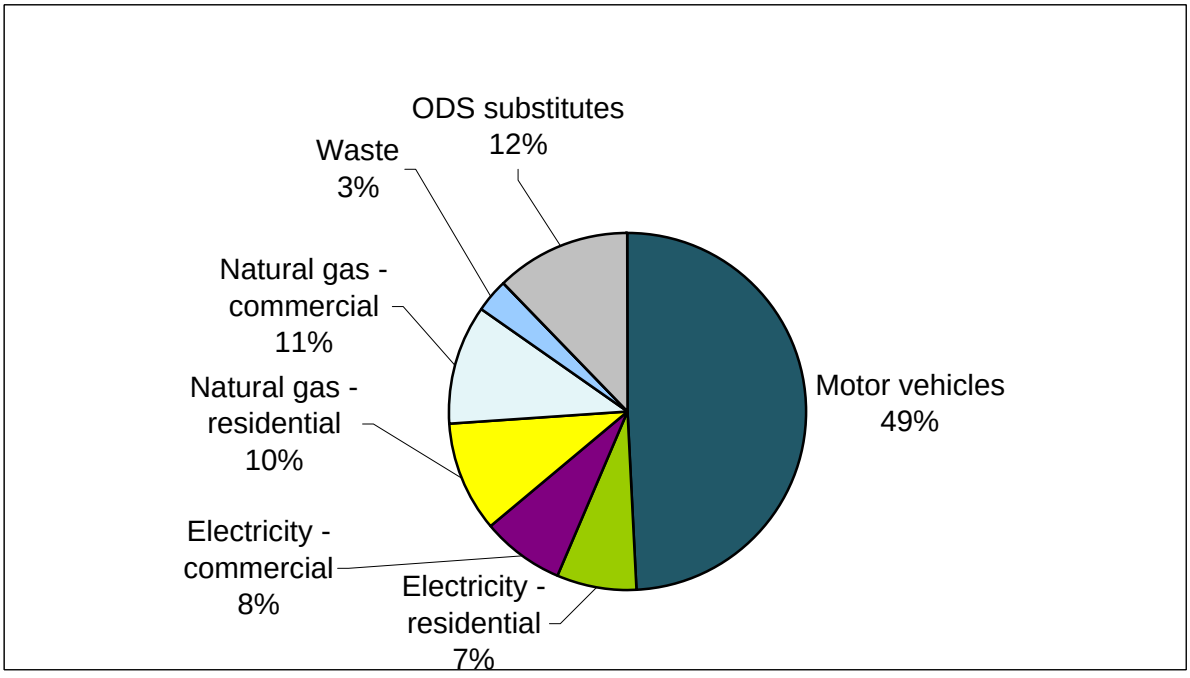
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,337,015	1,828,249
Electricity - residential	345,142	313,405
Electricity - commercial	366,817	334,657
Natural gas - residential	476,679	431,774
Natural gas - commercial	514,647	469,526
Waste	147,628	147,628
Offroad equipment	1,138	1,138
ODS substitutes	576,784	576,784
Total	***4,765,850***	4,103,161



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,149,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,069,502,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1130	835	641	514	428	368	328	304	292	292	303	326	364	390	0
LDT1	1305	964	741	594	495	425	379	351	338	337	350	376	420	451	0
LDT2	1536	1135	872	699	582	500	446	413	397	397	412	443	495	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	264	240	203	177	159	147	140	137	139	145	158	177	206	251	0
MDV	1957	1446	1111	890	742	637	569	526	506	506	525	564	630	676	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	487	444	378	335	306	289	282	285	296	319	354	408	487	603	0
LDT1	486	444	380	338	310	293	287	289	300	322	357	409	486	600	0
LDT2	484	441	378	335	308	291	285	287	298	320	354	407	483	597	0
LHD1	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
LHD2	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	490	446	380	336	307	290	283	285	297	319	355	410	490	608	0
MH	2390	2170	1782	1462	1312	1231	1164	1111	1072	1046	1034	1036	1051	0	0
OBUS	3024	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164	1344	0	0
SBUS	2632	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038	0	0	0
T6	2578	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016	1031	0	0
T7	3978	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568	1592	0	0
UBUS	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1	143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2	366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1	60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2	6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY	15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV	381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH	3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS	2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS	0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6	7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7	1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS	1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1	0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2	0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1	36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2	10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH	1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS	3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS	1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6	37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7	185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS	3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	444	95,444	1,988	9,526	30,550	25,468	144,160	59,580	61,685	31,272	123,830	121,830	9	0	0	**705,341**
LDT1	75	16,108	336	1,608	5,154	4,298	24,327	10,055	10,411	5,278	20,898	20,561	2	0	0	**119,035**
LDT2	226	48,522	1,011	4,843	15,528	12,946	73,283	30,289	31,360	15,898	62,951	61,935	5	0	0	**358,571**
LHD1	60	14,215	264	1,139	3,344	2,620	14,155	5,693	5,826	2,970	12,042	0	0	0	0	**62,268**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,453	27	116	342	268	1,447	582	596	304	1,231	0	0	0	0	**6,365**
MCY	2	417	10	50	173	155	934	409	446	237	979	1,006	0	0	0	**4,816**
MDV	299	64,398	1,341	6,427	20,607	17,181	97,257	40,199	41,620	21,099	83,547	82,199	6	0	0	**475,881**
MH	3	820	15	66	193	151	817	328	336	171	695	713	0	0	0	**4,305**
OBUS	2	487	9	39	115	90	485	195	200	102	412	423	0	0	0	**2,556**
SBUS	0	111	2	9	26	20	110	44	45	23	94	96	0	0	0	**580**
T6	7	1,653	31	132	389	305	1,646	662	678	345	1,400	1,437	0	0	0	**8,679**
T7	1	234	4	19	55	43	233	94	96	49	198	203	0	0	0	**1,227**
UBUS	1	271	5	22	64	50	270	109	111	57	230	236	0	0	0	**1,424**
Total	**1,127**	**244,134**	**5,042**	**23,994**	**76,539**	**63,595**	**359,124**	**148,240**	**153,409**	**77,803**	**308,508**	**290,640**	**22**	**0**	**0**	**1,752,177**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	140	3	17	60	56	344	155	173	94	401	422	0	0	0	**1,866**
LDT1	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**132**
LDT2	0	9	0	1	4	4	22	10	11	6	25	27	0	0	0	**119**
LHD1	8	2,218	60	360	1,384	1,344	8,521	3,806	4,095	2,077	7,931	0	0	0	0	**31,796**
LHD2	2	595	16	96	371	360	2,285	1,021	1,098	557	2,127	0	0	0	0	**8,528**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	16	0	2	7	6	38	17	19	10	44	47	0	0	0	**205**
MH	1	187	4	20	70	64	384	164	170	84	318	291	0	0	0	**1,757**
OBUS	3	736	16	82	295	279	1,749	725	794	390	1,447	1,150	0	0	0	**7,664**
SBUS	1	313	7	33	118	107	644	275	285	141	532	488	0	0	0	**2,943**
T6	39	9,278	207	974	3,497	3,189	19,121	8,152	8,460	4,188	15,808	14,485	1	0	0	**87,360**
T7	295	70,843	1,578	7,442	26,705	24,352	146,004	62,243	64,597	31,977	120,709	110,604	8	0	0	**667,062**
UBUS	3	802	22	130	500	486	3,080	1,376	1,480	751	2,867	2,622	0	0	0	**14,114**
Total	**351**	**85,146**	**1,914**	**9,159**	**33,016**	**30,252**	**182,216**	**77,953**	**81,194**	**40,283**	**152,239**	**130,166**	**9**	**0**	**0**	**823,898**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,576,074	2,337,015	2,337,015

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,435,514 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,173,962,610 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	796	0	**796**	5
5 - 10 MPH	661	774	0	**1,435**	5
10 - 15 MPH	128,951	166,457	354,011	**649,418**	10
15 - 20 MPH	4,357	6,447	6,811	**17,615**	15
20 - 25 MPH	19,066	31,870	54,334	**105,270**	20
25 - 30 MPH	77,876	103,120	224,064	**405,060**	25
30 - 35 MPH	86,309	136,586	170,618	**393,513**	30
35 - 40 MPH	508,418	658,756	1,327,422	**2,494,596**	35
40 - 45 MPH	227,365	277,442	609,480	**1,114,287**	40
45 - 50 MPH	193,416	254,865	750,637	**1,198,918**	45
50 - 55 MPH	104,609	147,771	355,701	**608,081**	50
55 - 60 MPH	464,301	552,054	1,305,747	**2,322,102**	55
60 - 65 MPH	445,111	552,939	1,126,227	**2,124,277**	60
65 - 70 MPH	25	32	89	**146**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,260,464**	**2,889,911**	**6,285,139**	**11,435,514**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2232	649418	17615	105270	405060	393513	2494596	1114287	1198918	608081	2322102	2124277	146	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	766	566	434	348	290	249	222	206	198	198	205	221	246	264	0
LDT1	926	684	525	421	351	301	269	249	240	239	248	267	298	320	0
LDT2	1144	845	649	520	434	372	332	308	296	296	307	330	368	395	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	237	216	183	160	143	132	126	124	125	131	142	159	186	225	0
MDV	1526	1128	866	694	579	497	443	410	395	395	409	440	491	527	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	330	301	258	230	211	200	195	197	205	219	243	278	330	406	0
LDT1	324	297	256	229	211	201	197	198	205	219	241	275	324	396	0
LDT2	353	323	278	248	228	216	212	213	221	237	261	298	353	433	0
LHD1	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
LHD2	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	377	344	294	260	238	225	220	221	230	247	275	316	377	467	0
MH	2151	1953	1604	1316	1180	1108	1048	1000	965	942	931	932	946	0	0
OBUS	2721	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047	1209	0	0
SBUS	2369	1957	1607	1268	1183	1110	1050	1002	967	943	933	934	0	0	0
T6	2320	1917	1574	1241	1158	1087	1028	981	947	924	913	915	928	0	0
T7	3580	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412	1432	0	0
UBUS	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	974	283335	7685	45928	176724	171686	1088370	486153	523077	265300	1013113	926803	64	0	0
LDT1	142	41390	1123	6709	25816	25080	158991	71018	76412	38756	147998	135389	9	0	0
LDT2	364	105917	2873	17169	66063	64180	406857	181735	195538	99175	378724	346459	24	0	0
LHD1	59	17301	469	2804	10791	10483	66457	29685	31939	16199	61861	56591	4	0	0
LHD2	6	1769	48	287	1103	1072	6793	3035	3265	1656	6324	5785	0	0	0
MCY	15	4308	117	698	2687	2610	16547	7391	7952	4033	15402	14090	1	0	0
MDV	379	110346	2993	17887	68826	66864	423870	189334	203715	103322	394561	360947	25	0	0
MH	3	998	27	162	622	605	3834	1712	1843	935	3569	3265	0	0	0
OBUS	2	593	16	96	370	359	2276	1017	1094	555	2119	1938	0	0	0
SBUS	0	135	4	22	84	82	517	231	248	126	481	440	0	0	0
T6	7	2012	55	326	1255	1219	7729	3452	3714	1884	7194	6581	0	0	0
T7	1	285	8	46	177	172	1093	488	525	266	1017	931	0	0	0
UBUS	1	330	9	54	206	200	1268	567	610	309	1181	1080	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	785	21	127	489	475	3014	1346	1449	735	2806	2567	0	0	0
LDT1	0	55	1	9	34	33	211	94	101	51	196	179	0	0	0
LDT2	0	50	1	8	31	30	191	86	92	47	178	163	0	0	0
LHD1	36	10542	286	1709	6575	6388	40494	18088	19462	9871	37694	34483	2	0	0
LHD2	10	2828	77	458	1764	1714	10863	4852	5221	2648	10112	9251	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
MH	1	213	6	35	133	129	818	366	393	199	762	697	0	0	0
OBUS	3	749	20	121	467	454	2877	1285	1383	701	2678	2450	0	0	0
SBUS	1	356	10	58	222	216	1368	611	658	333	1274	1165	0	0	0
T6	37	10797	293	1750	6734	6542	41473	18525	19932	10109	38605	35316	2	0	0
T7	184	53427	1449	8660	33324	32374	205227	91671	98633	50026	191036	174761	12	0	0
UBUS	3	814	22	132	508	493	3127	1397	1503	762	2910	2662	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	299	64,357	1,340	6,423	20,598	17,172	97,203	40,174	41,593	21,086	83,497	82,148	6	0	0	**475,598**
LDT1	53	11,371	237	1,135	3,638	3,034	17,172	7,098	7,349	3,725	14,751	14,514	1	0	0	**84,024**
LDT2	167	35,950	749	3,588	11,504	9,592	54,294	22,441	23,234	11,778	46,640	45,887	4	0	0	**265,661**
LHD1	54	12,729	236	1,020	2,995	2,346	12,676	5,098	5,217	2,659	10,784	0	0	0	0	**55,760**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,301	24	104	306	240	1,296	521	533	272	1,102	0	0	0	0	**5,700**
MCY	1	374	9	45	154	139	836	367	399	212	877	901	0	0	0	**4,313**
MDV	232	49,971	1,041	4,987	15,990	13,332	75,468	31,193	32,296	16,372	64,829	63,783	5	0	0	**369,266**
MH	3	734	14	59	173	135	731	294	301	153	622	638	0	0	0	**3,855**
OBUS	2	436	8	35	103	80	434	175	179	91	369	379	0	0	0	**2,289**
SBUS	0	99	2	8	23	18	99	40	41	21	84	86	0	0	0	**520**
T6	6	1,480	27	119	348	273	1,474	593	607	309	1,254	1,287	0	0	0	**7,772**
T7	1	209	4	17	49	39	208	84	86	44	177	182	0	0	0	**1,099**
UBUS	1	243	5	19	57	45	242	97	100	51	206	211	0	0	0	**1,275**
Total	**826**	**179,254**	**3,695**	**17,557**	**55,939**	**46,445**	**262,133**	**108,174**	**111,934**	**56,774**	**225,193**	**210,018**	**16**	**0**	**0**	**1,277,958**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	95	2	12	41	38	237	106	119	65	273	286	0	0	0	**1,274**
LDT1	0	7	0	1	3	3	17	7	8	5	19	20	0	0	0	**89**
LDT2	0	6	0	1	3	3	16	7	8	4	19	20	0	0	0	**87**
LHD1	7	1,986	54	322	1,239	1,204	7,630	3,408	3,667	1,860	7,102	0	0	0	0	**28,472**
LHD2	2	533	14	86	332	323	2,046	914	984	499	1,905	0	0	0	0	**7,636**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	12	0	1	5	5	29	13	15	8	34	36	0	0	0	**158**
MH	1	167	4	18	63	57	344	147	152	75	285	261	0	0	0	**1,574**
OBUS	3	659	15	74	264	250	1,566	649	711	349	1,296	1,030	0	0	0	**6,863**
SBUS	1	280	6	29	105	96	577	246	255	126	477	437	0	0	0	**2,635**
T6	35	8,308	185	872	3,132	2,856	17,122	7,300	7,576	3,750	14,156	12,971	1	0	0	**78,229**
T7	264	63,438	1,413	6,664	23,914	21,807	130,742	55,737	57,845	28,635	108,092	99,043	7	0	0	**597,336**
UBUS	2	718	19	116	448	435	2,758	1,232	1,325	672	2,567	2,348	0	0	0	**12,639**
Total	**315**	**76,209**	**1,713**	**8,198**	**29,550**	**27,076**	**163,085**	**69,767**	**72,664**	**36,048**	**136,224**	**116,451**	**8**	**0**	**0**	**737,308**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,015,266	1,828,249	1,828,249

EMFAC 2011
2020 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2020, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1097.601204	1129.5953	765.503158	0.004%
Fresno	2020	LDA	DSL	5	3.039576937	487.08109	329.765357	0.000%
Fresno	2020	LDA	GAS	10	19368.49589	834.77968	565.727079	0.068%
Fresno	2020	LDA	DSL	10	53.63699778	443.70668	301.292224	0.000%
Fresno	2020	LDA	GAS	15	9051.364273	640.94058	434.371007	0.032%
Fresno	2020	LDA	DSL	15	25.06585843	378.48579	258.477977	0.000%
Fresno	2020	LDA	GAS	20	570961.7421	513.96372	348.309075	2.019%
Fresno	2020	LDA	DSL	20	1581.159357	334.54556	229.633409	0.006%
Fresno	2020	LDA	GAS	25	115652.1287	428.38541	290.303306	0.409%
Fresno	2020	LDA	DSL	25	320.2743836	306.00044	210.894972	0.001%
Fresno	2020	LDA	GAS	30	266829.8871	367.60468	249.119316	0.943%
Fresno	2020	LDA	DSL	30	738.9295648	289.29397	199.928012	0.003%
Fresno	2020	LDA	GAS	35	920286.3609	328.24025	222.443474	3.254%
Fresno	2020	LDA	DSL	35	2548.5404	282.45305	195.437288	0.009%
Fresno	2020	LDA	GAS	40	1530953.789	303.70517	205.819413	5.413%
Fresno	2020	LDA	DSL	40	4239.656111	284.69426	196.908534	0.015%
Fresno	2020	LDA	GAS	45	1340675.525	292.23901	198.049009	4.740%
Fresno	2020	LDA	DSL	45	3712.720433	296.27271	204.509208	0.013%
Fresno	2020	LDA	GAS	50	1834855.081	292.10301	197.955884	6.487%
Fresno	2020	LDA	DSL	50	5081.247577	318.53069	219.120456	0.018%
Fresno	2020	LDA	GAS	55	1221758.238	302.89634	205.27008	4.319%
Fresno	2020	LDA	DSL	55	3383.404003	354.16085	242.509876	0.012%
Fresno	2020	LDA	GAS	60	1512183.811	325.75529	220.762098	5.346%
Fresno	2020	LDA	DSL	60	4187.676879	407.75495	277.691718	0.015%
Fresno	2020	LDA	GAS	65	1544869.267	363.73237	246.499166	5.462%
Fresno	2020	LDA	DSL	65	4278.192318	486.79924	329.580336	0.015%
Fresno	2020	LDA	GAS	70	1451953.777	390.01281	264.308173	5.133%
Fresno	2020	LDA	DSL	70	4020.882357	603.41836	406.134954	0.014%
Fresno	2020	LDT1	GAS	5	160.3399232	1304.7967	925.652415	0.001%
Fresno	2020	LDT1	DSL	5	0.212505042	486.45442	323.971419	0.000%
Fresno	2020	LDT1	GAS	10	2829.391349	964.45342	684.23582	0.010%
Fresno	2020	LDT1	DSL	10	3.749907629	444.12974	296.951752	0.000%
Fresno	2020	LDT1	GAS	15	1322.24271	740.61424	525.449186	0.005%
Fresno	2020	LDT1	DSL	15	1.752421886	380.48738	256.32308	0.000%
Fresno	2020	LDT1	GAS	20	83407.31561	593.77137	421.24901	0.295%
Fresno	2020	LDT1	DSL	20	110.5431162	337.6106	228.950955	0.000%
Fresno	2020	LDT1	GAS	25	16894.71195	494.765	350.98776	0.060%
Fresno	2020	LDT1	DSL	25	22.39124832	309.75632	211.169055	0.000%
Fresno	2020	LDT1	GAS	30	38979.08188	424.63836	301.25086	0.138%
Fresno	2020	LDT1	DSL	30	51.6605658	293.45418	200.761924	0.000%
Fresno	2020	LDT1	GAS	35	134437.4047	379.17701	269.000862	0.475%
Fresno	2020	LDT1	DSL	35	178.1753487	286.77884	196.500452	0.001%
Fresno	2020	LDT1	GAS	40	223644.9863	350.87622	248.929757	0.791%
Fresno	2020	LDT1	DSL	40	296.4058539	288.9658	197.896581	0.001%
Fresno	2020	LDT1	GAS	45	195848.7412	337.63129	239.533452	0.692%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDT1	DSL	45	259.5663607	300.26399	205.109234	0.001%
Fresno	2020	LDT1	GAS	50	268039.5871	337.46078	239.410422	0.948%
Fresno	2020	LDT1	DSL	50	355.2437845	321.98332	218.97465	0.001%
Fresno	2020	LDT1	GAS	55	178477.0744	349.92509	248.252412	0.631%
Fresno	2020	LDT1	DSL	55	236.5429175	356.75116	241.170106	0.001%
Fresno	2020	LDT1	GAS	60	220903.0487	376.34322	266.996146	0.781%
Fresno	2020	LDT1	DSL	60	292.7718184	409.04819	274.556024	0.001%
Fresno	2020	LDT1	GAS	65	225677.8211	420.22158	298.126155	0.798%
Fresno	2020	LDT1	DSL	65	299.1000053	486.17935	323.795817	0.001%
Fresno	2020	LDT1	GAS	70	212104.5317	450.56841	319.653386	0.750%
Fresno	2020	LDT1	DSL	70	281.110744	599.97604	396.44253	0.001%
Fresno	2020	LDT2	GAS	5	410.3073308	1536.0292	1143.76708	0.001%
Fresno	2020	LDT2	DSL	5	0.193123223	483.63558	352.949647	0.000%
Fresno	2020	LDT2	GAS	10	7240.367106	1135.2759	845.371167	0.026%
Fresno	2020	LDT2	DSL	10	3.40789224	441.45895	322.997862	0.000%
Fresno	2020	LDT2	GAS	15	3383.597905	871.73757	649.13865	0.012%
Fresno	2020	LDT2	DSL	15	1.59258996	378.03921	277.960266	0.000%
Fresno	2020	LDT2	GAS	20	213437.9851	698.95406	520.466327	0.755%
Fresno	2020	LDT2	DSL	20	100.4608962	335.3124	247.617766	0.000%
Fresno	2020	LDT2	GAS	25	43233.29642	582.47638	433.722102	0.153%
Fresno	2020	LDT2	DSL	25	20.34902432	307.5556	227.906247	0.000%
Fresno	2020	LDT2	GAS	30	99746.85881	499.88306	372.227237	0.353%
Fresno	2020	LDT2	DSL	30	46.94879405	291.3105	216.369771	0.000%
Fresno	2020	LDT2	GAS	35	344023.1716	446.36108	332.374045	1.216%
Fresno	2020	LDT2	DSL	35	161.9246321	284.65849	211.645838	0.001%
Fresno	2020	LDT2	GAS	40	572303.9925	413.02584	307.554824	2.023%
Fresno	2020	LDT2	DSL	40	269.3717451	286.83782	213.193489	0.001%
Fresno	2020	LDT2	GAS	45	501173.8359	397.43382	295.94458	1.772%
Fresno	2020	LDT2	DSL	45	235.8922431	298.09651	221.188859	0.001%
Fresno	2020	LDT2	GAS	50	685909.0183	397.23953	295.798871	2.425%
Fresno	2020	LDT2	DSL	50	322.8433094	319.73983	236.558891	0.001%
Fresno	2020	LDT2	GAS	55	456719.9404	411.91427	306.725826	1.615%
Fresno	2020	LDT2	DSL	55	214.9687115	354.38602	261.162921	0.001%
Fresno	2020	LDT2	GAS	60	565287.3873	443.00751	329.879711	1.999%
Fresno	2020	LDT2	DSL	60	266.0691583	406.50012	298.171814	0.001%
Fresno	2020	LDT2	GAS	65	577505.9743	494.65656	368.339783	2.042%
Fresno	2020	LDT2	DSL	65	271.8201986	483.36142	352.754954	0.001%
Fresno	2020	LDT2	GAS	70	542772.0652	530.38611	394.944181	1.919%
Fresno	2020	LDT2	DSL	70	255.4716835	596.75996	433.28506	0.001%
Fresno	2020	LHD1	GAS	5	21384.31271	2513.4972	2262.14749	0.076%
Fresno	2020	LHD1	DSL	5	8073.831436	521.44003	469.296029	0.029%
Fresno	2020	LHD1	GAS	10	55761.32258	2036.1281	1832.51532	0.197%
Fresno	2020	LHD1	DSL	10	26849.16852	521.44005	469.296042	0.095%
Fresno	2020	LHD1	GAS	15	126976.0519	1392.4297	1253.1867	0.449%
Fresno	2020	LHD1	DSL	15	58147.60848	521.44	469.296003	0.206%
Fresno	2020	LHD1	GAS	20	146719.8434	1006.0686	905.461733	0.519%
Fresno	2020	LHD1	DSL	20	63748.56088	521.43999	469.295993	0.225%
Fresno	2020	LHD1	GAS	25	113019.5197	768.01205	691.210844	0.400%
Fresno	2020	LHD1	DSL	25	68227.96575	521.44	469.295996	0.241%
Fresno	2020	LHD1	GAS	30	99946.34197	619.4336	557.490237	0.353%
Fresno	2020	LHD1	DSL	30	57593.04709	521.44001	469.296005	0.204%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LHD1	GAS	35	37346.32043	527.84649	475.061842	0.132%
Fresno	2020	LHD1	DSL	35	30394.08805	521.44001	469.296012	0.107%
Fresno	2020	LHD1	GAS	40	11023.78163	475.23318	427.709861	0.039%
Fresno	2020	LHD1	DSL	40	16685.3603	521.44002	469.296021	0.059%
Fresno	2020	LHD1	GAS	45	13571.24509	452.05583	406.850248	0.048%
Fresno	2020	LHD1	DSL	45	18008.9918	521.44002	469.296015	0.064%
Fresno	2020	LHD1	GAS	50	100208.1816	454.3218	408.889624	0.354%
Fresno	2020	LHD1	DSL	50	69538.42058	521.44004	469.296036	0.246%
Fresno	2020	LHD1	GAS	55	27561.98152	482.41547	434.173925	0.097%
Fresno	2020	LHD1	DSL	55	41876.66483	521.43999	469.295994	0.148%
Fresno	2020	LHD2	GAS	5	2185.999834	2513.4972	2262.14751	0.008%
Fresno	2020	LHD2	DSL	5	2165.940834	521.32551	469.192959	0.008%
Fresno	2020	LHD2	GAS	10	5700.171632	2036.1281	1832.51531	0.020%
Fresno	2020	LHD2	DSL	10	7202.740987	521.32545	469.192908	0.025%
Fresno	2020	LHD2	GAS	15	12980.05837	1392.4297	1253.18673	0.046%
Fresno	2020	LHD2	DSL	15	15599.07284	521.32548	469.192929	0.055%
Fresno	2020	LHD2	GAS	20	14998.35728	1006.0684	905.461596	0.053%
Fresno	2020	LHD2	DSL	20	17101.62232	521.3255	469.192951	0.060%
Fresno	2020	LHD2	GAS	25	11553.35919	768.01208	691.210875	0.041%
Fresno	2020	LHD2	DSL	25	18303.29766	521.32547	469.192927	0.065%
Fresno	2020	LHD2	GAS	30	10216.96052	619.4336	557.490236	0.036%
Fresno	2020	LHD2	DSL	30	15450.30236	521.32548	469.192934	0.055%
Fresno	2020	LHD2	GAS	35	3817.707199	527.84656	475.061906	0.013%
Fresno	2020	LHD2	DSL	35	8153.724442	521.32547	469.192923	0.029%
Fresno	2020	LHD2	GAS	40	1126.900176	475.23317	427.709853	0.004%
Fresno	2020	LHD2	DSL	40	4476.12821	521.32553	469.192978	0.016%
Fresno	2020	LHD2	GAS	45	1387.31323	452.05583	406.850248	0.005%
Fresno	2020	LHD2	DSL	45	4831.21426	521.32552	469.192968	0.017%
Fresno	2020	LHD2	GAS	50	10243.72797	454.32179	408.889615	0.036%
Fresno	2020	LHD2	DSL	50	18654.84861	521.32553	469.192974	0.066%
Fresno	2020	LHD2	GAS	55	2817.508813	482.4155	434.173947	0.010%
Fresno	2020	LHD2	DSL	55	11234.11873	521.32552	469.192971	0.040%
Fresno	2020	MCY	GAS	5	16.68688392	263.60959	237.248635	0.000%
Fresno	2020	MCY	GAS	10	294.4601557	239.987	215.988302	0.001%
Fresno	2020	MCY	GAS	15	137.6083261	203.31025	182.979225	0.000%
Fresno	2020	MCY	GAS	20	8680.359343	177.28794	159.559145	0.031%
Fresno	2020	MCY	GAS	25	1758.264929	159.11187	143.200685	0.006%
Fresno	2020	MCY	GAS	30	4056.627639	147.00431	132.303882	0.014%
Fresno	2020	MCY	GAS	35	13991.15637	139.89607	125.906467	0.049%
Fresno	2020	MCY	GAS	40	23275.16288	137.24882	123.523938	0.082%
Fresno	2020	MCY	GAS	45	20382.35374	138.97664	125.078975	0.072%
Fresno	2020	MCY	GAS	50	27895.39084	145.4486	130.903738	0.099%
Fresno	2020	MCY	GAS	55	18574.45022	157.57522	141.817698	0.066%
Fresno	2020	MCY	GAS	60	22989.80272	177.00467	159.304207	0.081%
Fresno	2020	MCY	GAS	65	23486.72339	206.48665	185.837981	0.083%
Fresno	2020	MCY	GAS	70	22074.1257	250.51598	225.464381	0.078%
Fresno	2020	MDV	GAS	5	427.4652288	1956.688	1525.97278	0.002%
Fresno	2020	MDV	DSL	5	0.333527873	490.28924	377.108778	0.000%
Fresno	2020	MDV	GAS	10	7543.139266	1446.2357	1127.90657	0.027%
Fresno	2020	MDV	DSL	10	5.885501367	446.28971	343.748967	0.000%
Fresno	2020	MDV	GAS	15	3525.090445	1110.5412	866.11421	0.012%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	DSL	15	2.75043645	380.1288	293.586725	0.000%
Fresno	2020	MDV	GAS	20	222363.35	890.39433	694.407181	0.786%
Fresno	2020	MDV	DSL	20	173.4980433	335.55537	259.791799	0.001%
Fresno	2020	MDV	GAS	25	45041.19318	741.97753	578.642654	0.159%
Fresno	2020	MDV	DSL	25	35.14319288	306.59881	237.837356	0.000%
Fresno	2020	MDV	GAS	30	103917.9823	636.78632	496.616032	0.367%
Fresno	2020	MDV	DSL	30	81.08154619	289.65159	224.98822	0.000%
Fresno	2020	MDV	GAS	35	358409.259	568.60891	443.447127	1.267%
Fresno	2020	MDV	DSL	35	279.6472728	282.71202	219.726732	0.001%
Fresno	2020	MDV	GAS	40	596236.1499	526.15478	410.342796	2.108%
Fresno	2020	MDV	DSL	40	465.2106216	284.9856	221.450527	0.002%
Fresno	2020	MDV	GAS	45	522131.5284	506.29265	394.85277	1.846%
Fresno	2020	MDV	DSL	45	407.3908075	296.73091	230.355656	0.001%
Fresno	2020	MDV	GAS	50	714591.7653	506.04172	394.655526	2.526%
Fresno	2020	MDV	DSL	50	557.5570769	319.30972	247.474579	0.002%
Fresno	2020	MDV	GAS	55	475818.7393	524.73439	409.233126	1.682%
Fresno	2020	MDV	DSL	55	371.2554625	355.45334	274.878147	0.001%
Fresno	2020	MDV	GAS	60	588926.1182	564.34648	440.127202	2.082%
Fresno	2020	MDV	DSL	60	459.5070332	409.81987	316.098065	0.002%
Fresno	2020	MDV	GAS	65	601655.6237	630.1431	491.441651	2.127%
Fresno	2020	MDV	DSL	65	469.4391087	490.00332	376.891997	0.002%
Fresno	2020	MDV	GAS	70	565469.2796	675.65501	526.934139	1.999%
Fresno	2020	MDV	DSL	70	441.2049752	608.30305	466.585136	0.002%
Fresno	2020	MH	GAS	5	375.9017657	2513.4973	2262.14753	0.001%
Fresno	2020	MH	DSL	5	74.62377466	2390.0672	2151.06044	0.000%
Fresno	2020	MH	GAS	10	1889.661497	2036.1283	1832.51547	0.007%
Fresno	2020	MH	DSL	10	371.4490664	2170.188	1953.16921	0.001%
Fresno	2020	MH	GAS	15	2386.966339	1392.4297	1253.18671	0.008%
Fresno	2020	MH	DSL	15	501.3272751	1781.9066	1603.71592	0.002%
Fresno	2020	MH	GAS	20	2475.870442	1006.0686	905.461738	0.009%
Fresno	2020	MH	DSL	20	531.6758273	1462.2599	1316.03391	0.002%
Fresno	2020	MH	GAS	25	2758.692156	768.01205	691.210843	0.010%
Fresno	2020	MH	DSL	25	553.719262	1311.5663	1180.40971	0.002%
Fresno	2020	MH	GAS	30	3119.094445	619.43361	557.490248	0.011%
Fresno	2020	MH	DSL	30	665.8025648	1231.0993	1107.98936	0.002%
Fresno	2020	MH	GAS	35	3876.560955	527.84661	475.061951	0.014%
Fresno	2020	MH	DSL	35	785.0689398	1164.3217	1047.88949	0.003%
Fresno	2020	MH	GAS	40	4825.918952	475.2332	427.709878	0.017%
Fresno	2020	MH	DSL	40	974.5408363	1111.2334	1000.11009	0.003%
Fresno	2020	MH	GAS	45	4400.908252	452.05585	406.850268	0.016%
Fresno	2020	MH	DSL	45	798.019717	1071.8346	964.651153	0.003%
Fresno	2020	MH	GAS	50	4282.988184	454.32186	408.889674	0.015%
Fresno	2020	MH	DSL	50	893.1138315	1046.1252	941.512654	0.003%
Fresno	2020	MH	GAS	55	5601.758146	482.41557	434.174012	0.020%
Fresno	2020	MH	DSL	55	1308.777391	1034.1051	930.694616	0.005%
Fresno	2020	MH	GAS	60	6464.173618	541.20922	487.088296	0.023%
Fresno	2020	MH	DSL	60	1572.715418	1035.7744	932.196962	0.006%
Fresno	2020	MH	GAS	65	1010.10891	641.49794	577.348142	0.004%
Fresno	2020	MH	DSL	65	247.5006536	1051.1334	946.020045	0.001%
Fresno	2020	OBUS	GAS	5	223.1933909	2513.4974	2262.14768	0.001%
Fresno	2020	OBUS	DSL	5	189.4743925	3023.7787	2721.40084	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	OBUS	GAS	10	1121.995179	2036.1283	1832.51547	0.004%
Fresno	2020	OBUS	DSL	10	873.8793826	2435.1748	2191.65732	0.003%
Fresno	2020	OBUS	GAS	15	1417.27225	1392.4297	1253.18671	0.005%
Fresno	2020	OBUS	DSL	15	1150.490893	1981.8507	1783.66567	0.004%
Fresno	2020	OBUS	GAS	20	1470.059473	1006.0686	905.461718	0.005%
Fresno	2020	OBUS	DSL	20	1535.69351	1680.0018	1512.00159	0.005%
Fresno	2020	OBUS	GAS	25	1637.986093	768.01209	691.210882	0.006%
Fresno	2020	OBUS	DSL	25	1593.312243	1565.8826	1409.29435	0.006%
Fresno	2020	OBUS	GAS	30	1851.976584	619.43366	557.490296	0.007%
Fresno	2020	OBUS	DSL	30	2222.551712	1524.477	1372.02928	0.008%
Fresno	2020	OBUS	GAS	35	2301.725777	527.84661	475.061952	0.008%
Fresno	2020	OBUS	DSL	35	3281.369258	1506.8029	1356.12259	0.012%
Fresno	2020	OBUS	GAS	40	2865.411437	475.23323	427.709905	0.010%
Fresno	2020	OBUS	DSL	40	3502.618858	1398.0016	1258.20144	0.012%
Fresno	2020	OBUS	GAS	45	2613.059424	452.05584	406.850252	0.009%
Fresno	2020	OBUS	DSL	45	3919.848541	1422.5072	1280.25645	0.014%
Fresno	2020	OBUS	GAS	50	2543.043925	454.32186	408.889677	0.009%
Fresno	2020	OBUS	DSL	50	4186.335389	1378.9402	1241.04618	0.015%
Fresno	2020	OBUS	GAS	55	3326.069877	482.41555	434.173991	0.012%
Fresno	2020	OBUS	DSL	55	5486.643759	1338.9738	1205.07644	0.019%
Fresno	2020	OBUS	GAS	60	3838.132886	541.2092	487.088281	0.014%
Fresno	2020	OBUS	DSL	60	3711.118326	1163.509	1047.15807	0.013%
Fresno	2020	OBUS	GAS	65	599.756791	641.49795	577.348151	0.002%
Fresno	2020	OBUS	DSL	65	966.0730169	1343.8417	1209.45751	0.003%
Fresno	2020	SBUS	GAS	5	58.03696424	2513.497	2262.14732	0.000%
Fresno	2020	SBUS	DSL	5	153.6039937	2632.2332	2369.0099	0.001%
Fresno	2020	SBUS	GAS	10	203.4165827	2036.1281	1832.5153	0.001%
Fresno	2020	SBUS	DSL	10	538.3741248	2174.4303	1956.98731	0.002%
Fresno	2020	SBUS	GAS	15	406.8331817	1392.4295	1253.18659	0.001%
Fresno	2020	SBUS	DSL	15	1076.74825	1785.3958	1606.85622	0.004%
Fresno	2020	SBUS	GAS	20	552.2098641	1006.0685	905.461668	0.002%
Fresno	2020	SBUS	DSL	20	1461.510625	1408.4997	1267.64973	0.005%
Fresno	2020	SBUS	GAS	25	871.7004002	768.0121	691.21089	0.003%
Fresno	2020	SBUS	DSL	25	2307.092737	1314.1617	1182.74553	0.008%
Fresno	2020	SBUS	GAS	30	1045.811315	619.43358	557.490219	0.004%
Fresno	2020	SBUS	DSL	30	2767.904718	1233.5395	1110.18552	0.010%
Fresno	2020	SBUS	GAS	35	1073.393783	527.84651	475.061863	0.004%
Fresno	2020	SBUS	DSL	35	2840.905979	1166.633	1049.96972	0.010%
Fresno	2020	SBUS	GAS	40	724.5975211	475.23316	427.709842	0.003%
Fresno	2020	SBUS	DSL	40	1917.761723	1113.4423	1002.09811	0.007%
Fresno	2020	SBUS	GAS	45	347.6444581	452.05579	406.850211	0.001%
Fresno	2020	SBUS	DSL	45	920.0959117	1073.9674	966.570693	0.003%
Fresno	2020	SBUS	GAS	50	174.1108852	454.32177	408.889594	0.001%
Fresno	2020	SBUS	DSL	50	460.811981	1048.2083	943.387475	0.002%
Fresno	2020	SBUS	GAS	55	259.1529318	482.41547	434.173922	0.001%
Fresno	2020	SBUS	DSL	55	685.8891861	1036.165	932.548455	0.002%
Fresno	2020	SBUS	GAS	60	144.2307875	541.2091	487.088192	0.001%
Fresno	2020	SBUS	DSL	60	381.7295431	1037.8374	934.05363	0.001%
Fresno	2020	T6	GAS	5	757.7971042	2513.4975	2262.14774	0.003%
Fresno	2020	T6	DSL	5	3782.072492	2577.8739	2320.08648	0.013%
Fresno	2020	T6	GAS	10	3809.452781	2036.1283	1832.51547	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	T6	DSL	10	18825.7321	2129.5253	1916.57274	0.067%
Fresno	2020	T6	GAS	15	4811.99169	1392.4297	1253.18675	0.017%
Fresno	2020	T6	DSL	15	25408.20417	1748.5248	1573.67236	0.090%
Fresno	2020	T6	GAS	20	4991.217479	1006.0686	905.46177	0.018%
Fresno	2020	T6	DSL	20	26946.3239	1379.4122	1241.47096	0.095%
Fresno	2020	T6	GAS	25	5561.370137	768.01215	691.210939	0.020%
Fresno	2020	T6	DSL	25	28063.52768	1287.0224	1158.32015	0.099%
Fresno	2020	T6	GAS	30	6287.921467	619.43362	557.49026	0.022%
Fresno	2020	T6	DSL	30	33744.11845	1208.0651	1087.25862	0.119%
Fresno	2020	T6	GAS	35	7814.932614	527.84653	475.061878	0.028%
Fresno	2020	T6	DSL	35	39788.75993	1142.5404	1028.28635	0.141%
Fresno	2020	T6	GAS	40	9728.784867	475.23324	427.709914	0.034%
Fresno	2020	T6	DSL	40	49391.55144	1090.4482	981.403359	0.175%
Fresno	2020	T6	GAS	45	8871.986895	452.05589	406.850299	0.031%
Fresno	2020	T6	DSL	45	40445.13139	1051.7885	946.609636	0.143%
Fresno	2020	T6	GAS	50	8634.26726	454.32179	408.889615	0.031%
Fresno	2020	T6	DSL	50	45264.67932	1026.5613	923.905185	0.160%
Fresno	2020	T6	GAS	55	11292.83405	482.4156	434.174038	0.040%
Fresno	2020	T6	DSL	55	66331.28571	1014.7667	913.290006	0.235%
Fresno	2020	T6	GAS	60	13031.41533	541.20926	487.088332	0.046%
Fresno	2020	T6	DSL	60	79708.15566	1016.4046	914.764098	0.282%
Fresno	2020	T6	GAS	65	2036.323575	641.49801	577.34821	0.007%
Fresno	2020	T6	DSL	65	12543.79741	1031.475	928.327461	0.044%
Fresno	2020	T7	GAS	5	45.14811148	2513.4971	2262.14736	0.000%
Fresno	2020	T7	DSL	5	8396.704746	3977.8081	3580.02731	0.030%
Fresno	2020	T7	GAS	10	220.662119	2036.1283	1832.51544	0.001%
Fresno	2020	T7	DSL	10	32075.80037	3285.9804	2957.38233	0.113%
Fresno	2020	T7	GAS	15	240.6355065	1392.4297	1253.18671	0.001%
Fresno	2020	T7	DSL	15	39228.96626	2698.0747	2428.26726	0.139%
Fresno	2020	T7	GAS	20	411.241983	1006.0685	905.461655	0.001%
Fresno	2020	T7	DSL	20	97100.08386	2129.5835	1916.62514	0.343%
Fresno	2020	T7	GAS	25	536.6970104	768.01215	691.210933	0.002%
Fresno	2020	T7	DSL	25	88604.77385	1985.9498	1787.35483	0.313%
Fresno	2020	T7	GAS	30	980.1093934	619.43364	557.490278	0.003%
Fresno	2020	T7	DSL	30	149589.5276	1864.1142	1677.70278	0.529%
Fresno	2020	T7	GAS	35	1743.255924	527.84661	475.061945	0.006%
Fresno	2020	T7	DSL	35	269115.3006	1763.0057	1586.70517	0.951%
Fresno	2020	T7	GAS	40	1519.637782	475.23317	427.709849	0.005%
Fresno	2020	T7	DSL	40	253966.6678	1682.6245	1514.36201	0.898%
Fresno	2020	T7	GAS	45	1607.939024	452.0558	406.850223	0.006%
Fresno	2020	T7	DSL	45	355569.7933	1622.9703	1460.67329	1.257%
Fresno	2020	T7	GAS	50	1682.35955	454.3218	408.889618	0.006%
Fresno	2020	T7	DSL	50	369783.8463	1584.0433	1425.63901	1.307%
Fresno	2020	T7	GAS	55	2469.579288	482.41551	434.173958	0.009%
Fresno	2020	T7	DSL	55	450928.7666	1565.8435	1409.25918	1.594%
Fresno	2020	T7	GAS	60	609.4964239	541.20921	487.088286	0.002%
Fresno	2020	T7	DSL	60	137368.6558	1568.3709	1411.53379	0.486%
Fresno	2020	T7	GAS	65	326.6774339	641.49796	577.348164	0.001%
Fresno	2020	T7	DSL	65	75239.57125	1591.6254	1432.46284	0.266%
Fresno	2020	UBUS	GAS	5	142.5170016	2513.497	2262.14729	0.001%
Fresno	2020	UBUS	DSL	5	351.317801	2440.8645	2196.77806	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	UBUS	GAS	10	511.5367803	2036.1283	1832.51547	0.002%
Fresno	2020	UBUS	DSL	10	1260.986146	2440.8645	2196.77804	0.004%
Fresno	2020	UBUS	GAS	15	1023.073523	1392.4297	1253.18671	0.004%
Fresno	2020	UBUS	DSL	15	2521.972627	2440.8642	2196.77781	0.009%
Fresno	2020	UBUS	GAS	20	1350.100402	1006.0686	905.461701	0.005%
Fresno	2020	UBUS	DSL	20	3328.12413	2440.8647	2196.77822	0.012%
Fresno	2020	UBUS	GAS	25	2033.347957	768.01208	691.210868	0.007%
Fresno	2020	UBUS	DSL	25	5012.394	2440.8646	2196.77812	0.018%
Fresno	2020	UBUS	GAS	30	2544.884591	619.43361	557.490252	0.009%
Fresno	2020	UBUS	DSL	30	6273.37969	2440.8644	2196.77797	0.022%
Fresno	2020	UBUS	GAS	35	2493.975603	527.84654	475.061885	0.009%
Fresno	2020	UBUS	DSL	35	6147.88385	2440.8645	2196.77802	0.022%
Fresno	2020	UBUS	GAS	40	1797.928884	475.23316	427.709842	0.006%
Fresno	2020	UBUS	DSL	40	4432.06321	2440.8647	2196.77821	0.016%
Fresno	2020	UBUS	GAS	45	783.7715293	452.05586	406.850272	0.003%
Fresno	2020	UBUS	DSL	45	1932.070593	2440.8644	2196.77797	0.007%
Fresno	2020	UBUS	GAS	50	398.2134972	454.3218	408.889617	0.001%
Fresno	2020	UBUS	DSL	50	981.633661	2440.8646	2196.77811	0.003%
Fresno	2020	UBUS	GAS	55	493.7042317	482.41551	434.173958	0.002%
Fresno	2020	UBUS	DSL	55	1217.027328	2440.8644	2196.77795	0.004%
Fresno	2020	UBUS	GAS	60	808.0757296	541.20919	487.088268	0.003%
Fresno	2020	UBUS	DSL	60	1991.982525	2440.8644	2196.778	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	Used 2010 emission factor projected by PG&E for BAU
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	377007	26.3	9.3	345,142
Commercial	1,800,825,042	7,503	400684	27.9	9.9	366,817
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**777,690**	**54.2**	**19.2**	**711,959**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

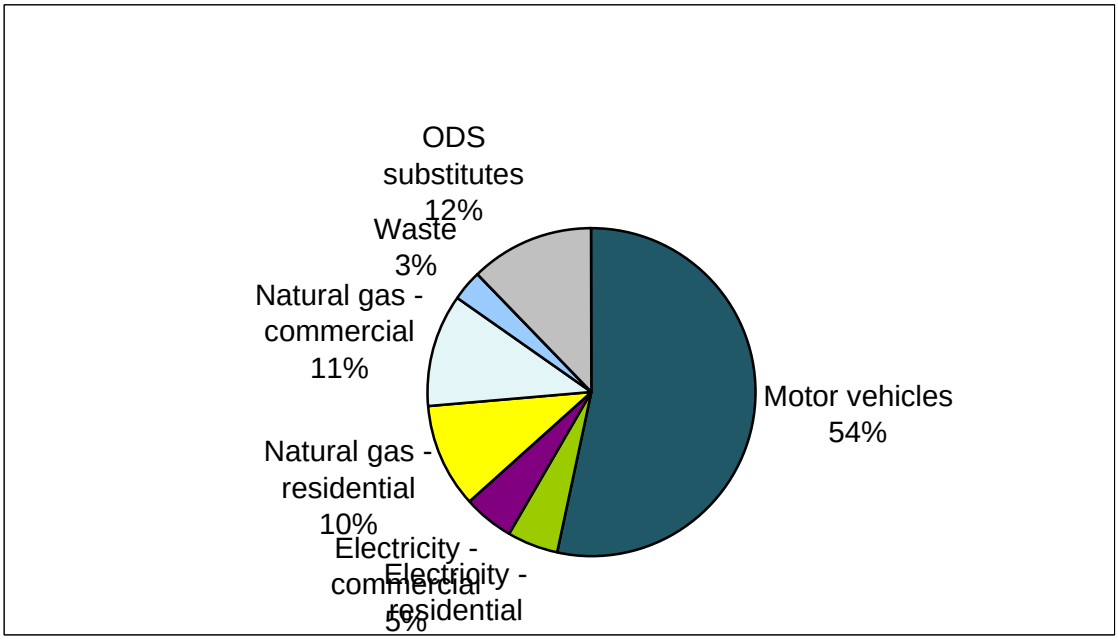
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**	**Without RPS**
Motor vehicles	3,036,848	2,205,409	3,036,848
Electricity - residential	271,756	271,756	315,237
Electricity - commercial	295,057	295,057	342,266
Natural gas - residential	573,160	519,166	519,166
Natural gas - commercial	632,169	564,560	632,169
Waste	177,508	177,508	177,508
Offroad equipment	1,314	1,314	1,314
ODS substitutes	694,734	694,734	694,734
Total	***5,682,546***	***4,729,504***	**5,719,242**



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	584	125,207	2,632	12,514	40,093	33,484	189,354	78,142	80,989	41,049	162,603	159,987	12	0	0	**926,067**
LDT1	101	21,588	454	2,157	6,911	5,772	32,644	13,473	13,964	7,077	28,034	27,583	2	0	0	**159,661**
LDT2	293	62,914	1,322	6,287	20,142	16,822	95,135	39,264	40,694	20,625	81,699	80,386	6	0	0	**465,297**
LHD1	79	18,609	345	1,490	4,378	3,430	18,531	7,452	7,627	3,888	15,765	0	0	0	0	**81,517**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	8	1,858	34	149	437	343	1,851	744	762	388	1,574	0	0	0	0	**8,141**
MCY	2	566	13	68	234	210	1,272	559	611	326	1,356	1,400	0	0	0	**6,615**
MDV	386	82,755	1,739	8,270	26,493	22,126	125,134	51,647	53,527	27,129	107,463	105,736	8	0	0	**612,028**
MH	4	1,057	20	85	249	195	1,053	423	433	221	896	919	0	0	0	**5,550**
OBUS	3	640	12	51	150	118	637	256	262	134	542	556	0	0	0	**3,358**
SBUS	1	145	3	12	34	27	144	58	59	30	122	126	0	0	0	**759**
T6	9	2,069	38	166	487	381	2,061	829	848	432	1,753	1,799	0	0	0	**10,864**
T7	1	238	4	19	56	44	237	95	97	50	201	207	0	0	0	**1,248**
UBUS	2	355	7	28	83	65	353	142	145	74	300	308	0	0	0	**1,862**
Total	**1,471**	**318,002**	**6,622**	**31,296**	**99,748**	**83,017**	**468,405**	**193,086**	**200,021**	**101,423**	**402,309**	**379,007**	**29**	**0**	**0**	**2,284,436**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	182	4	22	75	68	421	190	214	118	507	543	0	0	0	**2,344**
LDT1	0	13	0	2	6	5	31	14	16	9	37	40	0	0	0	**173**
LDT2	0	11	0	1	5	4	26	12	13	7	32	34	0	0	0	**146**
LHD1	10	2,899	79	470	1,808	1,757	11,136	4,974	5,352	2,714	10,366	0	0	0	0	**41,555**
LHD2	3	764	21	124	477	463	2,936	1,311	1,411	716	2,733	0	0	0	0	**10,956**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	20	0	2	8	8	47	21	24	13	56	60	0	0	0	**260**
MH	1	246	5	27	93	84	506	216	224	111	419	384	0	0	0	**2,314**
OBUS	4	923	20	103	370	350	2,196	910	996	490	1,816	1,443	0	0	0	**9,618**
SBUS	1	302	7	32	114	104	623	265	275	136	515	472	0	0	0	**2,845**
T6	51	12,194	272	1,280	4,597	4,192	25,132	10,714	11,119	5,504	20,778	19,039	1	0	0	**114,823**
T7	380	91,355	2,035	9,592	34,437	31,403	188,276	80,265	83,299	41,235	155,658	142,627	10	0	0	**860,192**
UBUS	3	987	27	160	616	598	3,792	1,694	1,822	924	3,530	3,229	0	0	0	**17,380**
Total	**454**	**109,898**	**2,470**	**11,815**	**42,605**	**39,037**	**235,122**	**100,586**	**104,766**	**51,978**	**196,447**	**167,870**	**11**	**0**	**0**	**1,063,059**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,347,495	3,036,848	3,036,848

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,034	0	**1,034**	5
5 - 10 MPH	859	1,004	0	**1,863**	5
10 - 15 MPH	167,394	216,081	459,549	**843,024**	10
15 - 20 MPH	5,656	8,370	8,841	**22,866**	15
20 - 25 MPH	24,751	41,371	70,532	**136,653**	20
25 - 30 MPH	101,092	133,862	290,863	**525,817**	25
30 - 35 MPH	112,039	177,305	221,483	**510,827**	30
35 - 40 MPH	659,988	855,145	1,723,155	**3,238,288**	35
40 - 45 MPH	295,148	360,153	791,178	**1,446,479**	40
45 - 50 MPH	251,077	330,845	974,418	**1,556,341**	45
50 - 55 MPH	135,795	191,825	461,743	**789,362**	50
55 - 60 MPH	602,719	716,634	1,695,018	**3,014,370**	55
60 - 65 MPH	577,808	717,782	1,461,979	**2,757,569**	60
65 - 70 MPH	32	42	115	**190**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,934,356**	**3,751,455**	**8,158,873**	**14,844,684**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2897	843024	22866	136653	525817	510827	3238288	1446479	1556341	789362	3014370	2757569	190	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1272	370168	10040	60004	230884	224302	1421917	635142	683382	346605	1323596	1210835	83	0	0
LDT1	189	54943	1490	8906	34269	33292	211050	94272	101432	51445	196457	179720	12	0	0
LDT2	470	136907	3713	22193	85393	82958	525898	234908	252750	128192	489533	447829	31	0	0
LHD1	77	22544	611	3654	14061	13660	86596	38681	41619	21109	80608	73741	5	0	0
LHD2	8	2251	61	365	1404	1364	8648	3863	4156	2108	8050	7364	1	0	0
MCY	20	5763	156	934	3595	3492	22139	9889	10640	5397	20608	18853	1	0	0
MDV	483	140560	3813	22785	87671	85172	539929	241176	259493	131613	502595	459777	32	0	0
MH	4	1281	35	208	799	776	4920	2198	2364	1199	4580	4189	0	0	0
OBUS	3	775	21	126	483	470	2977	1330	1431	726	2771	2535	0	0	0
SBUS	1	175	5	28	109	106	672	300	323	164	626	573	0	0	0
T6	9	2507	68	406	1564	1519	9629	4301	4628	2347	8964	8200	1	0	0
T7	1	288	8	47	180	174	1106	494	532	270	1029	942	0	0	0
UBUS	1	430	12	70	268	260	1650	737	793	402	1536	1405	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	988	27	160	616	599	3794	1695	1824	925	3532	3231	0	0	0
LDT1	0	73	2	12	45	44	280	125	135	68	261	238	0	0	0
LDT2	0	62	2	10	38	37	237	106	114	58	221	202	0	0	0
LHD1	47	13777	374	2233	8593	8348	52921	23639	25434	12900	49262	45065	3	0	0
LHD2	12	3632	99	589	2265	2201	13951	6232	6705	3401	12987	11880	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	110	3	18	68	66	421	188	202	103	392	358	0	0	0
MH	1	277	8	45	173	168	1064	475	511	259	991	906	0	0	0
OBUS	3	942	26	153	588	571	3619	1617	1740	882	3369	3082	0	0	0
SBUS	1	345	9	56	215	209	1324	591	636	323	1232	1127	0	0	0
T6	49	14224	386	2306	8872	8619	54638	24406	26259	13319	50860	46527	3	0	0
T7	237	68946	1870	11176	43003	41777	264839	118298	127283	64557	246526	225524	16	0	0
UBUS	4	1059	29	172	660	642	4067	1817	1955	991	3786	3464	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	344	73,750	1,550	7,371	23,616	19,722	111,533	46,027	47,704	24,178	95,776	94,236	7	0	0	**545,471**
LDT1	61	13,019	274	1,301	4,168	3,481	19,686	8,125	8,421	4,268	16,906	16,634	1	0	0	**96,282**
LDT2	197	42,332	890	4,231	13,553	11,319	64,012	26,419	27,381	13,878	54,972	54,088	4	0	0	**313,078**
LHD1	70	16,587	308	1,328	3,902	3,058	16,517	6,642	6,798	3,465	14,052	0	0	0	0	**72,658**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,656	31	133	390	305	1,649	663	679	346	1,403	0	0	0	0	**7,256**
MCY	2	505	12	60	209	187	1,133	498	545	291	1,208	1,248	0	0	0	**5,896**
MDV	266	57,011	1,198	5,697	18,251	15,243	86,205	35,580	36,875	18,689	74,031	72,842	6	0	0	**421,628**
MH	4	942	17	75	222	174	938	377	386	197	798	819	0	0	0	**4,947**
OBUS	2	570	11	46	134	105	568	228	234	119	483	496	0	0	0	**2,993**
SBUS	1	129	2	10	30	24	128	52	53	27	109	112	0	0	0	**676**
T6	8	1,844	34	148	434	340	1,837	739	756	385	1,563	1,604	0	0	0	**9,683**
T7	1	212	4	17	50	39	211	85	87	44	179	184	0	0	0	**1,112**
UBUS	1	316	6	25	74	58	315	127	130	66	268	275	0	0	0	**1,659**
Total	**964**	**208,872**	**4,336**	**20,443**	**65,031**	**54,055**	**304,733**	**125,563**	**130,049**	**65,954**	**261,749**	**242,537**	**19**	**0**	**0**	**1,484,303**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	109	2	13	45	41	252	113	128	70	303	324	0	0	0	**1,401**
LDT1	0	8	0	1	3	3	18	8	9	5	22	24	0	0	0	**102**
LDT2	0	8	0	1	3	3	18	8	9	5	21	23	0	0	0	**99**
LHD1	9	2,584	70	419	1,612	1,566	9,926	4,434	4,770	2,419	9,239	0	0	0	0	**37,039**
LHD2	2	681	18	110	425	413	2,617	1,169	1,258	638	2,436	0	0	0	0	**9,765**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	6	5	32	14	16	9	39	41	0	0	0	**178**
MH	1	219	5	24	83	75	451	192	200	99	373	342	0	0	0	**2,063**
OBUS	4	823	18	92	330	312	1,957	811	888	437	1,619	1,286	0	0	0	**8,572**
SBUS	1	269	6	28	102	93	555	237	246	122	459	420	0	0	0	**2,536**
T6	45	10,869	242	1,141	4,097	3,736	22,401	9,550	9,911	4,906	18,520	16,970	1	0	0	**102,344**
T7	339	81,426	1,813	8,550	30,695	27,990	167,815	71,542	74,247	36,754	138,741	127,126	9	0	0	**766,708**
UBUS	3	880	24	143	549	533	3,380	1,510	1,624	824	3,146	2,878	0	0	0	**15,491**
Total	**404**	**97,890**	**2,200**	**10,524**	**37,948**	**34,770**	**209,421**	**89,588**	**93,305**	**46,288**	**174,919**	**149,435**	**10**	**0**	**0**	**946,703**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,431,006	2,205,409	2,205,409

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,037,366,000	2,610	295418	31.6	11.2	271,756
Commercial	2,212,049,466	7,503	320747	34.3	12.2	295,057
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**616,165**	**65.9**	**23.4**	**566,813**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

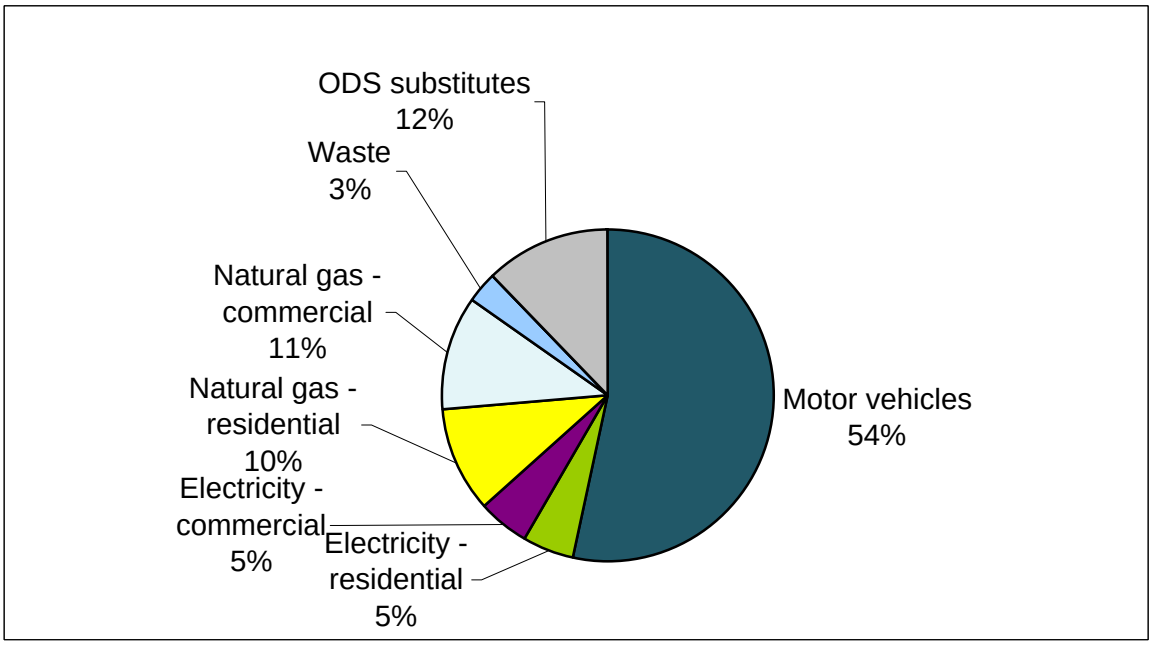
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**	**Without RPS**	
Motor vehicles	3,036,848	2,205,409	3,036,848	
Electricity - residential	271,756	271,756	414,999	used 2010 factors
Electricity - commercial	295,057	295,057	450,581	used 2010 factors
Natural gas - residential	573,160	573,160	573,160	
Natural gas - commercial	632,169	632,169	632,169	
Waste	177,508	177,508	177,508	
Offroad equipment	1,314	1,314	1,314	
ODS substitutes	694,734	694,734	694,734	
Total	***5,682,546***	***4,851,107***	**5,981,314**	



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	584	125,207	2,632	12,514	40,093	33,484	189,354	78,142	80,989	41,049	162,603	159,987	12	0	0	**926,067**
LDT1	101	21,588	454	2,157	6,911	5,772	32,644	13,473	13,964	7,077	28,034	27,583	2	0	0	**159,661**
LDT2	293	62,914	1,322	6,287	20,142	16,822	95,135	39,264	40,694	20,625	81,699	80,386	6	0	0	**465,297**
LHD1	79	18,609	345	1,490	4,378	3,430	18,531	7,452	7,627	3,888	15,765	0	0	0	0	**81,517**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	8	1,858	34	149	437	343	1,851	744	762	388	1,574	0	0	0	0	**8,141**
MCY	2	566	13	68	234	210	1,272	559	611	326	1,356	1,400	0	0	0	**6,615**
MDV	386	82,755	1,739	8,270	26,493	22,126	125,134	51,647	53,527	27,129	107,463	105,736	8	0	0	**612,028**
MH	4	1,057	20	85	249	195	1,053	423	433	221	896	919	0	0	0	**5,550**
OBUS	3	640	12	51	150	118	637	256	262	134	542	556	0	0	0	**3,358**
SBUS	1	145	3	12	34	27	144	58	59	30	122	126	0	0	0	**759**
T6	9	2,069	38	166	487	381	2,061	829	848	432	1,753	1,799	0	0	0	**10,864**
T7	1	238	4	19	56	44	237	95	97	50	201	207	0	0	0	**1,248**
UBUS	2	355	7	28	83	65	353	142	145	74	300	308	0	0	0	**1,862**
Total	**1,471**	**318,002**	**6,622**	**31,296**	**99,748**	**83,017**	**468,405**	**193,086**	**200,021**	**101,423**	**402,309**	**379,007**	**29**	**0**	**0**	**2,284,436**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	182	4	22	75	68	421	190	214	118	507	543	0	0	0	**2,344**
LDT1	0	13	0	2	6	5	31	14	16	9	37	40	0	0	0	**173**
LDT2	0	11	0	1	5	4	26	12	13	7	32	34	0	0	0	**146**
LHD1	10	2,899	79	470	1,808	1,757	11,136	4,974	5,352	2,714	10,366	0	0	0	0	**41,555**
LHD2	3	764	21	124	477	463	2,936	1,311	1,411	716	2,733	0	0	0	0	**10,956**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	20	0	2	8	8	47	21	24	13	56	60	0	0	0	**260**
MH	1	246	5	27	93	84	506	216	224	111	419	384	0	0	0	**2,314**
OBUS	4	923	20	103	370	350	2,196	910	996	490	1,816	1,443	0	0	0	**9,618**
SBUS	1	302	7	32	114	104	623	265	275	136	515	472	0	0	0	**2,845**
T6	51	12,194	272	1,280	4,597	4,192	25,132	10,714	11,119	5,504	20,778	19,039	1	0	0	**114,823**
T7	380	91,355	2,035	9,592	34,437	31,403	188,276	80,265	83,299	41,235	155,658	142,627	10	0	0	**860,192**
UBUS	3	987	27	160	616	598	3,792	1,694	1,822	924	3,530	3,229	0	0	0	**17,380**
Total	**454**	**109,898**	**2,470**	**11,815**	**42,605**	**39,037**	**235,122**	**100,586**	**104,766**	**51,978**	**196,447**	**167,870**	**11**	**0**	**0**	**1,063,059**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,347,495	3,036,848	3,036,848

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,034	0	**1,034**	5
5 - 10 MPH	859	1,004	0	**1,863**	5
10 - 15 MPH	167,394	216,081	459,549	**843,024**	10
15 - 20 MPH	5,656	8,370	8,841	**22,866**	15
20 - 25 MPH	24,751	41,371	70,532	**136,653**	20
25 - 30 MPH	101,092	133,862	290,863	**525,817**	25
30 - 35 MPH	112,039	177,305	221,483	**510,827**	30
35 - 40 MPH	659,988	855,145	1,723,155	**3,238,288**	35
40 - 45 MPH	295,148	360,153	791,178	**1,446,479**	40
45 - 50 MPH	251,077	330,845	974,418	**1,556,341**	45
50 - 55 MPH	135,795	191,825	461,743	**789,362**	50
55 - 60 MPH	602,719	716,634	1,695,018	**3,014,370**	55
60 - 65 MPH	577,808	717,782	1,461,979	**2,757,569**	60
65 - 70 MPH	32	42	115	**190**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,934,356**	**3,751,455**	**8,158,873**	**14,844,684**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2897	843024	22866	136653	525817	510827	3238288	1446479	1556341	789362	3014370	2757569	190	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1272	370168	10040	60004	230884	224302	1421917	635142	683382	346605	1323596	1210835	83	0	0
LDT1	189	54943	1490	8906	34269	33292	211050	94272	101432	51445	196457	179720	12	0	0
LDT2	470	136907	3713	22193	85393	82958	525898	234908	252750	128192	489533	447829	31	0	0
LHD1	77	22544	611	3654	14061	13660	86596	38681	41619	21109	80608	73741	5	0	0
LHD2	8	2251	61	365	1404	1364	8648	3863	4156	2108	8050	7364	1	0	0
MCY	20	5763	156	934	3595	3492	22139	9889	10640	5397	20608	18853	1	0	0
MDV	483	140560	3813	22785	87671	85172	539929	241176	259493	131613	502595	459777	32	0	0
MH	4	1281	35	208	799	776	4920	2198	2364	1199	4580	4189	0	0	0
OBUS	3	775	21	126	483	470	2977	1330	1431	726	2771	2535	0	0	0
SBUS	1	175	5	28	109	106	672	300	323	164	626	573	0	0	0
T6	9	2507	68	406	1564	1519	9629	4301	4628	2347	8964	8200	1	0	0
T7	1	288	8	47	180	174	1106	494	532	270	1029	942	0	0	0
UBUS	1	430	12	70	268	260	1650	737	793	402	1536	1405	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	988	27	160	616	599	3794	1695	1824	925	3532	3231	0	0	0
LDT1	0	73	2	12	45	44	280	125	135	68	261	238	0	0	0
LDT2	0	62	2	10	38	37	237	106	114	58	221	202	0	0	0
LHD1	47	13777	374	2233	8593	8348	52921	23639	25434	12900	49262	45065	3	0	0
LHD2	12	3632	99	589	2265	2201	13951	6232	6705	3401	12987	11880	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	110	3	18	68	66	421	188	202	103	392	358	0	0	0
MH	1	277	8	45	173	168	1064	475	511	259	991	906	0	0	0
OBUS	3	942	26	153	588	571	3619	1617	1740	882	3369	3082	0	0	0
SBUS	1	345	9	56	215	209	1324	591	636	323	1232	1127	0	0	0
T6	49	14224	386	2306	8872	8619	54638	24406	26259	13319	50860	46527	3	0	0
T7	237	68946	1870	11176	43003	41777	264839	118298	127283	64557	246526	225524	16	0	0
UBUS	4	1059	29	172	660	642	4067	1817	1955	991	3786	3464	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	344	73,750	1,550	7,371	23,616	19,722	111,533	46,027	47,704	24,178	95,776	94,236	7	0	0	**545,471**
LDT1	61	13,019	274	1,301	4,168	3,481	19,686	8,125	8,421	4,268	16,906	16,634	1	0	0	**96,282**
LDT2	197	42,332	890	4,231	13,553	11,319	64,012	26,419	27,381	13,878	54,972	54,088	4	0	0	**313,078**
LHD1	70	16,587	308	1,328	3,902	3,058	16,517	6,642	6,798	3,465	14,052	0	0	0	0	**72,658**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,656	31	133	390	305	1,649	663	679	346	1,403	0	0	0	0	**7,256**
MCY	2	505	12	60	209	187	1,133	498	545	291	1,208	1,248	0	0	0	**5,896**
MDV	266	57,011	1,198	5,697	18,251	15,243	86,205	35,580	36,875	18,689	74,031	72,842	6	0	0	**421,628**
MH	4	942	17	75	222	174	938	377	386	197	798	819	0	0	0	**4,947**
OBUS	2	570	11	46	134	105	568	228	234	119	483	496	0	0	0	**2,993**
SBUS	1	129	2	10	30	24	128	52	53	27	109	112	0	0	0	**676**
T6	8	1,844	34	148	434	340	1,837	739	756	385	1,563	1,604	0	0	0	**9,683**
T7	1	212	4	17	50	39	211	85	87	44	179	184	0	0	0	**1,112**
UBUS	1	316	6	25	74	58	315	127	130	66	268	275	0	0	0	**1,659**
Total	**964**	**208,872**	**4,336**	**20,443**	**65,031**	**54,055**	**304,733**	**125,563**	**130,049**	**65,954**	**261,749**	**242,537**	**19**	**0**	**0**	**1,484,303**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	109	2	13	45	41	252	113	128	70	303	324	0	0	0	**1,401**
LDT1	0	8	0	1	3	3	18	8	9	5	22	24	0	0	0	**102**
LDT2	0	8	0	1	3	3	18	8	9	5	21	23	0	0	0	**99**
LHD1	9	2,584	70	419	1,612	1,566	9,926	4,434	4,770	2,419	9,239	0	0	0	0	**37,039**
LHD2	2	681	18	110	425	413	2,617	1,169	1,258	638	2,436	0	0	0	0	**9,765**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	6	5	32	14	16	9	39	41	0	0	0	**178**
MH	1	219	5	24	83	75	451	192	200	99	373	342	0	0	0	**2,063**
OBUS	4	823	18	92	330	312	1,957	811	888	437	1,619	1,286	0	0	0	**8,572**
SBUS	1	269	6	28	102	93	555	237	246	122	459	420	0	0	0	**2,536**
T6	45	10,869	242	1,141	4,097	3,736	22,401	9,550	9,911	4,906	18,520	16,970	1	0	0	**102,344**
T7	339	81,426	1,813	8,550	30,695	27,990	167,815	71,542	74,247	36,754	138,741	127,126	9	0	0	**766,708**
UBUS	3	880	24	143	549	533	3,380	1,510	1,624	824	3,146	2,878	0	0	0	**15,491**
Total	**404**	**97,890**	**2,200**	**10,524**	**37,948**	**34,770**	**209,421**	**89,588**	**93,305**	**46,288**	**174,919**	**149,435**	**10**	**0**	**0**	**946,703**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,431,006	2,205,409	2,205,409

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,037,366,000	2,610	295418	31.6	11.2	271,756
Commercial	2,212,049,466	7,503	320747	34.3	12.2	295,057
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**616,165**	**65.9**	**23.4**	**566,813**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

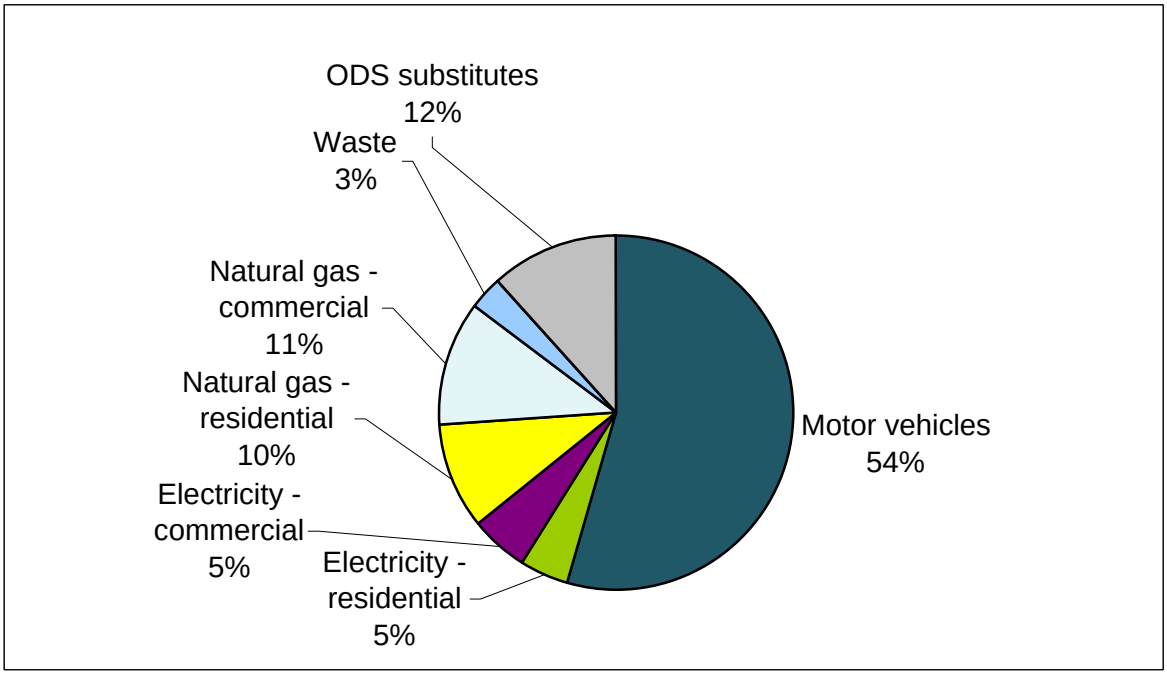
Summary
Year: 2050
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	912,600	Fresno COG
Employment	362,145	
County Information		
Population	1,521,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,745,122	2,711,894
Electricity - residential	317,710	317,710
Electricity - commercial	362,433	362,433
Natural gas - residential	670,082	670,082
Natural gas - commercial	776,525	776,525
Waste	207,525	207,525
Offroad equipment	1,314	1,314
ODS substitutes	812,214	812,214
Total	***6,892,926***	5,859,698



3%

Community Greenhouse Gas Inventory

Waste

Year: **2050**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	207,525	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1584	460945	12503	74719	287504	279308	1770618	790900	850970	431604	1648185	1507772	104	0	0
LDT1	235	68417	1856	11090	42673	41457	262807	117391	126307	64062	244635	223794	15	0	0
LDT2	586	170481	4624	27635	106334	103302	654865	292515	314732	159629	609583	557651	38	0	0
LHD1	96	28072	761	4550	17509	17010	107832	48167	51825	26285	100376	91825	6	0	0
LHD2	10	2803	76	454	1749	1699	10769	4810	5176	2625	10024	9170	1	0	0
MCY	25	7177	195	1163	4476	4349	27568	12314	13250	6720	25662	23476	2	0	0
MDV	601	175030	4748	28372	109171	106059	672338	300320	323130	163888	625847	572530	39	0	0
MH	5	1595	43	259	995	966	6126	2736	2944	1493	5703	5217	0	0	0
OBUS	3	965	26	156	602	585	3707	1656	1781	904	3450	3156	0	0	0
SBUS	1	218	6	35	136	132	837	374	402	204	779	713	0	0	0
T6	11	3122	85	506	1947	1892	11991	5356	5763	2923	11162	10211	1	0	0
T7	1	359	10	58	224	217	1377	615	662	336	1282	1173	0	0	0
UBUS	2	535	15	87	334	324	2055	918	987	501	1913	1750	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1230	33	199	767	745	4725	2111	2271	1152	4398	4023	0	0	0
LDT1	0	91	2	15	57	55	349	156	168	85	325	297	0	0	0
LDT2	0	77	2	12	48	47	295	132	142	72	275	251	0	0	0
LHD1	59	17156	465	2781	10700	10395	65899	29436	31671	16063	61342	56116	4	0	0
LHD2	16	4523	123	733	2821	2740	17373	7760	8349	4235	16171	14794	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	136	4	22	85	83	524	234	252	128	488	446	0	0	0
MH	1	345	9	56	215	209	1325	592	637	323	1233	1128	0	0	0
OBUS	4	1173	32	190	732	711	4507	2013	2166	1099	4195	3838	0	0	0
SBUS	1	429	12	70	268	260	1649	736	792	402	1535	1404	0	0	0
T6	61	17712	480	2871	11048	10733	68037	30391	32699	16585	63333	57937	4	0	0
T7	295	85853	2329	13917	53549	52022	329786	147309	158497	80388	306983	280830	19	0	0
UBUS	5	1319	36	214	822	799	5065	2262	2434	1235	4715	4313	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	720	154,409	3,245	15,432	49,444	41,293	233,517	96,366	99,878	50,622	200,527	197,301	15	0	0	**1,142,050**
LDT1	124	26,623	559	2,661	8,523	7,118	40,258	16,616	17,220	8,728	34,572	34,017	3	0	0	**196,898**
LDT2	362	77,587	1,630	7,754	24,839	20,745	117,323	48,422	50,185	25,435	100,753	99,134	8	0	0	**573,816**
LHD1	97	22,949	426	1,838	5,399	4,230	22,853	9,190	9,406	4,795	19,442	0	0	0	0	**100,529**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	10	2,292	43	184	539	422	2,282	918	939	479	1,942	0	0	0	0	**10,039**
MCY	3	698	16	83	288	259	1,568	689	754	402	1,672	1,727	0	0	0	**8,158**
MDV	476	102,056	2,144	10,199	32,671	27,287	154,319	63,693	66,011	33,457	132,526	130,396	10	0	0	**754,769**
MH	6	1,304	24	104	307	240	1,298	522	534	272	1,105	1,134	0	0	0	**6,845**
OBUS	3	789	15	63	186	145	786	316	323	165	668	686	0	0	0	**4,142**
SBUS	1	178	3	14	42	33	177	71	73	37	151	155	0	0	0	**936**
T6	11	2,552	47	204	600	470	2,541	1,022	1,046	533	2,162	2,219	0	0	0	**13,398**
T7	1	293	5	23	69	54	292	117	120	61	248	255	0	0	0	**1,539**
UBUS	2	437	8	35	103	81	435	175	179	91	370	380	0	0	0	**2,296**
Total	**1,815**	**392,168**	**8,167**	**38,596**	**123,012**	**102,379**	**577,649**	**238,118**	**246,671**	**125,078**	**496,138**	**467,402**	**36**	**0**	**0**	**2,817,228**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	225	5	27	92	84	519	234	264	145	626	670	0	0	0	**2,890**
LDT1	0	17	0	2	7	6	38	17	19	11	46	49	0	0	0	**213**
LDT2	0	14	0	2	6	5	32	15	16	9	39	42	0	0	0	**181**
LHD1	12	3,575	97	580	2,230	2,166	13,733	6,134	6,600	3,348	12,784	0	0	0	0	**51,247**
LHD2	3	943	26	153	588	571	3,621	1,617	1,740	883	3,370	0	0	0	0	**13,511**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	25	1	3	10	9	58	26	29	16	69	74	0	0	0	**321**
MH	1	303	7	33	114	104	624	266	276	137	516	473	0	0	0	**2,854**
OBUS	5	1,138	25	127	457	432	2,708	1,122	1,229	604	2,240	1,779	0	0	0	**11,861**
SBUS	2	373	8	39	140	128	768	327	340	168	635	582	0	0	0	**3,508**
T6	63	15,039	335	1,579	5,669	5,170	30,994	13,213	13,713	6,788	25,624	23,479	2	0	0	**141,603**
T7	469	112,661	2,509	11,829	42,469	38,727	232,187	98,985	102,727	50,852	191,961	175,891	12	0	0	**1,060,812**
UBUS	4	1,217	33	197	759	738	4,676	2,089	2,248	1,140	4,353	3,982	0	0	0	**21,433**
Total	**560**	**135,529**	**3,046**	**14,571**	**52,542**	**48,141**	**289,958**	**124,046**	**129,201**	**64,101**	**242,263**	**207,022**	**14**	**0**	**0**	**1,310,993**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,128,221	3,745,122	3,745,122

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,253,855 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,662,657,075 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,271	0	**1,271**	5
5 - 10 MPH	1,056	1,235	0	**2,291**	5
10 - 15 MPH	205,836	265,706	565,087	**1,036,629**	10
15 - 20 MPH	6,955	10,292	10,871	**28,118**	15
20 - 25 MPH	30,435	50,872	86,730	**168,037**	20
25 - 30 MPH	124,308	164,604	357,661	**646,573**	25
30 - 35 MPH	137,770	218,025	272,348	**628,142**	30
35 - 40 MPH	811,558	1,051,535	2,118,888	**3,981,981**	35
40 - 45 MPH	362,930	442,865	972,877	**1,778,672**	40
45 - 50 MPH	308,739	406,826	1,198,199	**1,913,764**	45
50 - 55 MPH	166,981	235,879	567,785	**970,644**	50
55 - 60 MPH	741,136	881,213	2,084,289	**3,706,639**	55
60 - 65 MPH	710,505	882,625	1,797,731	**3,390,862**	60
65 - 70 MPH	40	52	141	**233**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,608,249**	**4,612,999**	**10,032,608**	**18,253,855**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3562	1036629	28118	168037	646573	628142	3981981	1778672	1913764	970644	3706639	3390862	233	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1564	455179	12346	73784	283907	275814	1748469	781006	840325	426205	1627567	1488911	102	0	0
LDT1	232	67561	1833	10952	42139	40938	259519	115922	124727	63260	241574	220994	15	0	0
LDT2	578	168348	4566	27289	105003	102010	646673	288856	310795	157632	601958	550675	38	0	0
LHD1	95	27721	752	4494	17290	16797	106484	47564	51177	25956	99121	90676	6	0	0
LHD2	10	2768	75	449	1727	1677	10634	4750	5111	2592	9899	9055	1	0	0
MCY	24	7087	192	1149	4420	4294	27224	12160	13084	6636	25341	23182	2	0	0
MDV	594	172840	4688	28017	107805	104732	663927	296563	319087	161838	618018	565368	39	0	0
MH	5	1575	43	255	982	954	6050	2702	2907	1475	5631	5151	0	0	0
OBUS	3	953	26	154	594	577	3660	1635	1759	892	3407	3117	0	0	0
SBUS	1	215	6	35	134	130	827	369	397	202	770	704	0	0	0
T6	11	3083	84	500	1923	1868	11841	5289	5691	2886	11022	10083	1	0	0
T7	1	354	10	57	221	215	1360	607	654	331	1266	1158	0	0	0
UBUS	2	528	14	86	329	320	2029	906	975	495	1889	1728	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1215	33	197	758	736	4666	2084	2242	1137	4343	3973	0	0	0
LDT1	0	90	2	15	56	54	344	154	165	84	321	293	0	0	0
LDT2	0	76	2	12	47	46	291	130	140	71	271	248	0	0	0
LHD1	58	16941	460	2746	10566	10265	65075	29068	31275	15863	60575	55414	4	0	0
LHD2	15	4466	121	724	2786	2706	17155	7663	8245	4182	15969	14609	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	135	4	22	84	82	518	231	249	126	482	441	0	0	0
MH	1	341	9	55	212	206	1308	584	629	319	1218	1114	0	0	0
OBUS	4	1159	31	188	723	702	4451	1988	2139	1085	4143	3790	0	0	0
SBUS	1	424	11	69	264	257	1628	727	782	397	1515	1386	0	0	0
T6	60	17491	474	2835	10909	10598	67186	30011	32290	16377	62540	57213	4	0	0
T7	291	84779	2300	13743	52879	51372	325661	145466	156515	79383	303142	277317	19	0	0
UBUS	4	1302	35	211	812	789	5002	2234	2404	1219	4656	4259	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	423	90,687	1,906	9,064	29,039	24,252	137,147	56,597	58,660	29,731	117,772	115,877	9	0	0	**670,742**
LDT1	75	16,008	336	1,600	5,125	4,280	24,207	9,991	10,355	5,248	20,788	20,454	2	0	0	**118,393**
LDT2	243	52,054	1,094	5,202	16,665	13,918	78,713	32,487	33,670	17,065	67,596	66,510	5	0	0	**384,978**
LHD1	87	20,396	378	1,634	4,798	3,760	20,310	8,168	8,360	4,261	17,279	0	0	0	0	**89,344**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,037	38	163	479	375	2,028	816	835	426	1,726	0	0	0	0	**8,922**
MCY	2	621	14	74	256	230	1,394	613	670	357	1,486	1,535	0	0	0	**7,250**
MDV	327	70,103	1,473	7,006	22,442	18,743	106,003	43,751	45,344	22,982	91,033	89,570	7	0	0	**518,457**
MH	5	1,159	21	93	273	214	1,154	464	475	242	982	1,007	0	0	0	**6,083**
OBUS	3	701	13	56	165	129	698	281	287	146	594	610	0	0	0	**3,681**
SBUS	1	158	3	13	37	29	158	63	65	33	134	138	0	0	0	**832**
T6	10	2,268	42	182	534	418	2,259	908	930	474	1,921	1,972	0	0	0	**11,907**
T7	1	260	5	21	61	48	259	104	107	54	221	226	0	0	0	**1,368**
UBUS	2	389	7	31	91	72	387	156	159	81	329	338	0	0	0	**2,040**
Total	**1,185**	**256,841**	**5,331**	**25,137**	**79,966**	**66,469**	**374,716**	**154,399**	**159,916**	**81,101**	**321,861**	**298,237**	**23**	**0**	**0**	**1,825,183**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	134	3	16	55	50	309	139	157	87	373	399	0	0	0	**1,722**
LDT1	0	10	0	1	4	4	23	10	11	6	27	29	0	0	0	**126**
LDT2	0	9	0	1	4	4	22	10	11	6	26	28	0	0	0	**122**
LHD1	11	3,177	86	515	1,982	1,925	12,205	5,452	5,866	2,975	11,361	0	0	0	0	**45,545**
LHD2	3	838	23	136	523	508	3,218	1,437	1,547	784	2,995	0	0	0	0	**12,008**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	17	0	2	7	6	39	18	20	11	47	51	0	0	0	**219**
MH	1	269	6	29	102	93	555	237	246	122	459	420	0	0	0	**2,537**
OBUS	4	1,012	22	113	406	384	2,406	997	1,092	537	1,990	1,581	0	0	0	**10,541**
SBUS	1	331	7	35	125	114	682	291	302	149	564	517	0	0	0	**3,118**
T6	56	13,365	298	1,403	5,038	4,594	27,545	11,743	12,187	6,033	22,773	20,867	1	0	0	**125,848**
T7	416	100,127	2,230	10,513	37,744	34,418	206,354	87,972	91,298	45,195	170,604	156,322	11	0	0	**942,787**
UBUS	4	1,082	29	175	675	656	4,156	1,856	1,997	1,013	3,869	3,539	0	0	0	**19,048**
Total	**497**	**120,371**	**2,705**	**12,940**	**46,664**	**42,755**	**257,516**	**110,162**	**114,734**	**56,918**	**215,090**	**183,753**	**13**	**0**	**0**	**1,164,119**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,989,301	2,711,894	2,711,894

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
*EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2050

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,381,886,000	2,610	345373	36.9	13.1	317,710
Commercial	2,717,173,935	7,503	393990	42.1	14.9	362,433
Industrial	0		0	0.0	0.0	0
Total	**5,099,059,935**		**739,364**	**79.0**	**28.0**	**680,144**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	125,938,800	138	736,742	69.3	1.4	670,082
Commercial	145,944,435	403	853,775	80.3	1.6	776,525
Industrial	0		0	0.0	0.0	0
Total	**271,883,235**		**1,590,517**	**149.5**	**3.0**	**1,446,607**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
*OFFROAD only provides emissions rates up to 2040. Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	912,600
	Emissions (MTCO2e per person)	812,214
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

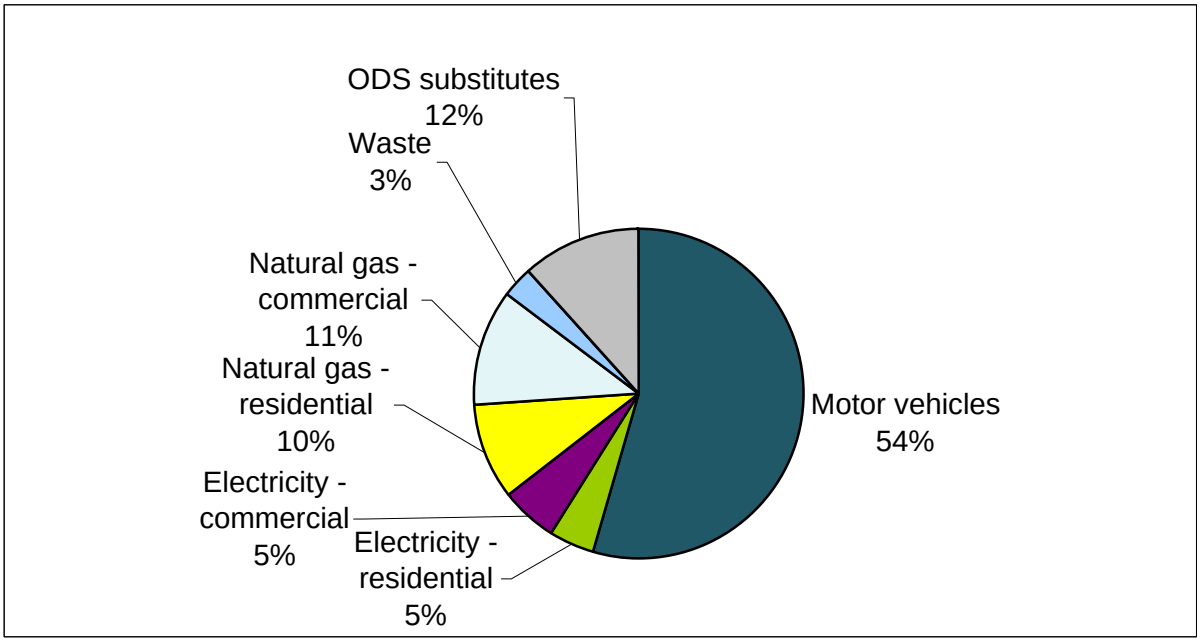
Summary
Year: 2056
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	970,000	Fresno COG
Employment	393,200	
County Information		
Population	1,616,667	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	4,028,432	2,914,488
Electricity - residential	337,694	337,694
Electricity - commercial	393,513	393,513
Natural gas - residential	712,228	712,228
Natural gas - commercial	843,115	843,115
Waste	220,578	220,578
Offroad equipment	1,314	1,314
ODS substitutes	863,300	863,300
Total	***7,400,173***	***6,286,229***



Community Greenhouse Gas Inventory

Waste

Year: **2056**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	220,578	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1704	495815	13449	80371	309253	300437	1904561	850730	915344	464254	1772866	1621832	111	0	0
LDT1	253	73592	1996	11929	45901	44593	282688	126271	135861	68908	263141	240723	17	0	0
LDT2	630	183378	4974	29725	114377	111117	704404	314643	338541	171705	655697	599836	41	0	0
LHD1	104	30196	819	4895	18834	18297	115990	51810	55745	28274	107969	98771	7	0	0
LHD2	10	3016	82	489	1881	1827	11583	5174	5567	2824	10782	9864	1	0	0
MCY	27	7720	209	1251	4815	4678	29654	13246	14252	7228	27603	25252	2	0	0
MDV	647	188270	5107	30518	117429	114082	723198	323038	347574	176286	673191	615841	42	0	0
MH	6	1715	47	278	1070	1039	6590	2943	3167	1606	6134	5611	0	0	0
OBUS	4	1038	28	168	647	629	3987	1781	1916	972	3711	3395	0	0	0
SBUS	1	234	6	38	146	142	901	402	433	220	838	767	0	0	0
T6	12	3358	91	544	2094	2035	12898	5761	6199	3144	12006	10983	1	0	0
T7	1	386	10	63	241	234	1481	662	712	361	1379	1261	0	0	0
UBUS	2	575	16	93	359	349	2210	987	1062	539	2057	1882	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	5	1323	36	214	825	802	5082	2270	2443	1239	4731	4328	0	0	0
LDT1	0	98	3	16	61	59	375	168	180	91	349	319	0	0	0
LDT2	0	83	2	13	52	50	317	142	153	77	295	270	0	0	0
LHD1	63	18453	501	2991	11510	11182	70884	31663	34067	17279	65983	60362	4	0	0
LHD2	17	4865	132	789	3034	2948	18687	8347	8981	4555	17395	15913	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	1	147	4	24	92	89	564	252	271	137	525	480	0	0	0
MH	1	371	10	60	231	225	1425	637	685	347	1327	1214	0	0	0
OBUS	4	1262	34	205	787	765	4848	2166	2330	1182	4513	4128	0	0	0
SBUS	2	462	13	75	288	280	1773	792	852	432	1651	1510	0	0	0
T6	65	19052	517	3088	11883	11545	73184	32690	35173	17839	68124	62320	4	0	0
T7	317	92348	2505	14970	57600	55958	354734	158453	170487	86470	330205	302074	21	0	0
UBUS	5	1418	38	230	885	859	5448	2434	2618	1328	5071	4639	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	774	166,090	3,491	16,600	53,185	44,417	251,182	103,656	107,434	54,452	215,696	212,226	16	0	0	**1,228,443**
LDT1	133	28,637	602	2,862	9,168	7,657	43,303	17,872	18,523	9,388	37,188	36,590	3	0	0	**211,793**
LDT2	389	83,457	1,754	8,340	26,718	22,315	126,198	52,085	53,981	27,359	108,375	106,633	8	0	0	**617,224**
LHD1	105	24,685	458	1,977	5,808	4,550	24,582	9,886	10,118	5,157	20,913	0	0	0	0	**108,133**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	10	2,465	46	197	580	454	2,455	987	1,010	515	2,088	0	0	0	0	**10,799**
MCY	3	751	17	90	310	279	1,687	742	811	432	1,798	1,858	0	0	0	**8,775**
MDV	512	109,777	2,307	10,970	35,143	29,351	165,992	68,511	71,005	35,987	142,551	140,260	11	0	0	**811,866**
MH	6	1,402	26	112	330	259	1,397	562	575	293	1,188	1,219	0	0	0	**7,363**
OBUS	4	849	16	68	200	156	845	340	348	177	719	738	0	0	0	**4,455**
SBUS	1	192	4	15	45	35	191	77	79	40	162	167	0	0	0	**1,006**
T6	12	2,745	51	220	646	506	2,733	1,099	1,125	573	2,325	2,387	0	0	0	**14,411**
T7	1	315	6	25	74	58	314	126	129	66	267	274	0	0	0	**1,655**
UBUS	2	470	9	38	111	87	468	188	193	98	398	409	0	0	0	**2,469**
Total	**1,952**	**421,835**	**8,785**	**41,515**	**132,317**	**110,124**	**621,347**	**256,132**	**265,331**	**134,540**	**533,670**	**502,760**	**39**	**0**	**0**	**3,030,345**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	242	5	29	99	91	558	252	284	156	673	721	0	0	0	**3,109**
LDT1	0	18	0	2	7	7	41	19	21	12	50	53	0	0	0	**229**
LDT2	0	15	0	2	6	6	35	16	18	10	42	45	0	0	0	**194**
LHD1	13	3,846	104	623	2,399	2,330	14,772	6,598	7,100	3,601	13,751	0	0	0	0	**55,123**
LHD2	3	1,014	28	164	632	614	3,895	1,740	1,872	949	3,625	0	0	0	0	**14,534**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	27	1	3	11	10	62	28	31	17	75	80	0	0	0	**345**
MH	1	326	7	36	123	112	672	286	297	147	555	509	0	0	0	**3,070**
OBUS	5	1,224	27	137	491	465	2,912	1,207	1,322	650	2,409	1,914	0	0	0	**12,758**
SBUS	2	401	9	42	151	138	826	352	365	181	683	626	0	0	0	**3,774**
T6	67	16,176	360	1,699	6,098	5,561	33,338	14,213	14,750	7,302	27,562	25,255	2	0	0	**152,315**
T7	504	121,184	2,699	12,724	45,682	41,657	249,751	106,473	110,498	54,699	206,483	189,197	13	0	0	**1,141,060**
UBUS	4	1,310	36	212	817	793	5,030	2,247	2,418	1,226	4,682	4,283	0	0	0	**23,054**
Total	**602**	**145,781**	**3,277**	**15,673**	**56,516**	**51,783**	**311,893**	**133,429**	**138,974**	**68,950**	**260,590**	**222,682**	**15**	**0**	**0**	**1,410,166**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,440,511	4,028,432	4,028,432

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,617,524 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,160,396,260 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,366	0	**1,366**	5
5 - 10 MPH	1,135	1,327	0	**2,462**	5
10 - 15 MPH	221,214	285,555	607,302	**1,114,071**	10
15 - 20 MPH	7,474	11,060	11,684	**30,218**	15
20 - 25 MPH	32,708	54,673	93,209	**180,590**	20
25 - 30 MPH	133,595	176,901	384,380	**694,876**	25
30 - 35 MPH	148,062	234,312	292,694	**675,068**	30
35 - 40 MPH	872,186	1,130,091	2,277,181	**4,279,457**	35
40 - 45 MPH	390,043	475,949	1,045,557	**1,911,549**	40
45 - 50 MPH	331,803	437,218	1,287,712	**2,056,733**	45
50 - 55 MPH	179,455	253,500	610,201	**1,043,157**	50
55 - 60 MPH	796,504	947,045	2,239,998	**3,983,546**	55
60 - 65 MPH	763,583	948,563	1,932,032	**3,644,178**	60
65 - 70 MPH	43	56	152	**250**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,877,806**	**4,957,617**	**10,782,101**	**19,617,524**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3828	1114071	30218	180590	694876	675068	4279457	1911549	2056733	1043157	3983546	3644178	250	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1681	489183	13269	79296	305117	296419	1879089	839352	903102	458045	1749156	1600141	110	0	0
LDT1	249	72608	1969	11770	45287	43996	278907	124582	134044	67986	259621	237504	16	0	0
LDT2	622	180925	4907	29328	112848	109631	694983	310435	334013	169409	646927	591814	41	0	0
LHD1	102	29792	808	4829	18582	18052	114438	51117	55000	27895	106525	97450	7	0	0
LHD2	10	2975	81	482	1856	1803	11428	5105	5493	2786	10638	9732	1	0	0
MCY	26	7617	207	1235	4751	4615	29257	13069	14061	7132	27234	24914	2	0	0
MDV	638	185752	5038	30110	115859	112556	713526	318718	342925	173929	664188	607604	42	0	0
MH	6	1693	46	274	1056	1026	6501	2904	3125	1585	6052	5536	0	0	0
OBUS	4	1024	28	166	639	621	3934	1757	1891	959	3662	3350	0	0	0
SBUS	1	231	6	38	144	140	889	397	427	217	827	757	0	0	0
T6	11	3313	90	537	2066	2007	12725	5684	6116	3102	11846	10836	1	0	0
T7	1	380	10	62	237	231	1462	653	702	356	1360	1245	0	0	0
UBUS	2	568	15	92	354	344	2181	974	1048	532	2030	1857	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1305	35	212	814	791	5014	2240	2410	1222	4668	4270	0	0	0
LDT1	0	96	3	16	60	58	370	165	178	90	344	315	0	0	0
LDT2	0	82	2	13	51	49	313	140	150	76	291	267	0	0	0
LHD1	63	18206	494	2951	11356	11032	69936	31239	33612	17048	65100	59554	4	0	0
LHD2	16	4800	130	778	2994	2908	18437	8235	8861	4494	17162	15700	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	145	4	23	90	88	556	248	267	136	518	474	0	0	0
MH	1	366	10	59	228	222	1406	628	676	343	1309	1197	0	0	0
OBUS	4	1245	34	202	777	755	4783	2137	2299	1166	4452	4073	0	0	0
SBUS	2	455	12	74	284	276	1750	782	841	426	1629	1490	0	0	0
T6	65	18797	510	3047	11724	11390	72205	32253	34702	17601	67213	61487	4	0	0
T7	313	91113	2471	14769	56830	55209	349990	156333	168207	85313	325789	298034	20	0	0
UBUS	5	1399	38	227	873	848	5375	2401	2583	1310	5004	4577	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	454	97,461	2,048	9,741	31,209	26,064	147,393	60,826	63,042	31,952	126,570	124,534	10	0	0	**720,850**
LDT1	80	17,204	362	1,719	5,508	4,600	26,015	10,737	11,128	5,640	22,341	21,982	2	0	0	**127,238**
LDT2	261	55,943	1,176	5,591	17,910	14,958	84,593	34,914	36,185	18,340	72,646	71,478	5	0	0	**413,738**
LHD1	93	21,919	407	1,756	5,157	4,041	21,828	8,778	8,984	4,580	18,570	0	0	0	0	**96,018**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,189	41	175	515	404	2,180	877	897	457	1,854	0	0	0	0	**9,589**
MCY	3	667	15	80	276	248	1,498	658	720	384	1,597	1,650	0	0	0	**7,792**
MDV	351	75,341	1,583	7,529	24,119	20,144	113,922	47,020	48,731	24,698	97,834	96,262	7	0	0	**557,189**
MH	5	1,245	23	100	293	230	1,240	499	510	260	1,055	1,083	0	0	0	**6,538**
OBUS	3	753	14	60	177	139	750	302	309	157	638	655	0	0	0	**3,956**
SBUS	1	170	3	14	40	31	170	68	70	36	144	148	0	0	0	**894**
T6	10	2,437	45	195	573	449	2,427	976	999	509	2,065	2,119	0	0	0	**12,797**
T7	1	280	5	22	66	52	279	112	115	58	237	243	0	0	0	**1,470**
UBUS	2	418	8	33	98	77	416	167	171	87	354	363	0	0	0	**2,193**
Total	**1,274**	**276,029**	**5,730**	**27,015**	**85,940**	**71,435**	**402,710**	**165,934**	**171,862**	**87,159**	**345,906**	**320,517**	**25**	**0**	**0**	**1,961,534**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	144	3	17	59	54	333	150	169	93	401	429	0	0	0	**1,851**
LDT1	0	11	0	1	4	4	24	11	12	7	29	31	0	0	0	**135**
LDT2	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**131**
LHD1	12	3,415	93	554	2,130	2,069	13,117	5,859	6,304	3,197	12,210	0	0	0	0	**48,947**
LHD2	3	900	24	146	562	546	3,458	1,545	1,662	843	3,219	0	0	0	0	**12,905**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	18	0	2	8	7	42	19	21	12	51	55	0	0	0	**235**
MH	1	289	6	32	109	99	596	254	264	131	493	452	0	0	0	**2,726**
OBUS	5	1,087	24	122	436	413	2,586	1,072	1,174	577	2,139	1,699	0	0	0	**11,329**
SBUS	1	356	8	37	134	122	733	313	324	161	606	556	0	0	0	**3,351**
T6	60	14,364	320	1,508	5,415	4,938	29,603	12,620	13,097	6,484	24,474	22,426	2	0	0	**135,250**
T7	448	107,607	2,397	11,299	40,564	36,990	221,770	94,544	98,118	48,571	183,349	168,000	12	0	0	**1,013,219**
UBUS	4	1,163	32	188	725	705	4,467	1,995	2,147	1,089	4,158	3,804	0	0	0	**20,471**
Total	**534**	**129,364**	**2,908**	**13,907**	**50,150**	**45,950**	**276,754**	**118,392**	**123,305**	**61,170**	**231,158**	**197,481**	**13**	**0**	**0**	**1,251,085**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,212,619	2,914,488	2,914,488

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
*EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	691	1132.07	673.30	0.002%
Fresno	2035	LDA	DSL	5	2	503.98	303.82	0.000%
Fresno	2035	LDA	GAS	10	35639	834.33	496.22	0.094%
Fresno	2035	LDA	DSL	10	95	455.14	274.43	0.000%
Fresno	2035	LDA	GAS	15	21241	646.52	384.52	0.056%
Fresno	2035	LDA	DSL	15	57	381.70	230.24	0.000%
Fresno	2035	LDA	GAS	20	808501	514.42	305.95	2.136%
Fresno	2035	LDA	DSL	20	2157	332.22	200.46	0.006%
Fresno	2035	LDA	GAS	25	197185	428.34	254.76	0.521%
Fresno	2035	LDA	DSL	25	526	300.08	181.12	0.001%
Fresno	2035	LDA	GAS	30	537843	368.22	219.00	1.421%
Fresno	2035	LDA	DSL	30	1435	281.26	169.80	0.004%
Fresno	2035	LDA	GAS	35	1366088	328.48	195.36	3.608%
Fresno	2035	LDA	DSL	35	3645	273.56	165.16	0.010%
Fresno	2035	LDA	GAS	40	1943582	303.47	180.49	5.134%
Fresno	2035	LDA	DSL	40	5186	276.08	166.68	0.014%
Fresno	2035	LDA	GAS	45	1929012	292.33	173.86	5.095%
Fresno	2035	LDA	DSL	45	5148	289.12	174.53	0.014%
Fresno	2035	LDA	GAS	50	2232463	292.13	173.74	5.897%
Fresno	2035	LDA	DSL	50	5957	314.19	189.61	0.016%
Fresno	2035	LDA	GAS	55	1665080	303.03	180.23	4.398%
Fresno	2035	LDA	DSL	55	4443	354.31	213.75	0.012%
Fresno	2035	LDA	GAS	60	1897400	325.92	193.84	5.012%
Fresno	2035	LDA	DSL	60	5063	414.66	250.07	0.013%
Fresno	2035	LDA	GAS	65	2035032	363.78	216.36	5.375%
Fresno	2035	LDA	DSL	65	5430	503.66	303.63	0.014%
Fresno	2035	LDA	GAS	70	1953744	390.12	232.03	5.161%
Fresno	2035	LDA	DSL	70	5214	634.98	382.65	0.014%
Fresno	2035	LDT1	GAS	5	103	1314.77	800.57	0.000%
Fresno	2035	LDT1	DSL	5	0	504.83	301.83	0.000%
Fresno	2035	LDT1	GAS	10	5290	969.21	590.16	0.014%
Fresno	2035	LDT1	DSL	10	7	455.72	272.47	0.000%
Fresno	2035	LDT1	GAS	15	3153	750.85	457.20	0.008%
Fresno	2035	LDT1	DSL	15	4	381.89	228.33	0.000%
Fresno	2035	LDT1	GAS	20	120003	597.52	363.84	0.317%
Fresno	2035	LDT1	DSL	20	159	332.15	198.59	0.000%
Fresno	2035	LDT1	GAS	25	29268	497.46	302.91	0.077%
Fresno	2035	LDT1	DSL	25	39	299.83	179.27	0.000%
Fresno	2035	LDT1	GAS	30	79830	427.66	260.41	0.211%
Fresno	2035	LDT1	DSL	30	106	280.92	167.96	0.000%
Fresno	2035	LDT1	GAS	35	202764	381.53	232.32	0.536%
Fresno	2035	LDT1	DSL	35	269	273.18	163.33	0.001%
Fresno	2035	LDT1	GAS	40	288480	352.53	214.66	0.762%
Fresno	2035	LDT1	DSL	40	383	275.71	164.84	0.001%
Fresno	2035	LDT1	GAS	45	286317	339.57	206.77	0.756%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	380	288.82	172.68	0.001%
Fresno	2035	LDT1	GAS	50	331357	339.33	206.62	0.875%
Fresno	2035	LDT1	DSL	50	440	314.02	187.75	0.001%
Fresno	2035	LDT1	GAS	55	247142	351.99	214.33	0.653%
Fresno	2035	LDT1	DSL	55	328	354.35	211.86	0.001%
Fresno	2035	LDT1	GAS	60	281625	378.58	230.52	0.744%
Fresno	2035	LDT1	DSL	60	374	415.03	248.14	0.001%
Fresno	2035	LDT1	GAS	65	302053	422.57	257.31	0.798%
Fresno	2035	LDT1	DSL	65	401	504.51	301.64	0.001%
Fresno	2035	LDT1	GAS	70	289988	453.16	275.93	0.766%
Fresno	2035	LDT1	DSL	70	385	636.53	380.57	0.001%
Fresno	2035	LDT2	GAS	5	255	1537.71	1044.73	0.001%
Fresno	2035	LDT2	DSL	5	0	502.58	342.88	0.000%
Fresno	2035	LDT2	GAS	10	13181	1133.52	770.12	0.035%
Fresno	2035	LDT2	DSL	10	6	454.17	309.95	0.000%
Fresno	2035	LDT2	GAS	15	7856	878.17	596.63	0.021%
Fresno	2035	LDT2	DSL	15	4	381.38	260.45	0.000%
Fresno	2035	LDT2	GAS	20	299025	698.83	474.79	0.790%
Fresno	2035	LDT2	DSL	20	135	332.34	227.10	0.000%
Fresno	2035	LDT2	GAS	25	72929	581.82	395.29	0.193%
Fresno	2035	LDT2	DSL	25	33	300.48	205.43	0.000%
Fresno	2035	LDT2	GAS	30	198922	500.18	339.82	0.525%
Fresno	2035	LDT2	DSL	30	90	281.83	192.75	0.000%
Fresno	2035	LDT2	GAS	35	505249	446.22	303.16	1.335%
Fresno	2035	LDT2	DSL	35	228	274.20	187.55	0.001%
Fresno	2035	LDT2	GAS	40	718836	412.30	280.12	1.899%
Fresno	2035	LDT2	DSL	40	324	276.70	189.26	0.001%
Fresno	2035	LDT2	GAS	45	713447	397.14	269.82	1.885%
Fresno	2035	LDT2	DSL	45	321	289.62	198.04	0.001%
Fresno	2035	LDT2	GAS	50	825679	396.86	269.63	2.181%
Fresno	2035	LDT2	DSL	50	372	314.47	214.94	0.001%
Fresno	2035	LDT2	GAS	55	615832	411.66	279.69	1.627%
Fresno	2035	LDT2	DSL	55	277	354.23	241.98	0.001%
Fresno	2035	LDT2	GAS	60	701756	442.76	300.82	1.854%
Fresno	2035	LDT2	DSL	60	316	414.05	282.66	0.001%
Fresno	2035	LDT2	GAS	65	752659	494.22	335.77	1.988%
Fresno	2035	LDT2	DSL	65	339	502.27	342.66	0.001%
Fresno	2035	LDT2	GAS	70	722594	529.99	360.08	1.909%
Fresno	2035	LDT2	DSL	70	326	632.42	431.18	0.001%
Fresno	2035	LHD1	GAS	5	28731	2513.50	2262.15	0.076%
Fresno	2035	LHD1	DSL	5	10879	519.04	467.14	0.029%
Fresno	2035	LHD1	GAS	10	74918	2036.13	1832.52	0.198%
Fresno	2035	LHD1	DSL	10	36179	519.04	467.14	0.096%
Fresno	2035	LHD1	GAS	15	170598	1392.43	1253.19	0.451%
Fresno	2035	LHD1	DSL	15	78354	519.04	467.14	0.207%
Fresno	2035	LHD1	GAS	20	197125	1006.07	905.46	0.521%
Fresno	2035	LHD1	DSL	20	85901	519.04	467.14	0.227%
Fresno	2035	LHD1	GAS	25	151847	768.01	691.21	0.401%
Fresno	2035	LHD1	DSL	25	91937	519.04	467.14	0.243%
Fresno	2035	LHD1	GAS	30	134283	619.43	557.49	0.355%
Fresno	2035	LHD1	DSL	30	77607	519.04	467.14	0.205%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50177	527.85	475.06	0.133%
Fresno	2035	LHD1	DSL	35	40956	519.04	467.14	0.108%
Fresno	2035	LHD1	GAS	40	14811	475.23	427.71	0.039%
Fresno	2035	LHD1	DSL	40	22483	519.04	467.14	0.059%
Fresno	2035	LHD1	GAS	45	18234	452.06	406.85	0.048%
Fresno	2035	LHD1	DSL	45	24267	519.04	467.14	0.064%
Fresno	2035	LHD1	GAS	50	134634	454.32	408.89	0.356%
Fresno	2035	LHD1	DSL	50	93703	519.04	467.14	0.248%
Fresno	2035	LHD1	GAS	55	37031	482.42	434.17	0.098%
Fresno	2035	LHD1	DSL	55	56429	519.04	467.14	0.149%
Fresno	2035	LHD2	GAS	5	2869	2513.50	2262.15	0.008%
Fresno	2035	LHD2	DSL	5	2868	519.11	467.20	0.008%
Fresno	2035	LHD2	GAS	10	7482	2036.13	1832.52	0.020%
Fresno	2035	LHD2	DSL	10	9538	519.11	467.20	0.025%
Fresno	2035	LHD2	GAS	15	17037	1392.43	1253.19	0.045%
Fresno	2035	LHD2	DSL	15	20656	519.11	467.20	0.055%
Fresno	2035	LHD2	GAS	20	19686	1006.07	905.46	0.052%
Fresno	2035	LHD2	DSL	20	22646	519.11	467.20	0.060%
Fresno	2035	LHD2	GAS	25	15164	768.01	691.21	0.040%
Fresno	2035	LHD2	DSL	25	24237	519.11	467.20	0.064%
Fresno	2035	LHD2	GAS	30	13410	619.43	557.49	0.035%
Fresno	2035	LHD2	DSL	30	20459	519.11	467.20	0.054%
Fresno	2035	LHD2	GAS	35	5011	527.85	475.06	0.013%
Fresno	2035	LHD2	DSL	35	10797	519.11	467.20	0.029%
Fresno	2035	LHD2	GAS	40	1479	475.23	427.71	0.004%
Fresno	2035	LHD2	DSL	40	5927	519.11	467.20	0.016%
Fresno	2035	LHD2	GAS	45	1821	452.06	406.85	0.005%
Fresno	2035	LHD2	DSL	45	6397	519.11	467.20	0.017%
Fresno	2035	LHD2	GAS	50	13445	454.32	408.89	0.036%
Fresno	2035	LHD2	DSL	50	24702	519.11	467.20	0.065%
Fresno	2035	LHD2	GAS	55	3698	482.42	434.17	0.010%
Fresno	2035	LHD2	DSL	55	14876	519.11	467.20	0.039%
Fresno	2035	MCY	GAS	5	11	266.39	239.75	0.000%
Fresno	2035	MCY	GAS	10	555	242.30	218.07	0.001%
Fresno	2035	MCY	GAS	15	331	205.03	184.53	0.001%
Fresno	2035	MCY	GAS	20	12588	178.74	160.86	0.033%
Fresno	2035	MCY	GAS	25	3070	160.51	144.46	0.008%
Fresno	2035	MCY	GAS	30	8374	148.52	133.67	0.022%
Fresno	2035	MCY	GAS	35	21270	141.68	127.51	0.056%
Fresno	2035	MCY	GAS	40	30261	139.44	125.49	0.080%
Fresno	2035	MCY	GAS	45	30035	141.74	127.57	0.079%
Fresno	2035	MCY	GAS	50	34759	149.02	134.11	0.092%
Fresno	2035	MCY	GAS	55	25925	162.25	146.03	0.068%
Fresno	2035	MCY	GAS	60	29542	183.23	164.91	0.078%
Fresno	2035	MCY	GAS	65	31685	214.91	193.42	0.084%
Fresno	2035	MCY	GAS	70	30420	262.14	235.92	0.080%
Fresno	2035	MDV	GAS	5	262	1969.99	1370.34	0.001%
Fresno	2035	MDV	DSL	5	0	504.23	348.36	0.000%
Fresno	2035	MDV	GAS	10	13533	1452.25	1010.20	0.036%
Fresno	2035	MDV	DSL	10	11	455.31	314.59	0.000%
Fresno	2035	MDV	GAS	15	8066	1125.04	782.58	0.021%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6	381.76	263.81	0.000%
Fresno	2035	MDV	GAS	20	307003	895.32	622.79	0.811%
Fresno	2035	MDV	DSL	20	239	332.20	229.60	0.001%
Fresno	2035	MDV	GAS	25	74875	745.38	518.49	0.198%
Fresno	2035	MDV	DSL	25	58	300.00	207.37	0.000%
Fresno	2035	MDV	GAS	30	204229	640.79	445.74	0.539%
Fresno	2035	MDV	DSL	30	159	281.16	194.36	0.000%
Fresno	2035	MDV	GAS	35	518730	571.67	397.66	1.370%
Fresno	2035	MDV	DSL	35	404	273.45	189.04	0.001%
Fresno	2035	MDV	GAS	40	738016	528.23	367.44	1.949%
Fresno	2035	MDV	DSL	40	575	275.97	190.78	0.002%
Fresno	2035	MDV	GAS	45	732483	508.81	353.94	1.935%
Fresno	2035	MDV	DSL	45	571	289.03	199.80	0.002%
Fresno	2035	MDV	GAS	50	847709	508.45	353.68	2.239%
Fresno	2035	MDV	DSL	50	661	314.14	217.13	0.002%
Fresno	2035	MDV	GAS	55	632263	527.41	366.87	1.670%
Fresno	2035	MDV	DSL	55	493	354.32	244.87	0.001%
Fresno	2035	MDV	GAS	60	720479	567.26	394.59	1.903%
Fresno	2035	MDV	DSL	60	562	414.77	286.60	0.001%
Fresno	2035	MDV	GAS	65	772741	633.18	440.44	2.041%
Fresno	2035	MDV	DSL	65	602	503.92	348.14	0.002%
Fresno	2035	MDV	GAS	70	741874	679.00	472.32	1.960%
Fresno	2035	MDV	DSL	70	578	635.44	438.94	0.002%
Fresno	2035	MH	GAS	5	497	2513.50	2262.15	0.001%
Fresno	2035	MH	DSL	5	100	2409.45	2168.51	0.000%
Fresno	2035	MH	GAS	10	2500	2036.13	1832.52	0.007%
Fresno	2035	MH	DSL	10	498	2187.79	1969.01	0.001%
Fresno	2035	MH	GAS	15	3158	1392.43	1253.19	0.008%
Fresno	2035	MH	DSL	15	672	1796.36	1616.72	0.002%
Fresno	2035	MH	GAS	20	3276	1006.07	905.46	0.009%
Fresno	2035	MH	DSL	20	713	1474.12	1326.71	0.002%
Fresno	2035	MH	GAS	25	3650	768.01	691.21	0.010%
Fresno	2035	MH	DSL	25	742	1322.20	1189.98	0.002%
Fresno	2035	MH	GAS	30	4127	619.43	557.49	0.011%
Fresno	2035	MH	DSL	30	893	1241.08	1116.98	0.002%
Fresno	2035	MH	GAS	35	5129	527.85	475.06	0.014%
Fresno	2035	MH	DSL	35	1053	1173.76	1056.39	0.003%
Fresno	2035	MH	GAS	40	6385	475.23	427.71	0.017%
Fresno	2035	MH	DSL	40	1307	1120.25	1008.22	0.003%
Fresno	2035	MH	GAS	45	5823	452.06	406.85	0.015%
Fresno	2035	MH	DSL	45	1070	1080.53	972.47	0.003%
Fresno	2035	MH	GAS	50	5667	454.32	408.89	0.015%
Fresno	2035	MH	DSL	50	1197	1054.61	949.15	0.003%
Fresno	2035	MH	GAS	55	7412	482.42	434.17	0.020%
Fresno	2035	MH	DSL	55	1755	1042.49	938.24	0.005%
Fresno	2035	MH	GAS	60	8553	541.21	487.09	0.023%
Fresno	2035	MH	DSL	60	2109	1044.17	939.76	0.006%
Fresno	2035	MH	GAS	65	1337	641.50	577.35	0.004%
Fresno	2035	MH	DSL	65	332	1059.66	953.69	0.001%
Fresno	2035	OBUS	GAS	5	301	2513.50	2262.15	0.001%
Fresno	2035	OBUS	DSL	5	246	3000.85	2700.76	0.001%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1513	2036.13	1832.52	0.004%
Fresno	2035	OBUS	DSL	10	1134	2416.38	2174.74	0.003%
Fresno	2035	OBUS	GAS	15	1911	1392.43	1253.19	0.005%
Fresno	2035	OBUS	DSL	15	1492	1966.46	1769.81	0.004%
Fresno	2035	OBUS	GAS	20	1982	1006.07	905.46	0.005%
Fresno	2035	OBUS	DSL	20	1992	1667.58	1500.82	0.005%
Fresno	2035	OBUS	GAS	25	2209	768.01	691.21	0.006%
Fresno	2035	OBUS	DSL	25	2067	1554.30	1398.87	0.005%
Fresno	2035	OBUS	GAS	30	2497	619.43	557.49	0.007%
Fresno	2035	OBUS	DSL	30	2883	1513.47	1362.13	0.008%
Fresno	2035	OBUS	GAS	35	3104	527.85	475.06	0.008%
Fresno	2035	OBUS	DSL	35	4257	1496.24	1346.62	0.011%
Fresno	2035	OBUS	GAS	40	3864	475.23	427.71	0.010%
Fresno	2035	OBUS	DSL	40	4544	1388.02	1249.22	0.012%
Fresno	2035	OBUS	GAS	45	3523	452.06	406.85	0.009%
Fresno	2035	OBUS	DSL	45	5085	1412.70	1271.43	0.013%
Fresno	2035	OBUS	GAS	50	3429	454.32	408.89	0.009%
Fresno	2035	OBUS	DSL	50	5431	1369.39	1232.45	0.014%
Fresno	2035	OBUS	GAS	55	4485	482.42	434.17	0.012%
Fresno	2035	OBUS	DSL	55	7117	1329.59	1196.63	0.019%
Fresno	2035	OBUS	GAS	60	5175	541.21	487.09	0.014%
Fresno	2035	OBUS	DSL	60	4814	1154.53	1039.08	0.013%
Fresno	2035	OBUS	GAS	65	809	641.50	577.35	0.002%
Fresno	2035	OBUS	DSL	65	1253	1334.35	1200.91	0.003%
Fresno	2035	SBUS	GAS	5	78	2513.50	2262.15	0.000%
Fresno	2035	SBUS	DSL	5	153	2617.43	2355.69	0.000%
Fresno	2035	SBUS	GAS	10	273	2036.13	1832.52	0.001%
Fresno	2035	SBUS	DSL	10	537	2162.21	1945.98	0.001%
Fresno	2035	SBUS	GAS	15	546	1392.43	1253.19	0.001%
Fresno	2035	SBUS	DSL	15	1074	1775.36	1597.82	0.003%
Fresno	2035	SBUS	GAS	20	741	1006.07	905.46	0.002%
Fresno	2035	SBUS	DSL	20	1458	1400.58	1260.52	0.004%
Fresno	2035	SBUS	GAS	25	1169	768.01	691.21	0.003%
Fresno	2035	SBUS	DSL	25	2302	1306.77	1176.10	0.006%
Fresno	2035	SBUS	GAS	30	1403	619.43	557.49	0.004%
Fresno	2035	SBUS	DSL	30	2762	1226.60	1103.94	0.007%
Fresno	2035	SBUS	GAS	35	1440	527.85	475.06	0.004%
Fresno	2035	SBUS	DSL	35	2835	1160.07	1044.07	0.007%
Fresno	2035	SBUS	GAS	40	972	475.23	427.71	0.003%
Fresno	2035	SBUS	DSL	40	1913	1107.18	996.46	0.005%
Fresno	2035	SBUS	GAS	45	466	452.06	406.85	0.001%
Fresno	2035	SBUS	DSL	45	918	1067.93	961.14	0.002%
Fresno	2035	SBUS	GAS	50	234	454.32	408.89	0.001%
Fresno	2035	SBUS	DSL	50	460	1042.31	938.08	0.001%
Fresno	2035	SBUS	GAS	55	348	482.42	434.17	0.001%
Fresno	2035	SBUS	DSL	55	684	1030.34	927.31	0.002%
Fresno	2035	SBUS	GAS	60	193	541.21	487.09	0.001%
Fresno	2035	SBUS	DSL	60	381	1032.00	928.80	0.001%
Fresno	2035	T6	GAS	5	974	2513.50	2262.15	0.003%
Fresno	2035	T6	DSL	5	5138	2559.93	2303.94	0.014%
Fresno	2035	T6	GAS	10	4894	2036.13	1832.52	0.013%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25573	2114.70	1903.23	0.068%
Fresno	2035	T6	GAS	15	6182	1392.43	1253.19	0.016%
Fresno	2035	T6	DSL	15	34514	1736.36	1562.72	0.091%
Fresno	2035	T6	GAS	20	6412	1006.07	905.46	0.017%
Fresno	2035	T6	DSL	20	36603	1369.81	1232.83	0.097%
Fresno	2035	T6	GAS	25	7145	768.01	691.21	0.019%
Fresno	2035	T6	DSL	25	38121	1278.07	1150.26	0.101%
Fresno	2035	T6	GAS	30	8078	619.43	557.49	0.021%
Fresno	2035	T6	DSL	30	45837	1199.66	1079.69	0.121%
Fresno	2035	T6	GAS	35	10040	527.85	475.06	0.027%
Fresno	2035	T6	DSL	35	54048	1134.59	1021.13	0.143%
Fresno	2035	T6	GAS	40	12498	475.23	427.71	0.033%
Fresno	2035	T6	DSL	40	67093	1082.86	974.57	0.177%
Fresno	2035	T6	GAS	45	11398	452.06	406.85	0.030%
Fresno	2035	T6	DSL	45	54940	1044.47	940.02	0.145%
Fresno	2035	T6	GAS	50	11092	454.32	408.89	0.029%
Fresno	2035	T6	DSL	50	61487	1019.42	917.48	0.162%
Fresno	2035	T6	GAS	55	14508	482.42	434.17	0.038%
Fresno	2035	T6	DSL	55	90103	1007.70	906.93	0.238%
Fresno	2035	T6	GAS	60	16741	541.21	487.09	0.044%
Fresno	2035	T6	DSL	60	108274	1009.33	908.40	0.286%
Fresno	2035	T6	GAS	65	2616	641.50	577.35	0.007%
Fresno	2035	T6	DSL	65	17039	1024.30	921.87	0.045%
Fresno	2035	T7	GAS	5	47	2513.50	2262.15	0.000%
Fresno	2035	T7	DSL	5	11173	3956.49	3560.84	0.030%
Fresno	2035	T7	GAS	10	230	2036.13	1832.52	0.001%
Fresno	2035	T7	DSL	10	42683	3268.37	2941.53	0.113%
Fresno	2035	T7	GAS	15	251	1392.43	1253.19	0.001%
Fresno	2035	T7	DSL	15	52201	2683.61	2415.25	0.138%
Fresno	2035	T7	GAS	20	429	1006.07	905.46	0.001%
Fresno	2035	T7	DSL	20	128970	2117.10	1905.39	0.341%
Fresno	2035	T7	GAS	25	560	768.01	691.21	0.001%
Fresno	2035	T7	DSL	25	117904	1975.31	1777.78	0.311%
Fresno	2035	T7	GAS	30	1023	619.43	557.49	0.003%
Fresno	2035	T7	DSL	30	199056	1854.12	1668.71	0.526%
Fresno	2035	T7	GAS	35	1819	527.85	475.06	0.005%
Fresno	2035	T7	DSL	35	358106	1753.56	1578.20	0.946%
Fresno	2035	T7	GAS	40	1585	475.23	427.71	0.004%
Fresno	2035	T7	DSL	40	337948	1673.61	1506.25	0.893%
Fresno	2035	T7	GAS	45	1678	452.06	406.85	0.004%
Fresno	2035	T7	DSL	45	473149	1614.27	1452.85	1.250%
Fresno	2035	T7	GAS	50	1755	454.32	408.89	0.005%
Fresno	2035	T7	DSL	50	492063	1575.55	1418.00	1.300%
Fresno	2035	T7	GAS	55	2576	482.42	434.17	0.007%
Fresno	2035	T7	DSL	55	600041	1557.45	1401.71	1.585%
Fresno	2035	T7	GAS	60	636	541.21	487.09	0.002%
Fresno	2035	T7	DSL	60	182794	1559.97	1403.97	0.483%
Fresno	2035	T7	GAS	65	341	641.50	577.35	0.001%
Fresno	2035	T7	DSL	65	100120	1583.10	1424.79	0.264%
Fresno	2035	UBUS	GAS	5	191	2513.50	2262.15	0.001%
Fresno	2035	UBUS	DSL	5	471	2299.61	2069.65	0.001%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686	2036.13	1832.52	0.002%
Fresno	2035	UBUS	DSL	10	1691	2299.61	2069.65	0.004%
Fresno	2035	UBUS	GAS	15	1372	1392.43	1253.19	0.004%
Fresno	2035	UBUS	DSL	15	3383	2299.61	2069.65	0.009%
Fresno	2035	UBUS	GAS	20	1811	1006.07	905.46	0.005%
Fresno	2035	UBUS	DSL	20	4464	2299.61	2069.65	0.012%
Fresno	2035	UBUS	GAS	25	2727	768.01	691.21	0.007%
Fresno	2035	UBUS	DSL	25	6723	2299.61	2069.65	0.018%
Fresno	2035	UBUS	GAS	30	3414	619.43	557.49	0.009%
Fresno	2035	UBUS	DSL	30	8415	2299.61	2069.65	0.022%
Fresno	2035	UBUS	GAS	35	3345	527.85	475.06	0.009%
Fresno	2035	UBUS	DSL	35	8247	2299.61	2069.65	0.022%
Fresno	2035	UBUS	GAS	40	2412	475.23	427.71	0.006%
Fresno	2035	UBUS	DSL	40	5945	2299.61	2069.65	0.016%
Fresno	2035	UBUS	GAS	45	1051	452.06	406.85	0.003%
Fresno	2035	UBUS	DSL	45	2592	2299.61	2069.65	0.007%
Fresno	2035	UBUS	GAS	50	534	454.32	408.89	0.001%
Fresno	2035	UBUS	DSL	50	1317	2299.61	2069.65	0.003%
Fresno	2035	UBUS	GAS	55	662	482.42	434.17	0.002%
Fresno	2035	UBUS	DSL	55	1632	2299.61	2069.65	0.004%
Fresno	2035	UBUS	GAS	60	1084	541.21	487.09	0.003%
Fresno	2035	UBUS	DSL	60	2672	2299.61	2069.65	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,531,700,000	2,610	367097	39.2	13.9	337,694
Commercial	2,950,179,600	7,503	427776	45.7	16.2	393,513
Industrial	0		0	0.0	0.0	0
Total	**5,481,879,600**		**794,873**	**85.0**	**30.2**	**731,206**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	133,860,000	138	783,081	73.6	1.5	712,228
Commercial	158,459,600	403	926,989	87.2	1.7	843,115
Industrial	0		0	0.0	0.0	0
Total	**292,319,600**		**1,710,070**	**160.8**	**3.2**	**1,555,342**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population in 2035

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2056
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	970,000
	Emissions (MTCO2e per person)	863,300
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

F.2 - Greenhouse Gas Reduction Plan

DRAFT
Fresno General Plan Update
Greenhouse Gas Reduction Plan
City of Fresno, California

Prepared for:
City of Fresno
Development and Resources Management Department
2600 Fresno Street
Fresno, CA 93721

Contact: Jennifer Clark

Prepared by:
FirstCarbon Solutions | Michael Brandman Associates
7265 N. First Street, Suite 101
Fresno, CA 93721
559.246.3732

Contact: Dave Mitchell, Air Quality Services Manager

July 2014

Table of Contents

Section 1: Introduction 1
1.1 - Purpose 1
1.2 - Relationship to the General Plan Update 1
1.3 - Organization and Plan Content 2
1.4 - Building on Prior Actions 3
1.4.1 - Fresno Green 2007 Sustainability Strategy 3
1.4.2 - Zero Waste Strategic Action Plan 3
1.4.3 - City of Fresno Urban Water Management Plan 4
1.4.4 - Water Efficient Landscape Standards 4
1.4.5 - General Plan Air Quality Update 2009 4
1.5 - CEQA Tiering and Streamlining Analysis of Greenhouse Gas Emissions 4
1.6 - How Does the Plan Reduce Greenhouse Gas Emissions? 5
1.7 - Relationship to State and Federal Actions to Reduce Greenhouse Gas Emissions 6
1.8 - Community Reduction Targets 6
1.9 - Challenges and Opportunities 8

Section 2: Background Information 11
2.1 - City of Fresno Background 11
2.1.1 - Location and Constraints to Growth 11
2.1.2 - Transportation Facilities 11
2.1.3 - General Plan Footprint and Buildout Statistics 12
2.2 - Climate Change Background 13
2.2.1 - Global Warming Potential 14
2.2.2 - Global Climate Change Trends 15
2.2.3 - Greenhouse Gas Emission Inventories 16
2.3 - Effects of Climate Change on Fresno 17
2.3.1 - Wildfire 18
2.3.2 - Water 18
2.4 - Federal, State, and Regional Actions to Address Climate Change 20
2.4.1 - United States Environmental Protection Agency 20
2.4.2 - State of California 21
2.4.3 - Fresno County Council of Governments 22
2.4.4 - San Joaquin Valley Air Pollution Control District 24

Section 3: Emission Inventory 27
3.1 - Inventory Methods and Assumptions 27
3.1.1 - Inventory Protocols 27
3.1.2 - Emission Inventory Source Categories 27
3.2 - Inventory Selection Criteria 28
3.3 - Baseline Inventory 29
3.4 - Inventory Projections 29
3.4.1 - BAU Inventory 29

Section 4: Reductions from State Regulations 33
4.1 - Motor Vehicles 33
4.2 - Electricity 34
4.2.1 - Renewable Portfolio Standard 34
4.2.2 - Title 24 Building Energy Efficiency Standards. 34

4.2.3 - California's Green Building Code 34
4.3 - Natural Gas 36
4.4 - Refrigerants 36
4.5 - Reductions from State Regulations 36
4.5.1 - Adjusted Business as Usual 37
4.5.3 - Post 2020 Targets 38

Section 5: Fresno's Greenhouse Gas Reduction Strategy 41
5.1 - GHG Plan Reduction Strategy 41
5.1.1 - Land Use Strategies 42
5.2 - Reduction Potential from Local Measures 65
5.2.1 - Mobile Source Reductions 66
5.2.2 - Energy Efficiency Reductions 66
5.2.3 - Indoor Water Conservation Measures 67
5.2.4 - Energy Savings from Water Conservation 68
5.2.5 - Waste Diversion and Recycling Reductions 68
5.2.6 - Summary of Reductions from Local Measures 68

Section 6: Development Project Requirements 71
6.1 - Projects Exempt from CEQA 71
6.2 - Projects Requiring a Discretionary Approval 71
6.2.1 - New Discretionary Development requiring a General Plan Amendment 72
6.2.2 - Projects within Downtown Plan, BRT Station Area, SCS Plan Area 72

Section 7: GHG Plan Implementation Monitoring 73
7.1 - Key Indicators 73
7.1.1 - Tracking and Monitoring of Performance Indicators 74

Section 8: Glossary of Terms and Acronyms 77

Section 9: References 79

Appendix A: General Plan Policy List

Appendix B: Greenhouse Gas Emission Reductions and Modeling Results

List of Tables

Table 1: General Plan Update Statistics 12
Table 2: General Plan Buildout Statistics 13
Table 3: Global Warming Potentials 15
Table 4: United States, California, and World GHG Emission Inventory (CO_2e) 17
Table 5: Inventory Emission Sources 28
Table 6: City of Fresno Baseline and Business as Usual Emissions Projections 29
Table 7: Reductions from Statewide Measures 36
Table 8: City of Fresno Adjusted Business as Usual Emissions 37

Table 9: City of Fresno 2020 BAU and Adjusted BAU Emissions Inventory 38
Table 10: City of Fresno 2035 and 2050 Interim Target Emissions Inventories 39
Table 11: General Plan Chapter Cross Reference 41
Table 12: Strategies for Existing Development 64
Table 13: Reductions from Local Measures 69
Table 14: GHG Plan Performance Indicators 74
Table 15: General Plan Policies 82

List of Figures

Figure 1: California GHG Emission Reductions to Achieve 2050 Target 7
Figure 2: Factors Affecting the Earth's Temperature 14
Figure 3: Global Atmospheric Concentration of CO_2 15
Figure 4: Carbon Dioxide Concentrations 1960 to 2013 16
Figure 5: Increases in Global Carbon Dioxide Emissions 1900 to 2008 17
Figure 6: 1997 San Joaquin River Flood 20
Figure 7: Fresno County Blueprint Preferred Scenario 24
Figure 8: City of Fresno Baseline and Business s Usual Emissions Projections 30
Figure 9: Reductions Required for 2035 and 2050 Target 40
Figure 10: City of Fresno Growth Areas and Proposed BRT Corridors 46

SECTION 1: INTRODUCTION

1.1 - Purpose

The City of Fresno (City) has prepared a Greenhouse Gas Reduction Plan (GHG Plan) as its primary strategy for reducing emissions that scientific consensus has concluded are responsible for human-induced climate change. The GHG Plan focuses on emissions generated by activities under the control or influence of the City. The GHG Plan is designed to ensure that the development accommodated by the buildout of the General Plan supports the goals of Assembly Bill (AB) 32—the Global Warming Solutions Act of 2006. AB 32 requires California to reduce statewide greenhouse gas emissions to 1990 levels by the year 2020. This GHG Plan would reduce community-related and City operations-related greenhouse gas emissions to a degree that would not hinder or delay implementation of AB 32. Although the State has not adopted a comprehensive target and strategy for achieving targets beyond 2020, other general targets for later years have been discussed. The Fresno Green Sustainability Strategy also includes a commitment to meet the 2020 AB 32 goal and to meet a reduction of 80 percent below 1990 levels by 2050 stated in Executive Order S-03-05.

The California Air Resources Board (ARB) adopted the State's strategy for achieving AB 32 targets in its Climate Change Scoping Plan (Scoping Plan) in 2008. The Scoping Plan greenhouse gas reduction goal is to reduce statewide emissions to 1990 levels by 2020. This would require a 21.7 percent reduction from business as usual (BAU) emissions predicted for 2020. Local governments that achieve reductions greater than or equal to reductions from sources under their control or influence would be supportive of the State's efforts. The Greenhouse Gas Reduction Plan (GHG Plan) includes strategies that will achieve this target. The strategy will continue to provide reductions past 2020 and includes "interim" targets for 2035 and 2050 that show the amount of reductions that would be required to be on a path to achieve the State's long-term goal of reducing emissions to 80 percent below 1990 levels by 2050. The GHG Plan includes projections that show the amount of emission reduction that will be required to achieve consistency with percentage reductions meets targets in later years, but the GHG Plan does not include a comprehensive strategy to achieve the later targets pending adoption of a statewide strategy for those later years.

1.2 - Relationship to the General Plan Update

The General Plan Update provides a clear mandate for action on greenhouse gas emissions with greenhouse gas policies and an implementation measure for the City to prepare a Climate Action

Plan as part of the General Plan Update and Master Environmental Impact Report (MEIR). The measure envisioned that the Climate Action Plan, referred here as the Greenhouse Gas Reduction Plan (GHG Plan) would be concurrently approved with the General Plan Update. The GHG Plan may also be adopted as follow-on action addressed in the MEIR. The intent of the GHG Plan is to achieve compliance with state mandates by focusing on feasible actions the City can take to minimize the adverse impacts of growth and development on climate change and air quality. The GHG Plan includes all required elements to meet this criterion.

1.3 - Organization and Plan Content

The Greenhouse Gas Reduction Plan includes the following four main sections:

- A Background section that describes the environmental and regulatory setting for greenhouse gases
- An Emission Inventory section that accounts for the sources of emissions applicable to the City
- A Strategy Section that details the strategies that will be used to reduce greenhouse gas emissions
- An Implementation and Monitoring section that details how the strategies will be implemented and tracked over time.

The General Plan Resource Conservation Element includes Policy RC-5-b, which outlines the content of the plan that will achieve this objective:

- A baseline inventory of all known or reasonably discoverable sources of greenhouse gases (GHGs) that currently exist in the city and sources that existed in 1990 (Updated to 2010).
- A projected inventory of the GHGs that can reasonably be expected to be emitted in the city in the year 2035 in accordance with discretionary land use decisions pursuant to this General Plan update and foreseeable communitywide and municipal operations.
- A target for the reduction of emissions from those identified sources.
- A list of feasible GHG reduction measures whose purpose shall be to meet the established local reduction target, including energy conservation and “green building” requirements in municipal buildings and private development.
- Periodically update municipal and community-wide GHG emissions inventories to determine the efficacy of adopted measures and to guide future policy formulation needed to achieve and maintain GHG emissions reduction targets.

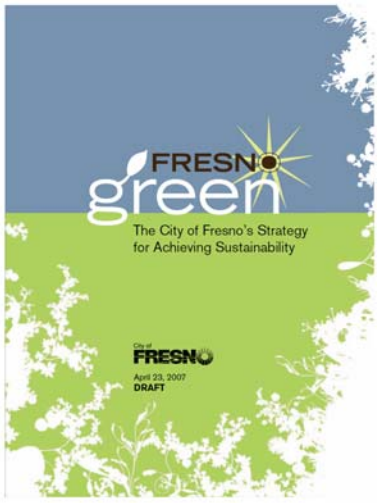
1.4 - Building on Prior Actions

1.4.1 - Fresno Green 2007 Sustainability Strategy

The City of Fresno has taken several important steps to improves the City's sustainability and reduce impacts that include greenhouse gas emissions. The Sustainability Strategy includes Green Visions, described below.

New City Beautiful

Fresno will be nationally recognized for the innovative integration of buildings within their neighborhood context; good urban design; and giving priority to public health, open spaces, public art, historic preservation, urban forests, and the protection of natural habitats.



Sierra View 2025

The Sierra Nevada mountain range will be clearly visible to all Valley residents by 2025. Public health will be improved by having cleaner air, enhanced public transportation, and additional opportunities for walking and cycling.

Solar Valley

Fresno will become a leader in renewable energy use by maximizing new renewable sources as well as increasing the efficiency of its existing uses. Fresno will lead the State in the creation of related innovative technology and new business enterprises. With its abundant sunshine and population growth, the opportunity exists to improve air quality, reduce dependence on foreign energy, and provide attractive new jobs by harnessing solar and other types of renewable energy.

Green Enterprises and Economic Development

The City of Fresno will become a center for innovative business enterprises that focus on the "triple bottom line" of providing environmental, economic, and social benefits.

City as Good Steward

The City of Fresno will lead by example by greening up its facilities and practices, embracing a zero waste initiative, providing appropriate staff resources, and collaborating with other municipalities and agencies to develop regionally based Green programs.

1.4.2 - Zero Waste Strategic Action Plan

The City of Fresno Zero Waste Strategic Action Plan, approved February 11, 2008, aims to achieve 75 percent diversion by 2012 and zero waste status by 2025. Zero Waste is a philosophy and a design principle for the 21st Century that includes recycling but goes beyond recycling by taking a "whole system" approach to the vast flow of resources throughout society. It is a goal and guide for people to emulate sustainable natural cycles, where all discarded materials are resources for others to use.

1.4.3 - City of Fresno Urban Water Management Plan

The Water Conservation Act of 2009 (Senate Bill [SB]x7-7), which was enacted in November 2009. SBx7-7 requires urban retail water suppliers, such as the City of Fresno, to develop per capita water use targets to be met by 2015 and 2020. The overall statewide objective of SBx7-7 is to reduce per capita water use by 20 percent by the year 2020. The 2010 Urban Water Management Plan (UWMP) was adopted by the Fresno City Council on November 29, 2012 to meet this requirement. The UWMP contains water conservation best management practices (BMP) to achieve the required reductions in water use.

1.4.4 - Water Efficient Landscape Standards

The City has adopted water conserving landscape requirements that are specified in the City Municipal Code (Section 6-522. Water Efficient Landscape Standards). These requirements define standards and procedures for the design, installation, and management of landscapes in order to utilize available plant, water, land, and human resources to the greatest benefit of the people of the City.

1.4.5 - General Plan Air Quality Update 2009

The Air Quality Update satisfied the requirements of AB 170 that mandated cities and counties of the San Joaquin Valley to address air quality in their General Plans. Many of the goals, policies, and implementation measures that reduce air pollutant emissions also reduce greenhouse gases. In addition, the Air Quality Update included greenhouse gas specific policies that are carried forward into the General Plan Update and form the basis of the strategy defined in the Greenhouse Gas Plan.

1.5 - CEQA Tiering and Streamlining Analysis of Greenhouse Gas Emissions

New development that will occur with the buildout of the General Plan must address greenhouse gas impacts to comply with the California Environmental Quality Act (CEQA). The legislature has adopted tiering and streamlining provisions in SB 97 that encourage cities to adopt greenhouse gas reduction plans as a mechanism to assist with project CEQA compliance. The greenhouse gas reduction plans and CAPs must meet the following criteria in order to use CEQA tiering and streamlining provisions.

A. Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;

B. Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;

C. Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;

D. Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;

E. Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;

F. Be adopted in a public process following environmental review.

The GHG Plan is structured to meet the streamlining criteria listed above. Compliance with the applicable General Plan policies and GHG Plan strategies would result in less than significant impacts related to greenhouse gas emissions.

1.6 - How Does the Plan Reduce Greenhouse Gas Emissions?

The largest source of greenhouse gases is the combustion of carbon containing fuels producing carbon dioxide (CO_2). Although there are many other greenhouse gases, the Plan emphasizes actions under the City's control or influence that can reduce CO_2 emissions. Other greenhouse gases such as methane (CH_4), nitric oxide (N_2O) and refrigerants such as hydrofluorocarbons (HFCs) are addressed in the plan, but have fewer sources and fewer control opportunities at the City level.

There are only a few ways to reduce GHG emissions:

- Improve the efficiency of the device using the fuel or power so it achieves the same amount of work using less fuel (e.g. improve aerodynamics in cars and trucks/low friction oils).
- Move to low carbon power generation with zero or low GHG facilities such as solar, wind, biofuels.
- Improve the efficiency of the combustion process to obtain more energy from the fuel being burned (e.g. high efficiency burners, better fuels).
- Conservation programs to reduce water use (reduced energy for water pumping and transport).
- Sequestration in urban forests (storing greenhouse gases).
- Reduce municipal waste to reduce emissions from transport and decomposition (e.g. recycling, reuse, diversion).

The Air Quality Update of the 2025 Fresno General Plan Resource Conservation Element states that greenhouse gas control efforts focus on these multiple aspects of emissions, attempting an integrated, broad-based strategy for "sustainability" to incorporate:

- Heightened energy efficiency incorporated into all aspects of structural design and operations, as appropriate to local climate
- Rehabilitation and renovation of existing structures, incorporating and upgrading energy efficiency measures
- Reduction in vehicle-related emissions
- Utilization of renewable and non-polluting sources of energy

- Incorporation of recycled and renewable materials in construction
- Reduction in use and generation of toxic materials that require special handling and disposal
- Increasing landscaping in ways appropriate to local climate
- Water conservation and water recycling

The GHG Plan provides a comprehensive approach utilizing the available strategies listed above to achieve emission reductions sufficient to demonstrate consistency with State of California targets. The GHG Plan does not reinvent the wheel. It builds on the General Plan policies and implementation measures. Where needed, the GHG Plan provides more details to clarify and focus action and to ensure implementation.

1.7 - Relationship to State and Federal Actions to Reduce Greenhouse Gas Emissions

Efforts by cities to reduce greenhouse gases are an important part of larger effort implemented by the State of California and to a lesser degree the federal government. Limited action has taken place on the federal level to reduce greenhouse gas emissions, making State of California actions the most important to the City. In absence of federal action, California has implemented an ambitious control strategy to reduce greenhouse gas emissions. The State recognized that the magnitude of the challenge of reducing greenhouse gases to the extent needed to prevent catastrophic effects of climate change is such that reductions throughout the economy, including those at the local level, are required. Climate change is a global problem that will take unprecedented cooperation and action at international, national, state, and local levels. California has chosen to be a leader in this effort and a model for others to follow.

1.8 - Community Reduction Targets

The development anticipated for the City of Fresno creates challenges and opportunities for reducing greenhouse gas emissions sufficiently to ensure that growth will not hinder or obstruct the implementation of AB 32 and achievement California targets. Areas with relatively high rates of growth such as Fresno will produce a larger share of greenhouse gas emissions in the future compared with slow-growing and built-out parts of the State. However, new development presents opportunities, with its ability to incorporate the latest technologies into buildings to reduce energy use and its ability to build complete neighborhoods and commercial areas in ways that reduce vehicle travel.

2020 Reduction Target

The ARB in its Status Report on compliance with AB 32 indicates that a 21.7 percent reduction from BAU emissions in 2020 will be required to meet the AB 32 2020 target of achieving 1990 rates. If per capita emission rates in Fresno decline by at least 21.7 percent compared with BAU emissions in 2020, the City would be supporting the State's ability to meet its 2020 target. Reductions will be achieved by existing development and new projects. Residents of new development projects will achieve lower per capita rates than residents of existing development. This is because of greater

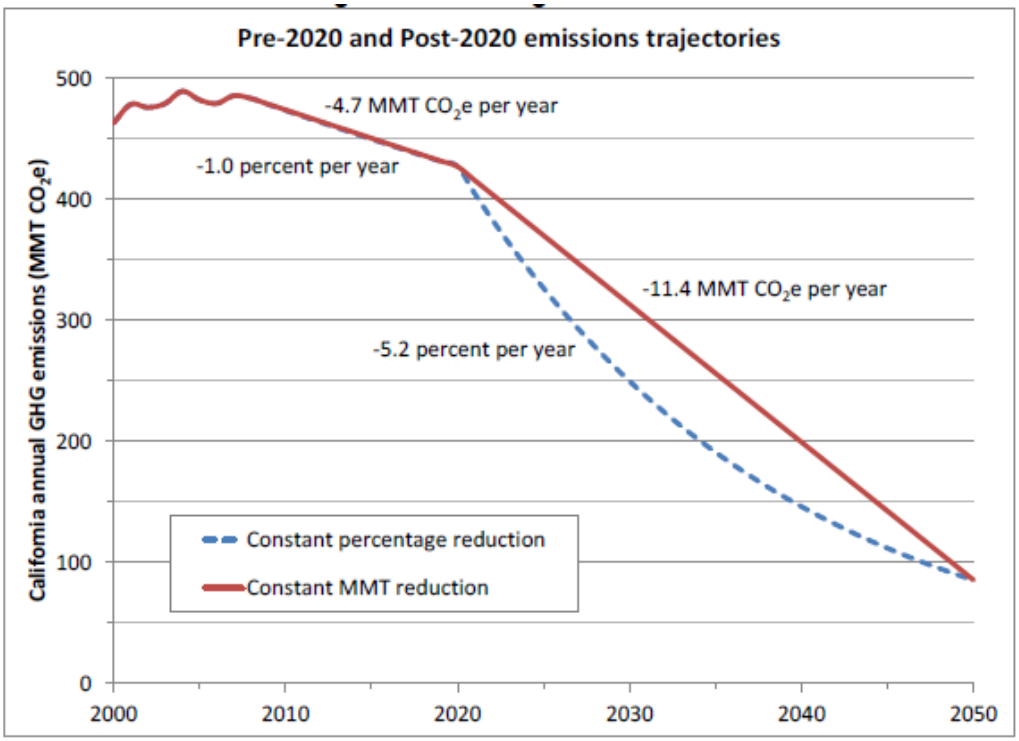
energy efficiency in new structures and lower motor vehicle travel resulting from the project designs and higher development densities anticipated from General Plan implementation. The target is based on per capita emissions from all city residents. It should be noted that the State also reports reduction goals in terms of both total emissions and per capita emissions for all of California.

Targets After 2020

The State has not adopted comprehensive targets or a new Scoping Plan to address emissions after 2020. The GHG Plan includes interim targets for later years (2035 and 2050) pending new legislation that sets later targets similar to AB 32 or adoption of a Scoping Plan Update that addresses these years. Targets after 2020 show the trajectory required to reduce per capita emissions to 80 percent below 1990 by 2050; however, once the State adopts targets for later years, new community targets that match the new state target years will be needed to ensure consistency.

The ARB released the Proposed First Update to the Climate Change Scoping Plan on February 10, 2014 (ARB 2014). The draft update discusses the need for a mid-term target between 2020 and 2050 to provide a continuum of action to reduce cumulative emissions. As shown in Figure 1, the State would need to reduce emissions after 2020 at a rate of 5.2 percent per year to reach emission levels 80 percent below 1990 by 2050. The Update states that the United States, in support of the Copenhagen Accord, pledged emission reduction of 42 percent below 2005 levels in 2030, which in California translates to 35 percent below 1990 levels. Although the State has not officially adopted this target, this amount or a similar amount of reduction is likely for the mid-term 2030 target.

Figure 1: California GHG Emission Reductions to Achieve 2050 Target



The Scoping Plan Update describes a post-2020 strategy that focuses on six key areas of the State's economy—energy, transportation, agriculture, water, waste management, and natural and working lands—along with short-lived climate pollutants, green buildings, and the Cap-and-Trade Program.

At the growth rates projected for General Plan buildout, the City could continue to grow through 2050 without designating additional land for development. The General Plan Update and the GHG Plan help ensure that the City of Fresno will do its part of reducing greenhouse gas emissions for the short-term (2020) and the long term (2050).

1.9 - Challenges and Opportunities

Greenhouse gas emissions are the ultimate cumulative effect. Global warming and climate change are the result of emissions from every source on the globe that combine to increase greenhouse gas concentrations in the atmosphere. Scientific evidence supports the need for drastic worldwide reductions to prevent catastrophic climate change. A commonly stated amount needed to stabilize the climate is an 80 percent reduction in global GHG emissions from 1990 levels by 2050. This leads to the following questions:

- What is California's responsibility for reducing emissions?
- What is local government's responsibility for reducing emissions?
- What is an individual development project's responsibility for reducing emissions?
- What is each person's responsibility for reducing emissions?

The government structure in the United States with its checks and balances limits the power of the states to take action to reduce greenhouse gases. For example, states are not allowed to interfere with interstate and international commerce; however, powers that are not vested in the federal government are reserved for the states. Individual rights for people to live how and where they want are also highly prized. This structure creates challenges for reducing greenhouse gas emissions that touch every sector of the economy and that are greatly influenced by individual choices and actions. With uneven action among the states and nations, the potential exists for regulations to cause businesses simply to relocate their emissions to nations, states, or cities with weak or no regulations. Fortunately, many actions that reduce GHG emissions produce multiple benefits that offset the cost of implementation. However, it must be recognized that individuals or organizations implementing the action may not directly benefit from cost savings or may have difficulty with initial capital costs.

A thorough discussion of regulatory authority for greenhouse gas emissions is provided in Section 2. In short, the State has broad authority to regulate GHG emission sources. It has authority to regulate greenhouse gases from motor vehicles, power generation, and industrial processes, and sets efficiency standards for buildings, lighting, appliances, water use, and waste management/recycling. On the other hand, local government's role is mostly a supportive one. Local government is called upon to support state programs and to use its land use authority and police power to reduce GHG impacts. For example, local government is authorized by the State to adopt ordinances that exceed energy standards for buildings and exceed water conservation and recycling mandates. Through the development review process and CEQA, local government can require or encourage project designs

that produce fewer vehicle trips and miles traveled and included mitigation measures with which projects must comply as conditions of approval.

Individual choice plays an important role in reducing GHG emissions. The State can mandate increasing numbers of electric vehicles (EVs) to be sold in California to meet emission standards, but it cannot force people to buy them. It can mandate energy efficient appliances and buildings but cannot make people turn out the lights and turn down the thermostat to save energy. It cannot prevent people from buying more and bigger televisions. However, the State and the City can provide incentives and disincentives that affect choice to align with the goal of reducing GHG emissions.

SECTION 2: BACKGROUND INFORMATION

Greenhouse gas emissions and climate change are complex topics that are the topics of hundreds of books, research papers, and policy documents. This section of the GHG Plan provides a brief overview of climate change and the local factors that affect GHG emission growth. The following information provides a discussion in a City of Fresno context.

2.1 - City of Fresno Background

The Greenhouse Gas Reduction Plan uses population, employment, and housing statistics as the basis for estimating current and future year emissions and reduction targets. The data are consistent with the assumptions used for the General Plan Update to the extent possible.

2.1.1 - Location and Constraints to Growth

The City of Fresno is located in Fresno County, which is generally located in the center of the San Joaquin Valley, the most productive agricultural region in the nation and the world. Fresno's central location in California between San Francisco (184 miles) to the north and Los Angeles (222 miles) to the southwest has made it an important regional center.

There are no significant physical barriers to Fresno's future growth; however, political boundaries and policy considerations are very important in shaping future growth. The San Joaquin River and the Fresno/Madera County line run along the northern edge of the city. The City of Clovis abuts Fresno to the northeast and east, preventing growth in that direction. The land southeast, south and west are mostly prime farmland. The southeast area is a long-term growth area in the General Plan Update. The City has limited development planned south and west of Fresno with no expansion of the sphere of influence planned in the General Plan Update in those directions.

2.1.2 - Transportation Facilities

The City of Fresno is crossed by two important state highways used for regional travel and commerce. State Route 99 (SR-99) runs northwest/southeast through the City, connecting Fresno to northern and southern California. SR-41 connects Fresno to the Central Coast and is a main route to Yosemite National Park. SR-41 also acts as a primary commuter facility between northern and southern parts of Fresno. SR-168 runs north/east to Clovis acting as a commute facility and beyond to the Sierra Nevada. SR-168 intersects with SR-180, which runs east/west through the City, connecting Fresno with the communities of western Fresno County and with Kings Canyon and Sequoia National Parks.

Fresno is on the California High Speed Rail route and a station is planned for Downtown Fresno. High Speed Rail is anticipated to be a major catalyst for development and redevelopment in Fresno, although the General Plan is not reliant on it to achieve its stated infill and development and redevelopment goals. Fresno currently receives rail service from Amtrak. Fresno Area Express (FAX) provides bus transit service. FAX offers 16 fixed-route bus lines and Handy Ride Paratransit Service. FAX operates a modern clean and green fleet of over 100 buses.

2.1.3 - General Plan Footprint and Buildout Statistics

The City of Fresno has a substantial development footprint. The incorporated City is 113 square miles (72,224 acres) and the City's sphere of influence is 157 square miles (100,249 acres). Additionally, there are 11 square miles (31,297 acres) of unincorporated "county islands" inside Fresno's city limits (City of Fresno. 2011 General Plan Map Atlas).

In accordance with the requirements of the State of California, the Local Agency Formation Commission (LAFCO) authorizes a "sphere of influence" (SOI) around municipalities as the probable physical boundary and ultimate service area of that government. The City of Fresno's SOI comprises 68,952 acres of incorporated land and 31,297 acres of unincorporated land. The City is responsible for planning within its entire Sphere of Influence; thus, the 100,240-acre SOI is considered the City of Fresno's "planning area." The City's incorporated area, which is under the direct control of the City of Fresno, comprises just fewer than 69 percent of the City's SOI. Some of the unincorporated land is completely surrounded by the City of Fresno and is referred to as a "county island," whereas other unincorporated land lies adjacent to the outer fringe of the City. Unincorporated land comprises 31 percent of the City's SOI (City of Fresno Working Paper 2, 2011).

Table 1 compares the existing and planned acreage within the plan area. The amount of land within the planning area is not changing with the General Plan Update. Increases in residential and commercial development will be provided by redesignating land currently designated for industrial and "other" uses to residential and commercial. The "Other" category primarily includes agriculture, and the entire Southeast Growth Area.

Table 1: General Plan Update Statistics

Land Use Designation	Existing General Plan Acreage	General Plan Update Acreage	Change in Acreage
Residential	41,688	46,043	4,355
Commercial	6,456	6,913	457
Industrial	12,072	9,578	-2,494
Mixed use	557	4,223	3,666
Public facilities	17,329	17,671	342
Open space	1,665	3,001	1,336
Other	26,260	18,598	-7,662
TOTAL	**106,027**	**106,027**	**0**
Population	790,000	970,000	180,000

Note:
No additional land is being designated for development by the General Plan Update.
Source: City of Fresno Development and Resource Management Department, 2012.

Table 2 provides more detail in terms of land use type for existing development and development anticipated with the General Plan Update. The General Plan Update envisions a substantial increase

in the amount of multi-family residential compared with single-family residential development. Multi-family would increase from 36.3 percent of existing residential development to 46.4 percent with the General Plan Update. The City assumes buildout of the Plan Area would occur by 2056.

The growth statistics reveal two important points. First, substantial growth is projected for Fresno over the coming decades and that growth will increase GHG emissions. Second, the proposed mix of land uses that would accommodate the growth in population will increase development density. Increased density when combined with a strong pedestrian and transit orientation can reduce motor vehicle travel and related greenhouse gas emissions.

Table 2: General Plan Buildout Statistics

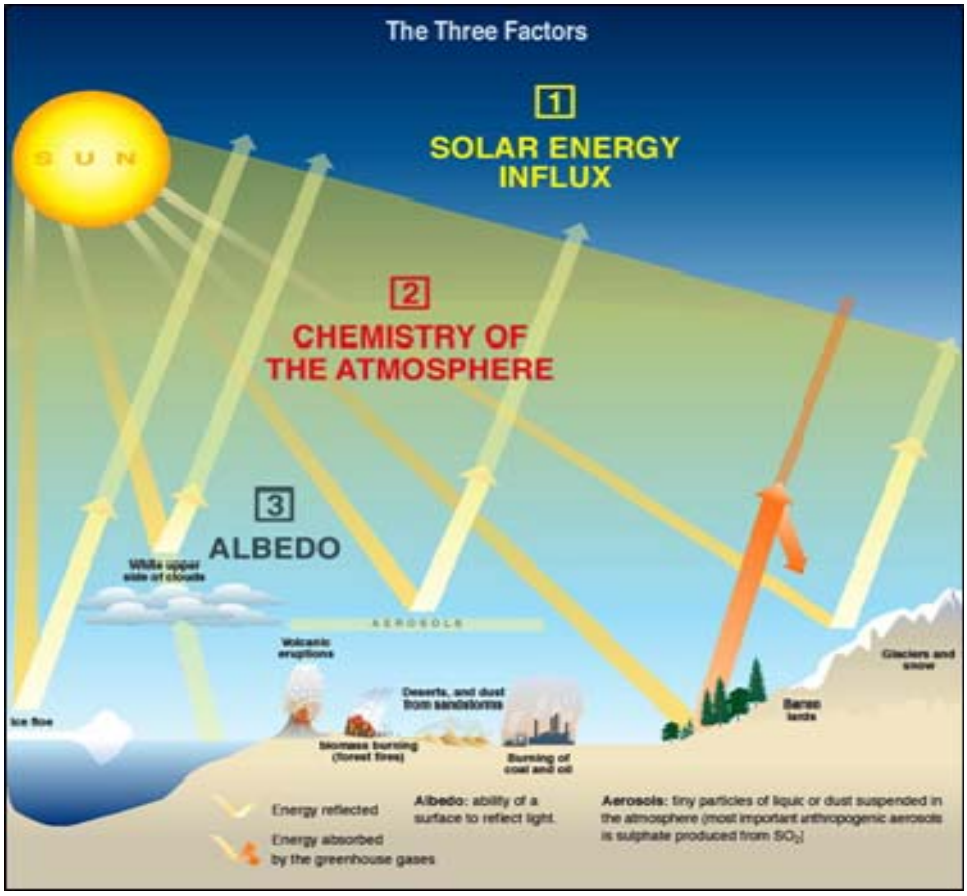
Land Use	Existing Development		General Plan Update		Incremental Increase	
	MSF	Acres	MSF	Acres	MSF	Acres
Single-Family Residential	109,000	26,147	169,626	38,961	60,626	12,814
Multiple-Family Residential	62,288	3,496	146,826	6,605	84,538	3,109
Commercial/Office/ Public Facility	66.4	14,804	129.7	26,517	63.3	11,712
Mixed Use	0.1	10	20.9	4,213	20.8	4,223
Industrial	72.8	6,765	113.3	9,578	40.5	2,813
Open Space	—	12,288	—	1,546	—	-10,742
Agriculture	—	11,714	—	736	—	-10,978
Vacant	—	12,522	—	0	—	-12,522
Other	—	18,281	—	17,861	—	-420
TOTAL		**106,027**	**—**	**106,027**	**—**	**0**
Population (persons)	545,000		970,000		425,000	

Note:
msf = million square feet
Source: City of Fresno Development and Resource Management Department, 2012.

2.2 - Climate Change Background

Climate scientists refer to gases that trap heat in the atmosphere as greenhouse gases. The effect is analogous to the way a greenhouse retains heat. As shown in Figure 2, the energy influx is maintained by three main factors: the amount of energy coming in, which depends on the earth's distance from the sun and solar activity; the albedo (the ability of the earth's surface to reflect light); and the chemical composition of the atmosphere. The presence of greenhouse gases in the atmosphere regulates the earth's temperature.

Figure 2: Factors Affecting the Earth's Temperature



The chemical composition of the atmosphere changes over time. Natural processes and human activities emit greenhouse gases. As shown in Figure 3, carbon dioxide concentrations in the atmosphere have increased over time. The global atmospheric concentration of carbon dioxide (CO_2) data in Figure 3 prior to 1958 is from ice core measurements and post-1958 data are from the Mauna Loa, Hawaii site.

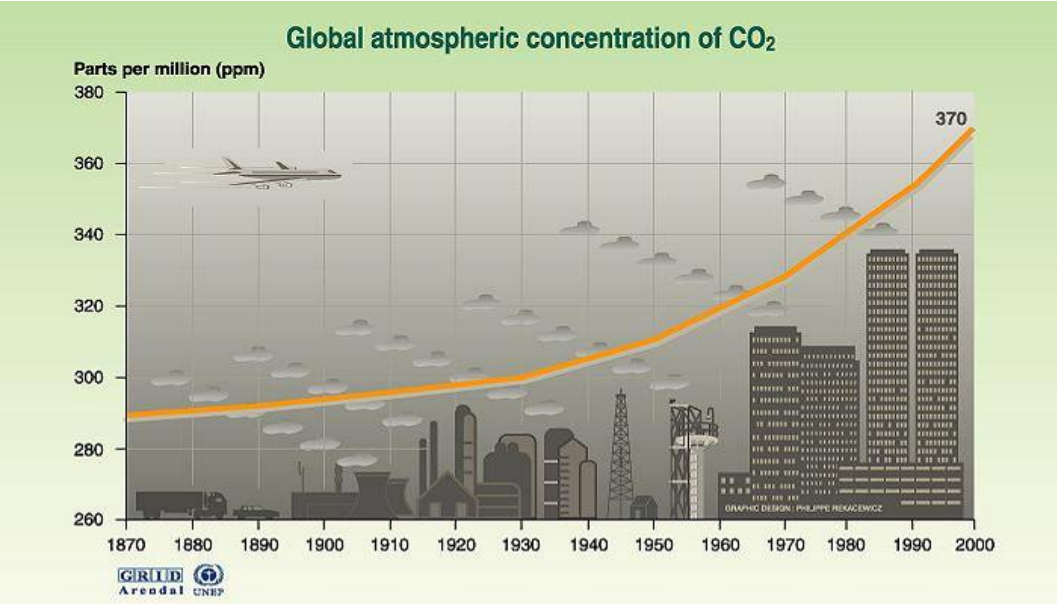
2.2.1 - Global Warming Potential

Greenhouse gases have varying global warming potential and atmospheric lifetimes. Carbon dioxide, the reference gas for global warming potential, has a global warming potential of 1. The calculation of the carbon dioxide equivalent (CO_2e) is a consistent methodology for comparing emissions, since it normalizes various emissions to a consistent metric. Methane's warming potential of 21 indicates that methane has a 21 times greater warming affect than carbon dioxide on a molecule per molecule basis. A carbon dioxide equivalent is the mass emissions of an individual greenhouse gas multiplied by its global warming potential. Emissions are typically shown in metric tons of carbon dioxide equivalents ($MTCO_2e$) or a million times that, million metric tons of carbon dioxide equivalents ($MMTCO_2e$). Global warming potentials are shown in Table 3.

Table 3: Global Warming Potentials

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous oxide (N_2O)	310
Source: Intergovernmental Panel on Climate Change 2007a	

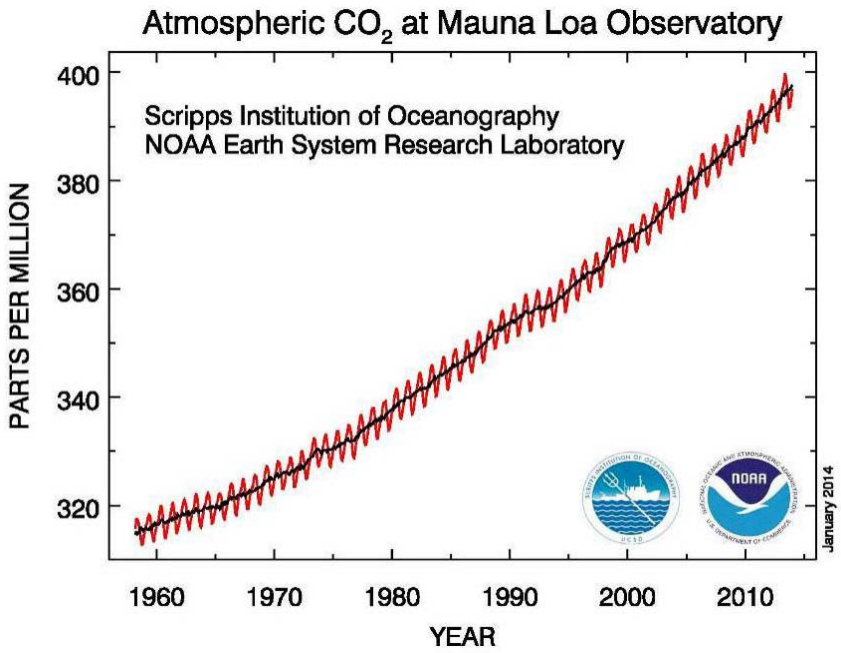
Figure 3: Global Atmospheric Concentration of CO_2



2.2.2 - Global Climate Change Trends

Figure 4 provides a more detailed look of concentrations since 1960 showing continuing steady increases even with international actions that have been taken to date. The National Oceanic and Atmospheric Administration reported that the global average CO_2 concentration was 396 parts per million (ppm) in 2013 and has exceeded 400 ppm at some monitoring stations (NOAA 2013).

Figure 4: Carbon Dioxide Concentrations 1960 to 2013



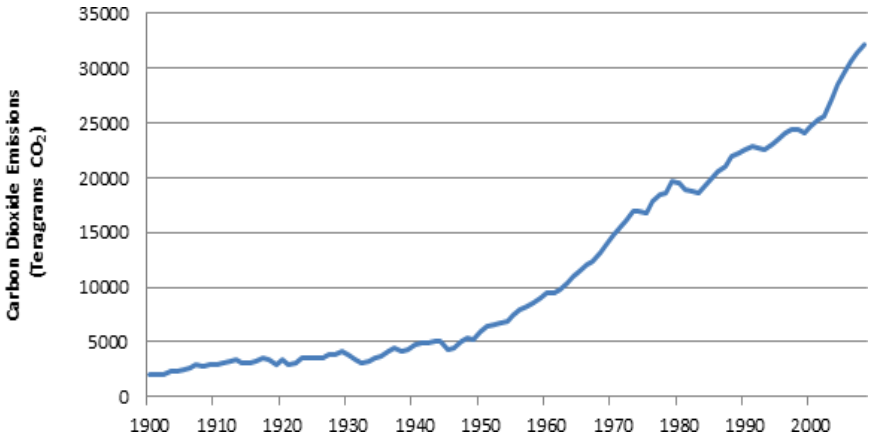
2.2.3 - Greenhouse Gas Emission Inventories

Emission inventories are database that list by source and pollutant the amount air pollutants discharged into the atmosphere during a given period of time. Inventories can range from individual businesses, cities, counties, states, nations, to global in scope. Emission inventories are used to help determine significant sources of air pollutants, establish emission trends over time, and target regulatory actions.

Emissions of greenhouse gases are a true cumulative impact. Emissions anywhere and everywhere in the world contribute to increased concentrations of greenhouse gases in the atmosphere and the potential for climate change. Viewing the emissions output at global, national, state, and local levels is important to understanding the scale of the problem and the relative contribution of each level of government organization.

Global emissions have increased rapidly since 1900 and continue to increase at an even faster pace since the year 2000. Figure 5 shows this trend with particularly dramatic increases after World War II and more recently with rapid increases in China and other rapidly industrializing nations in the last decade. Emissions have increase over 600 percent since 1950. Note that one teragram equals one million metric tons. The increases in emissions are consistent with the atmospheric concentrations shown in Figure 4 and Figure 5.

Figure 5: Increases in Global Carbon Dioxide Emissions 1900 to 2008



Source: EPA 2014.

The United States and California's greenhouse gas inventory in 2010 for all sources are shown in Table 4. The percentages of emissions for the United States are 12.2 percent of the global total yet accounts for only 4.4 percent of the world's population. This places extra responsibility for the United States to take a leadership role and to act as a model for other nations to follow. Although previous international efforts have not made substantial progress in slowing the growth in greenhouse gas emissions, the United States has many reasons to change to lower carbon economy. For example, reducing energy imports and increased energy security, cost savings from efficiency, employment in renewable energy, etc.

Table 4: United States, California, and World GHG Emission Inventory (CO_2e)

Inventory	$MMCO_2e$	Percent of Total
California	545	1.1
United States	5,921	12.2
World	48,629	100
Sources: ARB 2012 and EPA 2013.		

2.3 - Effects of Climate Change on Fresno

Scientific research indicates that an increase in global average temperature of 2 degrees Centigrade (°C) (3.6 ° Fahrenheit [F]) above pre-industrial levels poses risks to natural systems and human health and well-being. This is only 1.1°C (2.0°F) above present levels. In order to avoid temperatures above those levels, studies indicate that a concentration at or below 450 ppm CO_2e must be achieved. Other studies indicate a stable concentration of about 400 ppm CO_2e will be needed to prevent the 2.0°C (3.6°F) increase. As shown in Figure 4 above, readings at the Mauna Loa monitoring station have already exceeded 400 ppm CO_2e and the international average is likely to exceed 400 ppm in a

few years. The existing trend is likely to cause substantial harm to future generations and nature (ARB 2014).

Despite efforts to reduce greenhouse gas emissions, these gases can remain in the atmosphere for hundreds of years and emissions are expected to continue to increase globally for some time. Therefore, it is probable that climate change impacts will be observed. The impacts are predicted to vary by region. In California, climate change may result in a decreased water supply, sea level rise, and increased wildfires, to name a few. In order to manage these impacts, the City's vulnerability to these impacts is assessed and strategies have been developed to adapt to the projected changes.

Determining potential future impacts from climate change is an evolving process. The 2009 California Climate Adaptation Strategy provides a proactive foundation for an ongoing adaptation process within California for the sectors with the greatest risks. The document provides strategies for state and local governments to adapt to climate change (CNRA 2009). By incorporating applicable strategies as Implementation Strategies, the City is taking a proactive approach to ensure that impacts to the City are minimized.

The following discussion describes the main risks from climate change that could be experienced in the City of Fresno. The General Plan sections related to safety, public utilities, hydrology, and resource conservation contain policies that would decrease the risks to residents of the City. In general, City programs and policies to respond to existing levels of risk may need to be implemented more frequently or expanded to protect City residents and resources from potential impacts from climate change. Response to more or bigger events can be expected to demand more city resources.

2.3.1 - Wildfire

The City of Fresno is surrounded by irrigated agricultural lands, rural residential development, and the City of Clovis that are not subject to wildfire to any great extent. Fallow farmland and vacant land with weedy growth can become a fire hazard if not maintained. The San Joaquin River bluff area along the City's northern boundary could experience longer dry seasons and greater threats from wildfire.

San Joaquin River Bluffs

2.3.2 - Water

One of the potential impacts of climate change is a loss of natural snowpack, particularly the Sierra Nevada snowpack. Snowmelt provides an annual average of 15 million acre-feet of water, released between April and July each year (Department of Water Resources 2008). The California Department of Water Resources projects that the Sierra snowpack will experience at least a 25 percent reduction from its historic average by 2050 (DWR 2014). Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack.

Changes in precipitation patterns are expected to cause increased flooding. For the purposes of federal flood insurance, the Federal Emergency Management Agency (FEMA) has traditionally used the 100-year flood event, which refers to the level of flood flows that has a 1-percent chance of being exceeded in any single year. As California's hydrology changes, what is currently considered a 100-year flood may strike more often, leaving many communities at greater risk. Moreover, as peak flows and precipitation change over time, climate change calls into question assumptions of "stationarity" that are used in flood-related statistical analyses such as the 100-year flood. That is, the probable area of inundation does not change from year to year.

San Joaquin River

The California Department of Water Resources (2008) recommends that local governments implement land use policies that decrease flood risk. These following recommendations are included as GHG PLAN implementation policies where applicable and feasible.

- Local land use agencies should update General Plans to address increased flood risks posed by climate change. General Plans should consider an appropriate risk tolerance and planning horizon for each locality.
- Local governments should site new development outside of undeveloped floodplains unless the floodplain has at least a sustainable, 200-year level of flood protection.
- Local governments should use low-impact development techniques to infiltrate and store runoff.
- Local governments should include flood-resistant design requirements in local building codes. State, federal, and local agencies should develop conjunctive use management plans that integrate floodplain management, groundwater banking, and surface storage. Such plans could help facilitate system reoperation and provide a framework for the development of local projects that are beneficial across regions.
- Local land use agencies should adopt ordinances that protect the natural functioning of groundwater recharge areas.

Figure 6: 1997 San Joaquin River Flood

Source: DWR Final Report of the Flood Emergency Action Team, posted June 1997.

As precipitation falls in the form of rain rather than snow with greater storm intensity, high-frequency flood events are projected to increase. There is currently no known literature that suggests an increase in flooding from climate change in the Fresno area; however, it is possible that there could be changing weather patterns that would result in heavy downpours of rain in the area, which could cause street flooding. In addition, the potential for increased wildfires in foothill and mountain areas upstream from Fresno resulting from climate change could increase floods following fire if reservoirs had insufficient capacity to capture the runoff at that time.

2.4 - Federal, State, and Regional Actions to Address Climate Change

2.4.1 - United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is responsible for implementing federal policy to address global climate change. The federal government's early efforts have focused on public-private partnerships to reduce greenhouse gas intensity through energy efficiency, renewable energy, methane and other non-CO_2 gases, agricultural practices, and implementation of technologies to achieve greenhouse gas reductions.

The EPA is required to regulate carbon dioxide and other greenhouse gases as pollutants under Section 202(a)(1) of the federal Clean Air Act. The first step in implementing its authority was the Mandatory Reporting Rule that required inventory data collection commencing on January 1, 2010 with first reports due March 2011. Effective January 2, 2011, the EPA requires new and existing sources of greenhouse gas emissions of 75,000 tons per year to obtain a permit under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit Program. The EPA has developed federal light-duty vehicle standards that are harmonized with California standards

through 2016 and developed the first ever federal GHG standards for medium-duty and heavy-duty vehicles.

In June 2013, President Obama approved the nation's first Climate Action Plan that lays out a series of executive actions to reduce carbon pollution, prepare the nation for the impacts of climate change, and lead international efforts to address global climate change. The Plan reiterates the President's 2009 pledge to reduce United States greenhouse gas emissions by 17 percent below 2005 levels by 2020.

These federal efforts help support California's efforts by providing a more level playing field for regulated sources and by ensuring that out-of-state vehicles driving in California will contribute similar levels of emissions to those complying with California standards. However, legislative action at the federal level will be needed over the long term to ensure progress at the national level continues.

2.4.2 - State of California

California has adopted a variety of regulations aimed at reducing the State's greenhouse gas emissions. While state actions alone cannot stop climate change, the adoption and implementation of this legislation demonstrates California's leadership in addressing climate change. Key legislation and Executive Orders pertaining to the State's reduction targets are described below.

Executive Order S-3-05. California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S 3-05, the following reduction targets for greenhouse gas emissions:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

The State achieved the first goal of reducing emissions to 2000 levels by 2010. Total greenhouse gas emissions were reduced by 2.9 percent during that period even though population increased by 10.9 percent in the same period (ARB 2013). The State also appears to be on track for achieving the 2020 target.

AB 32. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. Greenhouse gases as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The California Air Resources Board (ARB) is the state agency charged with monitoring and regulating sources of greenhouse gases. The ARB approved the Climate Change Scoping Plan in December 2008 (California Air Resources Board 2008). The Scoping Plan contains measures designed to reduce the State's emissions to 1990 levels by the year 2020.

SB 375. SB 375 aligns regional transportation planning efforts, regional greenhouse gas reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy, which allocates land uses in the Metropolitan

Planning Organization's Regional Transportation Plan. Qualified projects consistent with an approved Sustainable Communities Strategy or Alternative Planning Strategy and categorized as "transit priority projects" would receive incentives under new provisions of CEQA. SB 375 requires regional reduction targets for light duty passenger vehicle CO_2 emissions for each MPO.

Other State Regulations

AB 1493 (Pavley). The Pavley Bill enacted in 2002 requires the maximum feasible and cost-effective reduction of greenhouse gases from automobiles and light-duty trucks. In 2004, ARB approved the "Pavley I" regulations that applied to new passenger vehicles beginning with model year 2009 through 2016. Pavley I is expected to reduce greenhouse gas emissions from regulated vehicles by 30 percent from 2002 levels by 2016. Pavley II was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III. The amendments, effective August 7, 2012, apply to vehicles for model years 2017 through 2025. The regulation will reduce greenhouse gases from new cars by 34 percent from 2016 levels by 2025 (ARB 2011).

Title 24 Energy Efficiency Standards. The State has adopted several other major regulations that will provide substantial reductions in greenhouse gases. Title 24, Part 6 California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 to reduce California's energy consumption. The California Energy Commission revises Title 24 about every three years to incorporate cost-effective energy efficiency technological advancements into the construction of new buildings. The latest version is the 2013 Title 24 update, which goes into effect July 1, 2014.

Green Building Code. California's Green Building Standard Code (CalGreen) was adopted in 2010 and went into effect January 2011. CalGreen is a mandatory green building code that sets minimum environmental standards for new buildings including standards for volatile organic compound (VOC) emitting materials, water conservation, and construction waste recycling.

Other Regulations. The ARB has adopted numerous regulations on sources of greenhouse gases since the approval of the Climate Change Scoping Plan. Some of the more notable regulations include the Low Carbon Fuel Standard and regulations affecting vehicle efficiency such as the Tire Pressure Program, Low Friction Oil, and Heavy Duty Vehicle Aerodynamic Efficiency Standards. Also important are ARB regulations that apply to high global warming potential consumer products and refrigerants.

2.4.3 - Fresno County Council of Governments

SB 375 Regional Targets and SCS

SB 375 aligns regional transportation planning efforts, regional greenhouse gas reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPO) are required to adopt a Sustainable Communities Strategy, which allocates land uses in the Metropolitan Planning Organization's Regional Transportation Plan. Qualified projects consistent with an approved Sustainable Communities Strategy or Alternative Planning Strategy and categorized as "transit priority projects" would receive incentives under new provisions of CEQA.

The initial results of the MPO scenario analysis for Fresno County indicated that achieving a percent reduction in passenger vehicle CO_2 per capita of 4.7 percent by 2020 and 7.6 percent by 2035 is feasible. These numbers are subject to changes due to model validation, calibration, and ongoing local coordination efforts. The MPO growth scenario focuses on existing core areas without expansion of the City of Fresno sphere of influence (ARB 2013). Under the General Plan Update, growth would be distributed along major corridors and activity centers supported by a new Bus Rapid Transit (BRT) system, and has a theme of complete neighborhoods to provide convenient access to different uses at the neighborhood level. The strategy relies on a combination of increasing density, mixed uses, and infill.

The Fresno Council of Governments (FCOG) has developed a Sustainable Community Strategy (SCS) to implement SB 375 requirements. The SCS, adopted by the FCOG on June 26, 2014 demonstrates that Fresno County will be able to achieve the GHG targets for light-duty vehicle travel adopted by the ARB for this area.

San Joaquin Valley Blueprint

The San Joaquin Valley Blueprint Planning Process was a 4-year effort by agencies, organizations, and individuals, including the Fresno Council of Governments, to identify visions, values, guiding principles, and alternative growth scenarios for development over a 20-year planning horizon.

The adopted 12 Blueprint Smart Growth Principles from this process are:

- Create a range of housing opportunities and choices.
- Create walkable neighborhoods.
- Encourage community and stakeholder collaboration.
- Foster distinctive, attractive communities with a strong sense of place.
- Make development decisions predictable, fair, and cost-effective.
- Mix land uses.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Provide a variety of transportation choices.
- Strengthen and direct development towards existing communities.
- Take advantage of compact building design.
- Enhance the economic vitality of the region.
- Support actions that encourage environmental resource management.

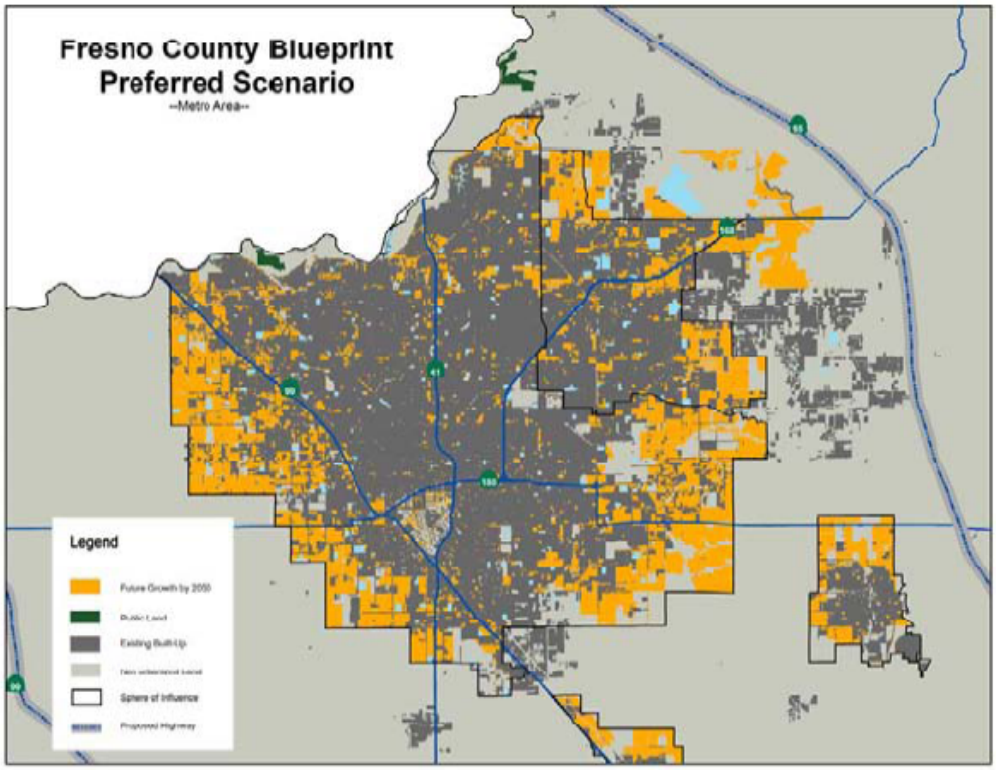
Fresno County's Blueprint Vision is as follows:

- Fresno County will be composed of unique cities, communities and a diverse population in a connected high quality environment that accommodates anticipated population growth and is supported by:
  - A vibrant economy built on competitive strength and world class education
  - A healthy and sustainable environment where air, aquifers, surface waters, forests, soil, agriculture, open space and wildlife resources are enhanced and protected

- A focus on cultural and community stewardship where all people enjoy fundamental rights as members of a free society, and where the community takes ownership of problems and their solutions.

The form of the Fresno region blueprint recognizes its economic, environmental, and cultural connectedness while maintaining a system of high-capacity multimodal transportation corridors that link the metro area to the rural areas and the State while preserving and maintaining the character of individual communities and the vital agricultural and natural resources between and around them (Fresno COG 2009).

Figure 7: Fresno County Blueprint Preferred Scenario



The Blueprint preferred scenario would result in countywide average residential density of new growth between now and 2050 averaging 8.0 dwelling units/acre. The density of new growth in the Fresno Clovis Metropolitan Areas (FCMA) will be 9.0 units/acre, while the average density of new development in the non-FCMA areas will be around 5.7 units/acre. This is comparable with the current trend density for Fresno County of 3.8 dwelling units/acre (Fresno COG 2009).

2.4.4 - San Joaquin Valley Air Pollution Control District

San Joaquin Valley AIR POLLUTION CONTROL DISTRICT

The City of Fresno is within the San Joaquin Valley Air Basin, which is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (District). The District has regulatory authority over certain stationary and industrial GHG emission sources and provides voluntary technical guidance on addressing greenhouse gases for other emission sources in a CEQA context. District initiatives related to greenhouse gases are described below.

Climate Change Action Plan

The District Governing Board approved the San Joaquin Valley Air Pollution Control District Climate Change Action Plan (CCAP) on August 21, 2008. The CCAP began a public process to bring together stakeholders, land use agencies, environmental groups, and business groups, and to conduct public workshops to develop comprehensive policies for CEQA guidelines, a carbon exchange bank, and voluntary greenhouse gas emissions mitigation agreements for the Governing Board's consideration. The CCAP contains the following goals and actions:

Goals

1. Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with greenhouse gas emissions increases.
2. Assist Valley businesses in complying with mandates of AB 32 (Global Warming Solutions Act of 2006).
3. Ensure that climate protection measures do not cause increases in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

Actions

1. Develop greenhouse gas significance threshold(s) or other mechanisms to address CEQA projects with greenhouse gas emissions increases.
2. Develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary greenhouse gas reductions created in the Valley.
3. Enhance the District's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB 32 emission reporting requirements to submit simultaneous streamlined reports to the District and the state of California with minimal duplication.
4. Develop and administer voluntary greenhouse gas emission reduction agreements to mitigate proposed greenhouse gas increases from new projects.

CEQA Greenhouse Gas Guidance

The District developed several resource documents that were used as guidance for developing the GHG Plan. The most important is the Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA, which is intended to assist local agencies in complying with CEQA and which contains a GHG threshold approach that has been widely accepted for use in the San Joaquin Valley and in other parts of the State. The District concluded that the existing science is inadequate to support quantification of the impacts that project-specific greenhouse gas emissions have on global climatic change. The District found that the effects of project-specific emissions to be cumulative, and without mitigation, their incremental contribution to global climatic change could be considered cumulatively considerable. The District found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas

emissions, whether through project design elements or mitigation. Many San Joaquin Valley local jurisdictions, including Fresno, have used the District guidance for CEQA compliance.

The primary features of the District's approach include:

- Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. The GHG Plan is intended to meet the criteria as an approved plan or mitigation program.
- Projects for which there is no applicable approved plan or program, or those projects not complying with an approved plan or program, the lead agency would evaluate the project against a performance-based standards and would require the adoption of design elements, known as a Best Performance Standard, to reduce greenhouse gas emissions.
- Projects incorporating Best Performance Standards would not require specific quantification of greenhouse gas emissions, and automatically would be determined to have a less than significant cumulative impact for greenhouse gas emissions.
- Best Performance Standards means, "Any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual." This equates to 21.65 percent accounting for revised 2020 growth projections that reflect the 2008 recession.

San Joaquin Valley Carbon Exchange and Rule 2301

The District initiated work on the San Joaquin Valley Carbon Exchange in November 2008. The Exchange was implemented with the adoption of Amendments to Rule 2301 Emission Reduction Credit Banking on January 19, 2012. The purpose of the carbon exchange is to quantify, verify, and track voluntary greenhouse gas emissions reductions generated within the San Joaquin Valley.

The District incorporated a method to register voluntary greenhouse gas emission reductions with amendments to Rule 2301. The purposes of the amendments to the rule include the following:

- Provide an administrative mechanism for sources to bank voluntary greenhouse gas emission reductions for later use.
- Provide an administrative mechanism for sources to transfer banked greenhouse gas emission reductions to others for any use.
- Define eligibility standards, quantitative procedures, and administrative practices to ensure that banked greenhouse gas emission reductions are real, permanent, quantifiable, surplus, and enforceable.

The District is participating in a new program developed by the California Air Pollution Control Officers to encourage banking and use of greenhouse gas reduction credits referred to as the CAPCOA Greenhouse Gas Reduction Exchange (GHGRx). The GHGRx provides information on GHG credit projects within participating air districts. The District is one of the first to have offsets available for trading on the Exchange.

SECTION 3: EMISSION INVENTORY

Emission inventories are compilations of emissions generated by sources in a geographic area at a given time. Greenhouse gas emission inventories are normally reported in units of metric tons of carbon dioxide equivalent (CO_2e) emissions per year. Emission inventories identify the contribution of each type or category of emissions to the total inventory of pollutants of interest. Emission inventories help to rank sources by size to determine those that are most important to control. Inventories are required to determine existing conditions and to forecast emissions in future years to account for the effects of growth.

3.1 - Inventory Methods and Assumptions

3.1.1 - Inventory Protocols

Emission inventory protocols have been developed for many emission sources by governmental and independent agencies, and professional associations. The U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, developed by ICLEI Local Governments for Sustainability, provides guidance for developing community inventories prepared in the United States. The U.S. Community Protocol is not entirely applicable to inventories in California communities. For some inventory categories, a more detailed inventory may be required to ensure its adequacy for use in a CEQA context. California specific emission factors and data are available for many sources that when used produce a more accurate inventory. The inventory prepared for the City of Fresno GHG Plan follows the U.S. Community Protocol as modified for use in California.

3.1.2 - Emission Inventory Source Categories

The inventory includes the following source sectors:

- Motor Vehicles
- Electricity Use
- Natural Gas Use
- Waste – Landfill Emissions
- Refrigerants

Another way to identify emission sources is recommended by the U.S. Community Protocol. Under that approach, emissions are categorized in Table 5.

Table 5: Inventory Emission Sources

Emission Sources	Activities
Built Environment	Fuel use in residential and commercial stationary combustion equipment (e.g., boilers and furnaces)
	Industrial stationary combustion sources not regulated by ARB or Air District
	Refrigerant leakage
Transportation and Other Mobile Sources	On-road passenger vehicles operating within the community boundary
	On-road freight and service vehicles operating within the community boundary
	On-road transit vehicles operating within the community boundary
	Off-road surface vehicles and other mobile equipment operating within the community boundary
Solid Waste	Operation of solid waste disposal facilities
	Generation and disposal of solid waste by the community
Wastewater and Water	Use of energy associated with use of potable water
	Use of energy associated with generation of wastewater
Upstream Impacts of Community-Wide Activities	Upstream and transmission and distribution (T&D) impacts of purchased electricity used by the community
Source: US Community Protocol V1, October 2012.	

The inventory does not include sources that comprise less than 3 percent of the inventory and sources that are not within the control or influence of the City of Fresno. One exception is off-road equipment, which is less than 1 percent but is commonly included in project level greenhouse gas analyses. Large industrial sources of emissions that are subject to ARB's reporting regulation and Cap and Trade regulation are not included in the inventory. Agricultural sources are not included in the inventory because the General Plan does not designate land for agricultural use. The inventory does not impacts of upstream emissions because those sources are not within the control or influence of the City. Although electricity transmission and distribution losses are not within the control of the City, strategies that promote local generation such as rooftop solar reduce T&D losses because the electricity is generated close to where it is used.

3.2 - Inventory Selection Criteria

The inventory year is important because it forms the starting point for setting emission reduction targets in future years. Several criteria were considered in selecting the best year for the baseline inventory, including:

- Availability of data
- Relationship with state inventories and targets
- Recommended practices from other agencies and organizations

Since the AB 32 target is based on returning emissions to 1990 levels by 2020, some jurisdictions include a 1990 inventory. The 1990 baseline represents statewide emissions and not the emissions of individual cities and counties. Growth rates vary widely from city to city since 1990. A 1990 inventory and target that do not account for variations in growth from community to community do not provide a valid comparison of the effectiveness or stringency of a greenhouse gas reduction program. In addition, the City cannot go back in time and change the amount and type of development that has occurred since 1990; it can only work from existing conditions. Therefore, the City has determined that a 2010 baseline provides the most recent year with complete data available suitable for describing existing conditions.

3.3 - Baseline Inventory

The City of Fresno baseline inventory year for the GHG Plan is 2010. The ARB has prepared an updated inventory for 2010 that accounts for regulations adopted to that point in time. Therefore, 2010 provides the best available baseline for the GHG Plan and can be compared directly with state progress to date and targets.

3.4 - Inventory Projections

The GHG Plan includes inventory projections for 2020, 2035, 2050, and 2056 (General Plan Buildout). These years correspond to state regulatory targets and goals and the General Plan buildout.

3.4.1 - BAU Inventory

BAU scenarios are commonly used in air quality planning to ensure that control measures are adequate to overcome the effects of cumulative growth in emissions by an attainment year. BAU is defined in ARB's AB 32 Scoping Plan as emissions occurring in 2020 if the average baseline emissions during the 2005 period grew to 2020 levels without additional control. The reduction required of the State's 2020 BAU inventory to achieve 1990 levels is 28.4 percent. BAU inventories allow for separate accounting of the benefits of regulations, strategies, and programs on future emissions. This concept is applied to the GHG Plan so that targets for the City can be compared directly with targets for the State. The BAU inventory for each milestone year is provided in Table 6 and Figure 8.

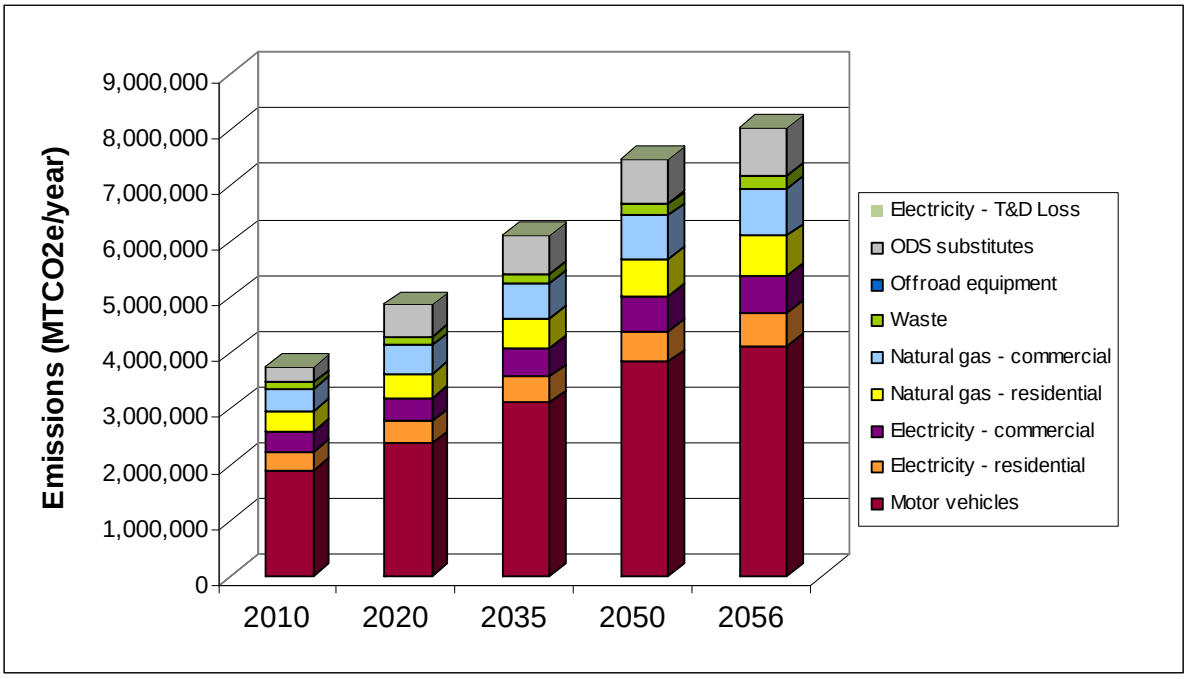
Table 6: City of Fresno Baseline and Business as Usual Emissions Projections

Sector	Emissions ($MTCO_2e$/year)				
	2010	2020	2035	2050	2056
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447

Table 6 (cont.): City of Fresno Baseline and Business as Usual Emissions Projections

Sector	Emissions ($MTCO_2e$/year)				
	2010	2020	2035	2050	2056
Electricity—commercial	361,836	415,012	509,781	626,137	679,888
Natural gas—residential	362,832	476,679	573,160	670,082	712,228
Natural gas—commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
Ozone depleting substance (ODS) substitutes	273,422	576,784	694,734	812,214	863,300
Total	**3,745,116**	**4,905,399**	**6,166,049**	**7,475,346**	**8,026,499**
Source: FCS 2013					

Figure 8: City of Fresno Baseline and Business s Usual Emissions Projections

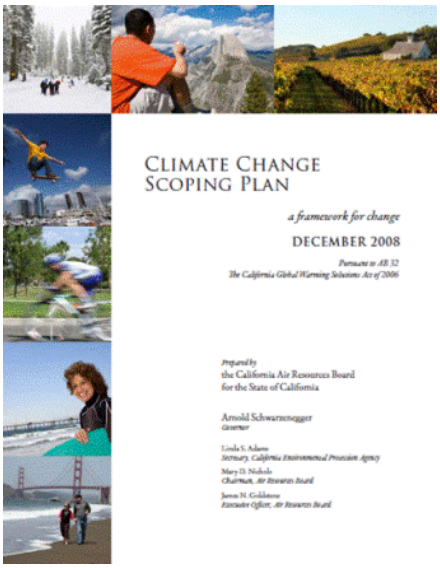


The BAU inventories presented above show that in the absence of regulations and other measures to reduce greenhouse gas emissions, buildout of the General Plan will more than double the City's emissions by 2056. The inventory breakdown by source categories show that Fresno's emissions are

dominated by mobile sources with over half the total emissions. Direct emissions from residential and commercial natural gas combustion are the second largest source. Indirect emissions from the consumption of electricity are the next largest source. So-called ozone depleting substances (ODS) substitutes, which are primarily used as refrigerants are expected to grow more rapidly than the other source categories. Ozone depleting substances are being phased out to comply with international treaties to protect the Earth's ozone layer; unfortunately, the substitutes tend to have higher global warming potentials than the gases they replace. Electricity transmission and distribution losses are estimated at 6.84 percent in the Western United States in 2010. No forecasts were found for other years. The 2010 emissions from T&D losses are estimated at 42,205 $MTCO_2e$.

SECTION 4: REDUCTIONS FROM STATE REGULATIONS

The State has enacted many regulations pursuant to the requirements in AB 32 that would reduce emissions within the City. The State's strategy is detailed in the Climate Change Scoping Plan adopted by the ARB in December 2008. Scoping Plan strategies are primarily implemented through the adoption of regulations (ARB 2008). The most important strategies are discussed below.



4.1 - Motor Vehicles

The ARB has adopted many of the Scoping Plan measures for mobile sources as regulations. Only the measures that have been adopted or put into practice are included in this assessment (California Air Resources Board 2012). The following regulations are included:

- **Pavley and Low Carbon Fuel Standard (LCFS)**: EMFAC2011 emission factors that include Pavley I and the LCFS were used to estimate the impact of those regulations. In this way, the reductions from those measures are more specific than simply applying the statewide reduction estimates because the reductions in EMFAC take into account the variations between vehicle classes and region. The Pavley I Vehicle Standards apply to passenger cars and light-duty trucks for model years 2009 to 2016.
- **Low Emission Vehicle (LEV) III Standards**: The LEV III standards amend the exhaust and evaporative emission standards for passenger cars and light- and medium-duty trucks. The standards provide requirements for model years 2017 to 2025. The regulation applies to both criteria pollutant and greenhouse gas emissions. The standard drops greenhouse gas emission to 166 grams per mile, a reduction of 34 percent compared with 2016 levels. LEV III implements the Pavley II standards described in the Scoping Plan.
- **Tire Pressure Program**: This regulation is categorized under vehicle efficiency measures in the Scoping Plan. This regulation applies to automotive service providers performing or offering to perform automotive maintenance or repair services in California. This applies to passenger cars, light-duty trucks, medium-duty vehicles, and light heavy-duty trucks with gross vehicle weight ratings of less than or equal to 10,000 pounds (California Air Resources Board 2009). This measure is anticipated to reduce emissions by 0.5 percent for those vehicle types.
- **Low Friction Oil**: ARB indicates that this measure has been achieved in practice. It is assumed that this measure would apply to the same vehicle types as in the tire pressure program. This measure is anticipated to reduce emissions by 2.2 percent.
- **Aerodynamic efficiency**: This regulation improves the fuel efficiency of heavy-duty tractors that pull 53-foot or longer box-type trailers. Fuel efficiency is improved through improvements in

tractor and trailer aerodynamics and the use of low rolling-resistance tires. This measure would reduce emissions by 2.1 percent from heavy-duty vehicles.

4.2 - Electricity

The State's strategy for reducing electricity-related greenhouse gases targets electric power utilities on the production side and energy efficiency on the consumer side. Two regulations are in place to reduce emissions from this source. The Renewable Portfolio Standard requires electric utilities to provide an increasing share of their energy from renewable sources with 33 percent required by 2020. Title 24 Energy Efficiency Standards for Residential and Non-Residential Buildings requires new structures to meet increasingly stringent energy efficiency standards. California's Green Building Code mandates increased water conservation that results in less electricity consumed to pump and transport water.

4.2.1 - Renewable Portfolio Standard.

The electricity emission factor was decreased to account for the renewable energy regulations, which require 33 percent renewable energy by the year 2020. The average renewable energy use for 2005–2009 for PG&E was calculated as 12.6 percent (California Public Utilities Commission 2012). Therefore, an additional 20.4 percent increase in renewables is needed for the utility to comply with the regulation.

4.2.2 - Title 24 Building Energy Efficiency Standards.

Building energy efficiency standards are designed to ensure that new and existing buildings achieve energy efficiency and preserve outdoor and indoor environmental quality. These standards are contained in the California Code of Regulations Title 24, Part 6. The California Energy Commission (CEC) is required by state law to update energy efficiency standards about every 3 years. The 2013 Standards will result in 25 percent less energy used for lighting, heating, cooling, ventilation, and water heating than the 2008 Standards that went into effect in 2010 (CEC 2012).

The reductions from Title 24 are applied to the energy consumption related emissions for new development and remodeling projects at existing buildings subject to the regulations. The benefits of the standards accrue as buildings subject to the standards are constructed to meet the standard applicable at the time. PG&E provided actual electricity and natural gas usage for 2008 through 2010, which reflect the benefits of all development subject to previous versions of the Title 24 standards. New development built after 2010 would provide additional reductions as buildings are constructed to comply with the standards.

4.2.3 - California's Green Building Code

On January 12, 2010, the State Building Standards Commission unanimously adopted updates to the California Green Building Standards Code, which went into effect on January 1, 2011. The Code is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings.

The California Green Building Standards Code does not prevent a local jurisdiction from adopting a more stringent code, as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

The California Green Building Standards Code includes the following requirements to reduce water and energy consumption:

- **Wastewater reduction**. Each building shall reduce the generation of wastewater by one of the following methods:
  1. The installation of water-conserving fixtures or
  2. Using non-potable water systems.
- **Water use savings**. 20 percent mandatory reduction in indoor water use with voluntary goal standards for 30, 35 and 40-percent reductions.
- **Water meters**. Separate water meters for buildings in excess of 50,000 sq ft or buildings projected to consume more than 1,000 gallons per day.
- **Irrigation efficiency**. Moisture-sensing irrigation systems for larger landscaped areas.
- **Building commissioning**. Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 sq ft to ensure that all are working at their maximum capacity according to their design efficiencies.
- **Materials pollution control**. Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard.
- **Short-term bicycle parking**. If a commercial project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack (5.106.4.1).
- **Long-term bicycle parking**. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space (5.106.4.2).
- **Designated parking**. Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.6.2 (5.106.5.2).
- **Recycling by Occupants**. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling.
- **Construction waste.** A minimum 50-percent diversion of construction and demolition waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects. All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled.

4.3 - Natural Gas

Title 24 will also provide reductions in natural gas usage required for water heating and space heating. The CEC estimates that the 2008 and 2013 standards will reduce emissions from residential and non-residential natural gas use by over 25 percent by 2020. Projects constructed between the 2010 base year and July 2014 comply with the 2008 Title 24 and projects after July 1, 2014 are assumed to comply with 2013 Title 24. Future revisions to Title 24 are normally scheduled about every 3 years. Therefore, emissions related to residential and commercial natural gas combustion will continue to decline in later years. However, no additional reductions for future regulations are currently claimed in the GHG Plan.

4.4 - Refrigerants

The State has adopted several refrigerant management regulations that are anticipated to achieve substantial reductions. For example, ARB predicts that the regulations that will apply to large commercial refrigeration units will reduce emissions by more than 50 percent.

4.5 - Reductions from State Regulations

The predicted reduction in emissions from state measures on City of Fresno emissions is shown in Table 7. The State's motor vehicle standards for new vehicles and low carbon fuel standard provide 74 percent of the reductions, although mobile sources comprise about 50 percent of the 2020 BAU inventory. Energy regulations provide 17 percent of the reductions.

Table 7: Reductions from Statewide Measures

Sector	State Measures	Emissions (MTCO2e/year)	
		2020	2035
Motor Vehicles	Pavley and Low Carbon Fuel Standard	554,774	902,450
	Low Emission Vehicle Program III	32,090	397,767
	Tire Tread Program	3,173	4,138
	Tire Pressure Program	5,817	7,587
	Low Friction Oil	23,270	30,347
	HD Aerodynamic/MHD Hybridization	15,125	19,726
	Subtotal	***634,250***	***1,362,016***
Electricity - Residential	Renewable Portfolio Standards	164,477	154,774
	Title 24 Energy Efficiency Standards	16,833	12,810

Table 7 (cont.): Reductions from Statewide Measures

Sector	State Measures	Emissions (MTCO2e/year)	
		2020	2035
Electricity - Commercial	Renewable Portfolio Standards	174,877	160,204
	Title 24 Energy Efficiency Standards	9,614	4,196
	Subtotal	***365,731***	***331,984***
Natural Gas –Residential	Title 24 Energy Efficiency Standards	7,983	12,496
Natural Gas - Commercial	Title 24 Energy Efficiency Standards	17,530	11,108
	Subtotal	**25,513**	*23,604*
Refrigerants (Ozone depleting substance substitutes)	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	288,392	347,367
	subtotal	**288,392**	**347,367**
	Total	**1,313,886**	**2,064,971**
Source: FCS 2013 (General Plan Update MEIR Appendix B)			

4.5.1 - Adjusted Business as Usual

The adjusted BAU inventory applies emission reductions achieved by regulations, programs, and measures that are implemented by other agencies for each source category. This inventory identifies the base from which reductions are needed from local strategies and measures to demonstrate consistency with the targets contained in AB 32. Table 8 shows the emission inventories for each year after the application of state regulatory measures.

Table 8: City of Fresno Adjusted Business as Usual Emissions

Sector	2010	2020	2035
Motor vehicles	1,795,666	1,748,773	1,745,843
Electricity - residential	289,745	209,178	258,766
Electricity—commercial	319,817	230,591	290,861
Natural gas—residential	400,169	468,696	506,670
Natural gas—commercial	448,706	497,117	553,452
Waste	123,945	147,628	177,508
Offroad equipment	1,051	1,138	1,314
Ozone depleting substance (ODS) substitutes	273,422	288,392	347,367
Total	**3,652,521**	**3,591,513**	**3,881,781**

4.5.2 - 2020 Target Analysis

Table 9 shows the percentage reduction from each inventory source category and from the total 2020 BAU inventory with the application of state regulations. The results demonstrate that the regulations alone are sufficient to reduce the BAU inventory by 27.0 percent, which exceeds the amount required to be consistent with AB 32 Scoping Plan targets (21.65 percent). Reductions from the GHG Plan will be 5.0 percent for a total reduction of 32.0 percent. Reductions from local measures are detailed in Section 5.2.4.

Table 9: City of Fresno 2020 BAU and Adjusted BAU Emissions Inventory

Inventory	2020 BAU Emissions ($MTCO_2e$/year)	2020 with Regulations ($MTCO_2e$/year)	Percent Reduction
Motor vehicles	2,383,023	1,748,773	26.62%
Electricity - residential	390,488	209,178	46.43%
Electricity - commercial	415,012	230,591	44.44%
Natural gas - residential	476,679	468,696	1.67%
Natural gas - commercial	514,647	497,117	3.41%
Waste	147,628	147,628	0.00%
Offroad equipment	1,138	1,138	0.00%
ODS substitutes (refrigerants)	576,784	288,392	50.00%
Total	**4,905,399**	**3,591,513**	**26.78%**
Emissions with Reductions from Local Measures	**—**	**3,443,261**	**29.81%**
Target based on Consistency with AB 32 Targets	—	—	21.65%
Meets Target in 2020?	—	—	Yes
Source: FirstCarbon Solutions, 2013 General Plan Update MEIR (Appendix B).			

4.5.3 - Post 2020 Targets

The City has committed to pursuing a target for 2050 based on the State's long-term goal of reducing California's emissions to 80 percent below 1990 levels by 2050. This is equivalent to 80 percent below the 2020 target. The City cannot achieve this target on its own because it lacks the authority to regulate most of the emissions generated within its boundaries. Therefore, the emissions presented in Table 10 below represent the amount of reductions required by all levels of government and individuals. An actual amount required as reductions from the City must be determined at a time when the State identifies its strategy for achieving the targets. The State estimates that a reduction trajectory of 5.8 percent per year is required to reach the 2050 target. Figure 9 shows that achieving this trajectory will require a substantial acceleration in reductions after 2035.

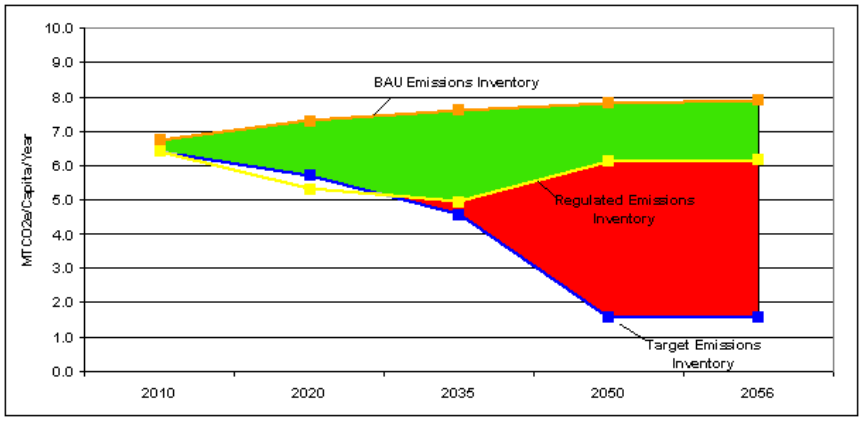
Table 10: City of Fresno 2035 and 2050 Interim Target Emissions Inventories

Inventory	Community Emissions ($MTCO_2e$)	Per Capita Emissions ($MTCO_2e$/Person)
2035 Interim Target	3,699,629	4.74
Percent Reduction from BAU in 2035		**40%**
2035 Inventory with Regulations	3,881,781	4.96
2035 Local Reductions	197,966	
2035 Inventory with Local Reductions	3,683,815	4.72
Additional Reductions to Reach Interim 2035 Target	None	
2050 Target	1,430,285	1.57
Reduction from 2035 to reach 2050 Target	2,253,533	
Percent Reduction from BAU in 2050		**80%**
Source: FCS 2013 (General Plan Update MEIR Appendix B)		

The emissions in 2035 with regulations currently in effect reflect substantial reductions from currently adopted regulations and local measures committed to by the City that would achieve a 40 percent reduction from the 2035 BAU inventory. Adoption of new motor vehicle emission standards for vehicles built in 2026 and later well before 2035 can reasonably be assumed. In addition, Title 24 energy efficiency standards for buildings will likely be updated several times prior to 2035, providing additional reductions from the energy sector. Finally, emission reductions from voluntary energy efficiency retrofits have not been quantified. Therefore, it is highly likely that City of Fresno would exceed a 40 percent reduction from BAU by 2035. It must be noted that the State has not adopted a target for 2035; therefore, the target presented here is provided for information only and does not represent a firm commitment by the City.

Achieving a 2050 target based on an 80 percent reduction from 1990 levels will require technologies yet to be identified and nearly complete transition from carbon-based fuels to renewable or zero emission energy sources. The City considers identifying a 2050 target and strategy to be speculative.

Figure 9: Reductions Required for 2035 and 2050 Target



SECTION 5: FRESNO'S GREENHOUSE GAS REDUCTION STRATEGY

The Greenhouse Gas Reduction Strategy is a comprehensive vision of the City's plan to reduce greenhouse gas emissions. The City is already on a path toward lower emissions through its prior actions. The City has adopted a large number of goals, policies, and programs that will reduce greenhouse gas emissions to implement the previous 2025 General Plan. The General Plan Update builds on the 2025 General Plan to provide a comprehensive strategy to reduce greenhouse gases from all sources within the City's ability to control or influence. The strategies enhance the effectiveness of State strategies by ensuring that the City is developed in ways that minimize emissions and by application to City-owned facilities. The relevant General Plan objectives and policies are listed throughout the following section. For convenience, a compilation of the General Plan objectives and policies is provided as Appendix A to this GHG Plan. Table 11 provides a listing of General Plan Elements/Chapters and the associated letter designations to enable the reader to identify the General Plan Element/Chapter associated with the objectives and policies listed in this section.

Table 11: General Plan Chapter Cross Reference

General Plan Element and Chapter	Policy Prefix
Urban Form (Chapter 3)	UF
Land Use (Chapter 3)	LU
Design (Chapter 3)	D
Mobility and Transportation (Chapter 4)	MT
Park and Open Space (Chapter 5)	POSS
Public Utilities and Services (Chapter 6)	PU
Resource Conservation and Resilience (Chapter 7)	RC
Health Communities (Chapter 10)	HC
Economic Development and Fiscal Sustainability (Chapter 2)	ED

5.1 - GHG Plan Reduction Strategy

The City can control or influence GHG emissions in several ways. The City has direct control over its own fleet vehicles and buildings where it can use its budgeting authority and purchasing decisions for high efficiency/low emission options. The City has influence over emissions from development and redevelopment projects through its land use authority and its responsibilities as a Lead Agency under CEQA. The City can also provide leadership and education to the community to encourage voluntary actions to reduce GHG emissions. The General Plan Update provides the comprehensive objectives and policies that direct development in the City. The GHG Plan relies upon the General Plan as the basis of the development related strategies to reduce GHG emissions.

Greenhouse gas emissions are generated by a multitude of sources and activities. There is no single technology or individual program that provides a silver bullet for addressing this problem. Comprehensive solutions on multiple fronts are required to make the progress needed to achieve reduction targets for 2020 and beyond.

The GHG Plan strategies are categorized as follows:

- Land Use and Transportation
- Transportation Facilities Strategies
- Transportation Demand Strategies
- Energy Conservation Strategies for New and Existing Buildings
- Waste Diversion and Recycling and Energy Recovery
- Strategies for Existing Development
- Municipal Strategies

As described in the previous section, motor vehicle emissions dominate the City's emission inventory. The City has control over the emissions from its government fleet vehicles through its purchasing decisions, but no control over the emissions from other vehicles that operate in and pass through the City. However, the City's authority over land use provides opportunities to influence the amount people drive and their choice of travel mode. In planning circles, this is called the land use, transportation, air quality connection.

Land use and transportation strategies are supported by the General Plan land use and circulation plans and policies that provide the City's vision of future development in the planning area to the extent that they reduce vehicle trips and miles traveled compared with alternative development plans and patterns. The City's General Plan Update includes many land use and transportation policies that when implemented result in lower greenhouse gas emissions through the promotion of smart growth; jobs/housing balance; transit-oriented development; and infill development through that application of land use designations, and zoning, and the use of public-private partnerships to encourage action.

The following are land use strategies utilizing goals and policies in the General Plan that with application to individual projects will achieve GHG emission reductions.

5.1.1 - Land Use Strategies

Development that is more dense and compact places people closer to destinations that can be accessed by walking or bicycling, and transit. Higher densities near transit routes and facilities also

increases the potential for more frequent high-quality transit service such as would be provided by BRT. The General Plan Update includes the following related policy.

Policy RC-2-a **Link Land Use to Transportation.** Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Compact and Infill Development

The General Plan provides for a substantial increase in development density in new growth areas compared to existing development. In addition, development trends show that more project developers can be expected to propose higher-density, single- and multi-family development than was constructed in the past. The General Plan land use designations provide density ranges that allow for higher average densities than experienced in the past for land already designated by the General Plan. The General Plan Updates provide an increase in density in new growth areas.

Higher-density development tends to produce fewer vehicle trips per dwelling unit and more intense commercial development increases opportunities for walking, bicycling, and transit use for some trips. Although higher density is a prerequisite for achieving compact development, the design of the new projects is critical for maximizing reductions from being more compact related to walking, bicycling, and transit use. Approved but undeveloped subdivisions would comply with existing General Plan designations; however, market forces could result in requests for revisions to these subdivisions that would increase development density. Another way to increase density is to allow second units on residential lots. This practice increases overall development density and promotes more compact development that brings more people closer to commercial development.

Related General Plan Policies

Policy UF-1-c **Legible City Structure**. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people, and pedestrian-oriented activity in Downtown; along a small number of prominent east west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lanes and streets.

Objective UF-12 Locate roughly one-half of future residential development in infill areas — defined as being within the City on December 21, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land..

Policy UF-12-b **Activity Centers**. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include Chapter 3: Urban Form, Land Use, and Design commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place..

Policy LU-2-a **Infill Development and Redevelopment**. Promote development of vacant, underdeveloped, and redevelopable land uses within the City Limits where urban services are available by establishing and implementing supportive regulations and programs.

Policy LU-2-b **Infill Development for Affordable Housing**. Consider a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City as a strategy to help to meet the affordable housing needs of the community.

Policy LU-3-b **Mixed-Use Urban Corridors that Connect the Downtown Planning Area**. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon corridors, as shown on Figure LU-1: General Plan Land Use Diagram.

Policy LU-3-c **Zoning for High Density on Major Transit Corridors**. Encourage adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish long-term growth and development potential for Downtown.

Policy LU-5-f **High Density Residential Uses**. Promote high-density residential uses to support Activity Centers and BRT corridors, affordable housing and walkable access to transit stops.

Policy RC-2-a **Link Land Use to Transportation**. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Key GHG Plan Indicators

- Compile ongoing development statistics for comparison with General Plan Policy objectives.
- Projects comply with General Plan policies.

Figure 10 illustrates the conceptual location for the City of Fresno growth areas and the proposed BRT corridor. Compact development and infill provide the supporting base that maximizes the potential reductions in GHG emissions from the Plan strategy. Increased density, strategically located near quality transit and activity centers, is critical to successful implementation.

Key GHG Plan Indicators

- Change in development density with time.
- Number of infill and redevelopment projects proposed
- Changes in transit service and ridership

Mixed-Use Development

Mixed-use projects provide opportunities for walking between uses for some trips. Trips are reduced when visitors can park once at the development and obtain services, shopping, or go to a restaurant during a single trip. There are a variety of mixed-use development types with different mixes of uses and designs. Infill projects that provide residential development close to existing commercial development or vice versa can produce many of the same mixed-use benefits if done in a walkable environment.

Relevant General Plan Policies

Policy RC-2-a **Link Land Use to Transportation**. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

Policy RC-2-b **Provide Infrastructure for Mixed-Use and Infill**. Promote investment in the public infrastructure needed to allow mixed-use and denser infill development to occur in targeted locations, such as expanded water and wastewater conveyance systems, complete streetscapes, parks and open space amenities, and trails. Discourage investment in infrastructure that would not meet these criteria.

Policy UF-12-d **Appropriate Mixed-Use.** Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one or

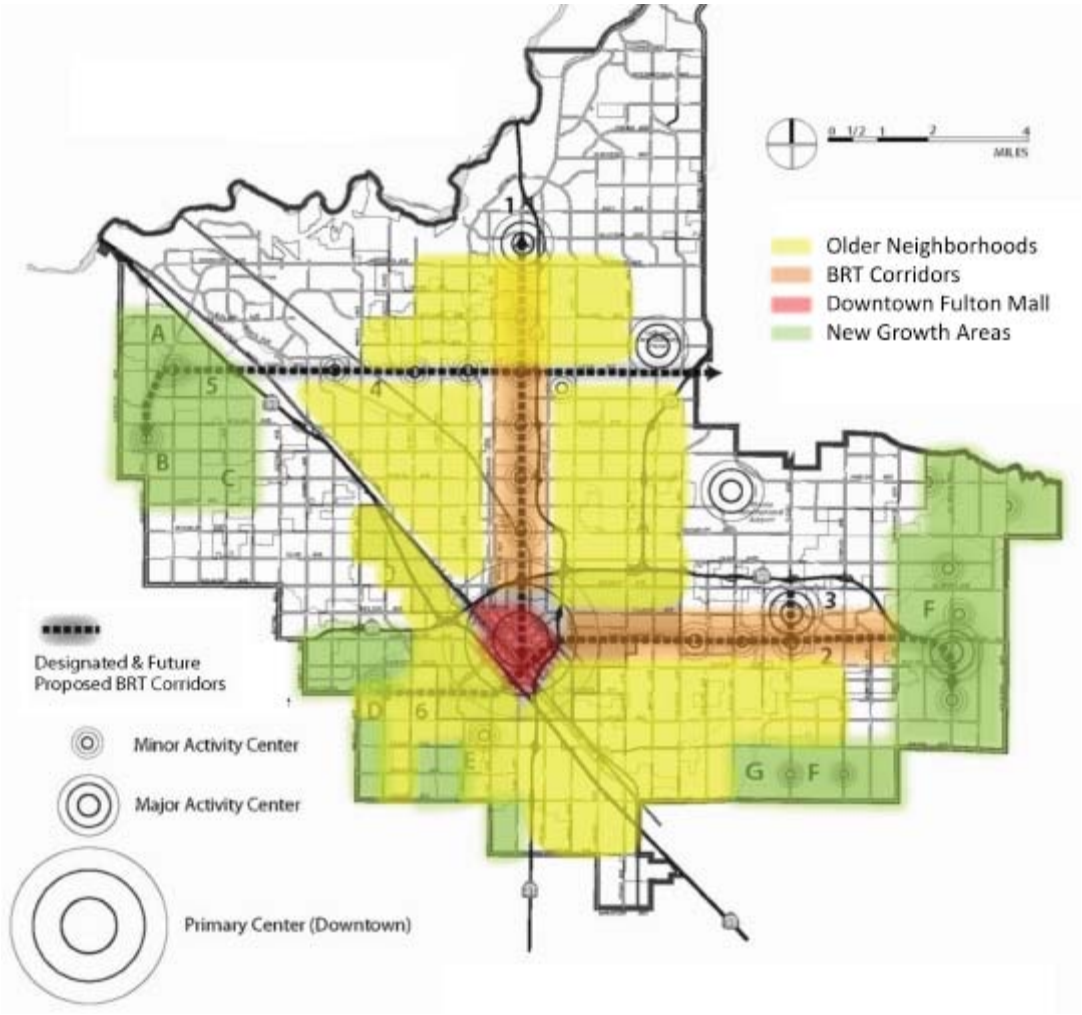
adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.

Policy UF-12-f **Mixed-Use in Activity Centers**. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.

Key GHG Plan Indicators

- The number of mixed use projects proposed
- The number of mixed use project constructed

Figure 10: City of Fresno Growth Areas and Proposed BRT Corridors



Pedestrian Oriented Development

Providing pedestrian-friendly infrastructure such as sidewalks, paths, and direct connections to neighboring uses such as shopping, schools, libraries, and parks increase the potential for people to make trips on foot instead of making a car trip. This strategy is consistent with the Complete Streets concept that aims to make streets safe for walking and bicycling.

Relevant General Plan Policies

Policy UF-12-e **Access to Activity Centers**. Promote adoption and implement standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.

Policy UF-12-f **Mixed-Use in Activity Centers**. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.

Objective UF-14 Create an urban form to facilitate multi-modal connectivity.

Policy UF-14-a **Design Guidelines for Walkability**. Use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.

Policy UF-14-b **Local Street Connectivity**. Design local roadways to connect throughout neighborhoods and large private developments with adjacent major streets and pathways of existing adjacent development. Create access for pedestrians and bicycles where a local street must dead end or be designed as a cul-de-sac to adjoining uses that provide services, shopping, and connecting pathways for access to the greater community area.

Policy UF-14-c **Block Length**. Create development standards that provide desired and maximum block lengths in residential, retail, and mixed-use districts order to enhanced walkability.

Policy D-3-c **Local Streets as Urban Parkways**. Develop local streets as "urban parkways", where appropriate, with landscaping and pedestrian spaces.

Policy D-4-b **Incentives for Pedestrian-Oriented Anchor Retail**. Consider adopting and implementing incentives for new pedestrian-friendly anchor retail at intersections within Activity Centers and along corridors to attract retail clientele and maximize foot traffic.

Policy MT-1-h **Update Standards for Complete Streets**. Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specifications reflect the Complete Streets concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.

Key GHG Plan Indicators

- Project compliance with General Plan Policies

Transit Oriented Development

Although limited transit service is now available in Fresno, long-term development trends for increasing density and mixes of uses can lead to improved transit service in those areas of the City over time. Higher densities when combined with pedestrian orientation encourage transit use. A key factor is that both ends of the transit trip must be walkable and have the potential to serve reasonably large numbers of transit riders. The City's proposed BRT system combined with plans to increase development densities at BRT stations and along the corridor are critical elements of the City's transit oriented development strategy.

Objective UF-12 Locate roughly one-half of future residential development in infill areas — defined as being within the City on December 21, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land..

Policy UF-12-a **BRT Corridors**. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.

Policy UF-12-b **Activity Centers**. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include Chapter 3: Urban Form, Land Use, and Design commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.

Key GHG Plan Indicators

- Comparison of development approved in infill areas versus non-infill areas
- Project designs consistent with General Plan policies

Transportation Facilities Strategies

The following are strategies related to transportation infrastructure and facilities that encourage the use of alternative modes of transportation such as walking, bicycling, and transit use. This strategy would be implemented through support for and funding of transit, bicycle, and pedestrian

connections, through transit and trail planning, and with regional cooperation among relevant agencies.

Transit Facilities

Transit facilities include bus stops, bus turnouts, multimodal transfer centers, and information kiosks. These facilities increase the comfort and convenience of using transit and minimize impacts on traffic flow from buses stopping for riders and re-entering traffic. Overall increases in transit service through the addition of new buses, new routes, and more frequent stops can also provide increased transit mode share. Transit facility improvements are often provided by development projects in new growth areas as conditions of approval and mitigation measures. The improvements can also be provided as retrofits on existing streets and upgrades to existing transit stops using transportation funding.

Relevant General Plan Policies

Objective MT-8 Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize environmental impacts.

Policy MT-8-a **Street Design Coordinated with Transit**. Coordinate the planning, design, and construction of the major street network with transit operators to facilitate efficient direct transit routing throughout the Planning Area.

Policy MT-8-b **Transit Serving Residential and Employment Nodes**. Identify the location of current and future residential and employment concentrations and Activity Centers throughout the transit service area in order to facilitate planning and implementation of optimal transit services for these uses. Work with California State University, Fresno to determine locations within the campus core for bus stops.

Policy MT-8-g **High Speed Train.** If the State moves forward with HST, ensure it is constructed through Fresno in a manner that minimizes impacts to surrounding property owners and creates the most opportunity for redevelopment around the HST station.

Objective MT-9 Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, frequent, reliable, and financially feasible.

Key GHG Plan Indicators

- Transit route expansions
- Transit ridership trends

Bicycle and Pedestrian Infrastructure

Adequate pedestrian infrastructure connecting frequently accessed destinations is critical to an increase in walking trips. Pedestrian infrastructure should be incorporated into project designs for new development, but also can be retrofitted in existing neighborhoods with barriers to walking such as lack of sidewalks or dangerous crossings.

Bicycle infrastructure including separate bicycle paths and bicycle lanes on roadways can increase the safety of cyclists and encourage the use of this travel mode. Bicycle paths designed to provide more direct connections shorten travel distances and maximize safety. Bicycle lanes are less costly and can more easily connect multiple destinations for cyclists. The City of Fresno has an aggressive program in place to construct bike lanes and paths throughout the city. All new development is required to comply with the Bicycle, Pedestrian, and Trails Master Plan. Most arterials are now equipped with striped bike lanes. The City has also been installing sensors in the bike lanes that will trigger traffic lights to change when no motor vehicles are present.

Relevant General Plan Policies

Objective MT-4 Establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.

Policy MT-4-a **Bicycle, Pedestrian and Trails Master Plan**. To the extent consistent with this General Plan, continue to implement and periodically update the Bicycle, Pedestrian, and Trails Master Plan to meet State standards and requirements for recommended improvements and funding proposals as determined appropriate and feasible..

Policy MT-4-b **Bikeway Improvements**. Establish and implement property development standards to assure that projects adjacent to designated bikeways provide adequate right-of-way and that necessary improvements are constructed to implement the planned bikeway system shown on Figure MT-2 to provide for bikeways, to the extent feasible, when existing roadways are reconstructed; and alternative bikeway alignments or routes where inadequate right-of-way is available.

Policy MT-4-c **Bikeway Linkages**. Provide linkages between bikeways, trails and paths, and other regional networks such as the San Joaquin River Trail and adjacent jurisdiction bicycle systems wherever possible.

Objective MT-5 Establish a well-integrated network of pedestrian facilities to accommodate safe, convenient, practical, and inviting travel by walking, including for those with physical mobility and vision impairments.

Policy MT-5-a **Sidewalk Development**. Pursue funding and implement standards for development of sidewalks on public streets, with priority given to meeting the needs of persons with physical and vision limitations; providing safe routes to school; completing pedestrian improvements in existing neighborhoods with lower vehicle ownership rates; or providing pedestrian access to public transportation routes.

Objective MT-6 Establish a network of multi-purpose pedestrian and bicycle paths, as well as limited access trails, to link residential areas to local and regional open space and urban Activity Centers in order to enhance Fresno's recreational amenities and alternative transportation options.

Policy MT-6-a **Link Residences to Destinations**. Design a pedestrian and bicycle path network that links residential areas with Activity Centers, such as parks and recreational facilities, educational institutions, employment centers, cultural sites, and other focal points of the city environment.

Policy MT-6-g **Path and Trail Development in Subdivisions**. Require all subdivision maps to incorporate planned multi-purpose path and trail development standards and corridor linkages consistent with the General Plan, applicable law and case-by-case determinations as a condition of tentative map approval.

Policy POSS-7-h **Interlink City and San Joaquin River Parkway Trail Networks**. Strive to connect the parkway trail network to other trails in the vicinity, in order to create a community and regional trail system that offers a variety of different route combinations and enhances public access to the parkway.

Key GHG Plan Indicators

- Bicycle, Pedestrian, and Trails Master Plan implementation progress (projects funded and constructed)
- Developer funded and constructed bicycle and pedestrian projects
- Compliance with General Plan policies and Development Code.

Traffic Calming Features

Design features and strategies to reduce vehicle speeds and reduce conflicts with pedestrians encourage more walking. Slower speeds encouraged by traffic calming can also improve safety and increase bicycling. Providing on-street parking, or street trees and landscaping to separate vehicles from pedestrians improve walkability.

Transportation Demand Strategies

These strategies provide programs and facilities that encourage employees to use alternative modes for commute trips.

Transportation Demand Management

Transportation Demand Management (TDM) refers to measures designed to reduce the demand for transportation facilities that are usually implemented at employment sites and event centers. These include programs targeting employee commute trips at the worksite such as vanpools, and incentives for alternative transportation and government-operated programs such as rideshare matching and outreach and incentives. Event center TDM measures involve the use of shuttles, encouraging carpooling, and staggering arrival and departure times to reduce congestion.

Large existing and new employers are required by existing regulations to implement TDM programs. The San Joaquin Valley Air Pollution Control District has adopted Rule 9410 Employer Based Trip Reduction, which requires employers with over 100 employees to implement trip reduction programs. The rule targets employee commute trips and requires large employers to implement measures that reduce VMT by increasing transit use, carpooling, vanpooling, bicycling, or other measures to reduce trips. The SJVAPCD estimates that the rule will reduce light-duty mobile source criteria pollutants by approximately 6.8 percent by 2023 (SJVAPCD 2009). Similar reductions in greenhouse gas emissions would also be achieved with the reduction in trips and vehicle miles traveled from the rule.

End-of-trip facilities include items such as showers and lockers for people who bicycle to work, secure bike parking, onsite services such as dry cleaning pick-up and cafeterias, and break rooms to reduce trips for errands and lunch. These are measures intended to increase the convenience and reduce potential negatives associated with bicycling to work and to eliminate the need for some trips during the workday. End-of-trip facilities are often included as design features in large projects to attract employees and may be selected by businesses as compliance options for Rule 9410.

Relevant General Plan Policies

Policy MT-10-c **Transportation Demand Management Guidelines**. Establish transportation demand management guidelines to allow for reduced off-street parking requirements.

Parking Measures

Providing limited parking is one of the most effective transportation measures. Use of parking structures and paid parking provide strong incentive to use alternative modes and to take advantage of carpools and vanpools. This measure would only apply in higher-density development areas, downtown, and mixed-use projects specifically designed for this strategy.

a

Relevant General Plan Policies

Policy MT-10-a **Updating Parking Standards**. Update off-street parking standards to reflect the context and location within activity areas of multiple uses and reductions appropriate for mixed residential and non-residential uses and proximity to existing or planned transit service.

Policy MT-10-b **Shared Parking**. Establish a strategy to promote the sharing of excess parking between uses within Activity Centers and BRT corridors, including specific provisions for this in the Development Code.

Policy MT-10-d **Parking Maximums**. Explore maximum off-street parking limits within Activity Centers proximate to BRT corridors, if such an Activity Center is determined compatible with promotion of a healthy and vigorous business environment.

Policy MT-10-f **Parking Benefit Districts**. Establish parking benefit districts to fund consolidated public parking where supported by local businesses.

Key GHG Plan Indicators

- Completion of parking standards update incorporating the policies.
- Projects with shared parking approved.

Electric Vehicle Charging Stations

Infrastructure to charge electric vehicles while at work or other destinations would allow longer distance commuters and other drivers to use electric vehicles without concern for running out of charge on the return trip. Quick-charge technologies are in development that can partially charge a car battery in 15 minutes. Once quick-charging stations are widely available, the range impediment of electric vehicles will be much less important.

The interim solution to battery range is hybrid vehicles that can run on electricity or conventional fuels. Plug-in hybrids have larger battery packs that allow vehicles to travel greater distances under battery power prior to use of the gasoline engine.

Relevant General Plan Policies

Policy RC-8-j **Alternative Fuel Network**. Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.

Key GHG Plan Indicators

- Completion of EV charging stations and alternative fuel stations

Energy Conservation Strategies for New and Existing Buildings

Improving energy efficiency in new and existing buildings and facilities provides one of the most cost-effective strategies for reducing greenhouse gases. The energy savings from improved energy efficiency can often pay for the cost of the upgrades and retrofits over time. These strategies are implemented through the promotion of energy- and water-efficient buildings (e.g., LEED buildings and/or exceeding Title 24 standards) through green building ordinances, project timing, prioritization, and other implementing tools.

Energy Efficiency in New Buildings

New projects can exceed Title 24 Energy Efficiency Standards for new residential and non-residential buildings. The amount of reductions in energy use can be related to voluntary tier levels contained in Title 24 or through use of outside certifying programs such as LEED, EnergyStar or Greenpoint Rating systems. It should be noted that meeting LEED standards does not necessarily mean that a project would comply with Title 24, so additional measures may still be required for some projects to meet regulatory requirements. The state's ultimate goal is for new buildings to achieve "net zero" energy consumption. Net zero requires a combination of high efficiency buildings and energy self-generation through solar power or other means. Once net zero buildings become the norm, opportunities for reductions from new building energy efficiency become limited. Locations and building designs that are not suitable for onsite generation will not be able to achieve net zero energy consumption with currently available technologies. For those sites, offsite generation in common areas or through purchase of energy generated by zero emission facilities may be used.

Key General Plan Policies

Objective RC-8 Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

Policy RC-8-a **Existing Standards and Programs**. Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.

Policy RC-8-b **Energy Reduction Targets**. Strive to reduce per capita residential electricity use to 1,800 kWh per year and nonresidential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings.

Policy RC-8-c **Energy Conservation in New Development**. Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.:

Policy RC-8-d **Incentives**. Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Policy RC-8-e **Energy Use Disclosure**. Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

Key GHG Plan Indicators

- Title 24 compliance reports demonstrating projects meet or exceed regulatory requirements
- Project CEQA documents include discussion of energy conservation design features
- Periodic compilation of building energy efficiency reports for comparison with Plan goals

Energy Efficiency in Existing Buildings

Older buildings that were constructed prior to the adoption of Title 24 or that were constructed when early versions of Title 24 were in place provide significant opportunities for cost-effective energy retrofits. Most current energy retrofit programs are voluntary incentive based programs. The State of California and the federal government have from time to time offered tax credits and deductions for energy retrofits. Public utilities also offer energy efficiency rebates for projects such as whole-house fans, insulation, weatherization, and other actions that reduce energy consumption in residential and commercial buildings. Some jurisdictions have proposed mandatory energy efficiency retrofits at time of sale; however, those programs are currently considered by many to be infeasible because of the loss of equity experienced by many homeowners at the time of sale, especially when housing values are low.

In January 2011, the City Council unanimously approved the adoption of the California Property Assessed Clean Energy (PACE) program administered by figtreecompany.com for the City of Fresno. PACE is helping property owners improve their energy efficiency and save money. PACE utilizes bond financing to provide property owners fixed-rate, property-based, no-money-down financing for energy and water efficiency retrofits to their properties, significantly reducing energy bills and expenses with instant cost savings.

Key General Plan Policies

Policy RC-7-i **PACE Financing**. Develop a residential Property Assessed Clean Energy (PACE) program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.

Key GHG Plan Indicators

- Progress in implementing the PACE program
- Report on types and numbers of projects funded

Self Generation using Solar Panels and Solar Hot Water Systems

The City of Fresno's location and climate is excellent for solar electric generation and hot water systems with an average of 262 sunny days per year. Residential and commercial projects can include solar-ready roofs to allow future installation of solar panels or provide solar panels at the time of construction. Solar panel technology is becoming increasingly efficient in terms of power production and costs have declined substantially in recent years. Not all locations and project settings are conducive to solar power production, and cost-effectiveness is currently dependent on the receipt of incentives in most cases. Sites with the potential for other structures or trees shading the panel location greatly reduce feasibility. The projects also often require net metering where surplus power generated by the panels is sold to the utility and power is purchased from the grid during periods of low production or high usage. The utilities are only required to accept a limited amount of solar photovoltaic (PV) distributed generation into their systems each year. If limits are exceeded and net metering is not allowed, the systems become less feasible.

Solar hot water systems have been used for residential water heating for many years and are especially popular for residences with swimming pools to extend the days per year when the pool can be used. Another option for hot water is to use tankless, electric water heaters. These are increasingly used in new development. Tankless heating saves water and energy because it is not necessary to run the water for long periods for the water to arrive from the hot water tank to the faucet as is the case with the conventional water heaters.

Key General Plan Policies

Policy RC-8-h **Solar Assistance**. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Key GHG Plan Indicators

- Projects permitted

Water Conservation Strategies

Northeast Fresno Surface Water Treatment Plant

Water pumping and transport consumes approximately 20 percent of all energy used in California. Measures to reduce water consumption through improved efficiency in plumbing fixtures and landscaping can result in substantial savings compared to past practices. In some cases, it may be feasible to go beyond the water efficiency standards in the California Green Building Code and the Model Water Landscape Efficiency Ordinance with new construction. Water reuse and recycling through non-potable "purple pipe" systems may reduce energy consumption for water transport; however, the City has determined that construction of such a system from the Fresno/Clovis Regional Water Reclamation Facility (RWRF) back to the urban area is currently infeasible because of cost and practicality. The use of recycled water should focus on new and existing large green spaces, industrial uses, and new development. However, the development of a gray water policy for the residential reuse of wastewater for household gardening and landscape irrigation on site may be feasible. Water users that implement these measures or purchase buildings and homes that include these features will benefit from savings in their water bills.

Key General Plan Policies

Policy RC-6-d **Recycled Water**. Prepare, adopt, and implement a City of Fresno Recycled Water Master Plan.

Objective RC-7 Promote water conservation through standards, incentives and capital investments.

Policy RC-7-a **Water Conservation Program and 2035 Target**. Maintain a comprehensive conservation program that reduces per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees.

- Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving

programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.
- Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements.
- Adopt and implement policies in the event an artificial lake is proposed for development.
- Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area.
- Expand efforts to educate the public about water supply issues and water conservation techniques.

Policy RC-7-d **Update Standards for New Development**. Continue to refine water saving and conservation standards for new development.

Policy RC-7-f **Implementation and Update Conservation Program**. Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City's Water Conservation Program.

Policy RC-7-h **Landscape Water Conservation Standards**. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other State regulations.

- Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance.
- Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.

Key GHG Plan Indicators

- Track per capita water use with collected meter data and normal reporting
- Progress in updating the Water Conservation Program

Waste Diversion and Recycling and Energy Recovery

Programs and actions that promote recycling and diversion of waste from landfills can reduce energy consumed in the transport and handling of the waste material and can reduce the greenhouse gases that are emitted during the decomposition of organic waste.

The State of California has adopted increasingly stringent mandates for the percentage of solid waste that can be disposed in landfills. Programs that require or encourage further reductions in waste beyond mandates will result in greenhouse gas reductions from this source. Certain landfills are mandated to install methane capture systems. Methane is a powerful greenhouse gas that is 21

times more effective than carbon dioxide in retaining heat in the atmosphere. The methane can be flared, producing mainly carbon dioxide or used in combustion devices to generate heat or power that can be used for productive purposes displacing the use of fossil fuels.

Relevant General Plan Policies

Policy PU-9-a **New Techniques**. Continue to collaborate affected stakeholders and partners to identify and support programs and new techniques of solid waste disposal, such as recycling, composting, waste to energy technology, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.

Policy PU-9-b **Compliance with State Law**. Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.

Policy RC-11-a **Waste Reduction Strategies**. Maintain current targets for recycling and re-use of all types of waste material in the city and enhance waste and wastewater management practices to reduce natural resource consumption, including the following measures:

- Continue to require recyclable material collection and storage areas in all residential development.
- Establish recycling collection and storage area standards for commercial and industrial facilities to size the recycling areas according to the anticipated types and amounts of recyclable material generated.
- Provide educational materials to residents on how and what to recycle and how to dispose of hazardous waste.
- Provide recycling canisters and collection in public areas where trash cans are also provided.
- Institute a program to evaluate major waste generators and identify recycling opportunities for their facilities and operations.
- Continue to partner with the California Integrated Waste Management Board on waste diversion and recycling programs and the CalMax (California Materials Exchange) program.
- Evaluate the feasibility of a residential, restaurant and institutional food waste segregation and recycling program, to reduce the amount of organic material sent to landfill and minimize the emissions generated by decomposing organic material.
- Evaluate the feasibility of "carbon footprinting" for the City's wastewater treatment facilities, biomass and composting operations, solid waste collection and recycling programs.
- Expand yard waste collection to divert compostable waste from landfills.
- Study the feasibility and cost-benefit analysis of a municipal composting program to collect and compost food and yard waste, using the resulting compost matter for City park and median maintenance.

Policy RC-4-i **Methane Capture**. Continue to pursue opportunities to reduce air pollution by using methane gas from the old City landfill and the City's wastewater treatment process.

Policy RC-11-b **Zero Waste Strategy**. Create a strategic and operations plan for fulfilling the City Council resolution committing the City to a Zero Waste goal.

Key GHG Plan Indicators

- Progress reports on achieving State mandated waste reduction and diversion goals
- Adoption of commercial and industrial recycling area and storage standards
- Adoption of the Zero Waste Strategy

Wastewater

Fresno/Clovis RWRF

Wastewater treatment can produce methane emissions that are a powerful greenhouse gas, but it also provides a valuable renewable energy source when scrubbed of harmful components. Fresno currently operates a major regional secondary treatment plant and reuses water primarily for agricultural purposes. The City has one tertiary treatment facility at the Copper River development in north Fresno that provides water for a golf course and shared landscaped areas. Tertiary treatment of wastewater can allow its use for safely watering landscaped areas such as highway medians, parks, and golf courses using so-called "purple pipe" systems. Tertiary treatment systems can use substantial amounts of energy, so energy savings from less water pumping must be balanced with the energy costs of treating the water and pumping to where it is used. Wastewater treatment plants such as the Fresno/Clovis RWRF with anaerobic digesters capture the methane produced during the treatment process for productive use such as generation of electricity or process heat to offset some of the plant's power consumption.

Relevant General Plan Policies

Objective PU-7 Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.

Policy PU-7-a **Reduce Wastewater**. Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.

Policy PU-7-d **Wastewater Recycling**. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely

technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.

Key GHG Plan Indicators

- Progress in adopting wastewater reduction programs
- Feasibility studies regarding future tertiary treatment/recycling options

Community Involvement and Outreach

Many of the strategies listed above will be more effective if there is community involvement and outreach to engage the citizens. This strategy requires public awareness of the measures available for them to take effective action at reducing their energy use and carbon footprint.

Measures and programs that reduce greenhouse gas emissions are often operated at the regional level. Many modes of transportation operate at the regional level, because people travel throughout the region. Regional cooperation provides a venue for sharing knowledge and resources to help address a variety of issues, including climate change and greenhouse gas emissions.

Relevant General Plan Policies

Policy RC-7-g **Educate on State Requirements**. Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.

Policy RC-8-h **Solar Assistance**. Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.

Policy RC-8-k **Energy Efficiency Education**. Provide long-term and ongoing education of homeowners and businesses as to the value of energy efficiency and the need to upgrade existing structures on the regular basis as technology improves and structures age.

Key GHG Plan Indicators

- Progress reports on education and outreach programs.
- Number of solar panel installation permits issued

Municipal Strategies

The City of Fresno has a comprehensive set of strategies specifically targeted at greenhouse gas emissions generated at city-owned facilities and from city operations. The strategies identified by the City include the following measures intended to improve energy efficiency in buildings and equipment owned by the City, alternative fuels for city vehicles and equipment, and water conservation:

- Improve energy efficiency in city operations.
- New city buildings exceed Title 24 energy efficiency standards.
- Install renewable energy systems on city facilities.

- City operated transportation demand management for city employees.
- Purchase green vehicles for city fleets.
- Enhance reduction, recycling, and reuse efforts at city facilities.
- Implement water efficient landscaping in city parks and facilities.

Relevant General Plan Policies

Policy RC-7-c **Best Practices for Conservation**. Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate.

Policy RC-7-e **Retrofit City Facilities, and Consider Incentives Programs for to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites.** Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.

Policy RC-8-f **City Heating and Cooling**. Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.

Policy RC-8-g **Revolving Energy Fund**. Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.

Key GHG Plan Indicators

- Progress reports from responsible departments on conservation efforts
- Progress on creating a City Energy Fund
- Identification and recognition of major individual conservation projects

Regional Urban Forestry Program

Trees provide shade that can reduce the urban heat island effect caused when pavement and other open surfaces absorb solar radiation and re-radiate heat to the surrounding environment. The shade can reduce energy required for cooling. Trees also store carbon as they grow, in a process referred to as sequestration. Emission reductions from urban forestry projects must consider the life cycle emissions such as tree maintenance and the ultimate disposition of trees at the end of their lives to ensure that they produce a net decrease in greenhouse gas emissions.

The City maintains trees in parks and other publicly owned landscaped areas. These areas may provide an opportunity for new tree planting or replacement of tree species that possess a low potential to store carbon, with tree species that possess higher carbon storage potential. Guidance for managing urban forests is available from a number of sources. The Climate Action Reserve, Urban Forest Project Reporting Protocol (CAR 2008) provides criteria for generating greenhouse gas

emission offsets with tree planting along with procedures for project monitoring. ICLEI's Urban Forestry Toolkit for Local Governments provides a series of fact sheets and case studies that communities can use to design an effective urban forestry program (ICLEI 2006).

Relevant General Plan Policies

Policy POSS-1-g **Regional Urban Forest**. Maintain and implement incrementally, through new development projects, additions to Fresno's regional urban forest to delineate corridors and the boundaries of urban areas, and to provide tree canopy for bike lanes, sidewalks, parking lots, and trails.

Key GHG Plan Indicators

- Track change in urban tree cover over time.

Other Municipal Strategies

Energy Savings from Traffic and Street Lighting

The City plans to replace lighting fixtures with more efficient LED or other technology whenever possible. According to a report prepared by PG&E, Phase II LED luminaires provided power savings of 36 percent compared with high-pressure sodium luminaires, and the newer Phase III LED luminaires provided 52 percent savings (PG&E 2008).

Low-Emission City Fleet Vehicles

The City operates vehicles used by the FAX bus fleet, the Solid Waste Division, the Police Department and for maintenance and other purposes. The City has already converted a significant number of buses and refuse hauling trucks to compressed natural gas (CNG) and liquefied natural gas (LNG). FAX operated 81 alternatively fueled CNG buses in 2013. The City's entire fleet of garbage trucks is run by LNG. Most other vehicles in the City fleet are powered by gasoline and diesel fuels. The City will replace vehicles with the lowest-emission technology that fulfills the work requirements and that is cost-effective as the current fleet reaches the end of its useful life. The full life cycle reductions in greenhouse gases are 23 to 24 percent for CNG buses and 11 to 16 percent for LNG trucks compared with diesel (CEC 2007).

Green Purchasing

The City makes purchases typical for city government operations such as vehicles, computers, paper, and materials required to maintain the City's infrastructure. The City's natural gas fleet vehicles provide good examples of its past green purchasing practices.

Municipal Water Conservation

The City has implemented water saving measures at most public parks, and other landscaped areas maintained by the City. The General Plan Policies listed in the Water Conservation Strategies section apply to municipally operated facilities.

Strategies for Existing Development

The GHG Plan strategies described above are implemented in two ways. New development projects are proposed and constructed consistent with the General Plan and GHG Plan. Existing residents and businesses comply with regulations that apply to everyone and participate in new and existing programs and measures. People living in existing residential development also share the benefits of the land use strategies applied at work places and commercial areas that are walkable and transit oriented. The strategies that apply directly and indirectly to existing development are shown in Table 12.

Table 12: Strategies for Existing Development

Strategy	How it Applies
Transportation Demand Management (TDM)	TDM is implemented at existing and new businesses and can also reduce trips from new and existing housing where employees live.
Expanded Transit Service	Improved transit service will encourage increased ridership from new and existing development.
Improved Transit Stations	Transit stations service a wider community area that includes new and existing development.
Traffic Calming Retrofits	Traffic calming designs can be retrofitted on existing roads or built in new development.
Complete Streets Program	Complete streets connect existing and new areas.
Parking Management	Parking management at new and existing employment centers encourages trip reductions from all residential development

Table 12 (cont.): Strategies for Existing Development

Strategy	How it Applies
Energy Retrofits	Educational and incentive programs encourage existing residents and business owners to install energy retrofits providing large benefits in older structures.
Bicycle and Pedestrian Improvements on Existing Roads	Bicycle paths and lanes can be retrofitted on existing roads and sidewalks and pedestrian paths can connect existing neighborhoods with appropriate destinations.
Bicycle Parking Facilities	Bicycle parking can be added to existing businesses if needed to satisfy demand by employees and customers.
Water Conservation Programs	Educational and incentive programs encourage existing residents and businesses to conserve water.
Recycled Water Use in Existing Parks	Recycled water can be piped to any area retrofitted or initially developed with a "purple pipe" system to distribute recycled water.

Recycling Programs	Operational programs such as recycling apply to all residents and businesses in the City.
Electric Vehicle Charging	Charging stations can be installed in existing development as a retrofit or in new development.
Measures That Apply to New Development but Indirectly Benefit Existing Development	
Transit and Pedestrian Oriented Development	Transit and pedestrian oriented development provides destinations that encourage transit use from existing development and walking once people arrive.
Mixed Use Development	Mixed-use development creates a more walkable environment conducive to transit use for trips from existing development.
Compact Development	Making the City more compact shortens average trip lengths for residents and creates more opportunities for transit.
Traffic Flow Improvements	Transportation improvements that reduce congestion and improve flow can reduce emissions from both existing and new development.

5.2 - Reduction Potential from Local Measures

Reductions beyond state regulations will be achieved through the development of the land use pattern and transportation system envisioned by the General Plan, enforcement of city ordinances and design standards, and direct reductions from energy conservation projects, and alternative fuels use.

The effectiveness of the GHG land use strategy is dependent on several factors. The first factor is the rate of population growth. Rapid population growth has two contradictory effects. First, the overall growth in emissions will increase substantially in high growth areas; however, the per capita emissions in high growth areas will be lower. This is because a larger percentage of the population will live in areas of the city with energy efficient homes and businesses, and better transportation options than the slow growing or built out counterparts. On a citywide basis, faster-growing cities will build out neighborhoods and shopping centers more rapidly, providing more work and shopping opportunities close to home and shorter travel distances.

The second factor is economic. The type and scale of development projects will vary depending on market forces and the state of the economy in future years. Market forces affect the amount of single-family development compared to multifamily development. A vibrant economy will tend to create more jobs and increase in migration.

The amount of trips and miles traveled varies substantially between highly urban areas and suburban and rural areas. Frequent bus, light rail, or commuter train service requires high development densities to provide adequate ridership to support the service. The reductions that can be achieved by pedestrian orientated development and transit oriented development vary widely based the density and design at both ends of the trip.

5.2.1 - Mobile Source Reductions

Land Use Strategy. SB 375 required the ARB to set regional targets for reductions from light duty passenger vehicle emission. After a lengthy review process and input from the regional transportation planning agencies, the ARB adopted a Fresno County target reduction in passenger vehicle CO_2 per capita of 4.7 percent by 2020 and 7.6 percent by 2035. The key strategies envisioned include:

- Combination of density increase, mixed uses, and infill
- Growth along major corridors and activity centers

The land use strategies are expected to reduce trip generation and vehicle miles traveled to achieve the percentage reductions based on modeling results from the regional transportation model for the General Plan Update land use scenario. The City of Fresno is participating in the SB 375 SCS process to more closely define the growth areas that would be part of the SCS and qualify for CEQA streamlining provisions.

A 4.7 percent reduction in light duty passenger cars and truck emissions by 2020 would provide approximately 55,400 $MTCO_2e$/year. A 7.6 percent reduction in 2035 would provide reductions of approximately 81,700 $MTCO_2e$/year.

Emission reductions at the individual project level would be substantially larger than the amounts estimated for as the overall reduction for SB 375 compliance. CAPCOA estimates that land use and transportation measures in a suburban setting can reduce emissions by a global maximum of 15 percent and 20 percent in a suburban center. Projects approaching the maximum reductions would be in locations served by frequent transit with complete pedestrian and bicycle infrastructure and multiple destinations such as retail and commercial service within walking distance.

Transportation Demand Management. The General Plan encourages transportation demand management (TDM) at projects that are large employers. The SJVAPCD Rule 9410 – Employer Trip Reduction would provide at 1.6 percent emission reduction in 2020 and 2035 through reduced trips and vehicle miles traveled.

A 1.6 percent reduction in 2020 would provide a 28,800 $MTCO_2e$/year emission reduction. The 1.6 percent reduction for 2035 would result in a 27,200 $MTCO_2e$/year emission reduction.

5.2.2 - Energy Efficiency Reductions

Building Energy Efficiency. The City supports the State's efforts to achieve net zero energy consumption in new residential and non-residential buildings. Achieving net zero is currently possible in some buildings with the use of onsite solar to offset the electricity consumption from the grid. The 2013 Title 24 standards that go into effect on July 1, 2014 are substantially more stringent than the 2008. With no experience implementing the new standards, it would be speculative to assume that all projects would be capable of exceeding the standard by a certain percentage.

General Plan Policy RC-8-b includes a city target to strive to reduce per capita residential electricity use to 1,800 kWh per year and nonresidential electricity use to 2,700 kWh per year per capita. This

would result in a 28 percent and a 30 percent reduction, respectively, from 2010 rates of consumption. Since the target includes both existing and new development, a direct comparison to Title 24 mandates is not possible.

The City encourages developers to achieve the voluntary tier levels from the California Public Utilities Commission (CPUC) Energy Efficiency Strategic Plan, which ultimately lead to net zero energy consumption for residential development by 2020 and non-residential development by 2030. However, use of solar to offset energy consumption to achieve the voluntary tier reduction levels is feasible for projects with suitable solar orientation and roof design. Once Title 24 mandates net zero energy consumption, no further reductions beyond regulation can be achieved by projects.

Water Conservation. The California Water Conservation Act mandates a 20 percent reduction in water usage by 2020. The City has a reduction target of per capita water usage in the City's water service area to 230 gpd per capita (25 percent below the current consumption rate) in 2035. The City will meet the reduction target with measures applicable to new and existing development. Reductions beyond the state mandated 20 percent are possible with the use of building and landscaping water conservation features. The reductions from buildings can be achieved with high-efficiency toilets, low-flow showers and faucets, and water-efficient appliances such as clothes washers and dishwashers. Water savings from landscaping would be achieved primarily through the use of synthetic ('turf') lawns, drought-tolerant landscaping or xeriscaping. The City is also proposing General Plan Policy RC-7-b that requires a tiered water cost structure to cover the true cost of the water supply. Example measures and water savings estimates are provided below.

5.2.3 - Indoor Water Conservation Measures

Hot water pipe insulation: Insulate hot-water pipes, and separation of hot and cold piping to avoid heat exchange. Water savings: 2,400 gallons per residential unit per year. Cost: $50/unit.

Pressure reducing valves: Pressure reducing valves maintain pressure below 60 psi reducing volume of any leakage present and preventing excessive flow from all appliances and fixtures. Water savings: 1,800 gallons per residential unit per year. Cost: $100 per unit.

Water-Efficient Dishwashers: Install Energy Star-certified units. Water savings: 650 gallons per residential unit per year.

Dual Flush Toilets. Provides option to flush with partial (0.8 gallon) flow of water or with a full (1.6 gallons) flow depending on need. Water savings: 4,000 gallons per year per toilet. Cost: $200 per toilet; however, retrofit kits are available for under $20.

High-efficiency Washing Machines: Use front loading and top loading Energy Star-qualified clothes washers that use 35 to 50 percent less water than conventional washing machines. Water savings: 7,000 gallons per year. Cost: $800 for a high-efficiency washing machine.

Point-of-Use or Tankless Water Heaters: Install small water heaters close to the point of use, such as bathrooms, kitchen, and laundry area. Water savings: 5,300 gallons per residential unit per year.

Cost: $700 for point of use water heaters. However, the cost is approximately the same for one large unit or three smaller ones.

Outdoor Water Conservation Measures:

Evapotranspiration (ET) Controllers: Irrigation scheduled by actual plant ET rates. Water savings: 20,000 gallons per single-family unit per year. Cost: $175 per controller and $48 per year in maintenance.

Water-Efficient Landscaping: Use drought tolerant plants and compliant irrigation systems and controllers. Water Savings: Up to 50 percent of outdoor use (12,000 gallons/year from a 2,100-square foot landscaped area. Cost: similar to conventional landscaping.

Xeriscape. Xeriscaping is a combination of seven principles, planning and design, practical turf areas, efficient irrigation, soil analysis and improvement, mulching, low-water-use plants, and appropriate maintenance. Water savings: 30 percent reduction in irrigation demand or about 16,000 gallons per year on a typical single-family lot. Cost: similar to conventional landscaping.

Estimates of water savings and costs are from the City of Chula Vista Water Conservation Plan Guidelines adopted in 2003.

5.2.4 - Energy Savings from Water Conservation

The combined benefits of indoor and outdoor water conservation program are estimated at 20 percent in 2020 to achieve compliance with state-mandated reductions and 25 percent by 2035 to meet the General Plan Update target. Reductions in water use reduce electricity consumed for pumping, treatment, and transport of water by proportional amounts. Reductions in water use by these amounts would provide emission reductions of 5,975 $MTCO_2e$/year by 2020 and 8,891 $MTCO_2e$/year by 2035.

5.2.5 - Waste Diversion and Recycling Reductions

The City of Fresno will meet or exceed the state-mandated 75 percent diversion target by 2020. The ARB estimates that statewide reductions of 20 to 30 $MMTCO_2e$ will be achieved through this strategy. The City of Fresno has achieved substantial progress to date. The City per capita baseline based on the 2002 to 2004 average is 6.6 pounds per day per person. The 2010 per capita rate was 3.7 pounds per day per person. The 75 percent diversion target would require a per capita rate of 1.65 pounds per person per day by 2020. Achieving net zero waste would provide additional reductions from this sector; however, no reductions are estimated pending adoption of a state mandate. Estimated emission reductions from achieving the 75 percent mandated diversion target are 74,886 $MTCO_2e$ per year in 2020 and 90,043 $MTCO_2e$ in 2035.

5.2.6 - Summary of Reductions from Local Measures

Table 13 summarizes the local reductions from the measures described above.

Table 13: Reductions from Local Measures

Sector	Local Measures	Emissions (MTCO2e/year)	
		2020	2035
Motor Vehicles	General Plan Land Use Plan (transportation and land use strategies)	50,275	81,734
	Transportation Demand Management (Rule 9410)	17,115	17,207
	Subtotal	*67,390*	*98,941*
Water - Electricity	Achieve mandated water reductions and General Plan policy objectives (20%/2020 and 25%/2035)	5,975	8,981
	Subtotal	*5,975*	*8,981*
Waste	Achieve 75 percent diversion/recycling mandate	74,886	90,043
	Subtotal	*74,886*	*90,043*
	Total	**164,079**	**197,966**
Source: FCS, 2014 (MEIR Appendix B).			

SECTION 6: DEVELOPMENT PROJECT REQUIREMENTS

This section describes the actions that individual development projects are required to implement in order to qualify for CEQA streamlining and to demonstrate that the project would not result in significant greenhouse gas impacts. Projects that have completed all environmental review prior to adoption of the GHG Plan must comply with regulations in effect at the time of construction and with conditions of approval that were required during review of the tract map, site plan, or conditional use permit approved by the City. This means that all development will help meet the City's greenhouse gas reduction targets.

6.1 - Projects Exempt from CEQA

Projects that have already completed the CEQA process and only require building permits have no requirements beyond applicable regulations such as the Uniform Building Code, Title 24 Energy Efficiency Standards, the City Development Code, and other City Ordinances.

City Development Code. (Consult the Development Code for requirements for each type of project.) Examples include:

- Street Design (complete streets) (applies if project involves street improvements)
- Pedestrian Improvements (sidewalks, paths, connections, etc.)
- Bicycle Lanes and Paths (consistent with Bike Master Plan)
- Bicycle Parking (Commercial)
- Enforce Building Code Requirements (Green Building Code)

State Regulations. (Project buildings must meet Title 24 energy performance standards and Green Building Code standards in effect at the time of construction.)

6.2 - Projects Requiring a Discretionary Approval

Projects requiring a discretionary approval from the City must comply with CEQA provisions related to greenhouse gas emissions. Projects that are consistent with a greenhouse gas (GHG)reduction plan meeting certain criteria are considered CEQA-compliant for greenhouse gas impacts. The following review process is proposed:

6.2.1 - New Discretionary Development Approval Process to Determine Consistency with GHG Reduction Plan

1. Review General Plan Policies listed in the GHG Plan to determine applicability to the project.
2. Incorporate design features or mitigation measures into the project as needed to demonstrate consistency.
   a. Street and pedestrian design complies with complete streets concepts.
   b. Review project against Development Code for mandatory design features required for the project.

c. Consider alternative energy generation (solar) if appropriate for the project and site. (The State is working towards zero net energy development that will require increasing efficiency and self generation over time).
d. Review water conservation building and landscape design features for compliance with City water conservation standards.

3. Implement project design features suitable for the development type and location.
   e. Projects within core/center areas and BRT corridors should meet minimum density and design requirements to ensure pedestrian and transit orientation is met.
   f. Maintain and enhance connections to regional bikeways and trail system.

4. Complete the latest version of the Fresno Green Residential or Non-Residential Checklist
   g. Meet the Fresno Green checklist point requirements.
   h. Alternatively, meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Programs, or qualify for Build It Green's GreenPoint rating system for residential building.

6.2.2 - New Discretionary Development requiring a General Plan Amendment

1. Comply with all of the measures listed above for ministerial and discretionary projects.
2. Ensure that change in land use designation would not result in a significant increase in GHG emissions compared to the existing designation (would require a GHG technical study to quantify GHG emissions and benefits of project design features).
3. Projects currently designated for residential or commercial development that increase development densities and intensities and comply with all other relevant General Plan policies and City design standards are considered to have less than significant GHG impacts.
4. Emissions from stationary sources for new industrial projects are not considered in the significance determination; however, emissions from motor vehicles trips generated by the project and energy efficiency of the building are considered.
5. Projects that propose decreases in development densities or intensities requiring a General Plan will require analysis to determine the impacts on the General Plan land use strategy and must identify mitigation measures to reduce greenhouse gas emissions beyond those required by regulation if needed.

6.2.3 - Projects within Downtown Plan, BRT Station Area, SCS Plan Area

Projects that are consistent with the land use and development densities specified by the applicable plan and that comply with design standards for those areas would be considered to have less than significant impacts on climate change.

SECTION 7: GHG PLAN IMPLEMENTATION MONITORING

The GHG Plan is designed so that it can be monitored, updated, and its effectiveness measured on an annual basis towards meeting a target for reduction of greenhouse gas emissions in 2020 and to measure further progress through buildout of the General Plan in 2056. More detailed analysis of benchmarks and performance indicators should be accomplished on a 3 to 5-year basis to fully diagnose and correct issues arising during implementation. The reporting required for the General Plan provides a good venue for monitoring the GHG Plan. California Government Code Section 65400 requires the City to prepare and submit an annual report on the status of the General Plan and progress in its implementation to the City Council, the Governor's Office of Planning and Research, and the Department of Housing and Community Development.

7.1 - Key Indicators

Changing the development pattern of a city is a long incremental process. Individual development projects often take years to complete. Large new development areas build out gradually and can take many years to provide the full range of residential, commercial, and institutional projects needed to achieve the ultimate vision for the neighborhood or plan area. Diligence is required to maintain the vision over time and patience is required for the vision to come to fruition. Tracking and assessing progress implementing the GHG Plan helps the community to determine if the cumulative actions over the previous reporting period are consistent with the vision. Identifying key indicators of success can help the City focus on the most important trends and milestones and document the progress.

Three Indicator Categories. The key indicators proposed for the GHG Plan fall into three categories. The indicators in the first category are those that are measureable on an individual project or building basis. These are usually physical improvements with energy savings, solar panels, or alternative fuel projects. The second category includes incremental land use changes such as project density and compliance with design standards that affect motor vehicle travel. The second category indicators typically require the passage of time and consideration of projects in context of neighborhoods, or growth areas to assess their effectiveness. The third indicator category includes the development of programmatic measures such as public education and outreach programs, energy and water conservation programs, recycling and composting programs, etc. For programmatic measures, the indicators initially track program development, and once operational, change to measuring program effectiveness in encouraging the desired behavior changes or actions.

Land Use Measures are Location Sensitive. The effectiveness of land use measures is highly context-sensitive. Projects must implement design features that best fit with the location and the use. For example, many design features that are appropriate for a high-density, mixed-use neighborhood are not appropriate for a low-density, single-family neighborhood. The City is planning for the entire community, so the reductions are averaged across the entire area to achieve an overall goal. Some areas will provide reductions below the goal and others will achieve over the goal, but on average, the City will achieve the needed reductions.

7.1.1 - Tracking and Monitoring of Performance Indicators

As part of the annual report to the City Council on progress in implementing the General Plan, staff will report on benchmarks achieved that implement goals, objectives, and policies having air quality, climate change, and sustainability benefits. The City will use its Geographic Information System to provide up-to-date land use and development data and tracking for other metrics or quantitative measures of success. Data should be reported annually. Results from past years should be summarized to show trends. Table 14 proposes performance indicators and benchmarks.

Table 14: GHG Plan Performance Indicators

Measure	Performance Indicator	Timeframe
Energy-Related		
Building Energy Efficiency	Title 24 Compliance Reports (percent over requirement)	Compile annually
Solar Installations (PV and Water Heaters)	Systems installed and kW/therms per system (building permits)	
Energy Retrofits (voluntary)	Type of retrofit (insulation, windows, whole house fans, etc.) (building permit data)	
Water Conservation		
Building Water Efficiency	Plan check results (buildings complying with standards for toilets, faucets, etc)	Compile annually
Outdoor Water Efficiency	Landscaping plan reviews (number of projects/area of coverage	
Solid Waste		
Recycling and diversion	Tons of waste to landfill compared to regulatory per capita baseline	Annual reports
Alternative Fuel Vehicles		
Municipal Fleet Vehicles	Number and type of alternative fueled vehicles purchased	Compile annually
Fueling/Charging Infrastructure	Infrastructure projects completed and fuel type	
Land Use Measures		
Compact development/ Infill	Building permit statistics (No. of units, units/acre, FAR)	Compile annually
	Plans/Maps approved (average density, location – infill, growth area	
	Change in inventory of approved vacant parcels by land use designation	

Table 14 (cont.): GHG Plan Performance Indicators

Measure	Performance Indicator	Timeframe
Transit and Pedestrian Oriented Development	Plans/Maps approved in growth areas designated for transit and pedestrian oriented development (name, acres, units, density)	Compile annually
Transportation and Circulation Measures		
Transit Improvements	Ridership statistics (boardings, passenger miles)	Compile annually
	Transit route expansions and changes to service frequency and type (enhanced, BRT, other)	
Road Improvements	New lane miles of roads built by functional classification	Compile annually
	Complete street projects	
	Congestion relief projects completed	
Bicycle Measure	Bicycle lanes and path by classification	Compile annually
SB 375 Sustainable Communities Strategies	SB 375 Sustainable Communities Strategies implementation status report	Compile annually
TDM Program	Number of employers participating in the program (SJVAPCD data)	Compile annually
VMT Reductions	Updates in vehicle miles traveled used by Fresno COG in making Transportation Conformity findings for transportation plans	Every three years
Programmatic Measures		
Public Education and Outreach	Qualitative assessment of implementation and list of events work products	Annual report
PACE Program	Program participation statistics with project summary data	Compile annually
Regulatory Program Development	Progress on adopting and implementing mandatory programs related to design and conservation	Compile annually
Voluntary Program Development/Support	Progress on developing and implementing voluntary programs. Once adopted, report on projects or events arising from the programs.	Compile annually

SECTION 8: GLOSSARY OF TERMS AND ACRONYMS

AB	Assembly Bill
ARB	California Air Resources Board: a part of the California Environmental Protection Agency, an organization that reports directly to the Governor's Office in the Executive Branch of California State government. The mission of the ARB is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the State.
CEQA	California Environmental Quality Act: a California statute passed in 1970 to institute a statewide policy of environmental protection.
BAU	Business as usual: emissions that are expected to occur in a future year in the absence of emission reduction regulations and controls.
CO_2	Carbon dioxide: A naturally occurring gas and a by-product of burning fossil fuels and biomass other industrial processes. It is the reference gas against which other greenhouse gases are measured and therefore has a global warming potential of 1.
Climate Change	The statistically significant variation either in the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer).
EPA	United States Environmental Protection Agency. The mission of the EPA is to protect human health and to safeguard the natural environment—air, water and land—upon which life depends.
Greenhouse gas	A gas that absorbs infrared radiation in the atmosphere. Greenhouse gases as defined by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
$MTCO_2e$	Metric tons of carbon dioxide equivalents: a measure of greenhouse gas emissions
$MMTCO_2e$	Million metric tons of carbon dioxide equivalents: a measure of greenhouse gas emissions
ODS	Ozone depleting substances: compounds that contributes to stratospheric ozone depletion. ODS include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, methyl bromide, carbon tetrachloride, hydrobromofluorocarbons, chlorobromomethane, and methyl chloroform. ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete ozone.
SB	Senate Bill

SECTION 9: REFERENCES

Boden, T.A., G. Marland, and R.J. Andres (2010). Global, Regional, and National Fossil-Fuel CO2 Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2010.

California Air Resources Board (ARB). 2011. LEV III Staff Report and Initial Statement of Reasons. December 7.

California Air Resources Board. 2008. Scoping Plan. Website: www.arb.ca.gov/cc/scopingplan /document/adopted_scoping_plan.pdf. Accessed June 21, 2012.

California Air Resources Board. 2013. Staff Report, Update on Senate Bill 375 Implementation in the San Joaquin Valley. Date of Release January 15, 2013. Website: http://www.arb.ca.gov/cc/sb375/finalstaffreport_011513.pdf. Accessed May 22, 2013.

California Air Resources Board. 2014. Proposed First Update to the Climate Changes Scoping Plan: Building on the Framework. February 2014

California Department of Water Resources. 2014. Climate Change. Website: http://www.water.ca.gov/climatechange/. Accessed March 27, 2014.

California Department of Water Resources. 2014. Final Report of the Flood Emergency Action Team. Website: http://www.water.ca.gov/historicaldocs/irwm/feat-1997/janc1.html Flood of 97. Accessed March 27, 2014.

California Energy Commission. 2012. Building Energy Efficiency Website: http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2013_Building Energy_Efficiency_Standards_FAQ.pdf, Frequently Asked Questions. Accessed December 4, 2012.

California Energy Commission. 2013. Impact Analysis California's 2013 Building Energy Efficiency Standards. CEC-400-2013-008. July.

California Public Utilities Commission. 2012. Large IOU RPS Procurement Data 2003-2010. Website: http://www.cpuc.ca.gov/PUC/energy/Renewables. Accessed June 28, 2012.

Intergovernmental Panel on Climate Change. 2007a. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor, and H.L. Miller [eds.]). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Website: www.ipcc.ch /publications_and_data/ar4/wg1/en/contents.html, Accessed June 23, 2012.

San Joaquin Valley Air Pollution Control District. 2009. Final Staff Report, Rule 9410 (Employer Based Trip Reduction) Appendix B. December 17, 2009.

United States Environmental Protection Agency. 2014. Global Greenhouse Gas Emissions Data. Website: http://www.epa.gov/climatechange/ghgemissions/global.html#four. Accessed March 27, 2014.

Appendix A:
General Plan Policy List

The General Plan Update is the foundation of the City of Fresno's strategy to reduce development related greenhouse gas emissions. The City's land use authority provides its most effective means of limiting the impact of growth predicted for the City. The Greenhouse Gas Reduction Plan (GHG Plan) relates the benefits of the General Plan and the City's strategy for achieving GHG reduction targets. The following Table is a list of General Plan Policies that provide greenhouse gas reductions or support GHG Plan strategies.

Table 155: General Plan Policies

Policy Numbers	Urban Form Element Policies
Policy UF-1-c	**Legible City Structure**. Focus integrated and ongoing planning efforts to achieve an identifiable city structure, comprised of a concentration of buildings, people, and pedestrian-oriented activity in Downtown; along a small number of prominent east west and north-south transit-oriented, mixed-use corridors with distinctive and strategically located Activity Centers; and in existing and new neighborhoods augmented with parks and connected by multi-purpose trails and tree lined bike lanes and streets.
Objective UF-12	Locate roughly one-half of future residential development in infill areas — defined as being within the City on December 21, 2012—including the Downtown core area and surrounding neighborhoods, mixed-use centers and transit-oriented development along major BRT corridors, and other non-corridor infill areas, and vacant land.
Policy UF-3-a	**BRT Corridors**. Design land uses and integrate development site plans along BRT corridors, with transit-oriented development that supports transit ridership and convenient pedestrian access to bus stops and BRT station stops.
Policy UF-12-b	**Activity Centers**. Mixed-use designated areas along BRT and/or transit corridors are appropriate for more intensive concentrations of urban uses. Typical uses could include Chapter 3: Urban Form, Land Use, and Design commercial areas; employment centers; schools; compact residential development; religious institutions; parks; and other gathering points where residents may interact, work, and obtain goods and services in the same place.
Policy UF-12-d	**Appropriate Mixed-Use.** Facilitate the development of vertical and horizontal mixed-uses to blend residential, commercial, and public land uses on one or adjacent sites. Ensure land use compatibility between mixed-use districts in Activity Centers and the surrounding residential neighborhoods.
Policy UF-3-e	**Access to Activity Centers.** Promote adoption and implement standards supporting pedestrian activities and bicycle linkages from surrounding land uses and neighborhoods into Activity Centers and to transit stops. Provide for priority transit routes and facilities to serve the Activity Centers.
Policy UF-12-f	**Mixed-Use in Activity Centers**. Update the Development Code to include use regulations and standards to allow for mixed uses and shared parking facilities, including multi-story and underground parking facilities, within Activity Centers.
Objective UF-14	Create an urban form to facilitate multi-modal connectivity.

Policy UF-5-a	**Design Guidelines for Walkability**. Develop and use design guidelines and standards for a walkable and pedestrian-scaled environment with a network of streets and connections for pedestrians and bicyclists, as well as transit and autos.
Policy UF-14-b	**Local Street Connectivity**. Design local roadways to connect throughout neighborhoods and large private developments with adjacent major streets and pathways of existing adjacent development. Create access for pedestrians and bicycles where a local street must dead end or be designed as a cul-de-sac to adjoining uses that provide services, shopping, and connecting pathways for access to the greater community area.
Policy UF-14-c	**Block Length**. Create development standards that provide desired and maximum block lengths in residential, retail, and mixed-use districts order to enhanced walkability.
Policy Number	**Land Use Element Policies**
Objective LU-2	Plan for infill development that includes a range of housing types, building forms, and land uses to meet the needs of both current and future residents.
Policy LU-2-a	**Infill Development and Redevelopment**. Promote development of vacant, underdeveloped, and redevelopable land uses within the City Limits where urban services are available by establishing and implementing supportive regulations and programs.
Policy LU-2-b	**Infill Development for Affordable Housing**. Consider a priority infill incentive program for residential infill development of existing vacant lots and underutilized sites within the City as a strategy to help to meet the affordable housing needs of the community.
Policy LU-3-b	**Mixed-Use Urban Corridors that Connect the Downtown Planning Area**. Support the development of mixed-use urban corridors that connect the Downtown Planning Area with the greater Fresno-Clovis Metropolitan Area with functional, enduring, and desirable urban qualities along the Blackstone Avenue, Shaw Avenue, California Avenue, and Ventura Avenue/Kings Canyon corridors, as shown on Figure LU-1: General Plan Land Use Diagram.
Policy LU-3-c	**Zoning for High Density on Major Transit Corridors**. Encourage adoption of supportive zoning regulations for compact development along BRT corridors leading to the Downtown Core that will not diminish long-term growth and development potential for Downtown.
Policy LU-5-f	**High Density Residential Uses.** Promote high-density residential uses to support Activity Centers and BRT corridors, affordable housing and walkable access to transit stops.
Policy Number	**Design Element Policies**
Policy D-3-c	**Local Streets as Urban Parkways.** Develop local streets as "urban parkways", where appropriate, with landscaping and pedestrian spaces.
Policy D-4-b	**Incentives for Pedestrian-Oriented Anchor Retail.** Consider adopting and implementing incentives for new pedestrian-friendly anchor retail at intersections within Activity Centers and along corridors to attract retail clientele and maximize foot traffic.

Policy	Transportation Element Policies
Policy MT-1-i	**Update Standards for Complete Streets.** Update the City's Engineering and Street Design Standards to ensure that roadway and streetscape design specifications reflect the Complete Streets concept, while also addressing the needs of through traffic, transit stops, bus turnouts, passenger loading needs, bike lanes, and short- and long-term parking.
Objective MT-4	Establish and maintain a continuous, safe, and easily accessible bikeways system throughout the metropolitan area to reduce vehicle use, improve air quality and the quality of life, and provide public health benefits.
Policy MT-4-a	**Bicycle, Pedestrian and Trails Master Plan.** To the extent consistent with this General Plan, continue to implement and periodically update the Bicycle, Pedestrian, and Trails Master Plan to meet State standards and requirements for recommended improvements and funding proposals as determined appropriate and feasible
Policy MT-4-b	**Bikeway Improvements.** Establish and implement property development standards to assure that projects adjacent to designated bikeways provide adequate right-of-way and that necessary improvements are constructed to implement the planned bikeway system shown on Figure MT-2 to provide for bikeways, to the extent feasible, when existing roadways are reconstructed; and alternative bikeway alignments or routes where inadequate right-of-way is available
Policy MT-4-c	**Bikeway Linkages.** Provide linkages between bikeways, trails and paths, and other regional networks such as the San Joaquin River Trail and adjacent jurisdiction bicycle systems wherever possible.
Objective MT-5	Establish a well-integrated network of pedestrian facilities to accommodate safe, convenient, practical, and inviting travel by walking, including for those with physical mobility and vision impairments.
Policy MT-5-a	**Sidewalk Development.** Pursue funding and implement standards for development of sidewalks on public streets, with priority given to meeting the needs of persons with physical and vision limitations; providing safe routes to school; completing pedestrian improvements in existing neighborhoods with lower vehicle ownership rates; or providing pedestrian access to public transportation routes.
Objective MT-6	Establish a network of multi-purpose pedestrian and bicycle paths, as well as limited access trails, to link residential areas to local and regional open space and urban Activity Centers in order to enhance Fresno's recreational amenities and alternative transportation options.
Policy MT-6-a	**Link Residences to Destinations.** Design a pedestrian and bicycle path network that links residential areas with Activity Centers, such as parks and recreational facilities, educational institutions, employment centers, cultural sites, and other focal points of the city environment.
Policy MT-6-g	**Path and Trail Development in Subdivisions.** Require all subdivision maps to incorporate planned multi-purpose path and trail development standards and corridor linkages consistent with the General Plan, applicable law and case-by-case determinations as a condition of tentative map approval.
Objective MT-8	Provide public transit options that serve existing and future concentrations of residences, employment, recreation and civic uses and are feasible, efficient, safe, and minimize environmental impacts.

Policy MT-8-a	**Street Design Coordinated with Transit.** Coordinate the planning, design, and construction of the major street network with transit operators to facilitate efficient direct transit routing throughout the Planning Area.
Policy MT-8-b	**Transit Serving Residential and Employment Nodes.** Identify the location of current and future residential and employment concentrations and Activity Centers throughout the transit service area in order to facilitate planning and implementation of optimal transit services for these uses. Work with California State University, Fresno to determine locations within the campus core for bus stops.
Policy MT-8-g	**High Speed Train.** If the State moves forward with HST, ensure it is constructed through Fresno in a manner that minimizes impacts to surrounding property owners and creates the most opportunity for redevelopment around the HST station.
Objective MT-9	Provide public transit opportunities to the maximum number and diversity of people practicable in balance with providing service that is high in quality, convenient, frequent, reliable, and financially feasible.
Policy MT-10-a	**Updating Parking Standards.** Update off-street parking standards to reflect the context and location within activity areas of multiple uses and reductions appropriate for mixed residential and non-residential uses and proximity to existing or planned transit service.
Policy MT-10-b	**Shared Parking.** Establish a strategy to promote the sharing of excess parking between uses within Activity Centers and BRT corridors, including specific provisions for this in the Development Code.
Policy MT-10-c	**Transportation Demand Management Guidelines.** Establish transportation demand management guidelines to allow for reduced off-street parking requirements.
Policy MT-10-d	**Parking Maximums.** Explore maximum off-street parking limits within Activity Centers proximate to BRT corridors, if such an Activity Center is determined compatible with promotion of a healthy and vigorous business environment.
Policy MT-10-f	**Parking Benefit Districts.** Establish parking benefit districts to fund consolidated public parking where supported by local businesses.
Policy Number	**Park and Open Space Policies**
Policy POSS-1-g	**Regional Urban Forest.** Maintain and implement incrementally, through new development projects, additions to Fresno's regional urban forest to delineate corridors and the boundaries of urban areas, and to provide tree canopy for bike lanes, sidewalks, parking lots, and trails.
Policy POSS-7-h	**Interlink City and San Joaquin River Parkway Trail Networks.** Strive to connect the parkway trail network to other trails in the vicinity, in order to create a community and regional trail system that offers a variety of different route combinations and enhances public access to the parkway.
Policy Number	**Public Utilities Policies**
Objective PU-7	Promote reduction in wastewater flows and develop facilities for beneficial reuse of reclaimed water and biosolids for management and distribution of treated wastewater.
Policy PU-7-a	**Reduce Wastewater.** Reduce Wastewater. Identify and consider implementing water conservation standards and other programs and policies, as determined

	appropriate, to reduce wastewater flows.
Policy PU-7-d	**Wastewater Recycling.** Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.
Policy PU-9-a	**New Techniques.** Continue to collaborate affected stakeholders and partners to identify and support programs and new techniques of solid waste disposal, such as recycling, composting, waste to energy technology, and waste separation, to reduce the volume and toxicity of solid wastes that must be sent to landfill facilities.
Policy PU-9-b	**Compliance with State Law.** Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.
Policy Numbers	**Resource Conservation Element Policies**
Objective RC-2	Promote land uses that conserve resources
Policy RC-2-a	**Link Land Use to Transportation**. Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.
Policy RC-2-b	**Provide Infrastructure for Mixed-Use and Infill.** Promote investment in the public infrastructure needed to allow mixed-use and denser infill development to occur in targeted locations, such as expanded water and wastewater conveyance systems, complete streetscapes, parks and open space amenities, and trails. Discourage investment in infrastructure that would not meet these criteria.
Policy RC-4-i	**Methane Capture.** Continue to pursue opportunities to reduce air pollution by using methane gas from the old City landfill and the City's wastewater treatment process.
Policy RC-6-d	**Recycled Water.** Prepare, adopt, and implement a City of Fresno Recycled Water Master Plan.
Objective RC-7	Promote water conservation through standards, incentives and capital investments.
Policy RC-7-a	**Water Conservation Program and 2035 Target.** Maintain a comprehensive conservation program that reduces per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees. • Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.

	• Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements. • Adopt and implement policies in the event an artificial lake is proposed for development. • Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area. • Expand efforts to educate the public about water supply issues and water conservation techniques.
Policy RC-7-c	**Best Practices for Conservation.** Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate
Policy RC-7-d	**Update Standards for New Development.** Continue to refine water saving and conservation standards for new development
Policy RC-7-e	**Retrofit City Facilities, and Consider Incentives Programs for to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites.** Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.
Policy RC-7-f	**Enforce and Update Conservation Program.** Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City's Water Conservation Program.
Policy RC-7-g	**Educate on State Requirements.** Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.
Policy RC-7-h	**Landscape Water Conservation Standards**. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other State regulations. • Evaluate and apply, as appropriate, augmented xeriscape, "water-wise," and "green gardening" practices to be implemented in public and private landscaping design and maintenance. • Facilitate implementation of the State's Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.
Policy RC-7-i	**PACE Financing.** Develop a residential Property Assessed Clean Energy (PACE)

	program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.
Objective RC-8	Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.
Policy RC-8-b	**Energy Reduction Targets.** Strive to reduce per capita residential electricity use to 1,800 kWh per year and nonresidential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings..
Policy RC-8-c	• **Energy Conservation in New Development.** Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.
Policy RC-8-d	**Incentives.** Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.
Policy RC-8-e	**Energy Use Disclosure.** Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.
Policy RC-8-f	**City Heating and Cooling.** Reduce energy use at City facilities by updating heating and cooling equipment and installing "smart lighting" where feasible and economically viable.
Policy RC-8-g	**Revolving Energy Fund.** Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.
Policy RC-8-h	**Solar Assistance.** Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kV) of units that can be so approved.
Policy RC-8-j	**Alternative Fuel Network.** Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.
Policy RC-8-k	**Energy Efficiency Education.** Provide long-term and ongoing education of homeowners and businesses as to the value of energy efficiency and the need to upgrade existing structures on the regular basis as technology improves and structures age.
Policy RC-11-a	**Waste Reduction Strategies.** Maintain current targets for recycling and re-use of all types of waste material in the city and enhance waste and wastewater management practices to reduce natural resource consumption, including the following measures: • Continue to require recyclable material collection and storage areas in all residential development. • Establish recycling collection and storage area standards for commercial and industrial facilities to size the recycling areas

	according to the anticipated types and amounts of recyclable material generated. • Provide educational materials to residents on how and what to recycle and how to dispose of hazardous waste. • Provide recycling canisters and collection in public areas where trash cans are also provided. • Institute a program to evaluate major waste generators and identify recycling opportunities for their facilities and operations. • Continue to partner with the California Integrated Waste Management Board on waste diversion and recycling programs and the CalMax (California Materials Exchange) program. • Evaluate the feasibility of a residential, restaurant and institutional food waste segregation and recycling program, to reduce the amount of organic material sent to landfill and minimize the emissions generated by decomposing organic material. • Evaluate the feasibility of "carbon footprinting" for the City's wastewater treatment facilities, biomass and composting operations, solid waste collection and recycling programs. • Expand yard waste collection to divert compostable waste from landfills. • Study the feasibility and cost-benefit analysis of a municipal composting program to collect and compost food and yard waste, using the resulting compost matter for City park and median maintenance.
Policy RC-11-b	**Zero Waste Strategy.** Create a strategic and operations plan for fulfilling the City Council resolution committing the City to a Zero Waste goal.

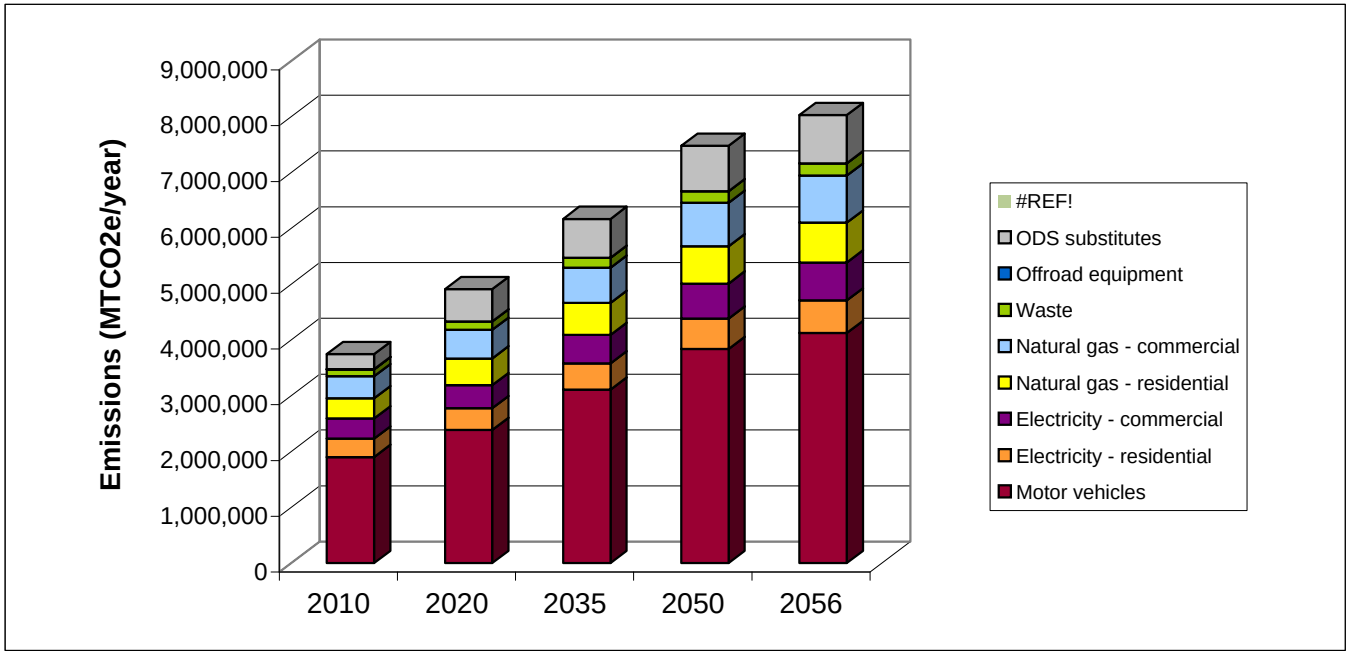
Appendix B: Greenhouse Gas Emission Reductions and Modeling Results

Community Greenhouse Gas Business as Usual Inventory

Summary

Prepared by Michael Brandman Associates

Source	2010	2020	2035	2050	2056
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447
Electricity - commercial	361,836	415,012	509,781	626,137	679,888
Natural gas - residential	362,832	476,679	573,160	670,082	712,228
Natural gas - commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	3,745,115	4,905,399	6,166,049	7,475,346	8,026,499



Emission Reduction from Local Measures

	2020 BAU	2020 w/Pavley I	2020 w/LEV III and Other Regs	Reduction from BAU
Mobile Source Emissions				
Motor Vehicles	2,383,023.0	1,828,249.0	1,745,490.1	**637,532.9**
Reduction		554,774.0		26.75%

Reductions from Land Use Strategy 2020

	Reduction Percentage	Emissions MTCO2e
2020 Lt Duty Vehicle Emissions without Local Measures		1,069,681.4
SB 375 Land Use Strategy	4.70%	**50,275**
Emissions after reduction		1,019,406

Source: ARB Staff Report Update on Senate Bill 375 Implementation in the San Joaquin Valley, January 15, 2013

Reductions from TDM

	Percentage Reduction	Emissions MTCO2e
2020 Lt Duty Emissions with SB 375		1,069,681.4
Rule 9410 TDM Emission Reductior	1.60%	**17,115**
Emissions after reduction		1,052,567

Source: SJVAPCD 2012 Rule 9410 Staff Report
Reductions include increases in travel by carpool, vanpool, transit, bicycling, and walking for commute trips

2035 Emission Emissions without Local Measures

Mobile Source Emissions	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Motor Vehicles	3,107,859.0	2,205,408.7	1,782,755.6	**1,325,103.4**
Reduction		902,450.3		42.64%

Reductions from Land Use Strategy 2035		
	Reduction Percentage	**Emissions MTCO2e**
2035 Light Duty Emissions without Local Measures		1,075,445.3
SB 375 Land Use Strategy	7.60%	**81,734**
Lt Duty Emissions after reduction		993,711

Source: ARB Staff Report Update on Senate Bill 375 Implementation in the San Joaquin Valley, January 15, 2013

Reductions from TDM 2035		
	Percentage Reduction	**Emissions MTCO2e**
2035 Emissions with SB 375		1,075,445.3
Rule 9410 TDM Emission Reductior	1.60%	**17,207**
Lt Duty Emissions after reduction		1,058,238

Source: SJVAPCD 2012 Rule 9410 Staff Report
Reductions include increases in travel by carpool, vanpool, transit, bicycling, and walking for commute trips

Water Use	Population	Water Use (gal/day)	Mgal/Day	Mgal/year	20% Reduction	25% Reduction
Per capita water use 2009 (gal)		275				
Population 2010	545,000	149,875,000	149.88	54,704.4		
Population 2020	649,200	178,530,000	178.53	65,163.5	13,032.7	
Population 2035	780,600	214,665,000	214.67	78,352.7		19,588.2
Population 2050	912,600	250,965,000	250.97	91,602.2		22,900.6
Population 2056	970,000	266,750,000	266.75	97,363.8		24,340.9

Electric Intensity Factors	kWh/mgal	2020 Energy Savings (kWh)	2035 Energy Savings (kWh)
Supply	2,117	27,590,205	41,468,180
Treatment	111	1,446,629	2,174,288
Distribution	1,272	16,577,582	24,916,167
Total		45,614,415	68,558,634

Emission Reductions from Water Use	PG&E Emissions Rate (MTCO2/MWh	Emission Reductions (MTCO2e)
2020 Reductions	0.131	5,975.5
2035 Reductions	0.131	8,981.2

Project Reduction Potential From Land Use and Transportation Measures

Land Use and Transportation		Reduction Range (percent)	Global Maximum Suburban (percent)	Global Max Suburban Center (percent)
Compact Development	LUT-1, LUT-2	1.5 to 30		
Mixed Use Development	LUT-3	9 to 30		
Pedestrian Orientation	LUT-4, TST-2	6.7 to 20		
Bicycle Infrastructure	LUT-8, TST-5	Not quantified		
Transit Service Enhancements	TST-3, TST-4	0.02 to 8.2		
TDM Programs at Commercial	TRT-1, TRT-2, TRT-3	1 to 21		
TDM Measures at Commm	TRT-4 through TRT-11, TRT-14, TRT-15	0.3 to 21		
Maximum Combined Reduction			**15**	**20**

Source: Reductions from CAPCOA 2010

Energy Related		
Exceed Title 24		1-100
Water Conservation		1-20
Solid Waste Reduction		
Alternative Energy Gen		0-100
Programs for Existing Sources		
Infrastructure benefiting Existing Development		
Improve Traffic Flow	RPT-2	0-45

Source: CAPCOA 2010 Table 6.2

This information represents the range of reductions that can be achieved by individual projects implementing the General Plan

Solid Waste		
Reductions from Diversion and Recycling		Per Capita (lbs/day)
2005 Waste Generation (tons)	505,910	6.6
2010 Waste Generation (tons)	333,098	3.7
Emissions MTCO2e	123,945	
Emission Rate (MTCO2e/ton)	0.37	
2020 Target (75% Diversion) tons		1.65
2020 Emission at 75% Diversion		1.65

	Population	Target	Waste Gen (lbs/day)	Waste Gen (tons/year)	Waste Emissions MTCO2e	BAU Emissions MTCO2e	Emission Reduction MTCO2e
Population 2020	649,200	1.65	1,071,180	195,490	72,742	147,628	74,886
Population 2035	780,600	1.65	1,287,990	235,058	87,465	177,508	90,043
BAU Emissions							

Local Reduction Summary			
Sector		**2020 (MTCO2e)**	**2035 MTCO2e**
Motor Vehicles	Land Use and Transportation Str	50,275	81,734
	TDM (Rule 9410)	17,115	17,207
	Subtotal	**67,390**	**98,941**
Electricity	Water Conservation	5,975	8,981
	Subtotal	**5,975**	**8,981**
Waste	75% Waste Diversion Target	74,886	90,043
	Subtotal	**74,886**	**90,043**
Total all Sectors		**148,252**	**197,966**

		Per Capita Emission
2020 BAU	4,905,399	
2020 Adj BAU	3,591,513	
2020 Local Reductions	148,252	
2020 w/all Reductions	3,443,261	5.30
Percent Reduction from BAU	29.81%	

		Per Capita Emissions
2035 BAU	6,166,049	
2035 Adj BAU	3,881,781	
2035 Local Reductions	197,966	
2035 w/all Reductions	3,683,815	4.72
Percent Reduction from BAU	40.26%	
2035 Interim Target	3,699,629	4.74
Additional Reductions Needed	-15,814	-0.02

Reductions from State Measures

Targets based on State Reductions for AB 32

State Inventory 2010 MTCO2e	451.6
New State Inventory 2020 BAU MTCO2e	**545.0**
State Inventory 2020 Reduced MTCO2e	507.0
AB 32 target - 1990 EI MTCO2e	427.0
Reductions Required from BAU MTCO2e	118.0
Percent Reduction Rqd BAU	**21.7**
Reduction from 2010	24.6
Percent Reduction from 2010	5.4

2020 Emission Reduction Calculations				
	Emissions	**Population**	**Per Capita**	**Reduction**
Fresno 2010 Inventory	3,745,116	545,000	6.87	
Fresno 2020 BAU Inventory	4,905,399	649,200	7.56	
Fresno 2020 Target	**3,843,313**	649,200	**5.92**	**21.65%**
Reduction Required from BAU	1,062,086			
Reductions Achieved	1,313,886			
Emissions with Reductions	3,591,513		5.53	**26.78%**

Offroad Emissions Alternative Estimate using State Inventory for 2010	
California 2010 MTCO2e	2,030,000
California Population	37,309,404
Per Capita Emissions MT/Person/Year	0.054
Fresno Population 2010	545,000
Fresno Offroad Emissions	29,653.4

	2020 BAU	**2020 w/Pavley I**	**2020 w/LEV III and Other Regs**	**Reduction from BAU**
Mobile Source Emissions				
Motor Vehicles	2,383,023.0	1,828,249.0	1,748,773.1	**634,250**
Reduction		554,774.0	79,475.9	26.62%

Fleet VMT Fractions in 2020		**CO2 tons/year**	**MTCO2e/year**
Gasoline Vehicles			
LDA	0.436	701,792.9	
LDT1	0.064	118,436.2	
LDT2	0.163	356,767.2	
Total	0.663	1,176,996.3	
LEV III 2020 Reduction 3%		35,309.9	
Diesel Vehicles			
LDA	0.0012	1,856.6	
LDT1	0.0001	131.0	
LDT2	0.0001	118.2	
Total	0.0014	2,105.8	
LEV III 2020 Reduction 3%		63.2	
Total Inventory 2020		**1,179,102.1**	1,069,681.4
LEV III 2020 Reduction 3%			**32,090.4**
ARB estimate of LEV Reductions from 2016 to 2020			

	tons/year	metric tons/ year	MTCO2e/ year
Carbon dioxide	1,179,102.1	1,069,681.4	1,069,681.4

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2020 Reductions	
California Reductions in MMT CO2e	0.93	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0041	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction in HD emissions MTCO2e	**9,836.7**	

Med/HDT Hybridization	2020 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction in HD emissions MTCO2e	**5,288.6**	**15,125.3**

Light Duty Vehicle Efficiency Measures	2020 Reductions	Fresno Reduction MTCO2e
Tire Pressure Regulation	0.55	5,817.4
Tire Tread Standard	0.3	3,173.1
Low Friction Oil	2.2	23,269.6
Total	3.05	**32,260.2**
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.013537506	
Fresno 2020 BAU Transportation EI in MTCO2e	2,383,023.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	**32,260.2**	
Total Reductions all Measures	**47,385.5**	

Mobile Reductions Summary	MTCO2e/ year
LEV III	32,090.4
Vehicle Efficiency	47,385.5
	79,475.9

Energy Emissions	2020 EI MTCO2e	2020 w/RPS	RPS Reduction
2020 Electricity Residential	390,488	226,011	164,477
2020 Electricity Commercial	415,012	240,205	174,807
Total	805,500	466,216	339,284

	2020 MTCO2e	T24 Reductions	2020 w/T24
2020 Natural Gas Residential	476,679	7,983	468,696
2020 Natural Gas Commercia	514,647	17,530	497,117
	991,326	**25,513**	965,813

PG&E Portfolio	Percent
2010 Pecentage	17.7
2020 Mandate Percentage	33
Reduction	15.3

Included in Emission Factor from PG&E in spreadsheets

Title 24 Reductions 2008 and 2013 Updates

	2020 BAU MTCO2e	2010 BAU MTCO2e	Increase 2010 to 2020	Emission Reduction
Electricity Residential	390,488	327,813	62,675	16,833
Electricity Commercial	415,012	361,836	53,176	9,614
Total	805,500	689,649	115,851	**26,447**
Natural Gas Residential	476,679	362,832	113,847	7,983
Natural Gas Commercial	514,647	394,417	120,230	17,530
	991,326	757,250	234,076	**25,513**
Title 24 Totals				**51,960**

Commercial reductions include 3 years reductions at 2008 standard and 7 years at 2013 standard.

2008 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	8,659	0.227	1,966
Multi-Family	0.539	10,143	0.197	1,998
Total 2020 Residential Electricity Reductions				**3,964**

2008 Title 24 Fresno Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	15,729	0.1	1,573
Multi-Family	0.539	18,425	0.07	1,290
Total 2020 Residential Natural Gas Reductions				**2,863**

2008 Standards provide reductions from 2010-2013
Reductions from CEC 2008

2013 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	20,204	0.364	7,354
Multi-Family	0.539	23,668	0.233	5,515
Total 2020 Residential Electricity Reductions				**12,869**

2013 Title 24 Fresno Residential Development Projections Natural Gas

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	36,701	0.065	2,386
Multi-Family	0.539	42,992	0.038	1,634
Total 2020 Residential Natural Gas Reductions				**4,019**

Emission Reductions from CEC 2012 Impact Analysis of 2013 T24 Standards
Reductions based on development from 2014-2020.

	2020 Adj EI MTCO2e	Title 24 Reductions	2020 EI W/T24	2020 BAU	Reduction from BAU
2020 Electricity Residential	226,011	16,833	209,178	390,488	181,310
2020 Electricity Commercial	240,205	9,614	230,591	415,012	184,421
Total	466,216	**26,447**	439,769		
2020 Nat Gas Residential	476,679	**7,983**	468,696	476,679	7,983
2020 Nat Gas Commercial	514,647	**17,530**	497,117	514,647	17,530
Total	991,326	25,513	965,813		

Ozone Depleting Substances	
	MTCO2e
2020 BAU Emissions	576,784
ARB Refrigerant Management Program Reduction 50%	0.5
2020 Reduction	**288,392**

Emission reductions estimates from ARB Appendix B. California Facilitites and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

Emissions (MTCO2e/year)		2020 BAU	Reductions in 2020	Adj BAU 2020	Percent Reduction
	Motor vehicles	2,383,023	634,250	1,748,773	26.62%
	Electricity - residential	390,488	181,310	209,178	46.43%
	Electricity - commercial	415,012	184,421	230,591	44.44%
	Natural gas - residential	476,679	7,983	468,696	1.67%
	Natural gas - commercial	514,647	17,530	497,117	3.41%
	Waste	147,628	0	147,628	0.00%
	Offroad equipment	1,138	0	1,138	0.00%
	ODS substitutes	576,784	288,392	288,392	50.00%
	Total	4,905,399	1,313,886	3,591,513	26.78%

BAU assumes 2005 emission rates to eliminate the effect of controls

Source Group	State Measures	Emissions (MTCO2e/year) 2020	
Motor vehicles	Pavley and Low Carbon Fuel Standard	554,774	
	Low Emission Vehicle Program III	32,090	
	Tire Tread Program	3,173	
	Tire Pressure Program	5,817	
	Low Friction Oil	23,270	
	Aerodynamic Efficiency/Hybridization	15,125	
	Subtotal	**634,250**	
Electricity - residential	Renewable Portfolio Standards	164,477	
	Title 24 Energy Efficiency Standards	16,833	
Electricity – commercial	Renewable Portfolio Standards	174,807	
	Title 24 Energy Efficiency Standards	9,614	
	Subtotal	**365,731**	
Natural Gas-Residential	Title 24 Energy Efficiency Standards	7,983	
Natural Gas-Commercial	Title 24 Energy Efficiency Standards	17,530	
	Subtotal	**25,513**	
Ozone depleting substance substitutes	Limit High GWP Use in Consumer Products; Motor Vehicle Air Conditioning; High GWP Refrigerant Management Program for Stationary Sources	288,392	
	Total	**1,313,886**	

Source: Michael Brandman Associates

Emission Summary BAU and Regulations All Years

Business as Usual Modeling Results

	2010 BAU	2020 BAU	2035 BAU	2050 BAU	2056 BAU
Motor vehicles	1,899,799	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - residential	327,813	390,488	469,524	548,921	583,447
Electricity - commercial	361,836	415,012	509,781	626,137	679,888
Natural gas - residential	362,832	476,679	573,160	670,082	712,228
Natural gas - commercial	394,417	514,647	632,169	776,459	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	***3,745,116***	***4,905,399***	***6,166,049***	***7,475,346***	***8,026,498***
Per Capita Emissions		7.556067612	7.89911452		

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Motor vehicles	1,795,666	1,828,249	2,205,409	2,711,894	2,914,488
Electricity - residential	289,745	226,011	271,756	317,710	337,694
Electricity - commercial	319,817	240,205	295,057	362,433	393,513
Natural gas - residential	400,169	476,679	519,166	670,082	712,228
Natural gas - commercial	448,706	514,647	564,560	776,525	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	576,784	694,734	812,214	863,300
Total	***3,652,521***	***4,011,341***	***4,729,504***	***5,859,698***	***6,286,229***

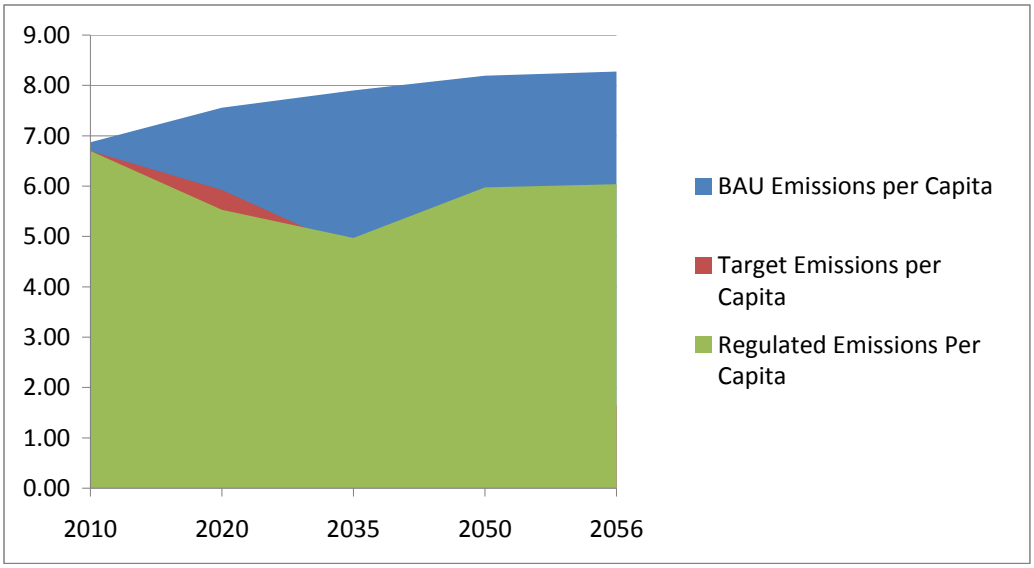
Adjusted BAU with Off Model Reductions from Title 24 and LEV III

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Motor vehicles	1,795,666	1,748,773	1,745,843	2,711,894	2,914,488
Electricity - residential	289,745	209,178	258,766	317,710	337,694
Electricity - commercial	319,817	230,591	290,861	362,433	393,513
Natural gas - residential	400,169	468,696	506,670	670,082	712,228
Natural gas - commercial	448,706	497,117	553,452	776,525	843,115
Waste	123,945	147,628	177,508	207,525	220,578
Offroad equipment	1,051	1,138	1,314	1,314	1,314
ODS substitutes	273,422	288,392	347,367	406,107	431,650
Total	***3,652,521***	***3,591,513***	***3,881,781***	***5,453,591***	***5,854,579***
Per Capita Emissions	6.70	5.53	4.97	5.98	6.04

Target Inventories

	2010	2020	2035	2050	2056
BAU Inventory	3,745,116	4,905,399	6,166,049	7,475,346	8,026,498
Target Inventories	3,495,422	3,843,380	3,699,629	1,495,069	1,605,300
Inventories with Regulations	3,652,521	3,591,513	3,881,781	5,453,591	5,854,579
Planning Area Population	545,000	649,200	780,600	912,600	970,000

	2010	2020	2035	2050	2056
BAU Emissions per Capita	6.87	7.56	7.90	8.19	8.27
Target Emissions per Capita	6.70	5.92	4.74	1.64	1.65
Regulated Emissions Per Capi	6.70	5.53	4.97	5.98	6.04



2020 Target	21.6 percent below 2020 BAU
2035 Target	40 percent below 2020 Target (1990 levels)
2050 Target	80 percent below 2020 Target (1990 levels)

2035 Emission Reduction Estimates

	2035 BAU	2035 w/Pavley I	2035 w/LEV III and Other Regs	Reduction
Mobile Source Emissions				
Motor Vehicles	3,107,859.0	2,205,408.7	1,745,842.7	**1,362,016.3**
Reduction		902,450.3		43.82%

LEV III Reduction Estimates

Gasoline Vehicles	Fleet VMT Fractions in 2035	MTCO2e tons/year
LDA	0.439	968,384.4
LDT1	0.065	143,734.1
LDT2	0.162	358,158.0
Total	0.667	1,470,276.5
LEV III 2035 Gas Reduction 27%		**396,974.7**

2035 Emfac Fleet Fractions

	GAS	DSL
LDA	0.439	0.001
LDT1	0.065	0.000
LDT2	0.162	0.000

Diesel Vehicles		
LDA	0.001	2,584.1
LDT1	0.000	190.7
LDT2	0.000	161.4
Total	0.0013	2,936.2
LEV III 2035 Diesel Reduction 27%		**792.8**
Total Light Duty Cars and Trucks with LEV III		**1,075,445.3**
LEV Reductions in 2035		**397,767.4**

	MTCO2e/ year
LEV III Reduction	397,767.4

Vehicle Efficiency Measures

Heavy Duty Aerodynamic Improvement	2035 Reductions
California Reductions in MMT CO2e	0.93
California 2020 BAU EI Transportation	225.3
Percent Reduction in Transportation	0.0041
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0
Reduction in HD emissions MTCO2e	**12,828.7**

Med/HDT Hybridization	2035 Reductions	
California Reductions in MMT CO2e	0.5	
California 2020 BAU EI Transportation	225.3	
Percent Reduction in Transportation	0.0022	
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0	
Reduction in HD emissions MTCO2e	**6,897.2**	**19,725.9**

Light Duty Vehicle Efficiency Measures	2035 Reductions	Fresno Reduction MTCO2e
Tire Pressure Regulation MMTCO2e	0.55	7,586.9
Tire Tread Standard MMTCO2e	0.3	4,138.3
Low Friction Oil MMTCO2e	2.2	30,347.5
Total (MMTCO2e)	3.05	**42,072.7**
California 2020 BAU EI Transportation MMTCO2e	225.3	
Percent Reduction in Transportation	0.013537506	
Fresno 2035 BAU Transportation EI in MTCO2e	3,107,859.0	
Reduction from Vehicle Efficiency Measures in MTCO2e	**42,072.7**	
Total Reductions all Measures	**61,798.5**	

Reduction based on ARB Scoping Plan reductions from Efficiency Measures

Total Reductions for Motor Vehicles	**1,362,016.3**

Energy Emissions

Electricity	2035 EI MTCO2e	2035 w/RPS	RPS Reduction	T24 Reduction	Total Reduction
2035 Electricity Residential	426,350	271,576	154,774	12,810	167,584
2035 Electricity Commercia	455,261	295,057	160,204	4,196	164,400
Total	881,611	566,633	314,978		331,985

Reduction estimates from inventory spreadheets and CEC Title 24 Report for 2008 and 2013

Natural Gas

	2035 MTCO2e	T24 Reductions	2035 w/T24
2035 Natural Gas Resident	519,166	12,496	506,670
2035 Natural Gas Commer	564,560	11,108	553,452
	1,083,726	**23,603**	1,060,123

Reduction estimates from inventory spreadheets and CEC Title 24 Reports for 2008 and 2013

Title 24 Reductions

	2010 MTCO2e	2035 MTCO2e	Increase 2010 to 2035	Emission Reduction	Residential	Commercial
Electricity Residential	205,228	271,576	66,348	12,810	12,810	
Electricity Commercial	219,145	295,057	75,912	4,196		4,196
Total	424,373	566,633	142,260	**17,007**		
Natural Gas Residential	431,774	519,166	87,392	12,496	12,496	
Natural Gas Commercial	469,526	564,560	95,034	11,108		11,108
	901,300	1,083,726	182,426	**23,603**		
Title 24 Totals				**40,610**	25,306	15,304

2008 Title 24 Fresno Residential Development Projections Electricity

	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	3,667	0.227	832
Multi-Family	0.539	4,295	0.197	846
Total 2020 Residential Electricity Reductions				**1,678**

2008 Title 24 Fresno Residential Development Projections Natural Gas				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	4,830	0.1	483
Multi-Family	0.539	5,657	0.07	396
Total 2020 Residential Natural Gas Reductions				**879**

2008 Standards provide reductions from 2010-2013
Reductions from CEC 2008

2013 Title 24 Fresno Residential Development Projections Electricity				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	26,888	0.25	6,722
Multi-Family	0.539	31,498	0.14	4,410
Total 2035 Residential Electricity Reductions				**11,132**

2013 Title 24 Fresno Residential Development Projections Natural Gas				
	Fraction	Emissions by LU	Reduction Fraction	MTCO2e
Single Family	0.461	35,417	0.2	7,083
Multi-Family	0.539	41,488	0.09	3,734
Total 2035 Residential Natural Gas Reductions				**10,817**

Emission Reductions from CEC 2012
Reductions based on development from 2014-2035.

	2035 EI MTCO2e w/RPS	Title 24 Reductions	2035 EI W/T24
2035 Electricity Residential	271,576	12,810	258,766
2035 Electricity Commercia	295,057	4,196	290,861
Total	566,633	**17,007**	549,626

Ozone Depleting Substances

	MTCO2e
2035 BAU Emissions	694,734
ARB Refrigerant Management Program Reduction 50%	0.5
2035 Reduction	**347,367**

Emission reductions estimates from ARB Appendix B. California Facilitites and GHG Emissions Inventory
High Global Warming Potential Stationary Source Refrigerant Management Program

Emission Reduction Summary

	Emissions (MTCO2e/year)			
	2035 BAU	**Reductions in 2035**	**Adj BAU 2035**	**Percent Reduction**
Motor vehicles	3,107,859	1,362,016	1,745,843	43.82%
Electricity - residential	469,524	167,584	301,940	35.69%
Electricity - commercial	509,781	164,400	345,381	32.25%
Natural gas - residential	573,160	12,496	560,664	2.18%
Natural gas - commercial	632,169	11,108	621,061	1.76%
Waste	177,508	0	177,508	0.00%
Offroad equipment	1,314	0	1,314	0.00%
ODS substitutes	694,734	347,367	347,367	50.00%
Total	6,166,049	2,064,971	4,101,078	33.49%

Transportation and Distribution Losses
Business as Usual Modeling Results

	2010 BAU	2020 BAU	2035 BAU	2050 BAU	2056 BAU
Electricity - residential	297,705	354,581	426,350	498,446	529,796
Electricity - commercial	317,868	378,626	455,261	532,246	565,723
Total E	615,573	733,207	881,611	1,030,692	1,095,519
T&D Loss	42,105	50,151	60,302	70,499	74,934

Adjusted Business as Usual Modeling RPS Pavley I LFS

	2010 Ajd	2020 Adj	2035 Adj	2050 Adj	2056 Adj
Electricity - residential	263,134	205,228	246,767	288,496	306,641
Electricity - commercial	280,954	219,145	263,501	308,059	327,435
Total E	544,088	424,374	510,268	596,555	634,076
T&D Loss	37,216	29,027	34,902	40,804	43,371

T&D Loss for Western Region in 2010 is 6.84%
No rates were found for future years, so assumed constant rate.
T&D losses are expected to decline with increases in local production from solar or other distributed generation.

Community Greenhouse Gas Inventory

Summary

Year: 2010

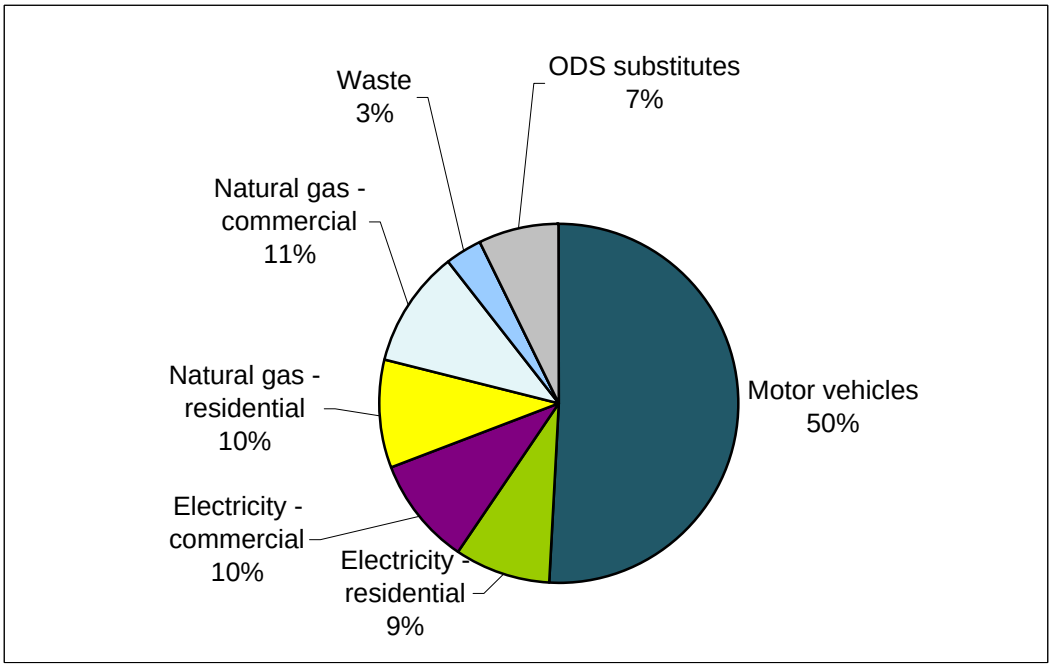
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	545,000	Fresno COG
Employment	209,261	Census 2011
County Information		
Population	930,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

- U.S. Census Bureau. 2011. 2009-2001 American Community Survey 3-Year Estimates Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%

Sources	**MTCO2e**
Motor vehicles	1,899,799
Electricity - residential	327,813
Electricity - commercial	361,836
Natural gas - residential	362,832
Natural gas - commercial	394,417
Waste	123,945
Offroad equipment	1,051
ODS substitutes	273,422
Total	***3,745,116***



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated		
Tons / year (instate)	333,099	
Percent Waste		
Mixed MSW	48.2	
Newspaper	1.3	
Office paper	10.1	
Corrugated cardboard	4.8	
Magazines/third class mail	1.2	
Food scraps	15.5	
Grass	1.9	
Leaves	1.9	
Branches	0.6	
Dimensional lumber	14.5	
Waste Emissions		
Emissions (MTCO2e)	123,945	SEEC 2013
Emissions (MTCO2e/person)	0.2274	Divide emissions by population

Sources:
Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility, Accessed July 31, 2013.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: Statewide Energy Efficiency Collaborative (SEEC). July 2013. Climate and Energy Management Suite. Version 2. Website: cems.californiaseec.org. Model run by Michael Brandman Associates/FirstCarbon Solutions, output contained in Appendix. Note: it was assumed that the landfills have methane capture. According to the County of Fresno Agenda Item 21, March 11, 2008 regarding the Feasibility Study on Gas to Energy Conversion at Southeast Regional Disposal Site and Amercian Avenue Disposal Site, Amercian Avenue Disposal site had methane capture at that time; that site collects 83 percent of the waste for the City (http://www2.co.fresno.ca.us/0110a/Questys_Agenda/MG151925/AS151956/AS151970/AI151985/DO152036/DO_152036.PDF).

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 9,162,734 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 3,344,397,910 Source: VMT per day * 365 days/year
Annual VMT Growth Rate 2.48%

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	733	213297	5785	34575	133039	129247	819333	365979	393776	199720	762678	697704	48	0	0
LDT1	102	29789	808	4829	18580	18051	114428	51113	54995	27893	106516	97442	7	0	0
LDT2	291	84691	2297	13728	52824	51318	325321	145315	156351	79300	302827	277028	19	0	0
LHD1	49	14123	383	2289	8809	8558	54252	24233	26074	13224	50501	46198	3	0	0
LHD2	5	1566	42	254	977	949	6014	2686	2890	1466	5598	5121	0	0	0
MCY	10	2891	78	469	1803	1752	11105	4960	5337	2707	10337	9456	1	0	0
MDV	353	102724	2786	16652	64072	62245	394592	176256	189643	96185	367307	336015	23	0	0
MH	3	804	22	130	502	487	3090	1380	1485	753	2877	2632	0	0	0
OBUS	2	537	15	87	335	325	2063	921	991	503	1920	1756	0	0	0
SBUS	0	114	3	19	71	69	439	196	211	107	409	374	0	0	0
T6	3	939	25	152	586	569	3608	1611	1734	879	3358	3072	0	0	0
T7	0	133	4	22	83	81	512	229	246	125	477	436	0	0	0
UBUS	1	293	8	48	183	178	1127	503	542	275	1049	959	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	578	16	94	360	350	2220	992	1067	541	2067	1891	0	0	0
LDT1	0	45	1	7	28	27	174	78	84	42	162	148	0	0	0
LDT2	0	40	1	6	25	24	153	68	73	37	142	130	0	0	0
LHD1	35	10132	275	1642	6320	6140	38921	17385	18705	9487	36229	33143	2	0	0
LHD2	8	2418	66	392	1508	1465	9289	4149	4464	2264	8646	7910	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	47	1	8	29	28	179	80	86	44	167	152	0	0	0
MH	0	144	4	23	90	87	553	247	266	135	515	471	0	0	0
OBUS	3	739	20	120	461	448	2837	1267	1363	692	2641	2416	0	0	0
SBUS	2	466	13	75	290	282	1789	799	860	436	1665	1523	0	0	0
T6	33	9535	259	1546	5947	5778	36627	16360	17603	8928	34094	31190	2	0	0
T7	150	43624	1183	7072	27210	26434	167573	74851	80536	40847	155986	142697	10	0	0
UBUS	2	678	18	110	423	411	2605	1163	1252	635	2424	2218	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	329	71,500	1,498	7,091	22,639	18,929	107,280	44,364	45,944	23,278	92,165	90,658	7	0	0	**525,353**
LDT1	52	11,398	239	1,131	3,612	3,020	17,113	7,078	7,330	3,714	14,704	14,466	1	0	0	**83,806**
LDT2	180	39,128	820	3,881	12,391	10,361	58,717	24,283	25,148	12,741	50,447	49,623	4	0	0	**287,545**
LHD1	49	11,546	214	925	2,716	2,128	11,498	4,624	4,732	2,412	9,781	0	0	0	0	**50,577**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	5	1,280	24	103	301	236	1,275	513	525	267	1,084	0	0	0	0	**5,607**
MCY	1	237	6	29	99	87	508	212	217	107	401	368	0	0	0	**2,271**
MDV	271	59,008	1,236	5,852	18,683	15,622	88,533	36,611	37,915	19,210	76,059	74,815	6	0	0	**433,550**
MH	3	658	12	53	155	121	655	263	270	137	557	572	0	0	0	**3,453**
OBUS	2	439	8	35	103	81	437	176	180	92	372	382	0	0	0	**2,305**
SBUS	0	93	2	7	22	17	93	37	38	20	79	81	0	0	0	**490**
T6	3	768	14	61	181	142	765	307	315	160	650	668	0	0	0	**4,031**
T7	0	109	2	9	26	20	109	44	45	23	92	95	0	0	0	**572**
UBUS	1	240	4	19	56	44	239	96	98	50	203	208	0	0	0	**1,259**
Total	**898**	**196,404**	**4,079**	**19,197**	**60,983**	**50,809**	**287,220**	**118,609**	**122,757**	**62,212**	**246,596**	**231,935**	**18**	**0**	**0**	**1,401,716**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	84	2	14	53	51	323	144	155	79	301	275	0	0	0	**1,483**
LDT1	0	7	0	1	4	4	26	12	13	6	24	22	0	0	0	**120**
LDT2	0	6	0	1	4	4	23	10	11	6	21	19	0	0	0	**104**
LHD1	7	2,167	59	351	1,351	1,313	8,322	3,717	4,000	2,029	7,747	0	0	0	0	**31,056**
LHD2	2	519	14	84	324	315	1,995	891	959	486	1,857	0	0	0	0	**7,443**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	7	0	1	4	4	27	12	13	6	25	23	0	0	0	**122**
MH	0	125	3	14	47	43	258	110	114	56	213	195	0	0	0	**1,177**
OBUS	3	737	16	82	295	279	1,743	723	790	389	1,442	1,152	0	0	0	**7,648**
SBUS	2	409	9	43	154	141	844	360	373	185	697	639	0	0	0	**3,854**
T6	34	8,290	185	870	3,125	2,850	17,086	7,284	7,559	3,742	14,126	12,943	1	0	0	**78,060**
T7	242	58,248	1,297	6,121	21,957	20,023	120,045	51,177	53,112	26,292	99,248	90,939	6	0	0	**548,464**
UBUS	2	715	19	116	446	433	2,748	1,227	1,321	670	2,558	2,340	0	0	0	**12,593**
Total	**294**	**71,315**	**1,605**	**7,699**	**27,765**	**25,459**	**153,438**	**65,667**	**68,419**	**33,945**	**128,258**	**108,548**	**7**	**0**	**0**	**692,418**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,094,134	1,899,799	1,899,799

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,422,450,000	2,610	358457	22.0	7.8	327,813
Commercial	1,570,085,283	7,503	395661	24.3	8.6	361,836
Industrial	*					0
Total	**2,992,535,283**		**754,119**	**46.4**	**16.5**	**689,649**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	68,192,726	125	398,927	37.5	0.8	362,832
Commercial	74,128,922	354	433,654	40.8	0.8	394,417
Industrial	*					0
Total	**142,321,648**		**832,582**	**78.3**	**1.6**	**757,250**

Notes and Sources:

*The Industrial kWH/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Emission Factor: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	1,019	0.1600	0.0100	930
Fresno	545,000	597	0	0	545
Percent Fresno/Fresno County	58.6%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	920	0.360	0.08000	864
Fresno	545,000	539	0	0	506
Percent Fresno/Fresno County	58.6%				

Total Fresno **1,051**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California

Emissions (MMTCO2e)	18.69
Population	37,253,956
Emissions (MTCO2e per person)	0.50

Fresno

Population	545,000
Emissions (MTCO2e per person)	273,422

(estimated by using California per person emissions)

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website: http://quickfacts.census.gov/qfd/states/06000.html. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

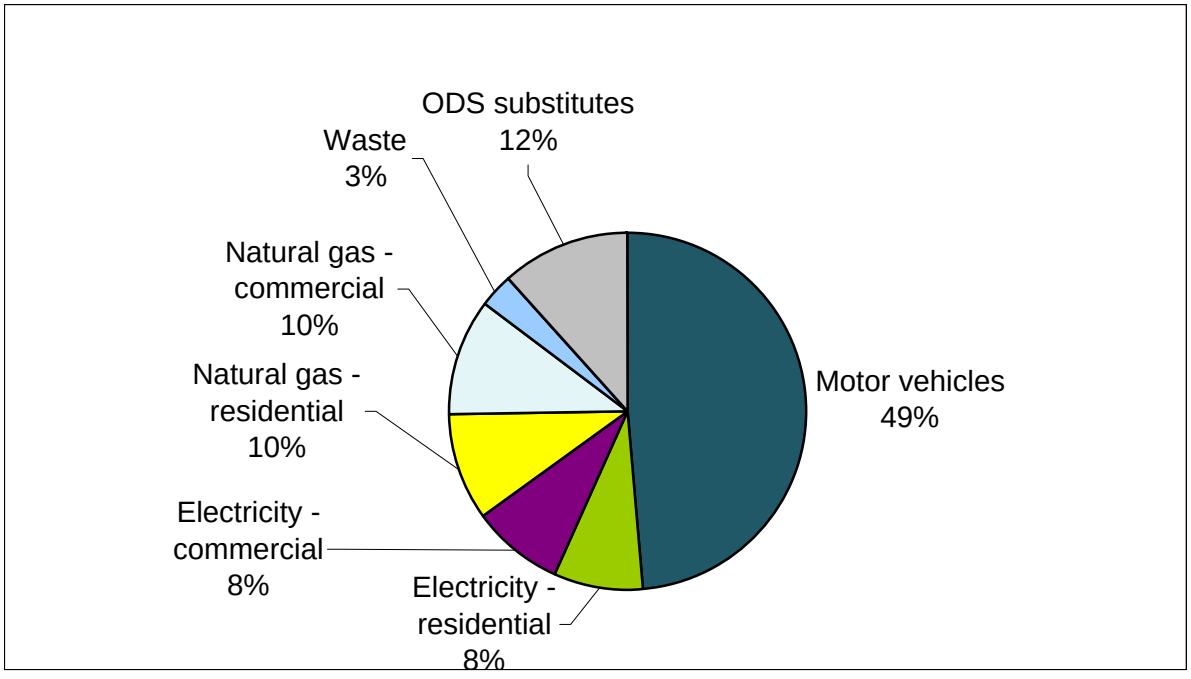
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,383,023	2,383,023
Electricity - residential	390,488	
Electricity - commercial	415,012	
Natural gas - residential	476,679	
Natural gas - commercial	514,647	
Waste	147,628	
Offroad equipment	1,138	
ODS substitutes	576,784	
Total	***4,905,399***	



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,195,062,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	919	267550	7257	43370	166878	162121	1027734	459069	493935	250520	956669	875168	60	0	0
LDT1	128	37366	1014	6057	23306	22642	143534	64114	68983	34988	133609	122226	8	0	0
LDT2	365	106233	2881	17220	66260	64371	408069	182276	196120	99470	379852	347491	24	0	0
LHD1	61	17716	481	2872	11050	10735	68051	30397	32706	16588	63346	57949	4	0	0
LHD2	7	1964	53	318	1225	1190	7544	3370	3626	1839	7022	6424	0	0	0
MCY	12	3626	98	588	2262	2197	13929	6222	6695	3395	12966	11862	1	0	0
MDV	443	128852	3495	20887	80369	78078	494958	221088	237880	120651	460733	421482	29	0	0
MH	3	1009	27	164	629	611	3876	1731	1863	945	3608	3301	0	0	0
OBUS	2	674	18	109	420	408	2587	1156	1243	631	2408	2203	0	0	0
SBUS	0	143	4	23	89	87	550	246	265	134	512	469	0	0	0
T6	4	1178	32	191	735	714	4525	2021	2175	1103	4212	3853	0	0	0
T7	1	167	5	27	104	101	642	287	309	157	598	547	0	0	0
UBUS	1	368	10	60	229	223	1413	631	679	345	1316	1204	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	725	20	118	452	439	2785	1244	1338	679	2592	2371	0	0	0
LDT1	0	57	2	9	35	34	219	98	105	53	203	186	0	0	0
LDT2	0	50	1	8	31	30	192	86	92	47	178	163	0	0	0
LHD1	44	12709	345	2060	7927	7701	48820	21807	23463	11900	45444	41573	3	0	0
LHD2	10	3033	82	492	1892	1838	11651	5204	5600	2840	10846	9922	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	58	2	9	36	35	224	100	108	55	209	191	0	0	0
MH	1	181	5	29	113	109	694	310	333	169	646	591	0	0	0
OBUS	3	926	25	150	578	561	3558	1590	1710	867	3312	3030	0	0	0
SBUS	2	584	16	95	364	354	2244	1002	1078	547	2089	1911	0	0	0
T6	41	11960	324	1939	7460	7247	45943	20522	22080	11199	42766	39123	3	0	0
T7	188	54720	1484	8870	34131	33158	210196	93890	101021	51237	195661	178993	12	0	0
UBUS	3	851	23	138	530	515	3267	1459	1570	796	3041	2782	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	413	89,687	1,879	8,895	28,397	23,744	134,567	55,648	57,630	29,199	115,608	113,717	9	0	0	**658,979**
LDT1	66	14,297	299	1,419	4,530	3,788	21,465	8,879	9,195	4,659	18,445	18,145	1	0	0	**105,122**
LDT2	226	49,080	1,028	4,868	15,543	12,996	73,652	30,460	31,544	15,982	63,278	62,245	5	0	0	**360,683**
LHD1	61	14,483	269	1,160	3,407	2,670	14,422	5,800	5,936	3,026	12,269	0	0	0	0	**63,442**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,606	30	129	378	296	1,599	643	658	335	1,360	0	0	0	0	**7,033**
MCY	1	298	7	36	124	109	638	266	272	134	503	461	0	0	0	**2,849**
MDV	341	74,017	1,551	7,340	23,435	19,595	111,052	45,923	47,559	24,096	95,405	93,844	7	0	0	**543,825**
MH	3	825	15	66	194	152	821	330	338	172	699	717	0	0	0	**4,331**
OBUS	2	551	10	44	130	102	548	221	226	115	466	479	0	0	0	**2,891**
SBUS	0	117	2	9	28	22	117	47	48	24	99	102	0	0	0	**615**
T6	4	963	18	77	227	178	959	386	395	201	816	837	0	0	0	**5,056**
T7	1	137	3	11	32	25	136	55	56	29	116	119	0	0	0	**718**
UBUS	1	301	6	24	71	55	300	120	123	63	255	262	0	0	0	**1,579**
Total	**1,127**	**246,360**	**5,116**	**24,079**	**76,495**	**63,732**	**360,276**	**148,778**	**153,982**	**78,036**	**309,319**	**290,928**	**22**	**0**	**0**	**1,758,250**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	106	3	17	66	64	406	181	195	99	378	346	0	0	0	**1,860**
LDT1	0	9	0	1	5	5	33	15	16	8	30	28	0	0	0	**150**
LDT2	0	7	0	1	5	5	29	13	14	7	27	24	0	0	0	**131**
LHD1	9	2,718	74	441	1,695	1,647	10,439	4,663	5,017	2,545	9,717	0	0	0	0	**38,955**
LHD2	2	651	18	106	406	395	2,502	1,118	1,202	610	2,329	0	0	0	0	**9,336**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	9	0	1	5	5	33	15	16	8	31	28	0	0	0	**152**
MH	1	157	3	17	59	54	323	138	143	71	267	245	0	0	0	**1,477**
OBUS	4	925	20	103	370	350	2,186	907	991	487	1,808	1,445	0	0	0	**9,594**
SBUS	2	513	11	54	194	176	1,058	451	468	232	875	802	0	0	0	**4,835**
T6	43	10,399	232	1,092	3,920	3,575	21,431	9,137	9,482	4,694	17,718	16,235	1	0	0	**97,915**
T7	304	73,063	1,627	7,678	27,542	25,116	150,579	64,194	66,621	32,979	124,492	114,070	8	0	0	**687,969**
UBUS	3	897	24	145	560	544	3,446	1,539	1,656	840	3,208	2,935	0	0	0	**15,796**
Total	**369**	**89,454**	**2,013**	**9,657**	**34,827**	**31,934**	**192,466**	**82,370**	**85,821**	**42,579**	**160,881**	**136,158**	**9**	**0**	**0**	**868,539**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,626,789	2,383,023	2,383,023

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,493,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,195,062,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	919	267550	7257	43370	166878	162121	1027734	459069	493935	250520	956669	875168	60	0	0
LDT1	128	37366	1014	6057	23306	22642	143534	64114	68983	34988	133609	122226	8	0	0
LDT2	365	106233	2881	17220	66260	64371	408069	182276	196120	99470	379852	347491	24	0	0
LHD1	61	17716	481	2872	11050	10735	68051	30397	32706	16588	63346	57949	4	0	0
LHD2	7	1964	53	318	1225	1190	7544	3370	3626	1839	7022	6424	0	0	0
MCY	12	3626	98	588	2262	2197	13929	6222	6695	3395	12966	11862	1	0	0
MDV	443	128852	3495	20887	80369	78078	494958	221088	237880	120651	460733	421482	29	0	0
MH	3	1009	27	164	629	611	3876	1731	1863	945	3608	3301	0	0	0
OBUS	2	674	18	109	420	408	2587	1156	1243	631	2408	2203	0	0	0
SBUS	0	143	4	23	89	87	550	246	265	134	512	469	0	0	0
T6	4	1178	32	191	735	714	4525	2021	2175	1103	4212	3853	0	0	0
T7	1	167	5	27	104	101	642	287	309	157	598	547	0	0	0
UBUS	1	368	10	60	229	223	1413	631	679	345	1316	1204	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	725	20	118	452	439	2785	1244	1338	679	2592	2371	0	0	0
LDT1	0	57	2	9	35	34	219	98	105	53	203	186	0	0	0
LDT2	0	50	1	8	31	30	192	86	92	47	178	163	0	0	0
LHD1	44	12709	345	2060	7927	7701	48820	21807	23463	11900	45444	41573	3	0	0
LHD2	10	3033	82	492	1892	1838	11651	5204	5600	2840	10846	9922	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	58	2	9	36	35	224	100	108	55	209	191	0	0	0
MH	1	181	5	29	113	109	694	310	333	169	646	591	0	0	0
OBUS	3	926	25	150	578	561	3558	1590	1710	867	3312	3030	0	0	0
SBUS	2	584	16	95	364	354	2244	1002	1078	547	2089	1911	0	0	0
T6	41	11960	324	1939	7460	7247	45943	20522	22080	11199	42766	39123	3	0	0
T7	188	54720	1484	8870	34131	33158	210196	93890	101021	51237	195661	178993	12	0	0
UBUS	3	851	23	138	530	515	3267	1459	1570	796	3041	2782	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	413	89,687	1,879	8,895	28,397	23,744	134,567	55,648	57,630	29,199	115,608	113,717	9	0	0	**658,979**
LDT1	66	14,297	299	1,419	4,530	3,788	21,465	8,879	9,195	4,659	18,445	18,145	1	0	0	**105,122**
LDT2	226	49,080	1,028	4,868	15,543	12,996	73,652	30,460	31,544	15,982	63,278	62,245	5	0	0	**360,683**
LHD1	61	14,483	269	1,160	3,407	2,670	14,422	5,800	5,936	3,026	12,269	0	0	0	0	**63,442**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,606	30	129	378	296	1,599	643	658	335	1,360	0	0	0	0	**7,033**
MCY	1	298	7	36	124	109	638	266	272	134	503	461	0	0	0	**2,849**
MDV	341	74,017	1,551	7,340	23,435	19,595	111,052	45,923	47,559	24,096	95,405	93,844	7	0	0	**543,825**
MH	3	825	15	66	194	152	821	330	338	172	699	717	0	0	0	**4,331**
OBUS	2	551	10	44	130	102	548	221	226	115	466	479	0	0	0	**2,891**
SBUS	0	117	2	9	28	22	117	47	48	24	99	102	0	0	0	**615**
T6	4	963	18	77	227	178	959	386	395	201	816	837	0	0	0	**5,056**
T7	1	137	3	11	32	25	136	55	56	29	116	119	0	0	0	**718**
UBUS	1	301	6	24	71	55	300	120	123	63	255	262	0	0	0	**1,579**
Total	**1,127**	**246,360**	**5,116**	**24,079**	**76,495**	**63,732**	**360,276**	**148,778**	**153,982**	**78,036**	**309,319**	**290,928**	**22**	**0**	**0**	**1,758,250**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	106	3	17	66	64	406	181	195	99	378	346	0	0	0	**1,860**
LDT1	0	9	0	1	5	5	33	15	16	8	30	28	0	0	0	**150**
LDT2	0	7	0	1	5	5	29	13	14	7	27	24	0	0	0	**131**
LHD1	9	2,718	74	441	1,695	1,647	10,439	4,663	5,017	2,545	9,717	0	0	0	0	**38,955**
LHD2	2	651	18	106	406	395	2,502	1,118	1,202	610	2,329	0	0	0	0	**9,336**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	9	0	1	5	5	33	15	16	8	31	28	0	0	0	**152**
MH	1	157	3	17	59	54	323	138	143	71	267	245	0	0	0	**1,477**
OBUS	4	925	20	103	370	350	2,186	907	991	487	1,808	1,445	0	0	0	**9,594**
SBUS	2	513	11	54	194	176	1,058	451	468	232	875	802	0	0	0	**4,835**
T6	43	10,399	232	1,092	3,920	3,575	21,431	9,137	9,482	4,694	17,718	16,235	1	0	0	**97,915**
T7	304	73,063	1,627	7,678	27,542	25,116	150,579	64,194	66,621	32,979	124,492	114,070	8	0	0	**687,969**
UBUS	3	897	24	145	560	544	3,446	1,539	1,656	840	3,208	2,935	0	0	0	**15,796**
Total	**369**	**89,454**	**2,013**	**9,657**	**34,827**	**31,934**	**192,466**	**82,370**	**85,821**	**42,579**	**160,881**	**136,158**	**9**	**0**	**0**	**868,539**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,626,789	2,383,023	2,383,023

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	426992	26.3	9.3	390,488
Commercial	1,800,825,042	7,503	453808	27.9	9.9	415,012
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**880,800**	**54.2**	**19.2**	**805,500**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

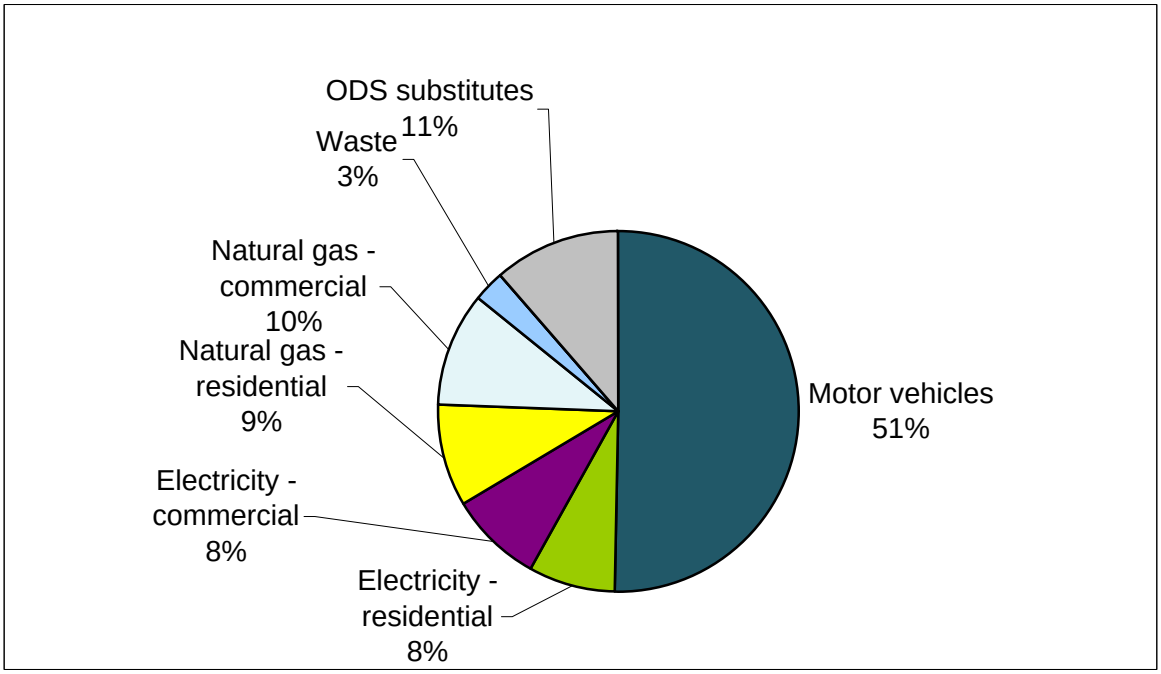
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,107,859	3,107,859
Electricity - residential	469,524	
Electricity - commercial	509,781	
Natural gas - residential	573,160	
Natural gas - commercial	632,169	
Waste	177,508	
Offroad equipment	1,314	
ODS substitutes	694,734	
Total	***6,166,049***	



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1199	348930	9464	56561	217637	211433	1340336	598702	644174	326719	1247656	1141366	78	0	0
LDT1	167	48732	1322	7899	30395	29529	187192	83615	89966	45630	174248	159404	11	0	0
LDT2	476	138545	3758	22458	86414	83951	532189	237719	255773	129726	495390	453187	31	0	0
LHD1	79	23104	627	3745	14411	14000	88750	39643	42654	21634	82613	75575	5	0	0
LHD2	9	2561	69	415	1598	1552	9839	4395	4729	2398	9158	8378	1	0	0
MCY	16	4729	128	767	2950	2866	18166	8114	8731	4428	16910	15469	1	0	0
MDV	577	168045	4558	27240	104814	101826	645508	288336	310235	157348	600873	549683	38	0	0
MH	5	1316	36	213	821	797	5055	2258	2430	1232	4706	4305	0	0	0
OBUS	3	878	24	142	548	532	3374	1507	1622	822	3141	2873	0	0	0
SBUS	1	187	5	30	117	113	718	321	345	175	668	611	0	0	0
T6	5	1536	42	249	958	931	5902	2636	2836	1439	5494	5026	0	0	0
T7	1	218	6	35	136	132	838	374	403	204	780	713	0	0	0
UBUS	2	480	13	78	299	291	1843	823	886	449	1716	1570	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	945	26	153	590	573	3632	1622	1746	885	3381	3093	0	0	0
LDT1	0	74	2	12	46	45	285	127	137	69	265	243	0	0	0
LDT2	0	65	2	11	41	39	250	112	120	61	233	213	0	0	0
LHD1	57	16575	450	2687	10338	10044	63670	28440	30600	15520	59267	54218	4	0	0
LHD2	14	3956	107	641	2467	2397	15195	6787	7303	3704	14145	12940	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	76	2	12	48	46	293	131	141	71	273	249	0	0	0
MH	1	236	6	38	147	143	905	404	435	221	842	770	0	0	0
OBUS	4	1208	33	196	754	732	4641	2073	2230	1131	4320	3952	0	0	0
SBUS	3	762	21	123	475	462	2926	1307	1406	713	2724	2492	0	0	0
T6	54	15598	423	2528	9729	9452	59917	26764	28797	14605	55774	51023	4	0	0
T7	245	71364	1936	11568	44512	43243	274130	122449	131749	66822	255175	233436	16	0	0
UBUS	4	1109	30	180	692	672	4261	1903	2048	1039	3966	3628	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	538	116,967	2,451	11,600	37,034	30,966	175,497	72,575	75,160	38,080	150,772	148,306	11	0	0	**859,419**
LDT1	86	18,645	390	1,851	5,908	4,940	27,995	11,580	11,992	6,076	24,055	23,664	2	0	0	**137,097**
LDT2	295	64,009	1,341	6,349	20,270	16,949	96,055	39,724	41,139	20,843	82,525	81,178	6	0	0	**470,391**
LHD1	80	18,888	350	1,513	4,444	3,482	18,809	7,564	7,742	3,946	16,001	0	0	0	0	**82,739**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,094	39	168	493	386	2,085	839	858	437	1,774	0	0	0	0	**9,172**
MCY	1	388	9	47	162	143	832	347	355	174	656	602	0	0	0	**3,715**
MDV	444	96,530	2,022	9,573	30,563	25,555	144,830	59,892	62,025	31,426	124,424	122,389	9	0	0	**709,239**
MH	5	1,076	20	86	253	198	1,071	431	441	225	911	935	0	0	0	**5,648**
OBUS	3	718	13	58	169	132	715	288	294	150	608	624	0	0	0	**3,770**
SBUS	1	153	3	12	36	28	152	61	63	32	129	133	0	0	0	**802**
T6	5	1,256	23	101	295	232	1,251	503	515	262	1,064	1,092	0	0	0	**6,594**
T7	1	178	3	14	42	33	178	71	73	37	151	155	0	0	0	**936**
UBUS	2	392	7	31	92	72	391	157	161	82	332	341	0	0	0	**2,059**
Total	**1,469**	**321,295**	**6,673**	**31,403**	**99,762**	**83,117**	**469,860**	**194,032**	**200,818**	**101,772**	**403,403**	**379,419**	**29**	**0**	**0**	**2,293,051**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	138	4	22	86	83	529	236	254	129	493	451	0	0	0	**2,425**
LDT1	0	11	0	2	7	7	43	19	21	10	40	36	0	0	0	**196**
LDT2	0	10	0	2	6	6	37	17	18	9	35	32	0	0	0	**171**
LHD1	12	3,544	96	575	2,211	2,148	13,615	6,081	6,543	3,319	12,673	0	0	0	0	**50,804**
LHD2	3	849	23	138	530	515	3,263	1,457	1,568	795	3,037	0	0	0	0	**12,176**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	11	0	2	7	7	43	19	21	11	40	37	0	0	0	**199**
MH	1	204	5	22	77	70	421	180	186	92	348	319	0	0	0	**1,926**
OBUS	5	1,206	27	135	483	456	2,851	1,183	1,293	636	2,359	1,885	0	0	0	**12,512**
SBUS	3	670	15	70	252	230	1,380	588	611	302	1,141	1,045	0	0	0	**6,305**
T6	56	13,562	302	1,424	5,112	4,662	27,950	11,916	12,366	6,121	23,108	21,173	1	0	0	**127,698**
T7	396	95,287	2,122	10,014	35,920	32,755	196,380	83,720	86,885	43,010	162,358	148,766	10	0	0	**897,226**
UBUS	4	1,170	32	190	730	709	4,495	2,008	2,160	1,096	4,184	3,828	0	0	0	**20,600**
Total	**481**	**116,663**	**2,626**	**12,595**	**45,420**	**41,647**	**251,008**	**107,424**	**111,926**	**55,531**	**209,815**	**177,572**	**12**	**0**	**0**	**1,132,719**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,425,770	3,107,859	3,107,859

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1199	348930	9464	56561	217637	211433	1340336	598702	644174	326719	1247656	1141366	78	0	0
LDT1	167	48732	1322	7899	30395	29529	187192	83615	89966	45630	174248	159404	11	0	0
LDT2	476	138545	3758	22458	86414	83951	532189	237719	255773	129726	495390	453187	31	0	0
LHD1	79	23104	627	3745	14411	14000	88750	39643	42654	21634	82613	75575	5	0	0
LHD2	9	2561	69	415	1598	1552	9839	4395	4729	2398	9158	8378	1	0	0
MCY	16	4729	128	767	2950	2866	18166	8114	8731	4428	16910	15469	1	0	0
MDV	577	168045	4558	27240	104814	101826	645508	288336	310235	157348	600873	549683	38	0	0
MH	5	1316	36	213	821	797	5055	2258	2430	1232	4706	4305	0	0	0
OBUS	3	878	24	142	548	532	3374	1507	1622	822	3141	2873	0	0	0
SBUS	1	187	5	30	117	113	718	321	345	175	668	611	0	0	0
T6	5	1536	42	249	958	931	5902	2636	2836	1439	5494	5026	0	0	0
T7	1	218	6	35	136	132	838	374	403	204	780	713	0	0	0
UBUS	2	480	13	78	299	291	1843	823	886	449	1716	1570	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	945	26	153	590	573	3632	1622	1746	885	3381	3093	0	0	0
LDT1	0	74	2	12	46	45	285	127	137	69	265	243	0	0	0
LDT2	0	65	2	11	41	39	250	112	120	61	233	213	0	0	0
LHD1	57	16575	450	2687	10338	10044	63670	28440	30600	15520	59267	54218	4	0	0
LHD2	14	3956	107	641	2467	2397	15195	6787	7303	3704	14145	12940	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	76	2	12	48	46	293	131	141	71	273	249	0	0	0
MH	1	236	6	38	147	143	905	404	435	221	842	770	0	0	0
OBUS	4	1208	33	196	754	732	4641	2073	2230	1131	4320	3952	0	0	0
SBUS	3	762	21	123	475	462	2926	1307	1406	713	2724	2492	0	0	0
T6	54	15598	423	2528	9729	9452	59917	26764	28797	14605	55774	51023	4	0	0
T7	245	71364	1936	11568	44512	43243	274130	122449	131749	66822	255175	233436	16	0	0
UBUS	4	1109	30	180	692	672	4261	1903	2048	1039	3966	3628	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	538	116,967	2,451	11,600	37,034	30,966	175,497	72,575	75,160	38,080	150,772	148,306	11	0	0	**859,419**
LDT1	86	18,645	390	1,851	5,908	4,940	27,995	11,580	11,992	6,076	24,055	23,664	2	0	0	**137,097**
LDT2	295	64,009	1,341	6,349	20,270	16,949	96,055	39,724	41,139	20,843	82,525	81,178	6	0	0	**470,391**
LHD1	80	18,888	350	1,513	4,444	3,482	18,809	7,564	7,742	3,946	16,001	0	0	0	0	**82,739**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,094	39	168	493	386	2,085	839	858	437	1,774	0	0	0	0	**9,172**
MCY	1	388	9	47	162	143	832	347	355	174	656	602	0	0	0	**3,715**
MDV	444	96,530	2,022	9,573	30,563	25,555	144,830	59,892	62,025	31,426	124,424	122,389	9	0	0	**709,239**
MH	5	1,076	20	86	253	198	1,071	431	441	225	911	935	0	0	0	**5,648**
OBUS	3	718	13	58	169	132	715	288	294	150	608	624	0	0	0	**3,770**
SBUS	1	153	3	12	36	28	152	61	63	32	129	133	0	0	0	**802**
T6	5	1,256	23	101	295	232	1,251	503	515	262	1,064	1,092	0	0	0	**6,594**
T7	1	178	3	14	42	33	178	71	73	37	151	155	0	0	0	**936**
UBUS	2	392	7	31	92	72	391	157	161	82	332	341	0	0	0	**2,059**
Total	**1,469**	**321,295**	**6,673**	**31,403**	**99,762**	**83,117**	**469,860**	**194,032**	**200,818**	**101,772**	**403,403**	**379,419**	**29**	**0**	**0**	**2,293,051**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	138	4	22	86	83	529	236	254	129	493	451	0	0	0	**2,425**
LDT1	0	11	0	2	7	7	43	19	21	10	40	36	0	0	0	**196**
LDT2	0	10	0	2	6	6	37	17	18	9	35	32	0	0	0	**171**
LHD1	12	3,544	96	575	2,211	2,148	13,615	6,081	6,543	3,319	12,673	0	0	0	0	**50,804**
LHD2	3	849	23	138	530	515	3,263	1,457	1,568	795	3,037	0	0	0	0	**12,176**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	11	0	2	7	7	43	19	21	11	40	37	0	0	0	**199**
MH	1	204	5	22	77	70	421	180	186	92	348	319	0	0	0	**1,926**
OBUS	5	1,206	27	135	483	456	2,851	1,183	1,293	636	2,359	1,885	0	0	0	**12,512**
SBUS	3	670	15	70	252	230	1,380	588	611	302	1,141	1,045	0	0	0	**6,305**
T6	56	13,562	302	1,424	5,112	4,662	27,950	11,916	12,366	6,121	23,108	21,173	1	0	0	**127,698**
T7	396	95,287	2,122	10,014	35,920	32,755	196,380	83,720	86,885	43,010	162,358	148,766	10	0	0	**897,226**
UBUS	4	1,170	32	190	730	709	4,495	2,008	2,160	1,096	4,184	3,828	0	0	0	**20,600**
Total	**481**	**116,663**	**2,626**	**12,595**	**45,420**	**41,647**	**251,008**	**107,424**	**111,926**	**55,531**	**209,815**	**177,572**	**12**	**0**	**0**	**1,132,719**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,425,770	3,107,859	3,107,859

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

		Per capita (kWh/person or employee/year)	Emissions (tons/year)			Emissions
	(kWh/year)		CO2	CH4	N2O	MTCO2e
Residential	2,037,366,000	2,610	513416	31.6	11.2	469,524
Commercial	2,212,049,466	7,503	557436	34.3	12.2	509,781
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**1,070,853**	**65.9**	**23.4**	**979,305**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

		Per capita (therms/person or employee/year)	Emissions (tons/year)			Emissions
	(therms/year)		CO2	CH4	N2O	MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

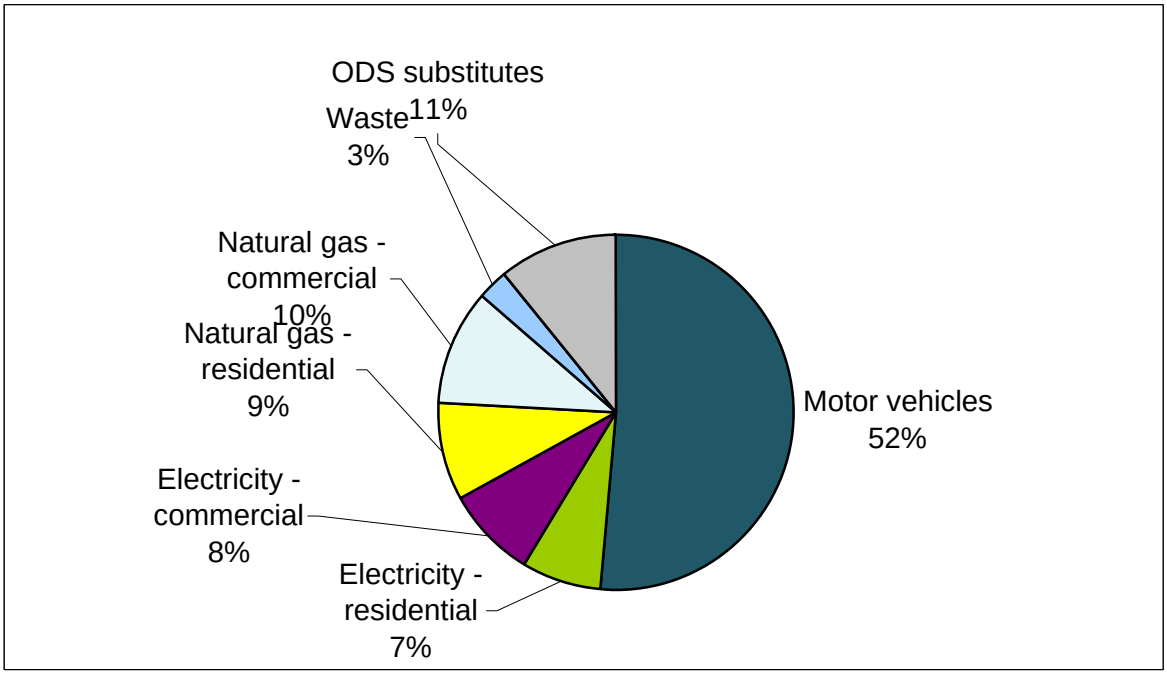
Summary
Year: 2050
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	912,600	Fresno COG
Employment	362,114	
County Information		
Population	1,521,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,832,694	3,832,694
Electricity - residential	548,921	
Electricity - commercial	626,137	
Natural gas - residential	670,082	
Natural gas - commercial	776,459	
Waste	207,525	
Offroad equipment	1,314	
ODS substitutes	812,214	
Total	***7,475,346***	



Community Greenhouse Gas Inventory

Waste

Year: **2050**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	207,525	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1479	430310	11672	69753	268396	260745	1652939	738335	794413	402919	1538643	1407563	97	0	0
LDT1	207	60097	1630	9742	37484	36416	230850	103116	110948	56272	214888	196581	14	0	0
LDT2	587	170857	4634	27696	106568	103530	656310	293161	315427	159982	610928	558882	38	0	0
LHD1	98	28493	773	4619	17772	17265	109449	48889	52602	26679	101881	93202	6	0	0
LHD2	11	3159	86	512	1970	1914	12133	5420	5831	2958	11294	10332	1	0	0
MCY	20	5832	158	945	3638	3534	22403	10007	10767	5461	20854	19077	1	0	0
MDV	712	207238	5621	33593	129260	125575	796057	355583	382590	194046	741013	677884	47	0	0
MH	6	1623	44	263	1012	983	6234	2785	2996	1520	5803	5309	0	0	0
OBUS	4	1083	29	176	676	656	4161	1859	2000	1014	3873	3543	0	0	0
SBUS	1	230	6	37	144	140	885	395	426	216	824	754	0	0	0
T6	7	1895	51	307	1182	1148	7278	3251	3498	1774	6775	6198	0	0	0
T7	1	269	7	44	168	163	1033	461	496	252	961	880	0	0	0
UBUS	2	592	16	96	369	359	2273	1015	1092	554	2116	1936	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1166	32	189	727	707	4479	2001	2153	1092	4169	3814	0	0	0
LDT1	0	92	2	15	57	55	352	157	169	86	327	299	0	0	0
LDT2	0	80	2	13	50	49	308	138	148	75	287	262	0	0	0
LHD1	70	20441	554	3313	12750	12386	78519	35073	37737	19140	73090	66863	5	0	0
LHD2	17	4878	132	791	3043	2956	18739	8370	9006	4568	17443	15957	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	94	3	15	59	57	361	161	174	88	336	307	0	0	0
MH	1	290	8	47	181	176	1116	498	536	272	1039	950	0	0	0
OBUS	5	1490	40	242	929	903	5723	2556	2751	1395	5327	4874	0	0	0
SBUS	3	940	25	152	586	569	3609	1612	1734	880	3359	3073	0	0	0
T6	66	19236	522	3118	11998	11656	73892	33006	35513	18012	68782	62922	4	0	0
T7	302	88008	2387	14266	54893	53328	338065	151007	162476	82406	314689	287880	20	0	0
UBUS	5	1368	37	222	853	829	5254	2347	2525	1281	4891	4474	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	664	144,247	3,022	14,305	45,672	38,189	216,428	89,501	92,689	46,962	185,936	182,895	14	0	0	**1,059,859**
LDT1	106	22,994	481	2,282	7,286	6,092	34,524	14,280	14,789	7,493	29,665	29,183	2	0	0	**169,072**
LDT2	363	78,938	1,654	7,830	24,998	20,902	118,457	48,989	50,734	25,705	101,772	100,111	8	0	0	**580,098**
LHD1	99	23,293	432	1,866	5,480	4,294	23,196	9,328	9,547	4,867	19,733	0	0	0	0	**102,036**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	11	2,582	48	207	608	476	2,571	1,034	1,058	539	2,188	0	0	0	0	**11,311**
MCY	2	479	11	58	200	176	1,025	428	438	215	808	742	0	0	0	**4,582**
MDV	548	119,044	2,494	11,806	37,691	31,515	178,608	73,860	76,491	38,755	153,443	150,933	12	0	0	**874,652**
MH	6	1,327	25	106	312	245	1,321	531	544	277	1,124	1,154	0	0	0	**6,966**
OBUS	4	886	16	71	208	163	882	355	363	185	750	770	0	0	0	**4,649**
SBUS	1	188	3	15	44	35	188	75	77	39	160	164	0	0	0	**989**
T6	7	1,549	29	124	364	286	1,542	620	635	324	1,312	1,347	0	0	0	**8,132**
T7	1	220	4	18	52	41	219	88	90	46	186	191	0	0	0	**1,154**
UBUS	2	484	9	39	114	89	482	194	198	101	410	421	0	0	0	**2,540**
Total	**1,812**	**396,229**	**8,229**	**38,727**	**123,029**	**102,502**	**579,444**	**239,285**	**247,654**	**125,507**	**497,488**	**467,910**	**36**	**0**	**0**	**2,827,852**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	170	5	28	106	103	653	292	314	159	607	556	0	0	0	**2,991**
LDT1	0	14	0	2	9	8	53	24	25	13	49	45	0	0	0	**241**
LDT2	0	12	0	2	7	7	46	21	22	11	43	39	0	0	0	**210**
LHD1	15	4,371	119	709	2,726	2,649	16,790	7,500	8,069	4,093	15,629	0	0	0	0	**62,653**
LHD2	4	1,048	28	170	653	635	4,024	1,797	1,934	981	3,746	0	0	0	0	**15,016**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	9	8	53	24	26	13	50	46	0	0	0	**245**
MH	1	252	6	28	95	87	520	222	230	114	430	394	0	0	0	**2,375**
OBUS	6	1,488	33	166	595	562	3,516	1,459	1,594	784	2,909	2,325	0	0	0	**15,430**
SBUS	3	826	18	87	311	284	1,702	726	753	373	1,407	1,289	0	0	0	**7,776**
T6	70	16,725	372	1,756	6,305	5,749	34,469	14,695	15,250	7,549	28,497	26,111	2	0	0	**157,480**
T7	489	117,510	2,617	12,349	44,297	40,394	242,181	103,245	107,149	53,041	200,224	183,462	13	0	0	**1,106,484**
UBUS	5	1,443	39	234	900	874	5,543	2,476	2,664	1,351	5,160	4,720	0	0	0	**25,405**
Total	**593**	**143,872**	**3,238**	**15,532**	**56,013**	**51,361**	**309,549**	**132,478**	**138,030**	**68,482**	**258,750**	**218,987**	**15**	**0**	**0**	**1,396,900**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,224,751	3,832,694	3,832,694

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2010 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/46 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1479	430310	11672	69753	268396	260745	1652939	738335	794413	402919	1538643	1407563	97	0	0
LDT1	207	60097	1630	9742	37484	36416	230850	103116	110948	56272	214888	196581	14	0	0
LDT2	587	170857	4634	27696	106568	103530	656310	293161	315427	159982	610928	558882	38	0	0
LHD1	98	28493	773	4619	17772	17265	109449	48889	52602	26679	101881	93202	6	0	0
LHD2	11	3159	86	512	1970	1914	12133	5420	5831	2958	11294	10332	1	0	0
MCY	20	5832	158	945	3638	3534	22403	10007	10767	5461	20854	19077	1	0	0
MDV	712	207238	5621	33593	129260	125575	796057	355583	382590	194046	741013	677884	47	0	0
MH	6	1623	44	263	1012	983	6234	2785	2996	1520	5803	5309	0	0	0
OBUS	4	1083	29	176	676	656	4161	1859	2000	1014	3873	3543	0	0	0
SBUS	1	230	6	37	144	140	885	395	426	216	824	754	0	0	0
T6	7	1895	51	307	1182	1148	7278	3251	3498	1774	6775	6198	0	0	0
T7	1	269	7	44	168	163	1033	461	496	252	961	880	0	0	0
UBUS	2	592	16	96	369	359	2273	1015	1092	554	2116	1936	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1166	32	189	727	707	4479	2001	2153	1092	4169	3814	0	0	0
LDT1	0	92	2	15	57	55	352	157	169	86	327	299	0	0	0
LDT2	0	80	2	13	50	49	308	138	148	75	287	262	0	0	0
LHD1	70	20441	554	3313	12750	12386	78519	35073	37737	19140	73090	66863	5	0	0
LHD2	17	4878	132	791	3043	2956	18739	8370	9006	4568	17443	15957	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	94	3	15	59	57	361	161	174	88	336	307	0	0	0
MH	1	290	8	47	181	176	1116	498	536	272	1039	950	0	0	0
OBUS	5	1490	40	242	929	903	5723	2556	2751	1395	5327	4874	0	0	0
SBUS	3	940	25	152	586	569	3609	1612	1734	880	3359	3073	0	0	0
T6	66	19236	522	3118	11998	11656	73892	33006	35513	18012	68782	62922	4	0	0
T7	302	88008	2387	14266	54893	53328	338065	151007	162476	82406	314689	287880	20	0	0
UBUS	5	1368	37	222	853	829	5254	2347	2525	1281	4891	4474	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	664	144,247	3,022	14,305	45,672	38,189	216,428	89,501	92,689	46,962	185,936	182,895	14	0	0	**1,059,859**
LDT1	106	22,994	481	2,282	7,286	6,092	34,524	14,280	14,789	7,493	29,665	29,183	2	0	0	**169,072**
LDT2	363	78,938	1,654	7,830	24,998	20,902	118,457	48,989	50,734	25,705	101,772	100,111	8	0	0	**580,098**
LHD1	99	23,293	432	1,866	5,480	4,294	23,196	9,328	9,547	4,867	19,733	0	0	0	0	**102,036**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	11	2,582	48	207	608	476	2,571	1,034	1,058	539	2,188	0	0	0	0	**11,311**
MCY	2	479	11	58	200	176	1,025	428	438	215	808	742	0	0	0	**4,582**
MDV	548	119,044	2,494	11,806	37,691	31,515	178,608	73,860	76,491	38,755	153,443	150,933	12	0	0	**874,652**
MH	6	1,327	25	106	312	245	1,321	531	544	277	1,124	1,154	0	0	0	**6,966**
OBUS	4	886	16	71	208	163	882	355	363	185	750	770	0	0	0	**4,649**
SBUS	1	188	3	15	44	35	188	75	77	39	160	164	0	0	0	**989**
T6	7	1,549	29	124	364	286	1,542	620	635	324	1,312	1,347	0	0	0	**8,132**
T7	1	220	4	18	52	41	219	88	90	46	186	191	0	0	0	**1,154**
UBUS	2	484	9	39	114	89	482	194	198	101	410	421	0	0	0	**2,540**
Total	**1,812**	**396,229**	**8,229**	**38,727**	**123,029**	**102,502**	**579,444**	**239,285**	**247,654**	**125,507**	**497,488**	**467,910**	**36**	**0**	**0**	**2,827,852**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	170	5	28	106	103	653	292	314	159	607	556	0	0	0	**2,991**
LDT1	0	14	0	2	9	8	53	24	25	13	49	45	0	0	0	**241**
LDT2	0	12	0	2	7	7	46	21	22	11	43	39	0	0	0	**210**
LHD1	15	4,371	119	709	2,726	2,649	16,790	7,500	8,069	4,093	15,629	0	0	0	0	**62,653**
LHD2	4	1,048	28	170	653	635	4,024	1,797	1,934	981	3,746	0	0	0	0	**15,016**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	9	8	53	24	26	13	50	46	0	0	0	**245**
MH	1	252	6	28	95	87	520	222	230	114	430	394	0	0	0	**2,375**
OBUS	6	1,488	33	166	595	562	3,516	1,459	1,594	784	2,909	2,325	0	0	0	**15,430**
SBUS	3	826	18	87	311	284	1,702	726	753	373	1,407	1,289	0	0	0	**7,776**
T6	70	16,725	372	1,756	6,305	5,749	34,469	14,695	15,250	7,549	28,497	26,111	2	0	0	**157,480**
T7	489	117,510	2,617	12,349	44,297	40,394	242,181	103,245	107,149	53,041	200,224	183,462	13	0	0	**1,106,484**
UBUS	5	1,443	39	234	900	874	5,543	2,476	2,664	1,351	5,160	4,720	0	0	0	**25,405**
Total	**593**	**143,872**	**3,238**	**15,532**	**56,013**	**51,361**	**309,549**	**132,478**	**138,030**	**68,482**	**258,750**	**218,987**	**15**	**0**	**0**	**1,396,900**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,224,751	3,832,694	3,832,694

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2050

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,381,886,000	2,610	600235	36.9	13.1	548,921
Commercial	2,716,941,342	7,503	684669	42.1	14.9	626,137
Industrial	0		0	0.0	0.0	0
Total	**5,098,827,342**		**1,284,904**	**79.0**	**28.0**	**1,175,058**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	125,938,800	138	736,742	69.3	1.4	670,082
Commercial	145,931,942	403	853,702	80.3	1.6	776,459
Industrial	0		0	0.0	0.0	0
Total	**271,870,742**		**1,590,444**	**149.5**	**3.0**	**1,446,540**

Notes and Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: California Climate Action Registry (CCAR). Power/Utility Protocol (PUP). Years 2004-2006.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
*OFFROAD only provides emissions rates up to 2040. Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	912,600
	Emissions (MTCO2e per person)	812,214
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

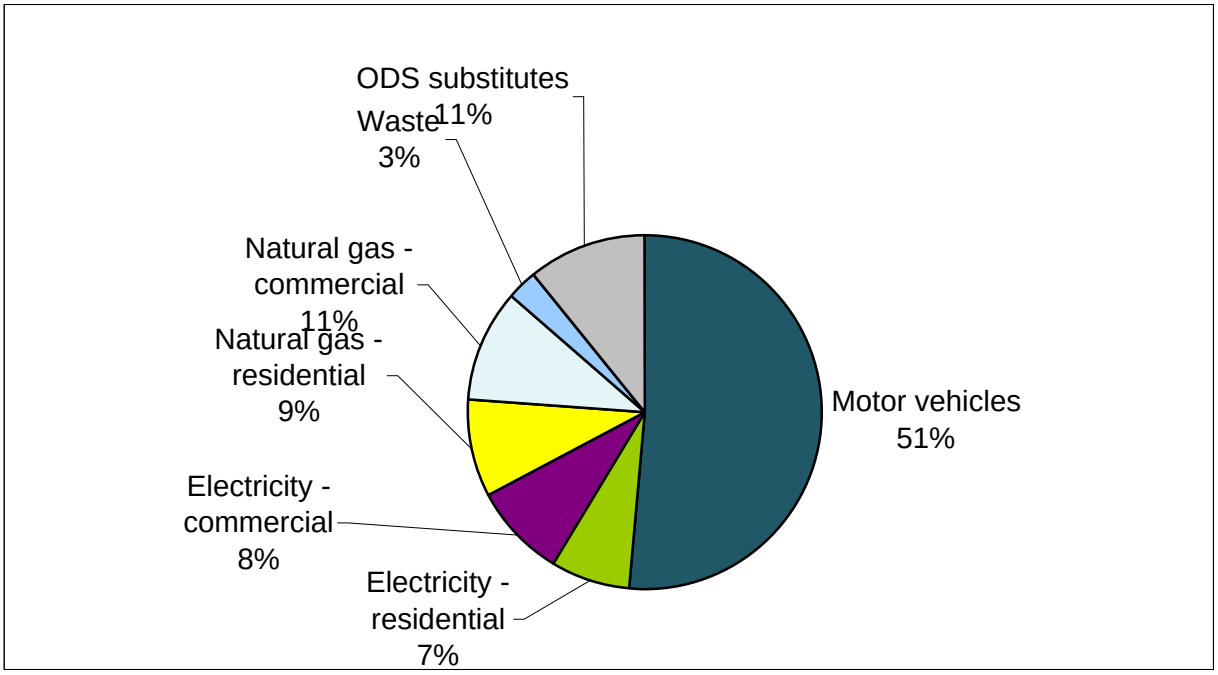
Summary
Year: 2056
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	970,000	Fresno COG
Employment	393,200	
County Information		
Population	1,616,667	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	4,122,629	4,122,629
Electricity - residential	583,447	
Electricity - commercial	679,888	
Natural gas - residential	712,228	
Natural gas - commercial	843,115	
Waste	220,578	
Offroad equipment	1,314	
ODS substitutes	863,300	
Total	***8,026,498***	



Community Greenhouse Gas Inventory

Waste

Year: **2056**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	220,578	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1590	462862	12555	75029	288699	280469	1777980	794189	854508	433399	1655038	1514041	104	0	0
LDT1	222	64643	1753	10479	40320	39170	248313	110917	119341	60529	231143	211452	15	0	0
LDT2	632	183782	4985	29791	114630	111362	705959	315338	339288	172084	657144	601160	41	0	0
LHD1	105	30648	831	4968	19116	18571	117729	52587	56581	28697	109588	100252	7	0	0
LHD2	12	3398	92	551	2119	2059	13051	5830	6272	3181	12149	11114	1	0	0
MCY	22	6273	170	1017	3913	3801	24098	10764	11581	5874	22431	20520	1	0	0
MDV	766	222915	6046	36134	139038	135074	856277	382482	411532	208725	797068	729164	50	0	0
MH	6	1746	47	283	1089	1058	6706	2995	3223	1635	6242	5710	0	0	0
OBUS	4	1165	32	189	727	706	4476	1999	2151	1091	4166	3811	0	0	0
SBUS	1	248	7	40	155	150	952	425	458	232	886	811	0	0	0
T6	7	2038	55	330	1271	1235	7829	3497	3763	1908	7287	6667	0	0	0
T7	1	289	8	47	180	175	1111	496	534	271	1034	946	0	0	0
UBUS	2	637	17	103	397	386	2445	1092	1175	596	2276	2082	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1254	34	203	782	760	4818	2152	2315	1174	4485	4103	0	0	0
LDT1	0	98	3	16	61	60	378	169	182	92	352	322	0	0	0
LDT2	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
LHD1	76	21987	596	3564	13714	13323	84459	37726	40592	20588	78619	71921	5	0	0
LHD2	18	5247	142	851	3273	3180	20157	9004	9687	4913	18763	17164	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	101	3	16	63	61	388	173	187	95	361	331	0	0	0
MH	1	312	8	51	195	189	1200	536	577	293	1117	1022	0	0	0
OBUS	6	1603	43	260	1000	971	6156	2750	2959	1501	5731	5242	0	0	0
SBUS	3	1011	27	164	630	612	3882	1734	1866	946	3614	3306	0	0	0
T6	71	20691	561	3354	12906	12538	79481	35503	38199	19374	73985	67682	5	0	0
T7	325	94666	2568	15345	59046	57363	363639	162430	174767	88640	338494	309657	21	0	0
UBUS	5	1471	40	239	918	892	5652	2525	2716	1378	5261	4813	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	714	155,159	3,251	15,388	49,127	41,078	232,800	96,271	99,700	50,514	200,001	196,731	15	0	0	**1,140,034**
LDT1	114	24,733	518	2,455	7,837	6,553	37,135	15,361	15,907	8,059	31,909	31,391	2	0	0	**181,861**
LDT2	391	84,909	1,779	8,422	26,889	22,484	127,418	52,695	54,572	27,649	109,471	107,684	8	0	0	**623,981**
LHD1	106	25,055	465	2,007	5,895	4,619	24,950	10,034	10,270	5,235	21,226	0	0	0	0	**109,755**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	12	2,778	52	222	653	512	2,766	1,112	1,138	580	2,353	0	0	0	0	**12,167**
MCY	2	515	12	63	215	189	1,103	461	471	231	870	798	0	0	0	**4,928**
MDV	589	128,049	2,683	12,699	40,542	33,899	192,120	79,448	82,278	41,687	165,051	162,351	12	0	0	**940,817**
MH	6	1,427	26	114	336	263	1,421	572	585	298	1,209	1,241	0	0	0	**7,493**
OBUS	4	953	18	76	224	176	949	381	390	199	807	828	0	0	0	**5,001**
SBUS	1	203	4	16	48	37	202	81	83	42	172	176	0	0	0	**1,064**
T6	7	1,666	31	133	392	307	1,659	667	683	348	1,411	1,449	0	0	0	**8,747**
T7	1	236	4	19	56	44	235	95	97	49	200	206	0	0	0	**1,241**
UBUS	2	520	10	42	122	96	518	208	213	109	441	452	0	0	0	**2,732**
Total	**1,949**	**426,203**	**8,851**	**41,657**	**132,336**	**110,256**	**623,277**	**257,386**	**266,388**	**135,002**	**535,121**	**503,306**	**39**	**0**	**0**	**3,041,772**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	183	5	30	114	111	702	314	337	171	653	598	0	0	0	**3,217**
LDT1	0	15	0	2	9	9	57	25	27	14	53	48	0	0	0	**260**
LDT2	0	13	0	2	8	8	49	22	24	12	46	42	0	0	0	**226**
LHD1	16	4,702	128	762	2,932	2,849	18,060	8,067	8,680	4,402	16,811	0	0	0	0	**67,393**
LHD2	4	1,127	31	183	703	683	4,328	1,933	2,080	1,055	4,029	0	0	0	0	**16,151**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	15	0	2	9	9	58	26	28	14	54	49	0	0	0	**264**
MH	1	271	6	30	102	93	559	238	247	122	462	423	0	0	0	**2,555**
OBUS	7	1,600	35	178	640	605	3,782	1,569	1,715	843	3,129	2,501	0	0	0	**16,597**
SBUS	4	888	20	93	335	305	1,831	780	810	401	1,514	1,387	0	0	0	**8,364**
T6	75	17,990	401	1,889	6,782	6,184	37,076	15,806	16,404	8,120	30,653	28,087	2	0	0	**169,393**
T7	526	126,400	2,815	13,284	47,648	43,450	260,502	111,056	115,254	57,054	215,371	197,341	14	0	0	**1,190,187**
UBUS	5	1,552	42	252	968	941	5,962	2,663	2,866	1,453	5,550	5,077	0	0	0	**27,327**
Total	**638**	**154,755**	**3,483**	**16,707**	**60,251**	**55,246**	**332,966**	**142,500**	**148,471**	**73,662**	**278,324**	**235,553**	**16**	**0**	**0**	**1,502,572**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,544,344	4,122,629	4,122,629

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2010 VMT)/2010 VMT))/45 years=.0254)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	40.99%	0.11%
LDT1	5.72%	0.01%
LDT2	16.28%	0.01%
LHD1	2.71%	1.95%
LHD2	0.30%	0.46%
MCY	0.56%	0.00%
MDV	19.74%	0.01%
MH	0.15%	0.03%
OBUS	0.10%	0.14%
SBUS	0.02%	0.09%
T6	0.18%	1.83%
T7	0.03%	8.38%
UBUS	0.06%	0.13%

		%	Includes
GAS	Heavy duty	0.5%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.8%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	41.5%	LDA, MCY
DSL	Heavy duty	10.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1118	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1277	953	736	584	484	417	372	345	332	332	344	370	413	443	0
LDT2	1541	1151	889	704	584	503	450	416	401	400	415	446	498	534	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	222	204	176	154	137	124	114	107	101	98	97	97	99	104	0
MDV	1916	1431	1105	875	726	625	559	517	498	497	516	555	620	664	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0
LDT1	373	373	373	373	373	373	373	373	373	373	373	373	373	373	0
LDT2	371	371	371	371	371	371	371	371	371	371	371	371	371	371	0
LHD1	533	533	533	533	533	533	533	533	533	533	533	0	0	0	0
LHD2	535	535	535	535	535	535	535	535	535	535	535	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	369	369	369	369	369	369	369	369	369	369	369	369	369	369	0
MH	2381	2162	1775	1457	1307	1226	1160	1107	1068	1042	1030	1032	1047	0	0
OBUS	3085	2487	2025	1711	1595	1551	1530	1421	1443	1399	1360	1188	1365	0	0
SBUS	2650	2189	1798	1418	1323	1242	1175	1121	1081	1055	1043	1045	0	0	0
T6	2621	2165	1778	1403	1309	1228	1162	1109	1070	1044	1032	1034	1049	0	0
T7	4026	3326	2731	2156	2010	1887	1784	1703	1643	1603	1585	1587	1611	0	0
UBUS	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	2627	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1590	462862	12555	75029	288699	280469	1777980	794189	854508	433399	1655038	1514041	104	0	0
LDT1	222	64643	1753	10479	40320	39170	248313	110917	119341	60529	231143	211452	15	0	0
LDT2	632	183782	4985	29791	114630	111362	705959	315338	339288	172084	657144	601160	41	0	0
LHD1	105	30648	831	4968	19116	18571	117729	52587	56581	28697	109588	100252	7	0	0
LHD2	12	3398	92	551	2119	2059	13051	5830	6272	3181	12149	11114	1	0	0
MCY	22	6273	170	1017	3913	3801	24098	10764	11581	5874	22431	20520	1	0	0
MDV	766	222915	6046	36134	139038	135074	856277	382482	411532	208725	797068	729164	50	0	0
MH	6	1746	47	283	1089	1058	6706	2995	3223	1635	6242	5710	0	0	0
OBUS	4	1165	32	189	727	706	4476	1999	2151	1091	4166	3811	0	0	0
SBUS	1	248	7	40	155	150	952	425	458	232	886	811	0	0	0
T6	7	2038	55	330	1271	1235	7829	3497	3763	1908	7287	6667	0	0	0
T7	1	289	8	47	180	175	1111	496	534	271	1034	946	0	0	0
UBUS	2	637	17	103	397	386	2445	1092	1175	596	2276	2082	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1254	34	203	782	760	4818	2152	2315	1174	4485	4103	0	0	0
LDT1	0	98	3	16	61	60	378	169	182	92	352	322	0	0	0
LDT2	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
LHD1	76	21987	596	3564	13714	13323	84459	37726	40592	20588	78619	71921	5	0	0
LHD2	18	5247	142	851	3273	3180	20157	9004	9687	4913	18763	17164	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	101	3	16	63	61	388	173	187	95	361	331	0	0	0
MH	1	312	8	51	195	189	1200	536	577	293	1117	1022	0	0	0
OBUS	6	1603	43	260	1000	971	6156	2750	2959	1501	5731	5242	0	0	0
SBUS	3	1011	27	164	630	612	3882	1734	1866	946	3614	3306	0	0	0
T6	71	20691	561	3354	12906	12538	79481	35503	38199	19374	73985	67682	5	0	0
T7	325	94666	2568	15345	59046	57363	363639	162430	174767	88640	338494	309657	21	0	0
UBUS	5	1471	40	239	918	892	5652	2525	2716	1378	5261	4813	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	714	155,159	3,251	15,388	49,127	41,078	232,800	96,271	99,700	50,514	200,001	196,731	15	0	0	**1,140,034**
LDT1	114	24,733	518	2,455	7,837	6,553	37,135	15,361	15,907	8,059	31,909	31,391	2	0	0	**181,861**
LDT2	391	84,909	1,779	8,422	26,889	22,484	127,418	52,695	54,572	27,649	109,471	107,684	8	0	0	**623,981**
LHD1	106	25,055	465	2,007	5,895	4,619	24,950	10,034	10,270	5,235	21,226	0	0	0	0	**109,755**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	12	2,778	52	222	653	512	2,766	1,112	1,138	580	2,353	0	0	0	0	**12,167**
MCY	2	515	12	63	215	189	1,103	461	471	231	870	798	0	0	0	**4,928**
MDV	589	128,049	2,683	12,699	40,542	33,899	192,120	79,448	82,278	41,687	165,051	162,351	12	0	0	**940,817**
MH	6	1,427	26	114	336	263	1,421	572	585	298	1,209	1,241	0	0	0	**7,493**
OBUS	4	953	18	76	224	176	949	381	390	199	807	828	0	0	0	**5,001**
SBUS	1	203	4	16	48	37	202	81	83	42	172	176	0	0	0	**1,064**
T6	7	1,666	31	133	392	307	1,659	667	683	348	1,411	1,449	0	0	0	**8,747**
T7	1	236	4	19	56	44	235	95	97	49	200	206	0	0	0	**1,241**
UBUS	2	520	10	42	122	96	518	208	213	109	441	452	0	0	0	**2,732**
Total	**1,949**	**426,203**	**8,851**	**41,657**	**132,336**	**110,256**	**623,277**	**257,386**	**266,388**	**135,002**	**535,121**	**503,306**	**39**	**0**	**0**	**3,041,772**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	183	5	30	114	111	702	314	337	171	653	598	0	0	0	**3,217**
LDT1	0	15	0	2	9	9	57	25	27	14	53	48	0	0	0	**260**
LDT2	0	13	0	2	8	8	49	22	24	12	46	42	0	0	0	**226**
LHD1	16	4,702	128	762	2,932	2,849	18,060	8,067	8,680	4,402	16,811	0	0	0	0	**67,393**
LHD2	4	1,127	31	183	703	683	4,328	1,933	2,080	1,055	4,029	0	0	0	0	**16,151**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	15	0	2	9	9	58	26	28	14	54	49	0	0	0	**264**
MH	1	271	6	30	102	93	559	238	247	122	462	423	0	0	0	**2,555**
OBUS	7	1,600	35	178	640	605	3,782	1,569	1,715	843	3,129	2,501	0	0	0	**16,597**
SBUS	4	888	20	93	335	305	1,831	780	810	401	1,514	1,387	0	0	0	**8,364**
T6	75	17,990	401	1,889	6,782	6,184	37,076	15,806	16,404	8,120	30,653	28,087	2	0	0	**169,393**
T7	526	126,400	2,815	13,284	47,648	43,450	260,502	111,056	115,254	57,054	215,371	197,341	14	0	0	**1,190,187**
UBUS	5	1,552	42	252	968	941	5,962	2,663	2,866	1,453	5,550	5,077	0	0	0	**27,327**
Total	**638**	**154,755**	**3,483**	**16,707**	**60,251**	**55,246**	**332,966**	**142,500**	**148,471**	**73,662**	**278,324**	**235,553**	**16**	**0**	**0**	**1,502,572**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,544,344	4,122,629	4,122,629

EMFAC 2011
2005 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2005, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
2005 Emission Rates will be used for BAU calculations.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDA	GAS	5	574.3459975	1117.902588	1117.90259	0.003%
Fresno	2005	LDA	DSL	5	1.55629378	362.9037298	362.90373	0.000%
Fresno	2005	LDA	GAS	10	1560.70567	834.9088117	834.908812	0.008%
Fresno	2005	LDA	DSL	10	4.229012934	362.9037176	362.903718	0.000%
Fresno	2005	LDA	GAS	15	1481.313242	644.9016731	644.901673	0.007%
Fresno	2005	LDA	DSL	15	4.013884191	362.9037424	362.903742	0.000%
Fresno	2005	LDA	GAS	20	384673.2535	510.8041631	510.804163	1.912%
Fresno	2005	LDA	DSL	20	1042.341227	362.903737	362.903737	0.005%
Fresno	2005	LDA	GAS	25	46631.55871	423.823398	423.823398	0.232%
Fresno	2005	LDA	DSL	25	126.3565868	362.903733	362.903733	0.001%
Fresno	2005	LDA	GAS	30	142960.6643	364.7820036	364.782004	0.711%
Fresno	2005	LDA	DSL	30	387.3776096	362.9037333	362.903733	0.002%
Fresno	2005	LDA	GAS	35	556848.446	326.1153018	326.115302	2.768%
Fresno	2005	LDA	DSL	35	1508.880862	362.9037744	362.903774	0.008%
Fresno	2005	LDA	GAS	40	1045053.417	301.9173486	301.917349	5.196%
Fresno	2005	LDA	DSL	40	2831.760101	362.9037532	362.903753	0.014%
Fresno	2005	LDA	GAS	45	898804.646	290.6000061	290.600006	4.469%
Fresno	2005	LDA	DSL	45	2435.472726	362.9037268	362.903727	0.012%
Fresno	2005	LDA	GAS	50	1236247.625	290.295843	290.295843	6.146%
Fresno	2005	LDA	DSL	50	3349.835262	362.9037543	362.903754	0.017%
Fresno	2005	LDA	GAS	55	881689.2606	300.9810314	300.981031	4.383%
Fresno	2005	LDA	DSL	55	2389.095509	362.90373	362.90373	0.012%
Fresno	2005	LDA	GAS	60	1065707.872	323.6299465	323.629947	5.298%
Fresno	2005	LDA	DSL	60	2887.727003	362.9037118	362.903712	0.014%
Fresno	2005	LDA	GAS	65	1052205.277	361.6105735	361.610573	5.231%
Fresno	2005	LDA	DSL	65	2851.139136	362.903729	362.903729	0.014%
Fresno	2005	LDA	GAS	70	930481.937	387.59416	387.59416	4.626%
Fresno	2005	LDA	DSL	70	2521.30786	362.9037511	362.903751	0.013%
Fresno	2005	LDT1	GAS	5	80.2134059	1277.383889	1277.38389	0.000%
Fresno	2005	LDT1	DSL	5	0.122139063	373.2062411	373.206241	0.000%
Fresno	2005	LDT1	GAS	10	217.9688072	952.9532874	952.953287	0.001%
Fresno	2005	LDT1	DSL	10	0.331895978	373.2062264	373.206226	0.000%
Fresno	2005	LDT1	GAS	15	206.8808052	735.6841431	735.684143	0.001%
Fresno	2005	LDT1	DSL	15	0.315012523	373.2062425	373.206242	0.000%
Fresno	2005	LDT1	GAS	20	53723.62363	583.5347772	583.534777	0.267%
Fresno	2005	LDT1	DSL	20	81.803698	373.206226	373.206226	0.000%
Fresno	2005	LDT1	GAS	25	6512.582938	484.1298404	484.12984	0.032%
Fresno	2005	LDT1	DSL	25	9.916557	373.2062055	373.206206	0.000%
Fresno	2005	LDT1	GAS	30	19965.94701	416.6904394	416.690439	0.099%
Fresno	2005	LDT1	DSL	30	30.4016764	373.2062064	373.206206	0.000%
Fresno	2005	LDT1	GAS	35	77769.69216	372.4778067	372.477807	0.387%
Fresno	2005	LDT1	DSL	35	118.418068	373.2062534	373.206253	0.001%
Fresno	2005	LDT1	GAS	40	145952.6125	344.9252398	344.92524	0.726%
Fresno	2005	LDT1	DSL	40	222.238591	373.2062401	373.20624	0.001%
Fresno	2005	LDT1	GAS	45	125527.4358	331.9868346	331.986835	0.624%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LDT1	DSL	45	191.137656	373.2062577	373.206258	0.001%
Fresno	2005	LDT1	GAS	50	172654.8816	331.6326825	331.632682	0.858%
Fresno	2005	LDT1	DSL	50	262.897513	373.2062113	373.206211	0.001%
Fresno	2005	LDT1	GAS	55	123137.0906	343.8328444	343.832844	0.612%
Fresno	2005	LDT1	DSL	55	187.497965	373.2061963	373.206196	0.001%
Fresno	2005	LDT1	GAS	60	148837.2054	369.7469417	369.746942	0.740%
Fresno	2005	LDT1	DSL	60	226.630859	373.206311	373.206311	0.001%
Fresno	2005	LDT1	GAS	65	146951.4277	413.1036658	413.103666	0.731%
Fresno	2005	LDT1	DSL	65	223.759469	373.2062322	373.206232	0.001%
Fresno	2005	LDT1	GAS	70	129951.4999	442.7709544	442.770954	0.646%
Fresno	2005	LDT1	DSL	70	197.874089	373.2062236	373.206224	0.001%
Fresno	2005	LDT2	GAS	5	228.0478692	1541.14964	1541.14964	0.001%
Fresno	2005	LDT2	DSL	5	0.107040842	371.0954996	371.0955	0.000%
Fresno	2005	LDT2	GAS	10	619.688516	1150.709694	1150.70969	0.003%
Fresno	2005	LDT2	DSL	10	0.290868673	371.095504	371.095504	0.000%
Fresno	2005	LDT2	GAS	15	588.1651566	888.7202414	888.720241	0.003%
Fresno	2005	LDT2	DSL	15	0.276072268	371.0954901	371.09549	0.000%
Fresno	2005	LDT2	GAS	20	152737.0474	704.1586177	704.158618	0.759%
Fresno	2005	LDT2	DSL	20	71.691539	371.0954812	371.095481	0.000%
Fresno	2005	LDT2	GAS	25	18515.36584	584.2418904	584.24189	0.092%
Fresno	2005	LDT2	DSL	25	8.6907219	371.095481	371.095481	0.000%
Fresno	2005	LDT2	GAS	30	56763.47295	502.8540511	502.854051	0.282%
Fresno	2005	LDT2	DSL	30	26.6435743	371.0954791	371.095479	0.000%
Fresno	2005	LDT2	GAS	35	221100.3455	449.539312	449.539312	1.099%
Fresno	2005	LDT2	DSL	35	103.779821	371.0955143	371.095514	0.001%
Fresno	2005	LDT2	GAS	40	414945.4046	416.2074653	416.207465	2.063%
Fresno	2005	LDT2	DSL	40	194.766579	371.0954985	371.095498	0.001%
Fresno	2005	LDT2	GAS	45	356876.2901	400.603499	400.603499	1.774%
Fresno	2005	LDT2	DSL	45	167.510172	371.0955097	371.09551	0.001%
Fresno	2005	LDT2	GAS	50	490860.2714	400.1823445	400.182345	2.440%
Fresno	2005	LDT2	DSL	50	230.399436	371.09548	371.09548	0.001%
Fresno	2005	LDT2	GAS	55	350080.5216	414.9103501	414.91035	1.740%
Fresno	2005	LDT2	DSL	55	164.320381	371.0955152	371.095515	0.001%
Fresno	2005	LDT2	GAS	60	423146.3014	446.1440566	446.144057	2.104%
Fresno	2005	LDT2	DSL	60	198.615926	371.0954932	371.095493	0.001%
Fresno	2005	LDT2	GAS	65	417785.0125	498.4924137	498.492414	2.077%
Fresno	2005	LDT2	DSL	65	196.099447	371.0954901	371.09549	0.001%
Fresno	2005	LDT2	GAS	70	369453.9847	534.3069769	534.306977	1.837%
Fresno	2005	LDT2	DSL	70	173.41387	371.0955028	371.095503	0.001%
Fresno	2005	LHD1	GAS	5	15493.27829	2513.497349	2513.49735	0.077%
Fresno	2005	LHD1	DSL	5	6887.103617	532.5794	532.5794	0.034%
Fresno	2005	LHD1	GAS	10	40399.97733	2036.128182	2036.12818	0.201%
Fresno	2005	LHD1	DSL	10	22902.76288	532.5792393	532.579239	0.114%
Fresno	2005	LHD1	GAS	15	91996.19282	1392.429536	1392.42954	0.457%
Fresno	2005	LHD1	DSL	15	49600.82188	532.5792921	532.579292	0.247%
Fresno	2005	LHD1	GAS	20	106300.888	1006.068544	1006.06854	0.528%
Fresno	2005	LHD1	DSL	20	54378.52199	532.5792617	532.579262	0.270%
Fresno	2005	LHD1	GAS	25	81884.45437	768.0121288	768.012129	0.407%
Fresno	2005	LHD1	DSL	25	58199.51987	532.5793513	532.579351	0.289%
Fresno	2005	LHD1	GAS	30	72412.73099	619.4335923	619.433592	0.360%
Fresno	2005	LHD1	DSL	30	49127.77262	532.5792941	532.579294	0.244%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	LHD1	GAS	35	27058.00658	527.8465902	527.84659	0.135%
Fresno	2005	LHD1	DSL	35	25926.63204	532.579317	532.579317	0.129%
Fresno	2005	LHD1	GAS	40	7986.90704	475.2331456	475.233146	0.040%
Fresno	2005	LHD1	DSL	40	14232.8744	532.5792642	532.579264	0.071%
Fresno	2005	LHD1	GAS	45	9832.585266	452.0558438	452.055844	0.049%
Fresno	2005	LHD1	DSL	45	15361.95268	532.5792928	532.579293	0.076%
Fresno	2005	LHD1	GAS	50	72602.43931	454.3217938	454.321794	0.361%
Fresno	2005	LHD1	DSL	50	59317.36357	532.5793236	532.579324	0.295%
Fresno	2005	LHD1	GAS	55	19969.09783	482.4155587	482.415559	0.099%
Fresno	2005	LHD1	DSL	55	35721.45554	532.5792563	532.579256	0.178%
Fresno	2005	LHD2	GAS	5	1717.546588	2513.497194	2513.49719	0.009%
Fresno	2005	LHD2	DSL	5	1643.654028	534.8240705	534.824071	0.008%
Fresno	2005	LHD2	GAS	10	4478.641561	2036.128258	2036.12826	0.022%
Fresno	2005	LHD2	DSL	10	5465.899708	534.8239928	534.823993	0.027%
Fresno	2005	LHD2	GAS	15	10198.47067	1392.429599	1392.4296	0.051%
Fresno	2005	LHD2	DSL	15	11837.57275	534.8239985	534.823999	0.059%
Fresno	2005	LHD2	GAS	20	11784.25424	1006.068517	1006.06852	0.059%
Fresno	2005	LHD2	DSL	20	12977.80233	534.8240078	534.824008	0.065%
Fresno	2005	LHD2	GAS	25	9077.508294	768.0121044	768.012104	0.045%
Fresno	2005	LHD2	DSL	25	13889.71073	534.8240484	534.824048	0.069%
Fresno	2005	LHD2	GAS	30	8027.49616	619.4336218	619.433622	0.040%
Fresno	2005	LHD2	DSL	30	11724.67582	534.824037	534.824037	0.058%
Fresno	2005	LHD2	GAS	35	2999.584099	527.846466	527.846466	0.015%
Fresno	2005	LHD2	DSL	35	6187.566882	534.8240546	534.824055	0.031%
Fresno	2005	LHD2	GAS	40	885.4087913	475.2331522	475.233152	0.004%
Fresno	2005	LHD2	DSL	40	3396.771437	534.8241463	534.824146	0.017%
Fresno	2005	LHD2	GAS	45	1090.016138	452.0558109	452.055811	0.005%
Fresno	2005	LHD2	DSL	45	3666.233792	534.824068	534.824068	0.018%
Fresno	2005	LHD2	GAS	50	8048.527309	454.3218106	454.321811	0.040%
Fresno	2005	LHD2	DSL	50	14156.48996	534.8240631	534.824063	0.070%
Fresno	2005	LHD2	GAS	55	2213.724954	482.415483	482.415483	0.011%
Fresno	2005	LHD2	DSL	55	8525.166441	534.8240334	534.824033	0.042%
Fresno	2005	MCY	GAS	5	7.7843384	221.6010944	221.601094	0.000%
Fresno	2005	MCY	GAS	10	21.1528613	204.3809145	204.380914	0.000%
Fresno	2005	MCY	GAS	15	20.07682252	176.0040917	176.004092	0.000%
Fresno	2005	MCY	GAS	20	5213.628487	154.0664735	154.066474	0.026%
Fresno	2005	MCY	GAS	25	632.0158685	137.0847399	137.08474	0.003%
Fresno	2005	MCY	GAS	30	1937.602297	123.9888015	123.988801	0.010%
Fresno	2005	MCY	GAS	35	7547.186875	114.0069527	114.006953	0.038%
Fresno	2005	MCY	GAS	40	14164.02356	106.5882594	106.588259	0.070%
Fresno	2005	MCY	GAS	45	12181.85384	101.351138	101.351138	0.061%
Fresno	2005	MCY	GAS	50	16755.35397	98.0507808	98.0507808	0.083%
Fresno	2005	MCY	GAS	55	11949.88349	96.5621063	96.5621063	0.059%
Fresno	2005	MCY	GAS	60	14443.95889	96.87654461	96.8765446	0.072%
Fresno	2005	MCY	GAS	65	14260.95394	99.1149102	99.1149102	0.071%
Fresno	2005	MCY	GAS	70	12611.18911	103.5614952	103.561495	0.063%
Fresno	2005	MDV	GAS	5	276.6057878	1915.561564	1915.56156	0.001%
Fresno	2005	MDV	DSL	5	0.125445122	369.0636663	369.063666	0.000%
Fresno	2005	MDV	GAS	10	751.6379153	1430.71487	1430.71487	0.004%
Fresno	2005	MDV	DSL	10	0.34087976	369.0636324	369.063632	0.000%
Fresno	2005	MDV	GAS	15	713.402331	1105.142376	1105.14238	0.004%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	MDV	DSL	15	0.323539357	369.0636164	369.063616	0.000%
Fresno	2005	MDV	GAS	20	185259.1327	875.2888262	875.288826	0.921%
Fresno	2005	MDV	DSL	20	84.01796496	369.0636582	369.063658	0.000%
Fresno	2005	MDV	GAS	25	22457.81699	726.2455563	726.245556	0.112%
Fresno	2005	MDV	DSL	25	10.18497853	369.0636516	369.063652	0.000%
Fresno	2005	MDV	GAS	30	68850.04116	625.0744431	625.074443	0.342%
Fresno	2005	MDV	DSL	30	31.22459012	369.0636522	369.063652	0.000%
Fresno	2005	MDV	GAS	35	268178.9233	558.8198391	558.819839	1.333%
Fresno	2005	MDV	DSL	35	121.6234022	369.0637076	369.063708	0.001%
Fresno	2005	MDV	GAS	40	503299.0839	517.3492783	517.349278	2.502%
Fresno	2005	MDV	DSL	40	228.2541587	369.0636653	369.063665	0.001%
Fresno	2005	MDV	GAS	45	432865.4758	497.9571493	497.957149	2.152%
Fresno	2005	MDV	DSL	45	196.3113735	369.0636861	369.063686	0.001%
Fresno	2005	MDV	GAS	50	595378.4851	497.4363565	497.436356	2.960%
Fresno	2005	MDV	DSL	50	270.0136082	369.0636733	369.063673	0.001%
Fresno	2005	MDV	GAS	55	424622.6866	515.7464096	515.74641	2.111%
Fresno	2005	MDV	DSL	55	192.5731227	369.0637145	369.063714	0.001%
Fresno	2005	MDV	GAS	60	513246.2809	554.5537379	554.553738	2.552%
Fresno	2005	MDV	DSL	60	232.7653436	369.0636774	369.063677	0.001%
Fresno	2005	MDV	GAS	65	506743.4137	619.6376375	619.637637	2.519%
Fresno	2005	MDV	DSL	65	229.8161802	369.0636924	369.063692	0.001%
Fresno	2005	MDV	GAS	70	448121.3124	664.1628397	664.16284	2.228%
Fresno	2005	MDV	DSL	70	203.2301423	369.0636551	369.063655	0.001%
Fresno	2005	MH	GAS	5	268.9167968	2513.497406	2513.49741	0.001%
Fresno	2005	MH	DSL	5	44.76225056	2381.129731	2381.12973	0.000%
Fresno	2005	MH	GAS	10	1351.847182	2036.128315	2036.12831	0.007%
Fresno	2005	MH	DSL	10	222.8096365	2162.072949	2162.07295	0.001%
Fresno	2005	MH	GAS	15	1707.614697	1392.429658	1392.42966	0.008%
Fresno	2005	MH	DSL	15	300.715632	1775.243505	1775.24351	0.001%
Fresno	2005	MH	GAS	20	1771.215993	1006.068537	1006.06854	0.009%
Fresno	2005	MH	DSL	20	318.91989	1456.791888	1456.79189	0.002%
Fresno	2005	MH	GAS	25	1973.543913	768.012138	768.012138	0.010%
Fresno	2005	MH	DSL	25	332.1424004	1306.661906	1306.66191	0.002%
Fresno	2005	MH	GAS	30	2231.372516	619.4336513	619.433651	0.011%
Fresno	2005	MH	DSL	30	399.3743491	1226.495736	1226.49574	0.002%
Fresno	2005	MH	GAS	35	2773.257546	527.8465727	527.846573	0.014%
Fresno	2005	MH	DSL	35	470.9149121	1159.967885	1159.96789	0.002%
Fresno	2005	MH	GAS	40	3452.419773	475.233224	475.233224	0.017%
Fresno	2005	MH	DSL	40	584.5676013	1107.078048	1107.07805	0.003%
Fresno	2005	MH	GAS	45	3148.370866	452.0558634	452.055863	0.016%
Fresno	2005	MH	DSL	45	478.6833316	1067.826603	1067.8266	0.002%
Fresno	2005	MH	GAS	50	3064.012004	454.3218205	454.321821	0.015%
Fresno	2005	MH	DSL	50	535.7245191	1042.213217	1042.21322	0.003%
Fresno	2005	MH	GAS	55	4007.448442	482.4155989	482.415599	0.020%
Fresno	2005	MH	DSL	55	785.0557197	1030.238195	1030.2382	0.004%
Fresno	2005	MH	GAS	60	4624.41305	541.2091675	541.209168	0.023%
Fresno	2005	MH	DSL	60	943.3760148	1031.901337	1031.90134	0.005%
Fresno	2005	MH	GAS	65	722.62303	641.4979244	641.497924	0.004%
Fresno	2005	MH	DSL	65	148.4605629	1047.202697	1047.2027	0.001%
Fresno	2005	OBUS	GAS	5	179.4898447	2513.497341	2513.49734	0.001%
Fresno	2005	OBUS	DSL	5	165.7644542	3084.635701	3084.6357	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	OBUS	GAS	10	902.2969282	2036.128585	2036.12858	0.004%
Fresno	2005	OBUS	DSL	10	764.4488042	2486.733654	2486.73365	0.004%
Fresno	2005	OBUS	GAS	15	1139.755796	1392.429568	1392.42957	0.006%
Fresno	2005	OBUS	DSL	15	1006.387031	2024.544507	2024.54451	0.005%
Fresno	2005	OBUS	GAS	20	1182.206665	1006.068712	1006.06871	0.006%
Fresno	2005	OBUS	DSL	20	1343.731614	1711.279078	1711.27908	0.007%
Fresno	2005	OBUS	GAS	25	1317.251509	768.0121314	768.012131	0.007%
Fresno	2005	OBUS	DSL	25	1394.142051	1595.098427	1595.09843	0.007%
Fresno	2005	OBUS	GAS	30	1489.340651	619.4336132	619.433613	0.007%
Fresno	2005	OBUS	DSL	30	1945.026661	1550.74938	1550.74938	0.010%
Fresno	2005	OBUS	GAS	35	1851.024293	527.8466067	527.846607	0.009%
Fresno	2005	OBUS	DSL	35	2872.193717	1530.258857	1530.25886	0.014%
Fresno	2005	OBUS	GAS	40	2304.334444	475.2331835	475.233184	0.011%
Fresno	2005	OBUS	DSL	40	3065.466762	1421.24912	1421.24912	0.015%
Fresno	2005	OBUS	GAS	45	2101.3955	452.0558515	452.055852	0.010%
Fresno	2005	OBUS	DSL	45	3431.453572	1443.331847	1443.33185	0.017%
Fresno	2005	OBUS	GAS	50	2045.089835	454.321748	454.321748	0.010%
Fresno	2005	OBUS	DSL	50	3664.621488	1399.471266	1399.47127	0.018%
Fresno	2005	OBUS	GAS	55	2674.791345	482.4155895	482.415589	0.013%
Fresno	2005	OBUS	DSL	55	4802.489099	1359.79194	1359.79194	0.024%
Fresno	2005	OBUS	GAS	60	3086.587339	541.2091188	541.209119	0.015%
Fresno	2005	OBUS	DSL	60	3246.411046	1188.092655	1188.09266	0.016%
Fresno	2005	OBUS	GAS	65	482.3182765	641.497927	641.497927	0.002%
Fresno	2005	OBUS	DSL	65	845.5605614	1365.372637	1365.37264	0.004%
Fresno	2005	SBUS	GAS	5	43.72972372	2513.49706	2513.49706	0.000%
Fresno	2005	SBUS	DSL	5	178.2500641	2650.118082	2650.11808	0.001%
Fresno	2005	SBUS	GAS	10	153.2704446	2036.128028	2036.12803	0.001%
Fresno	2005	SBUS	DSL	10	624.7573386	2189.204641	2189.20464	0.003%
Fresno	2005	SBUS	GAS	15	306.5408773	1392.429627	1392.42963	0.002%
Fresno	2005	SBUS	DSL	15	1249.514677	1797.52678	1797.52678	0.006%
Fresno	2005	SBUS	GAS	20	416.0794089	1006.068501	1006.0685	0.002%
Fresno	2005	SBUS	DSL	20	1696.012951	1418.069831	1418.06983	0.008%
Fresno	2005	SBUS	GAS	25	656.8093052	768.0121132	768.012113	0.003%
Fresno	2005	SBUS	DSL	25	2677.270418	1323.090846	1323.09085	0.013%
Fresno	2005	SBUS	GAS	30	787.9984747	619.4336026	619.433603	0.004%
Fresno	2005	SBUS	DSL	30	3212.02061	1241.920828	1241.92083	0.016%
Fresno	2005	SBUS	GAS	35	808.7813293	527.8465156	527.846516	0.004%
Fresno	2005	SBUS	DSL	35	3296.735071	1174.559776	1174.55978	0.016%
Fresno	2005	SBUS	GAS	40	545.9701739	475.2331343	475.233134	0.003%
Fresno	2005	SBUS	DSL	40	2225.470458	1121.007691	1121.00769	0.011%
Fresno	2005	SBUS	GAS	45	261.9433353	452.0558193	452.055819	0.001%
Fresno	2005	SBUS	DSL	45	1067.727156	1081.264572	1081.26457	0.005%
Fresno	2005	SBUS	GAS	50	131.1891745	454.3217491	454.321749	0.001%
Fresno	2005	SBUS	DSL	50	534.7501924	1055.33042	1055.33042	0.003%
Fresno	2005	SBUS	GAS	55	195.2667083	482.415443	482.415443	0.001%
Fresno	2005	SBUS	DSL	55	795.9414888	1043.205234	1043.20523	0.004%
Fresno	2005	SBUS	GAS	60	108.6750878	541.2091468	541.209147	0.001%
Fresno	2005	SBUS	DSL	60	442.9788178	1044.889015	1044.88902	0.002%
Fresno	2005	T6	GAS	5	313.9394	2513.49736	2513.49736	0.002%
Fresno	2005	T6	DSL	5	2964.362997	2621.415259	2621.41526	0.015%
Fresno	2005	T6	GAS	10	1578.176144	2036.128442	2036.12844	0.008%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	T6	DSL	10	14755.48228	2165.493866	2165.49387	0.073%
Fresno	2005	T6	GAS	15	1993.506875	1392.42983	1392.42983	0.010%
Fresno	2005	T6	DSL	15	19914.77964	1778.058179	1778.05818	0.099%
Fresno	2005	T6	GAS	20	2067.756551	1006.068559	1006.06856	0.010%
Fresno	2005	T6	DSL	20	21120.34755	1402.711041	1402.71104	0.105%
Fresno	2005	T6	GAS	25	2303.958615	768.012209	768.012209	0.011%
Fresno	2005	T6	DSL	25	21996.00436	1308.760752	1308.76075	0.109%
Fresno	2005	T6	GAS	30	2604.953592	619.4336025	619.433602	0.013%
Fresno	2005	T6	DSL	30	26448.41322	1228.469867	1228.46987	0.131%
Fresno	2005	T6	GAS	35	3237.56208	527.8465737	527.846574	0.016%
Fresno	2005	T6	DSL	35	31186.16258	1161.838388	1161.83839	0.155%
Fresno	2005	T6	GAS	40	4030.43084	475.2332482	475.233248	0.020%
Fresno	2005	T6	DSL	40	38712.76602	1108.866313	1108.86631	0.192%
Fresno	2005	T6	GAS	45	3675.47757	452.0558736	452.055874	0.018%
Fresno	2005	T6	DSL	45	31700.62212	1069.553643	1069.55364	0.158%
Fresno	2005	T6	GAS	50	3576.99512	454.3217943	454.321794	0.018%
Fresno	2005	T6	DSL	50	35478.15139	1043.900377	1043.90038	0.176%
Fresno	2005	T6	GAS	55	4678.38379	482.4155587	482.415559	0.023%
Fresno	2005	T6	DSL	55	51990.01588	1031.906517	1031.90652	0.258%
Fresno	2005	T6	GAS	60	5398.64157	541.2092298	541.20923	0.027%
Fresno	2005	T6	DSL	60	62474.71663	1033.572061	1033.57206	0.311%
Fresno	2005	T6	GAS	65	843.606066	641.4979114	641.497911	0.004%
Fresno	2005	T6	DSL	65	9831.744097	1048.89701	1048.89701	0.049%
Fresno	2005	T7	GAS	5	18.76846249	2513.497347	2513.49735	0.000%
Fresno	2005	T7	DSL	5	6085.370392	4025.733112	4025.73311	0.030%
Fresno	2005	T7	GAS	10	91.73117308	2036.127866	2036.12787	0.000%
Fresno	2005	T7	DSL	10	23246.39627	3325.570158	3325.57016	0.116%
Fresno	2005	T7	GAS	15	100.034277	1392.429565	1392.42957	0.000%
Fresno	2005	T7	DSL	15	28430.53281	2730.581376	2730.58138	0.141%
Fresno	2005	T7	GAS	20	170.9568883	1006.068425	1006.06843	0.001%
Fresno	2005	T7	DSL	20	70220.90117	2156.026899	2156.0269	0.349%
Fresno	2005	T7	GAS	25	223.1096354	768.012027	768.012027	0.001%
Fresno	2005	T7	DSL	25	64214.81804	2009.876716	2009.87672	0.319%
Fresno	2005	T7	GAS	30	407.4400111	619.433607	619.433607	0.002%
Fresno	2005	T7	DSL	30	108412.4915	1886.573218	1886.57322	0.539%
Fresno	2005	T7	GAS	35	724.6866805	527.8465816	527.846582	0.004%
Fresno	2005	T7	DSL	35	195036.7831	1784.246602	1784.2466	0.970%
Fresno	2005	T7	GAS	40	631.7265342	475.2333056	475.233306	0.003%
Fresno	2005	T7	DSL	40	184058.0666	1702.896867	1702.89687	0.915%
Fresno	2005	T7	GAS	45	668.4343308	452.0557651	452.055765	0.003%
Fresno	2005	T7	DSL	45	257693.2211	1642.524014	1642.52401	1.281%
Fresno	2005	T7	GAS	50	699.3715848	454.3217173	454.321717	0.003%
Fresno	2005	T7	DSL	50	267994.6167	1603.128043	1603.12804	1.332%
Fresno	2005	T7	GAS	55	1026.625606	482.4155395	482.415539	0.005%
Fresno	2005	T7	DSL	55	326803.0314	1584.708954	1584.70895	1.625%
Fresno	2005	T7	GAS	60	253.3729539	541.2091887	541.209189	0.001%
Fresno	2005	T7	DSL	60	99555.62045	1587.266747	1587.26675	0.495%
Fresno	2005	T7	GAS	65	135.80266	641.4978614	641.497861	0.001%
Fresno	2005	T7	DSL	65	54528.61248	1610.801421	1610.80142	0.271%
Fresno	2005	UBUS	GAS	5	112.3655482	2513.497178	2513.49718	0.001%
Fresno	2005	UBUS	DSL	5	259.736822	2627.453122	2627.45312	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2005	UBUS	GAS	10	403.3140682	2036.128273	2036.12827	0.002%
Fresno	2005	UBUS	DSL	10	932.274273	2627.453223	2627.45322	0.005%
Fresno	2005	UBUS	GAS	15	806.6280844	1392.429514	1392.42951	0.004%
Fresno	2005	UBUS	DSL	15	1864.54857	2627.453199	2627.4532	0.009%
Fresno	2005	UBUS	GAS	20	1064.467933	1006.06853	1006.06853	0.005%
Fresno	2005	UBUS	DSL	20	2460.55387	2627.453313	2627.45331	0.012%
Fresno	2005	UBUS	GAS	25	1603.164937	768.0121541	768.012154	0.008%
Fresno	2005	UBUS	DSL	25	3705.77074	2627.453153	2627.45315	0.018%
Fresno	2005	UBUS	GAS	30	2006.478844	619.4336943	619.433694	0.010%
Fresno	2005	UBUS	DSL	30	4638.04437	2627.453188	2627.45319	0.023%
Fresno	2005	UBUS	GAS	35	1966.340307	527.8465849	527.846585	0.010%
Fresno	2005	UBUS	DSL	35	4545.26272	2627.453585	2627.45358	0.023%
Fresno	2005	UBUS	GAS	40	1417.551931	475.2332242	475.233224	0.007%
Fresno	2005	UBUS	DSL	40	3276.71961	2627.453246	2627.45325	0.016%
Fresno	2005	UBUS	GAS	45	617.9537663	452.0558589	452.055859	0.003%
Fresno	2005	UBUS	DSL	45	1428.421313	2627.453287	2627.45329	0.007%
Fresno	2005	UBUS	GAS	50	313.9658901	454.3218054	454.321805	0.002%
Fresno	2005	UBUS	DSL	50	725.74291	2627.453219	2627.45322	0.004%
Fresno	2005	UBUS	GAS	55	389.2542268	482.4155339	482.415534	0.002%
Fresno	2005	UBUS	DSL	55	899.774456	2627.453379	2627.45338	0.004%
Fresno	2005	UBUS	GAS	60	637.1160815	541.2091431	541.209143	0.003%
Fresno	2005	UBUS	DSL	60	1472.715687	2627.453055	2627.45305	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.504	Used average of 2004-2006 historical emission factors.
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,531,700,000	2,610	637988	39.2	13.9	583,447
Commercial	2,950,179,600	7,503	743445	45.7	16.2	679,888
Industrial	0		0	0.0	0.0	0
Total	**5,481,879,600**		**1,381,434**	**85.0**	**30.2**	**1,263,335**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	133,860,000	138	783,081	73.6	1.5	712,228
Commercial	158,459,600	403	926,989	87.2	1.7	843,115
Industrial	0		0	0.0	0.0	0
Total	**292,319,600**		**1,710,070**	**160.8**	**3.2**	**1,555,342**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population in 2035

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2056
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	970,000
	Emissions (MTCO2e per person)	863,300
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

Summary

Year: 2010

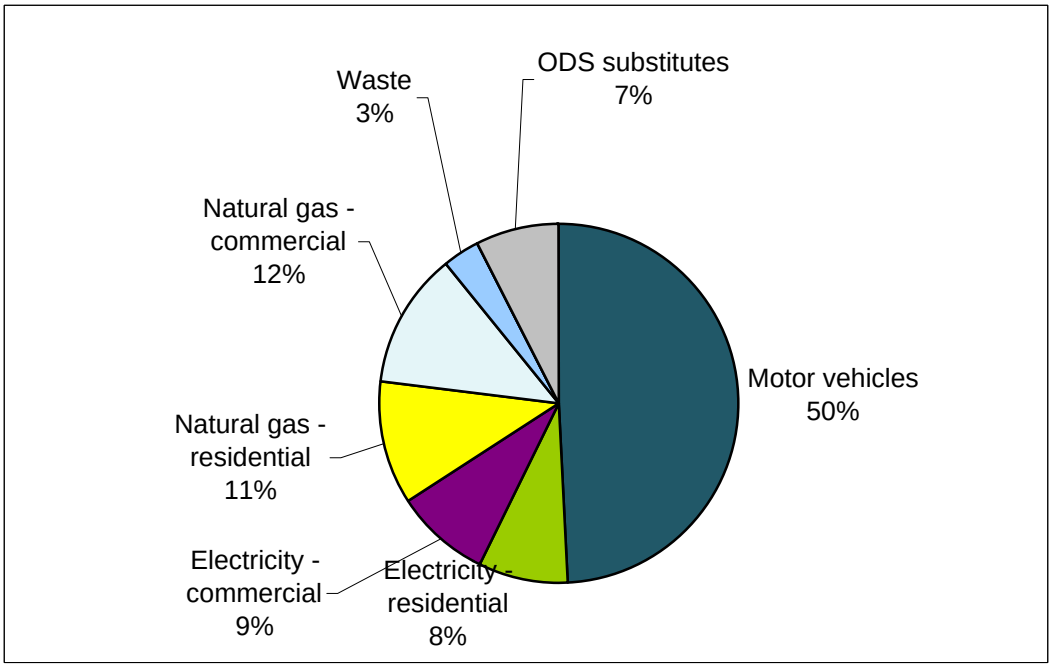
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	545,000	Fresno COG
Employment	209,261	Census 2011
County Information		
Population	930,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

- U.S. Census Bureau. 2011. 2009-2001 American Community Survey 3-Year Estimates Website: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_1YR_DP03&prodType=table; this number was backcast against the population growth rate of 2.239%

Sources	**MTCO2e**
Motor vehicles	1,795,666
Electricity - residential	289,745
Electricity - commercial	319,817
Natural gas - residential	400,169
Natural gas - commercial	448,706
Waste	123,945
Offroad equipment	1,051
ODS substitutes	273,422
Total	***3,652,521***



Community Greenhouse Gas Inventory

Waste

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Generated		
Tons / year (instate)	333,099	
Percent Waste		
Mixed MSW	48.2	
Newspaper	1.3	
Office paper	10.1	
Corrugated cardboard	4.8	
Magazines/third class mail	1.2	
Food scraps	15.5	
Grass	1.9	
Leaves	1.9	
Branches	0.6	
Dimensional lumber	14.5	
Waste Emissions		
Emissions (MTCO2e)	123,945	SEEC 2013
Emissions (MTCO2e/person)	0.2274	Divide emissions by population

Sources:
Waste Generated: California Department of Resources Recycling and Recovery (CalRecycle). 2013. Jurisdiction Disposal By Facility: With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC) Website: http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d168%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility, Accessed July 31, 2013.

Percent waste: California Integrated Waste Management Board (CIWMB), California 2008 Statewide Waste Characterization Study. Produced under contract by: Cascadia Consulting Group. August 2009. www.calrecycle.ca.gov/wastechar/WasteStudies.htm. Notes on waste percentages: office paper includes white ledger paper, other office paper, other miscellaneous paper, remainder/composite paper. Magazines includes magazines and catalogs, phone books and directories, and paper bags. Leaves and grass was one category in the publication; therefore, it was split into two categories by half. MSW (municipal solid waste) includes all other categories of waste to equal 100%.

Waste Emissions: Statewide Energy Efficiency Collaborative (SEEC). July 2013. Climate and Energy Management Suite. Version 2. Website: cems.californiaseec.org. Model run by Michael Brandman Associates/FirstCarbon Solutions, output contained in Appendix. Note: it was assumed that the landfills have methane capture. According to the County of Fresno Agenda Item 21, March 11, 2008 regarding the Feasibility Study on Gas to Energy Conversion at Southeast Regional Disposal Site and Amercian Avenue Disposal Site, Amercian Avenue Disposal site had methane capture at that time; that site collects 83 percent of the waste for the City (http://www2.co.fresno.ca.us/0110a/Questys_Agenda/MG151925/AS151956/AS151970/AI151985/DO152036/DO_152036.PDF).

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 9,162,734 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 3,344,397,910 Source: VMT per day * 365 days/year
Annual VMT Growth Rate 2.48%

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	638	0	**638**	5
5 - 10 MPH	530	620	0	**1,150**	5
10 - 15 MPH	103,322	133,374	283,652	**520,348**	10
15 - 20 MPH	3,491	5,166	5,457	**14,114**	15
20 - 25 MPH	15,277	25,536	43,535	**84,349**	20
25 - 30 MPH	62,398	82,625	179,532	**324,556**	25
30 - 35 MPH	69,155	109,440	136,708	**315,303**	30
35 - 40 MPH	407,371	527,830	1,063,600	**1,998,801**	35
40 - 45 MPH	182,177	222,301	488,347	**892,825**	40
45 - 50 MPH	154,975	204,211	601,450	**960,636**	45
50 - 55 MPH	83,818	118,402	285,006	**487,226**	50
55 - 60 MPH	372,022	442,335	1,046,233	**1,860,591**	55
60 - 65 MPH	356,646	443,044	902,392	**1,702,082**	60
65 - 70 MPH	20	26	71	**117**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**1,811,202**	**2,315,549**	**5,035,983**	**9,162,734**	

Source:
Fehr and Peers. 2013. 2010 VMT was found by using 2011 Existing Daily VMT provided by Fehr and Peers and back cast those numbers by the annual VMT growth rate).

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	654	0	654
5 - 10 MPH	543	636	0	1,179
10 - 15 MPH	105,950	136,766	290,867	533,583
15 - 20 MPH	3,580	5,297	5,596	14,473
20 - 25 MPH	15,666	26,186	44,642	86,494
25 - 30 MPH	63,985	84,727	184,099	332,811
30 - 35 MPH	70,914	112,224	140,185	323,323
35 - 40 MPH	417,733	541,256	1,090,653	2,049,642
40 - 45 MPH	186,811	227,955	500,768	915,534
45 - 50 MPH	158,917	209,405	616,748	985,070
50 - 55 MPH	85,950	121,414	292,255	499,619
55 - 60 MPH	381,485	453,586	1,072,845	1,907,916
60 - 65 MPH	365,717	454,313	925,345	1,745,375
65 - 70 MPH	20	27	73	120
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,857,271	2,374,446	5,164,076	9,395,793

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	1788	520348	14114	84349	324556	315303	1998801	892825	960636	487226	1860591	1702082	117	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.53%	0.10%
LDT1	6.25%	0.01%
LDT2	16.43%	0.01%
LHD1	2.91%	1.81%
LHD2	0.28%	0.48%
MCY	0.67%	0.00%
MDV	18.58%	0.01%
MH	0.16%	0.04%
OBUS	0.11%	0.11%
SBUS	0.02%	0.06%
T6	0.22%	1.31%
T7	0.04%	6.68%
UBUS	0.06%	0.14%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	44.5%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.2%	LDA, MCY
DSL	Heavy duty	8.3%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.3%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1119	835	645	511	424	365	326	302	291	290	301	324	362	388	0
LDT1	1283	958	740	586	486	419	374	347	334	333	345	371	415	445	0
LDT2	1533	1145	884	700	581	500	447	414	398	398	413	444	496	531	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	240	220	189	165	147	134	125	119	117	117	120	127	139	158	0
MDV	1926	1438	1111	880	730	628	562	520	501	500	519	558	623	668	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	404	389	366	351	341	335	333	334	338	346	358	376	404	444	0
LDT1	397	388	375	366	360	357	355	356	358	363	370	381	397	420	0
LDT2	394	384	369	359	353	349	347	348	350	356	364	376	393	420	0
LHD1	527	527	527	527	527	527	527	527	527	527	527	0	0	0	0
LHD2	527	527	527	527	527	527	527	527	527	527	527	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	453	422	376	345	325	314	309	310	319	334	359	397	452	534	0
MH	2377	2158	1772	1454	1304	1224	1158	1105	1066	1040	1028	1030	1045	0	0
OBUS	3053	2459	2002	1695	1580	1538	1519	1410	1434	1390	1350	1175	1355	0	0
SBUS	2639	2180	1790	1412	1317	1237	1169	1116	1077	1051	1039	1040	0	0	0
T6	2610	2156	1771	1397	1303	1223	1157	1104	1065	1039	1028	1029	1044	0	0
T7	4024	3324	2729	2152	2009	1886	1783	1702	1642	1602	1584	1587	1610	0	0
UBUS	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	2570	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	778	226524	6144	36720	141289	137261	870141	388675	418195	212105	809974	740970	51	0	0
LDT1	112	32536	883	5274	20294	19715	124980	55826	60066	30465	116338	106427	7	0	0
LDT2	294	85491	2319	13858	53323	51803	328396	146688	157829	80050	305689	279646	19	0	0
LHD1	52	15159	411	2457	9455	9186	58231	26011	27986	14194	54205	49587	3	0	0
LHD2	5	1482	40	240	924	898	5692	2542	2735	1387	5298	4847	0	0	0
MCY	12	3463	94	561	2160	2098	13301	5941	6392	3242	12381	11326	1	0	0
MDV	332	96692	2623	15674	60309	58590	371420	165906	178506	90537	345737	316283	22	0	0
MH	3	808	22	131	504	489	3103	1386	1491	756	2888	2642	0	0	0
OBUS	2	556	15	90	347	337	2137	954	1027	521	1989	1820	0	0	0
SBUS	0	119	3	19	74	72	458	204	220	112	426	390	0	0	0
T6	4	1124	30	182	701	681	4317	1928	2075	1052	4019	3676	0	0	0
T7	1	191	5	31	119	115	732	327	352	178	681	623	0	0	0
UBUS	1	292	8	47	182	177	1123	502	540	274	1046	957	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	2	524	14	85	327	318	2014	900	968	491	1875	1715	0	0	0
LDT1	0	32	1	5	20	19	123	55	59	30	114	105	0	0	0
LDT2	0	33	1	5	21	20	126	56	61	31	118	108	0	0	0
LHD1	32	9392	255	1522	5858	5691	36078	16115	17339	8794	33584	30723	2	0	0
LHD2	9	2518	68	408	1571	1526	9673	4321	4649	2358	9004	8237	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	74	2	12	46	45	285	127	137	69	265	242	0	0	0
MH	1	190	5	31	119	115	730	326	351	178	680	622	0	0	0
OBUS	2	559	15	91	349	339	2147	959	1032	523	1998	1828	0	0	0
SBUS	1	321	9	52	200	195	1234	551	593	301	1148	1051	0	0	0
T6	23	6794	184	1101	4238	4117	26099	11658	12543	6362	24294	22224	2	0	0
T7	119	34752	943	5633	21676	21058	133493	59629	64157	32540	124262	113676	8	0	0
UBUS	2	721	20	117	450	437	2769	1237	1331	675	2578	2358	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	349	75,988	1,592	7,535	24,057	20,115	114,001	47,142	48,821	24,736	97,937	96,334	7	0	0	**558,266**
LDT1	58	12,512	262	1,242	3,964	3,314	18,781	7,768	8,044	4,076	16,137	15,874	1	0	0	**91,974**
LDT2	181	39,290	823	3,897	12,442	10,403	58,957	24,382	25,250	12,793	50,652	49,824	4	0	0	**288,718**
LHD1	53	12,393	230	993	2,916	2,285	12,341	4,963	5,080	2,589	10,499	0	0	0	0	**54,287**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2010
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	5	1,211	22	97	285	223	1,206	485	496	253	1,026	0	0	0	0	**5,306**
MCY	1	307	7	37	128	113	668	285	299	152	597	579	0	0	0	**3,171**
MDV	257	55,838	1,170	5,538	17,681	14,784	83,785	34,649	35,883	18,181	71,982	70,806	5	0	0	**410,303**
MH	3	660	12	53	155	122	658	264	271	138	559	574	0	0	0	**3,467**
OBUS	2	455	8	36	107	84	453	182	186	95	385	395	0	0	0	**2,388**
SBUS	0	97	2	8	23	18	97	39	40	20	83	85	0	0	0	**511**
T6	4	919	17	74	216	169	915	368	377	192	778	799	0	0	0	**4,824**
T7	1	156	3	12	37	29	155	62	64	33	132	135	0	0	0	**818**
UBUS	1	239	4	19	56	44	238	96	98	50	203	208	0	0	0	**1,255**
Total	**914**	**200,065**	**4,153**	**19,541**	**62,065**	**51,703**	**292,256**	**120,685**	**124,910**	**63,307**	**250,970**	**235,613**	**18**	**0**	**0**	**1,426,202**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	82	2	12	45	43	269	121	131	68	269	259	0	0	0	**1,302**
LDT1	0	5	0	1	3	3	18	8	8	4	17	16	0	0	0	**83**
LDT2	0	5	0	1	3	3	18	8	9	4	17	16	0	0	0	**84**
LHD1	7	1,987	54	322	1,239	1,204	7,632	3,409	3,668	1,860	7,104	0	0	0	0	**28,479**
LHD2	2	533	14	86	332	323	2,048	915	984	499	1,906	0	0	0	0	**7,641**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	13	0	2	6	6	35	16	17	9	38	39	0	0	0	**181**
MH	1	165	4	18	62	57	340	145	150	74	281	257	0	0	0	**1,552**
OBUS	2	552	12	62	221	209	1,310	543	594	292	1,083	862	0	0	0	**5,740**
SBUS	1	281	6	30	106	97	579	247	256	127	479	439	0	0	0	**2,647**
T6	24	5,882	131	618	2,217	2,022	12,123	5,168	5,364	2,655	10,023	9,184	1	0	0	**55,387**
T7	193	46,382	1,033	4,868	17,484	15,944	95,590	40,751	42,292	20,936	79,029	72,413	5	0	0	**436,726**
UBUS	3	744	20	121	464	451	2,857	1,276	1,373	696	2,659	2,433	0	0	0	**13,094**
Total	**233**	**56,630**	**1,277**	**6,139**	**22,183**	**20,360**	**122,817**	**52,606**	**54,847**	**27,226**	**102,906**	**85,918**	**6**	**0**	**0**	**553,147**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	1,979,350	1,795,666	1,795,666

EMFAC 2011
2010 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2010, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LDA	GAS	5	693	1118.51	1112.61	0.003%
Fresno	2010	LDA	DSL	5	2	403.71	399.40	0.000%
Fresno	2010	LDA	GAS	10	1884	835.50	831.08	0.008%
Fresno	2010	LDA	DSL	10	4	388.74	384.86	0.000%
Fresno	2010	LDA	GAS	15	1788	645.40	641.99	0.008%
Fresno	2010	LDA	DSL	15	4	366.25	362.99	0.000%
Fresno	2010	LDA	GAS	20	464306	511.10	508.40	2.031%
Fresno	2010	LDA	DSL	20	1075	351.09	348.26	0.005%
Fresno	2010	LDA	GAS	25	56285	424.07	421.84	0.246%
Fresno	2010	LDA	DSL	25	130	341.24	338.69	0.001%
Fresno	2010	LDA	GAS	30	172555	365.00	363.07	0.755%
Fresno	2010	LDA	DSL	30	399	335.48	333.09	0.002%
Fresno	2010	LDA	GAS	35	672123	326.31	324.59	2.940%
Fresno	2010	LDA	DSL	35	1556	333.12	330.79	0.007%
Fresno	2010	LDA	GAS	40	1261393	302.09	300.50	5.518%
Fresno	2010	LDA	DSL	40	2920	333.89	331.54	0.013%
Fresno	2010	LDA	GAS	45	1084869	290.77	289.23	4.746%
Fresno	2010	LDA	DSL	45	2511	337.89	335.43	0.011%
Fresno	2010	LDA	GAS	50	1492167	290.46	288.93	6.527%
Fresno	2010	LDA	DSL	50	3454	345.57	342.89	0.015%
Fresno	2010	LDA	GAS	55	1064211	301.16	299.57	4.655%
Fresno	2010	LDA	DSL	55	2464	357.86	354.83	0.011%
Fresno	2010	LDA	GAS	60	1286323	323.81	322.10	5.627%
Fresno	2010	LDA	DSL	60	2978	376.34	372.80	0.013%
Fresno	2010	LDA	GAS	65	1270026	361.82	359.91	5.556%
Fresno	2010	LDA	DSL	65	2940	403.61	399.31	0.013%
Fresno	2010	LDA	GAS	70	1123104	387.82	385.77	4.913%
Fresno	2010	LDA	DSL	70	2600	443.84	438.41	0.011%
Fresno	2010	LDT1	GAS	5	100	1283.31	1276.59	0.000%
Fresno	2010	LDT1	DSL	5	0	396.83	393.67	0.000%
Fresno	2010	LDT1	GAS	10	271	957.84	952.82	0.001%
Fresno	2010	LDT1	DSL	10	0	388.06	385.22	0.000%
Fresno	2010	LDT1	GAS	15	257	739.63	735.75	0.001%
Fresno	2010	LDT1	DSL	15	0	374.89	372.50	0.000%
Fresno	2010	LDT1	GAS	20	66689	586.30	583.23	0.292%
Fresno	2010	LDT1	DSL	20	65	366.01	363.94	0.000%
Fresno	2010	LDT1	GAS	25	8084	486.45	483.90	0.035%
Fresno	2010	LDT1	DSL	25	8	360.24	358.37	0.000%
Fresno	2010	LDT1	GAS	30	24784	418.68	416.49	0.108%
Fresno	2010	LDT1	DSL	30	24	356.87	355.11	0.000%
Fresno	2010	LDT1	GAS	35	96538	374.28	372.32	0.422%
Fresno	2010	LDT1	DSL	35	95	355.49	353.78	0.000%
Fresno	2010	LDT1	GAS	40	181176	346.55	344.74	0.793%
Fresno	2010	LDT1	DSL	40	178	355.94	354.22	0.001%
Fresno	2010	LDT1	GAS	45	155822	333.56	331.81	0.682%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LDT1	DSL	45	153	358.28	356.48	0.001%
Fresno	2010	LDT1	GAS	50	214323	333.21	331.46	0.938%
Fresno	2010	LDT1	DSL	50	210	362.78	360.81	0.001%
Fresno	2010	LDT1	GAS	55	152854	345.47	343.66	0.669%
Fresno	2010	LDT1	DSL	55	150	369.97	367.76	0.001%
Fresno	2010	LDT1	GAS	60	184757	371.49	369.54	0.808%
Fresno	2010	LDT1	DSL	60	181	380.80	378.21	0.001%
Fresno	2010	LDT1	GAS	65	182416	415.06	412.89	0.798%
Fresno	2010	LDT1	DSL	65	179	396.77	393.62	0.001%
Fresno	2010	LDT1	GAS	70	161313	444.88	442.55	0.706%
Fresno	2010	LDT1	DSL	70	158	420.33	416.35	0.001%
Fresno	2010	LDT2	GAS	5	262	1532.90	1523.22	0.001%
Fresno	2010	LDT2	DSL	5	0	393.55	388.32	0.000%
Fresno	2010	LDT2	GAS	10	711	1144.66	1137.43	0.003%
Fresno	2010	LDT2	DSL	10	0	383.77	379.04	0.000%
Fresno	2010	LDT2	GAS	15	675	884.09	878.51	0.003%
Fresno	2010	LDT2	DSL	15	0	369.05	365.09	0.000%
Fresno	2010	LDT2	GAS	20	175232	700.40	695.98	0.767%
Fresno	2010	LDT2	DSL	20	67	359.13	355.69	0.000%
Fresno	2010	LDT2	GAS	25	21242	581.13	577.46	0.093%
Fresno	2010	LDT2	DSL	25	8	352.69	349.58	0.000%
Fresno	2010	LDT2	GAS	30	65123	500.18	497.02	0.285%
Fresno	2010	LDT2	DSL	30	25	348.92	346.01	0.000%
Fresno	2010	LDT2	GAS	35	253663	447.15	444.33	1.110%
Fresno	2010	LDT2	DSL	35	98	347.37	344.54	0.000%
Fresno	2010	LDT2	GAS	40	476057	413.99	411.37	2.082%
Fresno	2010	LDT2	DSL	40	183	347.88	345.02	0.001%
Fresno	2010	LDT2	GAS	45	409436	398.47	395.95	1.791%
Fresno	2010	LDT2	DSL	45	158	350.49	347.50	0.001%
Fresno	2010	LDT2	GAS	50	563153	398.05	395.53	2.463%
Fresno	2010	LDT2	DSL	50	217	355.52	352.26	0.001%
Fresno	2010	LDT2	GAS	55	401639	412.70	410.09	1.757%
Fresno	2010	LDT2	DSL	55	155	363.56	359.88	0.001%
Fresno	2010	LDT2	GAS	60	485466	443.76	440.96	2.124%
Fresno	2010	LDT2	DSL	60	187	375.65	371.35	0.001%
Fresno	2010	LDT2	GAS	65	479315	495.83	492.70	2.097%
Fresno	2010	LDT2	DSL	65	185	393.49	388.26	0.001%
Fresno	2010	LDT2	GAS	70	423866	531.46	528.10	1.854%
Fresno	2010	LDT2	DSL	70	163	419.81	413.21	0.001%
Fresno	2010	LHD1	GAS	5	18900	2513.50	2513.50	0.083%
Fresno	2010	LHD1	DSL	5	7256	526.86	526.86	0.032%
Fresno	2010	LHD1	GAS	10	49284	2036.13	2036.13	0.216%
Fresno	2010	LHD1	DSL	10	24129	526.86	526.86	0.106%
Fresno	2010	LHD1	GAS	15	112226	1392.43	1392.43	0.491%
Fresno	2010	LHD1	DSL	15	52256	526.86	526.86	0.229%
Fresno	2010	LHD1	GAS	20	129676	1006.07	1006.07	0.567%
Fresno	2010	LHD1	DSL	20	57290	526.86	526.86	0.251%
Fresno	2010	LHD1	GAS	25	99891	768.01	768.01	0.437%
Fresno	2010	LHD1	DSL	25	61315	526.86	526.86	0.268%
Fresno	2010	LHD1	GAS	30	88336	619.43	619.43	0.386%
Fresno	2010	LHD1	DSL	30	51758	526.86	526.86	0.226%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	LHD1	GAS	35	33008	527.85	527.85	0.144%
Fresno	2010	LHD1	DSL	35	27315	526.86	526.86	0.119%
Fresno	2010	LHD1	GAS	40	9743	475.23	475.23	0.043%
Fresno	2010	LHD1	DSL	40	14995	526.86	526.86	0.066%
Fresno	2010	LHD1	GAS	45	11995	452.06	452.06	0.052%
Fresno	2010	LHD1	DSL	45	16184	526.86	526.86	0.071%
Fresno	2010	LHD1	GAS	50	88567	454.32	454.32	0.387%
Fresno	2010	LHD1	DSL	50	62493	526.86	526.86	0.273%
Fresno	2010	LHD1	GAS	55	24360	482.42	482.42	0.107%
Fresno	2010	LHD1	DSL	55	37634	526.86	526.86	0.165%
Fresno	2010	LHD2	GAS	5	1847	2513.50	2513.50	0.008%
Fresno	2010	LHD2	DSL	5	1945	527.22	527.22	0.009%
Fresno	2010	LHD2	GAS	10	4817	2036.13	2036.13	0.021%
Fresno	2010	LHD2	DSL	10	6469	527.22	527.22	0.028%
Fresno	2010	LHD2	GAS	15	10969	1392.43	1392.43	0.048%
Fresno	2010	LHD2	DSL	15	14011	527.22	527.22	0.061%
Fresno	2010	LHD2	GAS	20	12675	1006.07	1006.07	0.055%
Fresno	2010	LHD2	DSL	20	15360	527.22	527.22	0.067%
Fresno	2010	LHD2	GAS	25	9764	768.01	768.01	0.043%
Fresno	2010	LHD2	DSL	25	16439	527.22	527.22	0.072%
Fresno	2010	LHD2	GAS	30	8634	619.43	619.43	0.038%
Fresno	2010	LHD2	DSL	30	13877	527.22	527.22	0.061%
Fresno	2010	LHD2	GAS	35	3226	527.85	527.85	0.014%
Fresno	2010	LHD2	DSL	35	7323	527.22	527.22	0.032%
Fresno	2010	LHD2	GAS	40	952	475.23	475.23	0.004%
Fresno	2010	LHD2	DSL	40	4020	527.22	527.22	0.018%
Fresno	2010	LHD2	GAS	45	1172	452.06	452.06	0.005%
Fresno	2010	LHD2	DSL	45	4339	527.22	527.22	0.019%
Fresno	2010	LHD2	GAS	50	8657	454.32	454.32	0.038%
Fresno	2010	LHD2	DSL	50	16755	527.22	527.22	0.073%
Fresno	2010	LHD2	GAS	55	2381	482.42	482.42	0.010%
Fresno	2010	LHD2	DSL	55	10090	527.22	527.22	0.044%
Fresno	2010	MCY	GAS	5	11	240.29	240.29	0.000%
Fresno	2010	MCY	GAS	10	29	220.49	220.49	0.000%
Fresno	2010	MCY	GAS	15	27	188.67	188.67	0.000%
Fresno	2010	MCY	GAS	20	7097	164.91	164.91	0.031%
Fresno	2010	MCY	GAS	25	860	147.22	147.22	0.004%
Fresno	2010	MCY	GAS	30	2638	134.27	134.27	0.012%
Fresno	2010	MCY	GAS	35	10274	125.16	125.16	0.045%
Fresno	2010	MCY	GAS	40	19281	119.33	119.33	0.084%
Fresno	2010	MCY	GAS	45	16583	116.51	116.51	0.073%
Fresno	2010	MCY	GAS	50	22809	116.66	116.66	0.100%
Fresno	2010	MCY	GAS	55	16267	120.03	120.03	0.071%
Fresno	2010	MCY	GAS	60	19662	127.21	127.21	0.086%
Fresno	2010	MCY	GAS	65	19413	139.27	139.27	0.085%
Fresno	2010	MCY	GAS	70	17167	157.99	157.99	0.075%
Fresno	2010	MDV	GAS	5	296	1926.06	1919.59	0.001%
Fresno	2010	MDV	DSL	5	0	452.63	448.28	0.000%
Fresno	2010	MDV	GAS	10	804	1438.32	1433.48	0.004%
Fresno	2010	MDV	DSL	10	1	422.15	418.22	0.000%
Fresno	2010	MDV	GAS	15	763	1110.93	1107.19	0.003%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	MDV	DSL	15	1	376.32	373.03	0.000%
Fresno	2010	MDV	GAS	20	198189	880.06	877.10	0.867%
Fresno	2010	MDV	DSL	20	152	345.44	342.58	0.001%
Fresno	2010	MDV	GAS	25	24025	730.19	727.74	0.105%
Fresno	2010	MDV	DSL	25	18	325.38	322.80	0.000%
Fresno	2010	MDV	GAS	30	73655	628.47	626.36	0.322%
Fresno	2010	MDV	DSL	30	56	313.64	311.22	0.000%
Fresno	2010	MDV	GAS	35	286896	561.85	559.96	1.255%
Fresno	2010	MDV	DSL	35	220	308.83	306.48	0.001%
Fresno	2010	MDV	GAS	40	538426	520.17	518.42	2.355%
Fresno	2010	MDV	DSL	40	413	310.41	308.04	0.002%
Fresno	2010	MDV	GAS	45	463076	500.67	498.99	2.026%
Fresno	2010	MDV	DSL	45	355	318.54	316.06	0.002%
Fresno	2010	MDV	GAS	50	636932	500.15	498.46	2.786%
Fresno	2010	MDV	DSL	50	488	334.19	331.48	0.002%
Fresno	2010	MDV	GAS	55	454258	518.55	516.81	1.987%
Fresno	2010	MDV	DSL	55	348	359.22	356.17	0.002%
Fresno	2010	MDV	GAS	60	549067	557.58	555.71	2.402%
Fresno	2010	MDV	DSL	60	421	396.88	393.31	0.002%
Fresno	2010	MDV	GAS	65	542110	623.01	620.92	2.371%
Fresno	2010	MDV	DSL	65	415	452.43	448.08	0.002%
Fresno	2010	MDV	GAS	70	479397	667.78	665.53	2.097%
Fresno	2010	MDV	DSL	70	367	534.37	528.90	0.002%
Fresno	2010	MH	GAS	5	307	2513.50	2513.50	0.001%
Fresno	2010	MH	DSL	5	67	2376.97	2376.97	0.000%
Fresno	2010	MH	GAS	10	1543	2036.13	2036.13	0.007%
Fresno	2010	MH	DSL	10	334	2158.29	2158.29	0.001%
Fresno	2010	MH	GAS	15	1949	1392.43	1392.43	0.009%
Fresno	2010	MH	DSL	15	451	1772.14	1772.14	0.002%
Fresno	2010	MH	GAS	20	2021	1006.07	1006.07	0.009%
Fresno	2010	MH	DSL	20	479	1454.25	1454.25	0.002%
Fresno	2010	MH	GAS	25	2252	768.01	768.01	0.010%
Fresno	2010	MH	DSL	25	499	1304.38	1304.38	0.002%
Fresno	2010	MH	GAS	30	2547	619.43	619.43	0.011%
Fresno	2010	MH	DSL	30	599	1224.35	1224.35	0.003%
Fresno	2010	MH	GAS	35	3165	527.85	527.85	0.014%
Fresno	2010	MH	DSL	35	707	1157.94	1157.94	0.003%
Fresno	2010	MH	GAS	40	3940	475.23	475.23	0.017%
Fresno	2010	MH	DSL	40	877	1105.14	1105.14	0.004%
Fresno	2010	MH	GAS	45	3593	452.06	452.06	0.016%
Fresno	2010	MH	DSL	45	718	1065.96	1065.96	0.003%
Fresno	2010	MH	GAS	50	3497	454.32	454.32	0.015%
Fresno	2010	MH	DSL	50	804	1040.39	1040.39	0.004%
Fresno	2010	MH	GAS	55	4573	482.42	482.42	0.020%
Fresno	2010	MH	DSL	55	1178	1028.44	1028.44	0.005%
Fresno	2010	MH	GAS	60	5278	541.21	541.21	0.023%
Fresno	2010	MH	DSL	60	1416	1030.10	1030.10	0.006%
Fresno	2010	MH	GAS	65	825	641.50	641.50	0.004%
Fresno	2010	MH	DSL	65	223	1045.37	1045.37	0.001%
Fresno	2010	OBUS	GAS	5	211	2513.50	2513.50	0.001%
Fresno	2010	OBUS	DSL	5	143	3052.65	3052.65	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	OBUS	GAS	10	1062	2036.13	2036.13	0.005%
Fresno	2010	OBUS	DSL	10	660	2459.32	2459.32	0.003%
Fresno	2010	OBUS	GAS	15	1342	1392.43	1392.43	0.006%
Fresno	2010	OBUS	DSL	15	869	2001.78	2001.78	0.004%
Fresno	2010	OBUS	GAS	20	1392	1006.07	1006.07	0.006%
Fresno	2010	OBUS	DSL	20	1157	1695.25	1695.25	0.005%
Fresno	2010	OBUS	GAS	25	1551	768.01	768.01	0.007%
Fresno	2010	OBUS	DSL	25	1201	1580.12	1580.12	0.005%
Fresno	2010	OBUS	GAS	30	1754	619.43	619.43	0.008%
Fresno	2010	OBUS	DSL	30	1673	1537.77	1537.77	0.007%
Fresno	2010	OBUS	GAS	35	2179	527.85	527.85	0.010%
Fresno	2010	OBUS	DSL	35	2467	1519.45	1519.45	0.011%
Fresno	2010	OBUS	GAS	40	2713	475.23	475.23	0.012%
Fresno	2010	OBUS	DSL	40	2636	1410.01	1410.01	0.012%
Fresno	2010	OBUS	GAS	45	2474	452.06	452.06	0.011%
Fresno	2010	OBUS	DSL	45	2945	1434.26	1434.26	0.013%
Fresno	2010	OBUS	GAS	50	2408	454.32	454.32	0.011%
Fresno	2010	OBUS	DSL	50	3146	1390.38	1390.38	0.014%
Fresno	2010	OBUS	GAS	55	3149	482.42	482.42	0.014%
Fresno	2010	OBUS	DSL	55	4126	1350.21	1350.21	0.018%
Fresno	2010	OBUS	GAS	60	3634	541.21	541.21	0.016%
Fresno	2010	OBUS	DSL	60	2801	1175.03	1175.03	0.012%
Fresno	2010	OBUS	GAS	65	568	641.50	641.50	0.002%
Fresno	2010	OBUS	DSL	65	727	1355.23	1355.23	0.003%
Fresno	2010	SBUS	GAS	5	52	2513.50	2513.50	0.000%
Fresno	2010	SBUS	DSL	5	140	2638.70	2638.70	0.001%
Fresno	2010	SBUS	GAS	10	182	2036.13	2036.13	0.001%
Fresno	2010	SBUS	DSL	10	490	2179.77	2179.77	0.002%
Fresno	2010	SBUS	GAS	15	363	1392.43	1392.43	0.002%
Fresno	2010	SBUS	DSL	15	979	1789.78	1789.78	0.004%
Fresno	2010	SBUS	GAS	20	493	1006.07	1006.07	0.002%
Fresno	2010	SBUS	DSL	20	1329	1411.96	1411.96	0.006%
Fresno	2010	SBUS	GAS	25	779	768.01	768.01	0.003%
Fresno	2010	SBUS	DSL	25	2098	1317.39	1317.39	0.009%
Fresno	2010	SBUS	GAS	30	934	619.43	619.43	0.004%
Fresno	2010	SBUS	DSL	30	2518	1236.57	1236.57	0.011%
Fresno	2010	SBUS	GAS	35	959	527.85	527.85	0.004%
Fresno	2010	SBUS	DSL	35	2584	1169.50	1169.50	0.011%
Fresno	2010	SBUS	GAS	40	647	475.23	475.23	0.003%
Fresno	2010	SBUS	DSL	40	1744	1116.18	1116.18	0.008%
Fresno	2010	SBUS	GAS	45	311	452.06	452.06	0.001%
Fresno	2010	SBUS	DSL	45	837	1076.60	1076.60	0.004%
Fresno	2010	SBUS	GAS	50	156	454.32	454.32	0.001%
Fresno	2010	SBUS	DSL	50	419	1050.78	1050.78	0.002%
Fresno	2010	SBUS	GAS	55	231	482.42	482.42	0.001%
Fresno	2010	SBUS	DSL	55	624	1038.71	1038.71	0.003%
Fresno	2010	SBUS	GAS	60	129	541.21	541.21	0.001%
Fresno	2010	SBUS	DSL	60	347	1040.39	1040.39	0.002%
Fresno	2010	T6	GAS	5	427	2513.50	2513.50	0.002%
Fresno	2010	T6	DSL	5	2401	2610.34	2610.34	0.011%
Fresno	2010	T6	GAS	10	2146	2036.13	2036.13	0.009%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2010	T6	DSL	10	11950	2156.35	2156.35	0.052%
Fresno	2010	T6	GAS	15	2711	1392.43	1392.43	0.012%
Fresno	2010	T6	DSL	15	16128	1770.55	1770.55	0.071%
Fresno	2010	T6	GAS	20	2812	1006.07	1006.07	0.012%
Fresno	2010	T6	DSL	20	17104	1396.79	1396.79	0.075%
Fresno	2010	T6	GAS	25	3134	768.01	768.01	0.014%
Fresno	2010	T6	DSL	25	17813	1303.23	1303.23	0.078%
Fresno	2010	T6	GAS	30	3543	619.43	619.43	0.015%
Fresno	2010	T6	DSL	30	21419	1223.28	1223.28	0.094%
Fresno	2010	T6	GAS	35	4403	527.85	527.85	0.019%
Fresno	2010	T6	DSL	35	25256	1156.93	1156.93	0.110%
Fresno	2010	T6	GAS	40	5482	475.23	475.23	0.024%
Fresno	2010	T6	DSL	40	31351	1104.18	1104.18	0.137%
Fresno	2010	T6	GAS	45	4999	452.06	452.06	0.022%
Fresno	2010	T6	DSL	45	25673	1065.04	1065.04	0.112%
Fresno	2010	T6	GAS	50	4865	454.32	454.32	0.021%
Fresno	2010	T6	DSL	50	28732	1039.49	1039.49	0.126%
Fresno	2010	T6	GAS	55	6363	482.42	482.42	0.028%
Fresno	2010	T6	DSL	55	42104	1027.55	1027.55	0.184%
Fresno	2010	T6	GAS	60	7343	541.21	541.21	0.032%
Fresno	2010	T6	DSL	60	50595	1029.21	1029.21	0.221%
Fresno	2010	T6	GAS	65	1147	641.50	641.50	0.005%
Fresno	2010	T6	DSL	65	7962	1044.47	1044.47	0.035%
Fresno	2010	T7	GAS	5	30	2513.50	2513.50	0.000%
Fresno	2010	T7	DSL	5	5509	4024.00	4024.00	0.024%
Fresno	2010	T7	GAS	10	149	2036.13	2036.13	0.001%
Fresno	2010	T7	DSL	10	21043	3324.13	3324.13	0.092%
Fresno	2010	T7	GAS	15	163	1392.43	1392.43	0.001%
Fresno	2010	T7	DSL	15	25736	2729.40	2729.40	0.113%
Fresno	2010	T7	GAS	20	278	1006.07	1006.07	0.001%
Fresno	2010	T7	DSL	20	63851	2152.43	2152.43	0.279%
Fresno	2010	T7	GAS	25	363	768.01	768.01	0.002%
Fresno	2010	T7	DSL	25	58129	2009.01	2009.01	0.254%
Fresno	2010	T7	GAS	30	662	619.43	619.43	0.003%
Fresno	2010	T7	DSL	30	98137	1885.76	1885.76	0.429%
Fresno	2010	T7	GAS	35	1178	527.85	527.85	0.005%
Fresno	2010	T7	DSL	35	176552	1783.48	1783.48	0.772%
Fresno	2010	T7	GAS	40	1026	475.23	475.23	0.004%
Fresno	2010	T7	DSL	40	166614	1702.16	1702.16	0.729%
Fresno	2010	T7	GAS	45	1086	452.06	452.06	0.005%
Fresno	2010	T7	DSL	45	233270	1641.82	1641.82	1.020%
Fresno	2010	T7	GAS	50	1136	454.32	454.32	0.005%
Fresno	2010	T7	DSL	50	242595	1602.44	1602.44	1.061%
Fresno	2010	T7	GAS	55	1668	482.42	482.42	0.007%
Fresno	2010	T7	DSL	55	295829	1584.02	1584.02	1.294%
Fresno	2010	T7	GAS	60	412	541.21	541.21	0.002%
Fresno	2010	T7	DSL	60	90120	1586.58	1586.58	0.394%
Fresno	2010	T7	GAS	65	221	641.50	641.50	0.001%
Fresno	2010	T7	DSL	65	49361	1610.11	1610.11	0.216%
Fresno	2010	UBUS	GAS	5	127	2513.50	2513.50	0.001%
Fresno	2010	UBUS	DSL	5	314	2569.78	2569.78	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (Miles/day)	CO2_RUNI (gms/mile)	CO2_RUNEX (gms/mile)	Percent of Total VMT (Pa
Fresno	2010	UBUS	GAS	10	457	2036.13	2036.13	0.002%
Fresno	2010	UBUS	DSL	10	1126	2569.78	2569.78	0.005%
Fresno	2010	UBUS	GAS	15	914	1392.43	1392.43	0.004%
Fresno	2010	UBUS	DSL	15	2253	2569.78	2569.78	0.010%
Fresno	2010	UBUS	GAS	20	1206	1006.07	1006.07	0.005%
Fresno	2010	UBUS	DSL	20	2973	2569.78	2569.78	0.013%
Fresno	2010	UBUS	GAS	25	1816	768.01	768.01	0.008%
Fresno	2010	UBUS	DSL	25	4478	2569.78	2569.78	0.020%
Fresno	2010	UBUS	GAS	30	2273	619.43	619.43	0.010%
Fresno	2010	UBUS	DSL	30	5604	2569.78	2569.78	0.025%
Fresno	2010	UBUS	GAS	35	2228	527.85	527.85	0.010%
Fresno	2010	UBUS	DSL	35	5492	2569.78	2569.78	0.024%
Fresno	2010	UBUS	GAS	40	1606	475.23	475.23	0.007%
Fresno	2010	UBUS	DSL	40	3959	2569.78	2569.78	0.017%
Fresno	2010	UBUS	GAS	45	700	452.06	452.06	0.003%
Fresno	2010	UBUS	DSL	45	1726	2569.78	2569.78	0.008%
Fresno	2010	UBUS	GAS	50	356	454.32	454.32	0.002%
Fresno	2010	UBUS	DSL	50	877	2569.78	2569.78	0.004%
Fresno	2010	UBUS	GAS	55	441	482.42	482.42	0.002%
Fresno	2010	UBUS	DSL	55	1087	2569.78	2569.78	0.005%
Fresno	2010	UBUS	GAS	60	722	541.21	541.21	0.003%
Fresno	2010	UBUS	DSL	60	1779	2569.78	2569.78	0.008%

Community Greenhouse Gas Inventory
Energy
Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	Used 2010 emission factor estimated by PG&E
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,422,450,000	2,610	316495	22.0	7.8	289,745
Commercial	1,570,085,283	7,503	349344	24.3	8.6	319,817
Industrial	*					0
Total	**2,992,535,283**		**665,839**	**46.4**	**16.5**	**609,562**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	75,210,000	138	439,979	41.4	0.8	400,169
Commercial	84,332,183	403	493,343	46.4	0.9	448,706
Industrial	*					0
Total	**159,542,183**		**933,322**	**87.7**	**1.8**	**848,875**

Notes and Sources:

*The Industrial kWH/year and therms/year is unavailable at this time.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Usage and emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2010

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	1,019	0.1600	0.0100	930
Fresno	545,000	597	0	0	545
Percent Fresno/Fresno County	58.6%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	930,000	920	0.360	0.08000	864
Fresno	545,000	539	0	0	506
Percent Fresno/Fresno County	58.6%				

Total Fresno **1,051**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2010
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California

Emissions (MMTCO2e)	18.69
Population	37,253,956
Emissions (MTCO2e per person)	0.50

Fresno

Population	545,000
Emissions (MTCO2e per person)	273,422

(estimated by using California per person emissions)

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf Accessed August 19, 2013.

California Population from: Census Bureau. 2010. Population Quick-Facts. Website: http://quickfacts.census.gov/qfd/states/06000.html. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

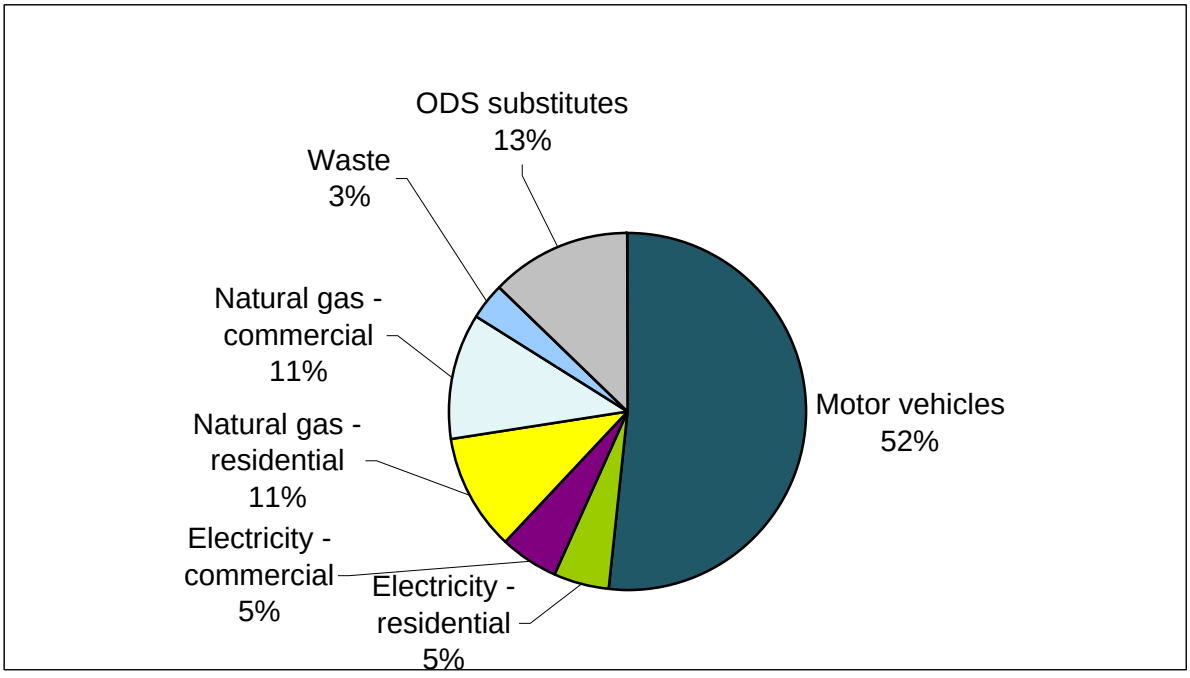
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,337,015	1,828,249
Electricity - residential	226,011	226,011
Electricity - commercial	240,205	240,205
Natural gas - residential	476,679	476,679
Natural gas - commercial	514,647	514,647
Waste	147,628	147,628
Offroad equipment	1,138	1,138
ODS substitutes	576,784	576,784
Total	***4,520,107***	4,011,341



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,149,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,069,502,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1130	835	641	514	428	368	328	304	292	292	303	326	364	390	0
LDT1	1305	964	741	594	495	425	379	351	338	337	350	376	420	451	0
LDT2	1536	1135	872	699	582	500	446	413	397	397	412	443	495	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	264	240	203	177	159	147	140	137	139	145	158	177	206	251	0
MDV	1957	1446	1111	890	742	637	569	526	506	506	525	564	630	676	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	487	444	378	335	306	289	282	285	296	319	354	408	487	603	0
LDT1	486	444	380	338	310	293	287	289	300	322	357	409	486	600	0
LDT2	484	441	378	335	308	291	285	287	298	320	354	407	483	597	0
LHD1	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
LHD2	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	490	446	380	336	307	290	283	285	297	319	355	410	490	608	0
MH	2390	2170	1782	1462	1312	1231	1164	1111	1072	1046	1034	1036	1051	0	0
OBUS	3024	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164	1344	0	0
SBUS	2632	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038	0	0	0
T6	2578	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016	1031	0	0
T7	3978	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568	1592	0	0
UBUS	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1	143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2	366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1	60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2	6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY	15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV	381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH	3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS	2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS	0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6	7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7	1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS	1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1	0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2	0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1	36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2	10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH	1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS	3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS	1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6	37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7	185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS	3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	444	95,444	1,988	9,526	30,550	25,468	144,160	59,580	61,685	31,272	123,830	121,830	9	0	0	**705,341**
LDT1	75	16,108	336	1,608	5,154	4,298	24,327	10,055	10,411	5,278	20,898	20,561	2	0	0	**119,035**
LDT2	226	48,522	1,011	4,843	15,528	12,946	73,283	30,289	31,360	15,898	62,951	61,935	5	0	0	**358,571**
LHD1	60	14,215	264	1,139	3,344	2,620	14,155	5,693	5,826	2,970	12,042	0	0	0	0	**62,268**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,453	27	116	342	268	1,447	582	596	304	1,231	0	0	0	0	**6,365**
MCY	2	417	10	50	173	155	934	409	446	237	979	1,006	0	0	0	**4,816**
MDV	299	64,398	1,341	6,427	20,607	17,181	97,257	40,199	41,620	21,099	83,547	82,199	6	0	0	**475,881**
MH	3	820	15	66	193	151	817	328	336	171	695	713	0	0	0	**4,305**
OBUS	2	487	9	39	115	90	485	195	200	102	412	423	0	0	0	**2,556**
SBUS	0	111	2	9	26	20	110	44	45	23	94	96	0	0	0	**580**
T6	7	1,653	31	132	389	305	1,646	662	678	345	1,400	1,437	0	0	0	**8,679**
T7	1	234	4	19	55	43	233	94	96	49	198	203	0	0	0	**1,227**
UBUS	1	271	5	22	64	50	270	109	111	57	230	236	0	0	0	**1,424**
Total	**1,127**	**244,134**	**5,042**	**23,994**	**76,539**	**63,595**	**359,124**	**148,240**	**153,409**	**77,803**	**308,508**	**290,640**	**22**	**0**	**0**	**1,752,177**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	140	3	17	60	56	344	155	173	94	401	422	0	0	0	**1,866**
LDT1	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**132**
LDT2	0	9	0	1	4	4	22	10	11	6	25	27	0	0	0	**119**
LHD1	8	2,218	60	360	1,384	1,344	8,521	3,806	4,095	2,077	7,931	0	0	0	0	**31,796**
LHD2	2	595	16	96	371	360	2,285	1,021	1,098	557	2,127	0	0	0	0	**8,528**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	16	0	2	7	6	38	17	19	10	44	47	0	0	0	**205**
MH	1	187	4	20	70	64	384	164	170	84	318	291	0	0	0	**1,757**
OBUS	3	736	16	82	295	279	1,749	725	794	390	1,447	1,150	0	0	0	**7,664**
SBUS	1	313	7	33	118	107	644	275	285	141	532	488	0	0	0	**2,943**
T6	39	9,278	207	974	3,497	3,189	19,121	8,152	8,460	4,188	15,808	14,485	1	0	0	**87,360**
T7	295	70,843	1,578	7,442	26,705	24,352	146,004	62,243	64,597	31,977	120,709	110,604	8	0	0	**667,062**
UBUS	3	802	22	130	500	486	3,080	1,376	1,480	751	2,867	2,622	0	0	0	**14,114**
Total	**351**	**85,146**	**1,914**	**9,159**	**33,016**	**30,252**	**182,216**	**77,953**	**81,194**	**40,283**	**152,239**	**130,166**	**9**	**0**	**0**	**823,898**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,576,074	2,337,015	2,337,015

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,435,514 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,173,962,610 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	796	0	**796**	5
5 - 10 MPH	661	774	0	**1,435**	5
10 - 15 MPH	128,951	166,457	354,011	**649,418**	10
15 - 20 MPH	4,357	6,447	6,811	**17,615**	15
20 - 25 MPH	19,066	31,870	54,334	**105,270**	20
25 - 30 MPH	77,876	103,120	224,064	**405,060**	25
30 - 35 MPH	86,309	136,586	170,618	**393,513**	30
35 - 40 MPH	508,418	658,756	1,327,422	**2,494,596**	35
40 - 45 MPH	227,365	277,442	609,480	**1,114,287**	40
45 - 50 MPH	193,416	254,865	750,637	**1,198,918**	45
50 - 55 MPH	104,609	147,771	355,701	**608,081**	50
55 - 60 MPH	464,301	552,054	1,305,747	**2,322,102**	55
60 - 65 MPH	445,111	552,939	1,126,227	**2,124,277**	60
65 - 70 MPH	25	32	89	**146**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,260,464**	**2,889,911**	**6,285,139**	**11,435,514**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2232	649418	17615	105270	405060	393513	2494596	1114287	1198918	608081	2322102	2124277	146	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	766	566	434	348	290	249	222	206	198	198	205	221	246	264	0
LDT1	926	684	525	421	351	301	269	249	240	239	248	267	298	320	0
LDT2	1144	845	649	520	434	372	332	308	296	296	307	330	368	395	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	237	216	183	160	143	132	126	124	125	131	142	159	186	225	0
MDV	1526	1128	866	694	579	497	443	410	395	395	409	440	491	527	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	330	301	258	230	211	200	195	197	205	219	243	278	330	406	0
LDT1	324	297	256	229	211	201	197	198	205	219	241	275	324	396	0
LDT2	353	323	278	248	228	216	212	213	221	237	261	298	353	433	0
LHD1	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
LHD2	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	377	344	294	260	238	225	220	221	230	247	275	316	377	467	0
MH	2151	1953	1604	1316	1180	1108	1048	1000	965	942	931	932	946	0	0
OBUS	2721	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047	1209	0	0
SBUS	2369	1957	1607	1268	1183	1110	1050	1002	967	943	933	934	0	0	0
T6	2320	1917	1574	1241	1158	1087	1028	981	947	924	913	915	928	0	0
T7	3580	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412	1432	0	0
UBUS	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	974	283335	7685	45928	176724	171686	1088370	486153	523077	265300	1013113	926803	64	0	0
LDT1	142	41390	1123	6709	25816	25080	158991	71018	76412	38756	147998	135389	9	0	0
LDT2	364	105917	2873	17169	66063	64180	406857	181735	195538	99175	378724	346459	24	0	0
LHD1	59	17301	469	2804	10791	10483	66457	29685	31939	16199	61861	56591	4	0	0
LHD2	6	1769	48	287	1103	1072	6793	3035	3265	1656	6324	5785	0	0	0
MCY	15	4308	117	698	2687	2610	16547	7391	7952	4033	15402	14090	1	0	0
MDV	379	110346	2993	17887	68826	66864	423870	189334	203715	103322	394561	360947	25	0	0
MH	3	998	27	162	622	605	3834	1712	1843	935	3569	3265	0	0	0
OBUS	2	593	16	96	370	359	2276	1017	1094	555	2119	1938	0	0	0
SBUS	0	135	4	22	84	82	517	231	248	126	481	440	0	0	0
T6	7	2012	55	326	1255	1219	7729	3452	3714	1884	7194	6581	0	0	0
T7	1	285	8	46	177	172	1093	488	525	266	1017	931	0	0	0
UBUS	1	330	9	54	206	200	1268	567	610	309	1181	1080	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	785	21	127	489	475	3014	1346	1449	735	2806	2567	0	0	0
LDT1	0	55	1	9	34	33	211	94	101	51	196	179	0	0	0
LDT2	0	50	1	8	31	30	191	86	92	47	178	163	0	0	0
LHD1	36	10542	286	1709	6575	6388	40494	18088	19462	9871	37694	34483	2	0	0
LHD2	10	2828	77	458	1764	1714	10863	4852	5221	2648	10112	9251	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
MH	1	213	6	35	133	129	818	366	393	199	762	697	0	0	0
OBUS	3	749	20	121	467	454	2877	1285	1383	701	2678	2450	0	0	0
SBUS	1	356	10	58	222	216	1368	611	658	333	1274	1165	0	0	0
T6	37	10797	293	1750	6734	6542	41473	18525	19932	10109	38605	35316	2	0	0
T7	184	53427	1449	8660	33324	32374	205227	91671	98633	50026	191036	174761	12	0	0
UBUS	3	814	22	132	508	493	3127	1397	1503	762	2910	2662	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	299	64,357	1,340	6,423	20,598	17,172	97,203	40,174	41,593	21,086	83,497	82,148	6	0	0	**475,598**
LDT1	53	11,371	237	1,135	3,638	3,034	17,172	7,098	7,349	3,725	14,751	14,514	1	0	0	**84,024**
LDT2	167	35,950	749	3,588	11,504	9,592	54,294	22,441	23,234	11,778	46,640	45,887	4	0	0	**265,661**
LHD1	54	12,729	236	1,020	2,995	2,346	12,676	5,098	5,217	2,659	10,784	0	0	0	0	**55,760**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,301	24	104	306	240	1,296	521	533	272	1,102	0	0	0	0	**5,700**
MCY	1	374	9	45	154	139	836	367	399	212	877	901	0	0	0	**4,313**
MDV	232	49,971	1,041	4,987	15,990	13,332	75,468	31,193	32,296	16,372	64,829	63,783	5	0	0	**369,266**
MH	3	734	14	59	173	135	731	294	301	153	622	638	0	0	0	**3,855**
OBUS	2	436	8	35	103	80	434	175	179	91	369	379	0	0	0	**2,289**
SBUS	0	99	2	8	23	18	99	40	41	21	84	86	0	0	0	**520**
T6	6	1,480	27	119	348	273	1,474	593	607	309	1,254	1,287	0	0	0	**7,772**
T7	1	209	4	17	49	39	208	84	86	44	177	182	0	0	0	**1,099**
UBUS	1	243	5	19	57	45	242	97	100	51	206	211	0	0	0	**1,275**
Total	**826**	**179,254**	**3,695**	**17,557**	**55,939**	**46,445**	**262,133**	**108,174**	**111,934**	**56,774**	**225,193**	**210,018**	**16**	**0**	**0**	**1,277,958**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	95	2	12	41	38	237	106	119	65	273	286	0	0	0	**1,274**
LDT1	0	7	0	1	3	3	17	7	8	5	19	20	0	0	0	**89**
LDT2	0	6	0	1	3	3	16	7	8	4	19	20	0	0	0	**87**
LHD1	7	1,986	54	322	1,239	1,204	7,630	3,408	3,667	1,860	7,102	0	0	0	0	**28,472**
LHD2	2	533	14	86	332	323	2,046	914	984	499	1,905	0	0	0	0	**7,636**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	12	0	1	5	5	29	13	15	8	34	36	0	0	0	**158**
MH	1	167	4	18	63	57	344	147	152	75	285	261	0	0	0	**1,574**
OBUS	3	659	15	74	264	250	1,566	649	711	349	1,296	1,030	0	0	0	**6,863**
SBUS	1	280	6	29	105	96	577	246	255	126	477	437	0	0	0	**2,635**
T6	35	8,308	185	872	3,132	2,856	17,122	7,300	7,576	3,750	14,156	12,971	1	0	0	**78,229**
T7	264	63,438	1,413	6,664	23,914	21,807	130,742	55,737	57,845	28,635	108,092	99,043	7	0	0	**597,336**
UBUS	2	718	19	116	448	435	2,758	1,232	1,325	672	2,567	2,348	0	0	0	**12,639**
Total	**315**	**76,209**	**1,713**	**8,198**	**29,550**	**27,076**	**163,085**	**69,767**	**72,664**	**36,048**	**136,224**	**116,451**	**8**	**0**	**0**	**737,308**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,015,266	1,828,249	1,828,249

EMFAC 2011
2020 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2020, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1097.601204	1129.5953	765.503158	0.004%
Fresno	2020	LDA	DSL	5	3.039576937	487.08109	329.765357	0.000%
Fresno	2020	LDA	GAS	10	19368.49589	834.77968	565.727079	0.068%
Fresno	2020	LDA	DSL	10	53.63699778	443.70668	301.292224	0.000%
Fresno	2020	LDA	GAS	15	9051.364273	640.94058	434.371007	0.032%
Fresno	2020	LDA	DSL	15	25.06585843	378.48579	258.477977	0.000%
Fresno	2020	LDA	GAS	20	570961.7421	513.96372	348.309075	2.019%
Fresno	2020	LDA	DSL	20	1581.159357	334.54556	229.633409	0.006%
Fresno	2020	LDA	GAS	25	115652.1287	428.38541	290.303306	0.409%
Fresno	2020	LDA	DSL	25	320.2743836	306.00044	210.894972	0.001%
Fresno	2020	LDA	GAS	30	266829.8871	367.60468	249.119316	0.943%
Fresno	2020	LDA	DSL	30	738.9295648	289.29397	199.928012	0.003%
Fresno	2020	LDA	GAS	35	920286.3609	328.24025	222.443474	3.254%
Fresno	2020	LDA	DSL	35	2548.5404	282.45305	195.437288	0.009%
Fresno	2020	LDA	GAS	40	1530953.789	303.70517	205.819413	5.413%
Fresno	2020	LDA	DSL	40	4239.656111	284.69426	196.908534	0.015%
Fresno	2020	LDA	GAS	45	1340675.525	292.23901	198.049009	4.740%
Fresno	2020	LDA	DSL	45	3712.720433	296.27271	204.509208	0.013%
Fresno	2020	LDA	GAS	50	1834855.081	292.10301	197.955884	6.487%
Fresno	2020	LDA	DSL	50	5081.247577	318.53069	219.120456	0.018%
Fresno	2020	LDA	GAS	55	1221758.238	302.89634	205.27008	4.319%
Fresno	2020	LDA	DSL	55	3383.404003	354.16085	242.509876	0.012%
Fresno	2020	LDA	GAS	60	1512183.811	325.75529	220.762098	5.346%
Fresno	2020	LDA	DSL	60	4187.676879	407.75495	277.691718	0.015%
Fresno	2020	LDA	GAS	65	1544869.267	363.73237	246.499166	5.462%
Fresno	2020	LDA	DSL	65	4278.192318	486.79924	329.580336	0.015%
Fresno	2020	LDA	GAS	70	1451953.777	390.01281	264.308173	5.133%
Fresno	2020	LDA	DSL	70	4020.882357	603.41836	406.134954	0.014%
Fresno	2020	LDT1	GAS	5	160.3399232	1304.7967	925.652415	0.001%
Fresno	2020	LDT1	DSL	5	0.212505042	486.45442	323.971419	0.000%
Fresno	2020	LDT1	GAS	10	2829.391349	964.45342	684.23582	0.010%
Fresno	2020	LDT1	DSL	10	3.749907629	444.12974	296.951752	0.000%
Fresno	2020	LDT1	GAS	15	1322.24271	740.61424	525.449186	0.005%
Fresno	2020	LDT1	DSL	15	1.752421886	380.48738	256.32308	0.000%
Fresno	2020	LDT1	GAS	20	83407.31561	593.77137	421.24901	0.295%
Fresno	2020	LDT1	DSL	20	110.5431162	337.6106	228.950955	0.000%
Fresno	2020	LDT1	GAS	25	16894.71195	494.765	350.98776	0.060%
Fresno	2020	LDT1	DSL	25	22.39124832	309.75632	211.169055	0.000%
Fresno	2020	LDT1	GAS	30	38979.08188	424.63836	301.25086	0.138%
Fresno	2020	LDT1	DSL	30	51.6605658	293.45418	200.761924	0.000%
Fresno	2020	LDT1	GAS	35	134437.4047	379.17701	269.000862	0.475%
Fresno	2020	LDT1	DSL	35	178.1753487	286.77884	196.500452	0.001%
Fresno	2020	LDT1	GAS	40	223644.9863	350.87622	248.929757	0.791%
Fresno	2020	LDT1	DSL	40	296.4058539	288.9658	197.896581	0.001%
Fresno	2020	LDT1	GAS	45	195848.7412	337.63129	239.533452	0.692%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDT1	DSL	45	259.5663607	300.26399	205.109234	0.001%
Fresno	2020	LDT1	GAS	50	268039.5871	337.46078	239.410422	0.948%
Fresno	2020	LDT1	DSL	50	355.2437845	321.98332	218.97465	0.001%
Fresno	2020	LDT1	GAS	55	178477.0744	349.92509	248.252412	0.631%
Fresno	2020	LDT1	DSL	55	236.5429175	356.75116	241.170106	0.001%
Fresno	2020	LDT1	GAS	60	220903.0487	376.34322	266.996146	0.781%
Fresno	2020	LDT1	DSL	60	292.7718184	409.04819	274.556024	0.001%
Fresno	2020	LDT1	GAS	65	225677.8211	420.22158	298.126155	0.798%
Fresno	2020	LDT1	DSL	65	299.1000053	486.17935	323.795817	0.001%
Fresno	2020	LDT1	GAS	70	212104.5317	450.56841	319.653386	0.750%
Fresno	2020	LDT1	DSL	70	281.110744	599.97604	396.44253	0.001%
Fresno	2020	LDT2	GAS	5	410.3073308	1536.0292	1143.76708	0.001%
Fresno	2020	LDT2	DSL	5	0.193123223	483.63558	352.949647	0.000%
Fresno	2020	LDT2	GAS	10	7240.367106	1135.2759	845.371167	0.026%
Fresno	2020	LDT2	DSL	10	3.40789224	441.45895	322.997862	0.000%
Fresno	2020	LDT2	GAS	15	3383.597905	871.73757	649.13865	0.012%
Fresno	2020	LDT2	DSL	15	1.59258996	378.03921	277.960266	0.000%
Fresno	2020	LDT2	GAS	20	213437.9851	698.95406	520.466327	0.755%
Fresno	2020	LDT2	DSL	20	100.4608962	335.3124	247.617766	0.000%
Fresno	2020	LDT2	GAS	25	43233.29642	582.47638	433.722102	0.153%
Fresno	2020	LDT2	DSL	25	20.34902432	307.5556	227.906247	0.000%
Fresno	2020	LDT2	GAS	30	99746.85881	499.88306	372.227237	0.353%
Fresno	2020	LDT2	DSL	30	46.94879405	291.3105	216.369771	0.000%
Fresno	2020	LDT2	GAS	35	344023.1716	446.36108	332.374045	1.216%
Fresno	2020	LDT2	DSL	35	161.9246321	284.65849	211.645838	0.001%
Fresno	2020	LDT2	GAS	40	572303.9925	413.02584	307.554824	2.023%
Fresno	2020	LDT2	DSL	40	269.3717451	286.83782	213.193489	0.001%
Fresno	2020	LDT2	GAS	45	501173.8359	397.43382	295.94458	1.772%
Fresno	2020	LDT2	DSL	45	235.8922431	298.09651	221.188859	0.001%
Fresno	2020	LDT2	GAS	50	685909.0183	397.23953	295.798871	2.425%
Fresno	2020	LDT2	DSL	50	322.8433094	319.73983	236.558891	0.001%
Fresno	2020	LDT2	GAS	55	456719.9404	411.91427	306.725826	1.615%
Fresno	2020	LDT2	DSL	55	214.9687115	354.38602	261.162921	0.001%
Fresno	2020	LDT2	GAS	60	565287.3873	443.00751	329.879711	1.999%
Fresno	2020	LDT2	DSL	60	266.0691583	406.50012	298.171814	0.001%
Fresno	2020	LDT2	GAS	65	577505.9743	494.65656	368.339783	2.042%
Fresno	2020	LDT2	DSL	65	271.8201986	483.36142	352.754954	0.001%
Fresno	2020	LDT2	GAS	70	542772.0652	530.38611	394.944181	1.919%
Fresno	2020	LDT2	DSL	70	255.4716835	596.75996	433.28506	0.001%
Fresno	2020	LHD1	GAS	5	21384.31271	2513.4972	2262.14749	0.076%
Fresno	2020	LHD1	DSL	5	8073.831436	521.44003	469.296029	0.029%
Fresno	2020	LHD1	GAS	10	55761.32258	2036.1281	1832.51532	0.197%
Fresno	2020	LHD1	DSL	10	26849.16852	521.44005	469.296042	0.095%
Fresno	2020	LHD1	GAS	15	126976.0519	1392.4297	1253.1867	0.449%
Fresno	2020	LHD1	DSL	15	58147.60848	521.44	469.296003	0.206%
Fresno	2020	LHD1	GAS	20	146719.8434	1006.0686	905.461733	0.519%
Fresno	2020	LHD1	DSL	20	63748.56088	521.43999	469.295993	0.225%
Fresno	2020	LHD1	GAS	25	113019.5197	768.01205	691.210844	0.400%
Fresno	2020	LHD1	DSL	25	68227.96575	521.44	469.295996	0.241%
Fresno	2020	LHD1	GAS	30	99946.34197	619.4336	557.490237	0.353%
Fresno	2020	LHD1	DSL	30	57593.04709	521.44001	469.296005	0.204%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LHD1	GAS	35	37346.32043	527.84649	475.061842	0.132%
Fresno	2020	LHD1	DSL	35	30394.08805	521.44001	469.296012	0.107%
Fresno	2020	LHD1	GAS	40	11023.78163	475.23318	427.709861	0.039%
Fresno	2020	LHD1	DSL	40	16685.3603	521.44002	469.296021	0.059%
Fresno	2020	LHD1	GAS	45	13571.24509	452.05583	406.850248	0.048%
Fresno	2020	LHD1	DSL	45	18008.9918	521.44002	469.296015	0.064%
Fresno	2020	LHD1	GAS	50	100208.1816	454.3218	408.889624	0.354%
Fresno	2020	LHD1	DSL	50	69538.42058	521.44004	469.296036	0.246%
Fresno	2020	LHD1	GAS	55	27561.98152	482.41547	434.173925	0.097%
Fresno	2020	LHD1	DSL	55	41876.66483	521.43999	469.295994	0.148%
Fresno	2020	LHD2	GAS	5	2185.999834	2513.4972	2262.14751	0.008%
Fresno	2020	LHD2	DSL	5	2165.940834	521.32551	469.192959	0.008%
Fresno	2020	LHD2	GAS	10	5700.171632	2036.1281	1832.51531	0.020%
Fresno	2020	LHD2	DSL	10	7202.740987	521.32545	469.192908	0.025%
Fresno	2020	LHD2	GAS	15	12980.05837	1392.4297	1253.18673	0.046%
Fresno	2020	LHD2	DSL	15	15599.07284	521.32548	469.192929	0.055%
Fresno	2020	LHD2	GAS	20	14998.35728	1006.0684	905.461596	0.053%
Fresno	2020	LHD2	DSL	20	17101.62232	521.3255	469.192951	0.060%
Fresno	2020	LHD2	GAS	25	11553.35919	768.01208	691.210875	0.041%
Fresno	2020	LHD2	DSL	25	18303.29766	521.32547	469.192927	0.065%
Fresno	2020	LHD2	GAS	30	10216.96052	619.4336	557.490236	0.036%
Fresno	2020	LHD2	DSL	30	15450.30236	521.32548	469.192934	0.055%
Fresno	2020	LHD2	GAS	35	3817.707199	527.84656	475.061906	0.013%
Fresno	2020	LHD2	DSL	35	8153.724442	521.32547	469.192923	0.029%
Fresno	2020	LHD2	GAS	40	1126.900176	475.23317	427.709853	0.004%
Fresno	2020	LHD2	DSL	40	4476.12821	521.32553	469.192978	0.016%
Fresno	2020	LHD2	GAS	45	1387.31323	452.05583	406.850248	0.005%
Fresno	2020	LHD2	DSL	45	4831.21426	521.32552	469.192968	0.017%
Fresno	2020	LHD2	GAS	50	10243.72797	454.32179	408.889615	0.036%
Fresno	2020	LHD2	DSL	50	18654.84861	521.32553	469.192974	0.066%
Fresno	2020	LHD2	GAS	55	2817.508813	482.4155	434.173947	0.010%
Fresno	2020	LHD2	DSL	55	11234.11873	521.32552	469.192971	0.040%
Fresno	2020	MCY	GAS	5	16.68688392	263.60959	237.248635	0.000%
Fresno	2020	MCY	GAS	10	294.4601557	239.987	215.988302	0.001%
Fresno	2020	MCY	GAS	15	137.6083261	203.31025	182.979225	0.000%
Fresno	2020	MCY	GAS	20	8680.359343	177.28794	159.559145	0.031%
Fresno	2020	MCY	GAS	25	1758.264929	159.11187	143.200685	0.006%
Fresno	2020	MCY	GAS	30	4056.627639	147.00431	132.303882	0.014%
Fresno	2020	MCY	GAS	35	13991.15637	139.89607	125.906467	0.049%
Fresno	2020	MCY	GAS	40	23275.16288	137.24882	123.523938	0.082%
Fresno	2020	MCY	GAS	45	20382.35374	138.97664	125.078975	0.072%
Fresno	2020	MCY	GAS	50	27895.39084	145.4486	130.903738	0.099%
Fresno	2020	MCY	GAS	55	18574.45022	157.57522	141.817698	0.066%
Fresno	2020	MCY	GAS	60	22989.80272	177.00467	159.304207	0.081%
Fresno	2020	MCY	GAS	65	23486.72339	206.48665	185.837981	0.083%
Fresno	2020	MCY	GAS	70	22074.1257	250.51598	225.464381	0.078%
Fresno	2020	MDV	GAS	5	427.4652288	1956.688	1525.97278	0.002%
Fresno	2020	MDV	DSL	5	0.333527873	490.28924	377.108778	0.000%
Fresno	2020	MDV	GAS	10	7543.139266	1446.2357	1127.90657	0.027%
Fresno	2020	MDV	DSL	10	5.885501367	446.28971	343.748967	0.000%
Fresno	2020	MDV	GAS	15	3525.090445	1110.5412	866.11421	0.012%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	DSL	15	2.75043645	380.1288	293.586725	0.000%
Fresno	2020	MDV	GAS	20	222363.35	890.39433	694.407181	0.786%
Fresno	2020	MDV	DSL	20	173.4980433	335.55537	259.791799	0.001%
Fresno	2020	MDV	GAS	25	45041.19318	741.97753	578.642654	0.159%
Fresno	2020	MDV	DSL	25	35.14319288	306.59881	237.837356	0.000%
Fresno	2020	MDV	GAS	30	103917.9823	636.78632	496.616032	0.367%
Fresno	2020	MDV	DSL	30	81.08154619	289.65159	224.98822	0.000%
Fresno	2020	MDV	GAS	35	358409.259	568.60891	443.447127	1.267%
Fresno	2020	MDV	DSL	35	279.6472728	282.71202	219.726732	0.001%
Fresno	2020	MDV	GAS	40	596236.1499	526.15478	410.342796	2.108%
Fresno	2020	MDV	DSL	40	465.2106216	284.9856	221.450527	0.002%
Fresno	2020	MDV	GAS	45	522131.5284	506.29265	394.85277	1.846%
Fresno	2020	MDV	DSL	45	407.3908075	296.73091	230.355656	0.001%
Fresno	2020	MDV	GAS	50	714591.7653	506.04172	394.655526	2.526%
Fresno	2020	MDV	DSL	50	557.5570769	319.30972	247.474579	0.002%
Fresno	2020	MDV	GAS	55	475818.7393	524.73439	409.233126	1.682%
Fresno	2020	MDV	DSL	55	371.2554625	355.45334	274.878147	0.001%
Fresno	2020	MDV	GAS	60	588926.1182	564.34648	440.127202	2.082%
Fresno	2020	MDV	DSL	60	459.5070332	409.81987	316.098065	0.002%
Fresno	2020	MDV	GAS	65	601655.6237	630.1431	491.441651	2.127%
Fresno	2020	MDV	DSL	65	469.4391087	490.00332	376.891997	0.002%
Fresno	2020	MDV	GAS	70	565469.2796	675.65501	526.934139	1.999%
Fresno	2020	MDV	DSL	70	441.2049752	608.30305	466.585136	0.002%
Fresno	2020	MH	GAS	5	375.9017657	2513.4973	2262.14753	0.001%
Fresno	2020	MH	DSL	5	74.62377466	2390.0672	2151.06044	0.000%
Fresno	2020	MH	GAS	10	1889.661497	2036.1283	1832.51547	0.007%
Fresno	2020	MH	DSL	10	371.4490664	2170.188	1953.16921	0.001%
Fresno	2020	MH	GAS	15	2386.966339	1392.4297	1253.18671	0.008%
Fresno	2020	MH	DSL	15	501.3272751	1781.9066	1603.71592	0.002%
Fresno	2020	MH	GAS	20	2475.870442	1006.0686	905.461738	0.009%
Fresno	2020	MH	DSL	20	531.6758273	1462.2599	1316.03391	0.002%
Fresno	2020	MH	GAS	25	2758.692156	768.01205	691.210843	0.010%
Fresno	2020	MH	DSL	25	553.719262	1311.5663	1180.40971	0.002%
Fresno	2020	MH	GAS	30	3119.094445	619.43361	557.490248	0.011%
Fresno	2020	MH	DSL	30	665.8025648	1231.0993	1107.98936	0.002%
Fresno	2020	MH	GAS	35	3876.560955	527.84661	475.061951	0.014%
Fresno	2020	MH	DSL	35	785.0689398	1164.3217	1047.88949	0.003%
Fresno	2020	MH	GAS	40	4825.918952	475.2332	427.709878	0.017%
Fresno	2020	MH	DSL	40	974.5408363	1111.2334	1000.11009	0.003%
Fresno	2020	MH	GAS	45	4400.908252	452.05585	406.850268	0.016%
Fresno	2020	MH	DSL	45	798.019717	1071.8346	964.651153	0.003%
Fresno	2020	MH	GAS	50	4282.988184	454.32186	408.889674	0.015%
Fresno	2020	MH	DSL	50	893.1138315	1046.1252	941.512654	0.003%
Fresno	2020	MH	GAS	55	5601.758146	482.41557	434.174012	0.020%
Fresno	2020	MH	DSL	55	1308.777391	1034.1051	930.694616	0.005%
Fresno	2020	MH	GAS	60	6464.173618	541.20922	487.088296	0.023%
Fresno	2020	MH	DSL	60	1572.715418	1035.7744	932.196962	0.006%
Fresno	2020	MH	GAS	65	1010.10891	641.49794	577.348142	0.004%
Fresno	2020	MH	DSL	65	247.5006536	1051.1334	946.020045	0.001%
Fresno	2020	OBUS	GAS	5	223.1933909	2513.4974	2262.14768	0.001%
Fresno	2020	OBUS	DSL	5	189.4743925	3023.7787	2721.40084	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	OBUS	GAS	10	1121.995179	2036.1283	1832.51547	0.004%
Fresno	2020	OBUS	DSL	10	873.8793826	2435.1748	2191.65732	0.003%
Fresno	2020	OBUS	GAS	15	1417.27225	1392.4297	1253.18671	0.005%
Fresno	2020	OBUS	DSL	15	1150.490893	1981.8507	1783.66567	0.004%
Fresno	2020	OBUS	GAS	20	1470.059473	1006.0686	905.461718	0.005%
Fresno	2020	OBUS	DSL	20	1535.69351	1680.0018	1512.00159	0.005%
Fresno	2020	OBUS	GAS	25	1637.986093	768.01209	691.210882	0.006%
Fresno	2020	OBUS	DSL	25	1593.312243	1565.8826	1409.29435	0.006%
Fresno	2020	OBUS	GAS	30	1851.976584	619.43366	557.490296	0.007%
Fresno	2020	OBUS	DSL	30	2222.551712	1524.477	1372.02928	0.008%
Fresno	2020	OBUS	GAS	35	2301.725777	527.84661	475.061952	0.008%
Fresno	2020	OBUS	DSL	35	3281.369258	1506.8029	1356.12259	0.012%
Fresno	2020	OBUS	GAS	40	2865.411437	475.23323	427.709905	0.010%
Fresno	2020	OBUS	DSL	40	3502.618858	1398.0016	1258.20144	0.012%
Fresno	2020	OBUS	GAS	45	2613.059424	452.05584	406.850252	0.009%
Fresno	2020	OBUS	DSL	45	3919.848541	1422.5072	1280.25645	0.014%
Fresno	2020	OBUS	GAS	50	2543.043925	454.32186	408.889677	0.009%
Fresno	2020	OBUS	DSL	50	4186.335389	1378.9402	1241.04618	0.015%
Fresno	2020	OBUS	GAS	55	3326.069877	482.41555	434.173991	0.012%
Fresno	2020	OBUS	DSL	55	5486.643759	1338.9738	1205.07644	0.019%
Fresno	2020	OBUS	GAS	60	3838.132886	541.2092	487.088281	0.014%
Fresno	2020	OBUS	DSL	60	3711.118326	1163.509	1047.15807	0.013%
Fresno	2020	OBUS	GAS	65	599.756791	641.49795	577.348151	0.002%
Fresno	2020	OBUS	DSL	65	966.0730169	1343.8417	1209.45751	0.003%
Fresno	2020	SBUS	GAS	5	58.03696424	2513.497	2262.14732	0.000%
Fresno	2020	SBUS	DSL	5	153.6039937	2632.2332	2369.0099	0.001%
Fresno	2020	SBUS	GAS	10	203.4165827	2036.1281	1832.5153	0.001%
Fresno	2020	SBUS	DSL	10	538.3741248	2174.4303	1956.98731	0.002%
Fresno	2020	SBUS	GAS	15	406.8331817	1392.4295	1253.18659	0.001%
Fresno	2020	SBUS	DSL	15	1076.74825	1785.3958	1606.85622	0.004%
Fresno	2020	SBUS	GAS	20	552.2098641	1006.0685	905.461668	0.002%
Fresno	2020	SBUS	DSL	20	1461.510625	1408.4997	1267.64973	0.005%
Fresno	2020	SBUS	GAS	25	871.7004002	768.0121	691.21089	0.003%
Fresno	2020	SBUS	DSL	25	2307.092737	1314.1617	1182.74553	0.008%
Fresno	2020	SBUS	GAS	30	1045.811315	619.43358	557.490219	0.004%
Fresno	2020	SBUS	DSL	30	2767.904718	1233.5395	1110.18552	0.010%
Fresno	2020	SBUS	GAS	35	1073.393783	527.84651	475.061863	0.004%
Fresno	2020	SBUS	DSL	35	2840.905979	1166.633	1049.96972	0.010%
Fresno	2020	SBUS	GAS	40	724.5975211	475.23316	427.709842	0.003%
Fresno	2020	SBUS	DSL	40	1917.761723	1113.4423	1002.09811	0.007%
Fresno	2020	SBUS	GAS	45	347.6444581	452.05579	406.850211	0.001%
Fresno	2020	SBUS	DSL	45	920.0959117	1073.9674	966.570693	0.003%
Fresno	2020	SBUS	GAS	50	174.1108852	454.32177	408.889594	0.001%
Fresno	2020	SBUS	DSL	50	460.811981	1048.2083	943.387475	0.002%
Fresno	2020	SBUS	GAS	55	259.1529318	482.41547	434.173922	0.001%
Fresno	2020	SBUS	DSL	55	685.8891861	1036.165	932.548455	0.002%
Fresno	2020	SBUS	GAS	60	144.2307875	541.2091	487.088192	0.001%
Fresno	2020	SBUS	DSL	60	381.7295431	1037.8374	934.05363	0.001%
Fresno	2020	T6	GAS	5	757.7971042	2513.4975	2262.14774	0.003%
Fresno	2020	T6	DSL	5	3782.072492	2577.8739	2320.08648	0.013%
Fresno	2020	T6	GAS	10	3809.452781	2036.1283	1832.51547	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	T6	DSL	10	18825.7321	2129.5253	1916.57274	0.067%
Fresno	2020	T6	GAS	15	4811.99169	1392.4297	1253.18675	0.017%
Fresno	2020	T6	DSL	15	25408.20417	1748.5248	1573.67236	0.090%
Fresno	2020	T6	GAS	20	4991.217479	1006.0686	905.46177	0.018%
Fresno	2020	T6	DSL	20	26946.3239	1379.4122	1241.47096	0.095%
Fresno	2020	T6	GAS	25	5561.370137	768.01215	691.210939	0.020%
Fresno	2020	T6	DSL	25	28063.52768	1287.0224	1158.32015	0.099%
Fresno	2020	T6	GAS	30	6287.921467	619.43362	557.49026	0.022%
Fresno	2020	T6	DSL	30	33744.11845	1208.0651	1087.25862	0.119%
Fresno	2020	T6	GAS	35	7814.932614	527.84653	475.061878	0.028%
Fresno	2020	T6	DSL	35	39788.75993	1142.5404	1028.28635	0.141%
Fresno	2020	T6	GAS	40	9728.784867	475.23324	427.709914	0.034%
Fresno	2020	T6	DSL	40	49391.55144	1090.4482	981.403359	0.175%
Fresno	2020	T6	GAS	45	8871.986895	452.05589	406.850299	0.031%
Fresno	2020	T6	DSL	45	40445.13139	1051.7885	946.609636	0.143%
Fresno	2020	T6	GAS	50	8634.26726	454.32179	408.889615	0.031%
Fresno	2020	T6	DSL	50	45264.67932	1026.5613	923.905185	0.160%
Fresno	2020	T6	GAS	55	11292.83405	482.4156	434.174038	0.040%
Fresno	2020	T6	DSL	55	66331.28571	1014.7667	913.290006	0.235%
Fresno	2020	T6	GAS	60	13031.41533	541.20926	487.088332	0.046%
Fresno	2020	T6	DSL	60	79708.15566	1016.4046	914.764098	0.282%
Fresno	2020	T6	GAS	65	2036.323575	641.49801	577.34821	0.007%
Fresno	2020	T6	DSL	65	12543.79741	1031.475	928.327461	0.044%
Fresno	2020	T7	GAS	5	45.14811148	2513.4971	2262.14736	0.000%
Fresno	2020	T7	DSL	5	8396.704746	3977.8081	3580.02731	0.030%
Fresno	2020	T7	GAS	10	220.662119	2036.1283	1832.51544	0.001%
Fresno	2020	T7	DSL	10	32075.80037	3285.9804	2957.38233	0.113%
Fresno	2020	T7	GAS	15	240.6355065	1392.4297	1253.18671	0.001%
Fresno	2020	T7	DSL	15	39228.96626	2698.0747	2428.26726	0.139%
Fresno	2020	T7	GAS	20	411.241983	1006.0685	905.461655	0.001%
Fresno	2020	T7	DSL	20	97100.08386	2129.5835	1916.62514	0.343%
Fresno	2020	T7	GAS	25	536.6970104	768.01215	691.210933	0.002%
Fresno	2020	T7	DSL	25	88604.77385	1985.9498	1787.35483	0.313%
Fresno	2020	T7	GAS	30	980.1093934	619.43364	557.490278	0.003%
Fresno	2020	T7	DSL	30	149589.5276	1864.1142	1677.70278	0.529%
Fresno	2020	T7	GAS	35	1743.255924	527.84661	475.061945	0.006%
Fresno	2020	T7	DSL	35	269115.3006	1763.0057	1586.70517	0.951%
Fresno	2020	T7	GAS	40	1519.637782	475.23317	427.709849	0.005%
Fresno	2020	T7	DSL	40	253966.6678	1682.6245	1514.36201	0.898%
Fresno	2020	T7	GAS	45	1607.939024	452.0558	406.850223	0.006%
Fresno	2020	T7	DSL	45	355569.7933	1622.9703	1460.67329	1.257%
Fresno	2020	T7	GAS	50	1682.35955	454.3218	408.889618	0.006%
Fresno	2020	T7	DSL	50	369783.8463	1584.0433	1425.63901	1.307%
Fresno	2020	T7	GAS	55	2469.579288	482.41551	434.173958	0.009%
Fresno	2020	T7	DSL	55	450928.7666	1565.8435	1409.25918	1.594%
Fresno	2020	T7	GAS	60	609.4964239	541.20921	487.088286	0.002%
Fresno	2020	T7	DSL	60	137368.6558	1568.3709	1411.53379	0.486%
Fresno	2020	T7	GAS	65	326.6774339	641.49796	577.348164	0.001%
Fresno	2020	T7	DSL	65	75239.57125	1591.6254	1432.46284	0.266%
Fresno	2020	UBUS	GAS	5	142.5170016	2513.497	2262.14729	0.001%
Fresno	2020	UBUS	DSL	5	351.317801	2440.8645	2196.77806	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	UBUS	GAS	10	511.5367803	2036.1283	1832.51547	0.002%
Fresno	2020	UBUS	DSL	10	1260.986146	2440.8645	2196.77804	0.004%
Fresno	2020	UBUS	GAS	15	1023.073523	1392.4297	1253.18671	0.004%
Fresno	2020	UBUS	DSL	15	2521.972627	2440.8642	2196.77781	0.009%
Fresno	2020	UBUS	GAS	20	1350.100402	1006.0686	905.461701	0.005%
Fresno	2020	UBUS	DSL	20	3328.12413	2440.8647	2196.77822	0.012%
Fresno	2020	UBUS	GAS	25	2033.347957	768.01208	691.210868	0.007%
Fresno	2020	UBUS	DSL	25	5012.394	2440.8646	2196.77812	0.018%
Fresno	2020	UBUS	GAS	30	2544.884591	619.43361	557.490252	0.009%
Fresno	2020	UBUS	DSL	30	6273.37969	2440.8644	2196.77797	0.022%
Fresno	2020	UBUS	GAS	35	2493.975603	527.84654	475.061885	0.009%
Fresno	2020	UBUS	DSL	35	6147.88385	2440.8645	2196.77802	0.022%
Fresno	2020	UBUS	GAS	40	1797.928884	475.23316	427.709842	0.006%
Fresno	2020	UBUS	DSL	40	4432.06321	2440.8647	2196.77821	0.016%
Fresno	2020	UBUS	GAS	45	783.7715293	452.05586	406.850272	0.003%
Fresno	2020	UBUS	DSL	45	1932.070593	2440.8644	2196.77797	0.007%
Fresno	2020	UBUS	GAS	50	398.2134972	454.3218	408.889617	0.001%
Fresno	2020	UBUS	DSL	50	981.633661	2440.8646	2196.77811	0.003%
Fresno	2020	UBUS	GAS	55	493.7042317	482.41551	434.173958	0.002%
Fresno	2020	UBUS	DSL	55	1217.027328	2440.8644	2196.77795	0.004%
Fresno	2020	UBUS	GAS	60	808.0757296	541.20919	487.088268	0.003%
Fresno	2020	UBUS	DSL	60	1991.982525	2440.8644	2196.778	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.290	Used 2020 emission factor projected by PG&E
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	245690	26.3	9.3	226,011
Commercial	1,800,825,042	7,503	261120	27.9	9.9	240,205
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**506,809**	**54.2**	**19.2**	**466,216**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

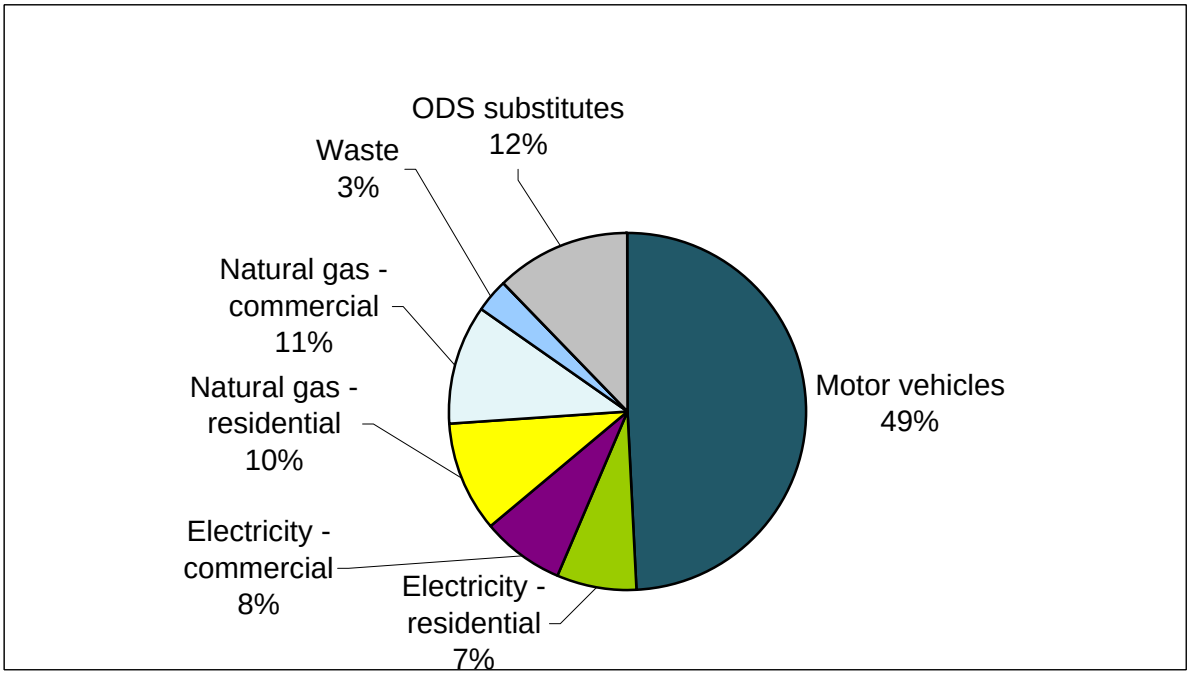
Summary
Year: 2020
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	649,200	Fresno COG
Employment	240,014	
County Information		
Population	1,082,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2020 population (649,200) and the 2020 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	2,337,015	1,828,249
Electricity - residential	345,142	313,405
Electricity - commercial	366,817	334,657
Natural gas - residential	476,679	431,774
Natural gas - commercial	514,647	469,526
Waste	147,628	147,628
Offroad equipment	1,138	1,138
ODS substitutes	576,784	576,784
Total	***4,765,850***	4,103,161



Community Greenhouse Gas Inventory

Waste

Year: **2020**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	147,628	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,149,323 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,069,502,895 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	800	0	**800**	5
5 - 10 MPH	665	778	0	**1,443**	5
10 - 15 MPH	129,603	167,298	355,800	**652,701**	10
15 - 20 MPH	4,379	6,480	6,845	**17,704**	15
20 - 25 MPH	19,163	32,031	54,608	**105,802**	20
25 - 30 MPH	78,269	103,641	225,197	**407,107**	25
30 - 35 MPH	86,745	137,277	171,480	**395,502**	30
35 - 40 MPH	510,988	662,086	1,334,132	**2,507,207**	35
40 - 45 MPH	228,515	278,844	612,561	**1,119,920**	40
45 - 50 MPH	194,394	256,153	754,432	**1,204,979**	45
50 - 55 MPH	105,138	148,518	357,499	**611,155**	50
55 - 60 MPH	466,648	554,845	1,312,348	**2,333,841**	55
60 - 65 MPH	447,361	555,735	1,131,920	**2,135,016**	60
65 - 70 MPH	25	33	89	**147**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,271,891**	**2,904,520**	**6,316,912**	**11,493,323**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2243	652701	17704	105802	407107	395502	2507207	1119920	1204979	611155	2333841	2135016	147	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1130	835	641	514	428	368	328	304	292	292	303	326	364	390	0
LDT1	1305	964	741	594	495	425	379	351	338	337	350	376	420	451	0
LDT2	1536	1135	872	699	582	500	446	413	397	397	412	443	495	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	264	240	203	177	159	147	140	137	139	145	158	177	206	251	0
MDV	1957	1446	1111	890	742	637	569	526	506	506	525	564	630	676	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	487	444	378	335	306	289	282	285	296	319	354	408	487	603	0
LDT1	486	444	380	338	310	293	287	289	300	322	357	409	486	600	0
LDT2	484	441	378	335	308	291	285	287	298	320	354	407	483	597	0
LHD1	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
LHD2	521	521	521	521	521	521	521	521	521	521	521	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	490	446	380	336	307	290	283	285	297	319	355	410	490	608	0
MH	2390	2170	1782	1462	1312	1231	1164	1111	1072	1046	1034	1036	1051	0	0
OBUS	3024	2435	1982	1680	1566	1524	1507	1398	1423	1379	1339	1164	1344	0	0
SBUS	2632	2174	1785	1408	1314	1234	1167	1113	1074	1048	1036	1038	0	0	0
T6	2578	2130	1749	1379	1287	1208	1143	1090	1052	1027	1015	1016	1031	0	0
T7	3978	3286	2698	2130	1986	1864	1763	1683	1623	1584	1566	1568	1592	0	0
UBUS	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	979	284768	7724	46161	177617	172554	1093872	488611	525722	266641	1018234	931488	64	0	0
LDT1	143	41599	1128	6743	25947	25207	159795	71377	76799	38952	148746	136074	9	0	0
LDT2	366	106452	2887	17256	66397	64504	408913	182654	196526	99676	380638	348211	24	0	0
LHD1	60	17388	472	2819	10845	10536	66793	29835	32101	16281	62174	56877	4	0	0
LHD2	6	1777	48	288	1109	1077	6828	3050	3281	1664	6356	5814	0	0	0
MCY	15	4329	117	702	2700	2623	16630	7428	7993	4054	15480	14161	1	0	0
MDV	381	110904	3008	17977	69174	67202	426013	190292	204744	103845	396555	362772	25	0	0
MH	3	1003	27	163	626	608	3853	1721	1852	939	3587	3281	0	0	0
OBUS	2	596	16	97	371	361	2288	1022	1100	558	2130	1948	0	0	0
SBUS	0	135	4	22	84	82	520	232	250	127	484	442	0	0	0
T6	7	2022	55	328	1261	1225	7768	3470	3733	1893	7231	6615	0	0	0
T7	1	286	8	46	178	173	1099	491	528	268	1023	935	0	0	0
UBUS	1	332	9	54	207	201	1275	569	613	311	1187	1086	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	789	21	128	492	478	3029	1353	1456	738	2820	2580	0	0	0
LDT1	0	55	1	9	34	33	212	95	102	52	197	180	0	0	0
LDT2	0	50	1	8	31	30	192	86	93	47	179	164	0	0	0
LHD1	36	10595	287	1717	6608	6420	40699	18179	19560	9921	37885	34657	2	0	0
LHD2	10	2842	77	461	1773	1722	10918	4877	5247	2661	10163	9297	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	87	2	14	54	52	332	148	160	81	309	283	0	0	0
MH	1	214	6	35	134	130	822	367	395	200	766	700	0	0	0
OBUS	3	753	20	122	469	456	2891	1292	1390	705	2691	2462	0	0	0
SBUS	1	358	10	58	223	217	1375	614	661	335	1280	1171	0	0	0
T6	37	10851	294	1759	6768	6575	41683	18619	20033	10161	38801	35495	2	0	0
T7	185	53697	1456	8704	33492	32537	206264	92134	99132	50279	192002	175645	12	0	0
UBUS	3	818	22	133	510	496	3142	1404	1510	766	2925	2676	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	444	95,444	1,988	9,526	30,550	25,468	144,160	59,580	61,685	31,272	123,830	121,830	9	0	0	**705,341**
LDT1	75	16,108	336	1,608	5,154	4,298	24,327	10,055	10,411	5,278	20,898	20,561	2	0	0	**119,035**
LDT2	226	48,522	1,011	4,843	15,528	12,946	73,283	30,289	31,360	15,898	62,951	61,935	5	0	0	**358,571**
LHD1	60	14,215	264	1,139	3,344	2,620	14,155	5,693	5,826	2,970	12,042	0	0	0	0	**62,268**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without regulation)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,453	27	116	342	268	1,447	582	596	304	1,231	0	0	0	0	**6,365**
MCY	2	417	10	50	173	155	934	409	446	237	979	1,006	0	0	0	**4,816**
MDV	299	64,398	1,341	6,427	20,607	17,181	97,257	40,199	41,620	21,099	83,547	82,199	6	0	0	**475,881**
MH	3	820	15	66	193	151	817	328	336	171	695	713	0	0	0	**4,305**
OBUS	2	487	9	39	115	90	485	195	200	102	412	423	0	0	0	**2,556**
SBUS	0	111	2	9	26	20	110	44	45	23	94	96	0	0	0	**580**
T6	7	1,653	31	132	389	305	1,646	662	678	345	1,400	1,437	0	0	0	**8,679**
T7	1	234	4	19	55	43	233	94	96	49	198	203	0	0	0	**1,227**
UBUS	1	271	5	22	64	50	270	109	111	57	230	236	0	0	0	**1,424**
Total	**1,127**	**244,134**	**5,042**	**23,994**	**76,539**	**63,595**	**359,124**	**148,240**	**153,409**	**77,803**	**308,508**	**290,640**	**22**	**0**	**0**	**1,752,177**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	140	3	17	60	56	344	155	173	94	401	422	0	0	0	**1,866**
LDT1	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**132**
LDT2	0	9	0	1	4	4	22	10	11	6	25	27	0	0	0	**119**
LHD1	8	2,218	60	360	1,384	1,344	8,521	3,806	4,095	2,077	7,931	0	0	0	0	**31,796**
LHD2	2	595	16	96	371	360	2,285	1,021	1,098	557	2,127	0	0	0	0	**8,528**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	16	0	2	7	6	38	17	19	10	44	47	0	0	0	**205**
MH	1	187	4	20	70	64	384	164	170	84	318	291	0	0	0	**1,757**
OBUS	3	736	16	82	295	279	1,749	725	794	390	1,447	1,150	0	0	0	**7,664**
SBUS	1	313	7	33	118	107	644	275	285	141	532	488	0	0	0	**2,943**
T6	39	9,278	207	974	3,497	3,189	19,121	8,152	8,460	4,188	15,808	14,485	1	0	0	**87,360**
T7	295	70,843	1,578	7,442	26,705	24,352	146,004	62,243	64,597	31,977	120,709	110,604	8	0	0	**667,062**
UBUS	3	802	22	130	500	486	3,080	1,376	1,480	751	2,867	2,622	0	0	0	**14,114**
Total	**351**	**85,146**	**1,914**	**9,159**	**33,016**	**30,252**	**182,216**	**77,953**	**81,194**	**40,283**	**152,239**	**130,166**	**9**	**0**	**0**	**823,898**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,576,074	2,337,015	2,337,015

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 11,435,514 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 4,173,962,610 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	796	0	**796**	5
5 - 10 MPH	661	774	0	**1,435**	5
10 - 15 MPH	128,951	166,457	354,011	**649,418**	10
15 - 20 MPH	4,357	6,447	6,811	**17,615**	15
20 - 25 MPH	19,066	31,870	54,334	**105,270**	20
25 - 30 MPH	77,876	103,120	224,064	**405,060**	25
30 - 35 MPH	86,309	136,586	170,618	**393,513**	30
35 - 40 MPH	508,418	658,756	1,327,422	**2,494,596**	35
40 - 45 MPH	227,365	277,442	609,480	**1,114,287**	40
45 - 50 MPH	193,416	254,865	750,637	**1,198,918**	45
50 - 55 MPH	104,609	147,771	355,701	**608,081**	50
55 - 60 MPH	464,301	552,054	1,305,747	**2,322,102**	55
60 - 65 MPH	445,111	552,939	1,126,227	**2,124,277**	60
65 - 70 MPH	25	32	89	**146**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,260,464**	**2,889,911**	**6,285,139**	**11,435,514**	

Source:
Fehr and Peers. 2013. 2020 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 10 years of VMT growth between 2010 and 2020 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2232	649418	17615	105270	405060	393513	2494596	1114287	1198918	608081	2322102	2124277	146	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.63%	0.12%
LDT1	6.37%	0.01%
LDT2	16.31%	0.01%
LHD1	2.66%	1.62%
LHD2	0.27%	0.44%
MCY	0.66%	0.00%
MDV	16.99%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.12%
SBUS	0.02%	0.05%
T6	0.31%	1.66%
T7	0.04%	8.23%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.7%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.6%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.3%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	766	566	434	348	290	249	222	206	198	198	205	221	246	264	0
LDT1	926	684	525	421	351	301	269	249	240	239	248	267	298	320	0
LDT2	1144	845	649	520	434	372	332	308	296	296	307	330	368	395	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	237	216	183	160	143	132	126	124	125	131	142	159	186	225	0
MDV	1526	1128	866	694	579	497	443	410	395	395	409	440	491	527	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	330	301	258	230	211	200	195	197	205	219	243	278	330	406	0
LDT1	324	297	256	229	211	201	197	198	205	219	241	275	324	396	0
LDT2	353	323	278	248	228	216	212	213	221	237	261	298	353	433	0
LHD1	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
LHD2	469	469	469	469	469	469	469	469	469	469	469	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	377	344	294	260	238	225	220	221	230	247	275	316	377	467	0
MH	2151	1953	1604	1316	1180	1108	1048	1000	965	942	931	932	946	0	0
OBUS	2721	2192	1784	1512	1409	1372	1356	1258	1280	1241	1205	1047	1209	0	0
SBUS	2369	1957	1607	1268	1183	1110	1050	1002	967	943	933	934	0	0	0
T6	2320	1917	1574	1241	1158	1087	1028	981	947	924	913	915	928	0	0
T7	3580	2957	2428	1917	1787	1678	1587	1514	1461	1426	1409	1412	1432	0	0
UBUS	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	2197	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	974	283335	7685	45928	176724	171686	1088370	486153	523077	265300	1013113	926803	64	0	0
LDT1	142	41390	1123	6709	25816	25080	158991	71018	76412	38756	147998	135389	9	0	0
LDT2	364	105917	2873	17169	66063	64180	406857	181735	195538	99175	378724	346459	24	0	0
LHD1	59	17301	469	2804	10791	10483	66457	29685	31939	16199	61861	56591	4	0	0
LHD2	6	1769	48	287	1103	1072	6793	3035	3265	1656	6324	5785	0	0	0
MCY	15	4308	117	698	2687	2610	16547	7391	7952	4033	15402	14090	1	0	0
MDV	379	110346	2993	17887	68826	66864	423870	189334	203715	103322	394561	360947	25	0	0
MH	3	998	27	162	622	605	3834	1712	1843	935	3569	3265	0	0	0
OBUS	2	593	16	96	370	359	2276	1017	1094	555	2119	1938	0	0	0
SBUS	0	135	4	22	84	82	517	231	248	126	481	440	0	0	0
T6	7	2012	55	326	1255	1219	7729	3452	3714	1884	7194	6581	0	0	0
T7	1	285	8	46	177	172	1093	488	525	266	1017	931	0	0	0
UBUS	1	330	9	54	206	200	1268	567	610	309	1181	1080	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	785	21	127	489	475	3014	1346	1449	735	2806	2567	0	0	0
LDT1	0	55	1	9	34	33	211	94	101	51	196	179	0	0	0
LDT2	0	50	1	8	31	30	191	86	92	47	178	163	0	0	0
LHD1	36	10542	286	1709	6575	6388	40494	18088	19462	9871	37694	34483	2	0	0
LHD2	10	2828	77	458	1764	1714	10863	4852	5221	2648	10112	9251	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	86	2	14	54	52	331	148	159	81	308	282	0	0	0
MH	1	213	6	35	133	129	818	366	393	199	762	697	0	0	0
OBUS	3	749	20	121	467	454	2877	1285	1383	701	2678	2450	0	0	0
SBUS	1	356	10	58	222	216	1368	611	658	333	1274	1165	0	0	0
T6	37	10797	293	1750	6734	6542	41473	18525	19932	10109	38605	35316	2	0	0
T7	184	53427	1449	8660	33324	32374	205227	91671	98633	50026	191036	174761	12	0	0
UBUS	3	814	22	132	508	493	3127	1397	1503	762	2910	2662	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	299	64,357	1,340	6,423	20,598	17,172	97,203	40,174	41,593	21,086	83,497	82,148	6	0	0	**475,598**
LDT1	53	11,371	237	1,135	3,638	3,034	17,172	7,098	7,349	3,725	14,751	14,514	1	0	0	**84,024**
LDT2	167	35,950	749	3,588	11,504	9,592	54,294	22,441	23,234	11,778	46,640	45,887	4	0	0	**265,661**
LHD1	54	12,729	236	1,020	2,995	2,346	12,676	5,098	5,217	2,659	10,784	0	0	0	0	**55,760**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2020
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	6	1,301	24	104	306	240	1,296	521	533	272	1,102	0	0	0	0	**5,700**
MCY	1	374	9	45	154	139	836	367	399	212	877	901	0	0	0	**4,313**
MDV	232	49,971	1,041	4,987	15,990	13,332	75,468	31,193	32,296	16,372	64,829	63,783	5	0	0	**369,266**
MH	3	734	14	59	173	135	731	294	301	153	622	638	0	0	0	**3,855**
OBUS	2	436	8	35	103	80	434	175	179	91	369	379	0	0	0	**2,289**
SBUS	0	99	2	8	23	18	99	40	41	21	84	86	0	0	0	**520**
T6	6	1,480	27	119	348	273	1,474	593	607	309	1,254	1,287	0	0	0	**7,772**
T7	1	209	4	17	49	39	208	84	86	44	177	182	0	0	0	**1,099**
UBUS	1	243	5	19	57	45	242	97	100	51	206	211	0	0	0	**1,275**
Total	**826**	**179,254**	**3,695**	**17,557**	**55,939**	**46,445**	**262,133**	**108,174**	**111,934**	**56,774**	**225,193**	**210,018**	**16**	**0**	**0**	**1,277,958**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	95	2	12	41	38	237	106	119	65	273	286	0	0	0	**1,274**
LDT1	0	7	0	1	3	3	17	7	8	5	19	20	0	0	0	**89**
LDT2	0	6	0	1	3	3	16	7	8	4	19	20	0	0	0	**87**
LHD1	7	1,986	54	322	1,239	1,204	7,630	3,408	3,667	1,860	7,102	0	0	0	0	**28,472**
LHD2	2	533	14	86	332	323	2,046	914	984	499	1,905	0	0	0	0	**7,636**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	12	0	1	5	5	29	13	15	8	34	36	0	0	0	**158**
MH	1	167	4	18	63	57	344	147	152	75	285	261	0	0	0	**1,574**
OBUS	3	659	15	74	264	250	1,566	649	711	349	1,296	1,030	0	0	0	**6,863**
SBUS	1	280	6	29	105	96	577	246	255	126	477	437	0	0	0	**2,635**
T6	35	8,308	185	872	3,132	2,856	17,122	7,300	7,576	3,750	14,156	12,971	1	0	0	**78,229**
T7	264	63,438	1,413	6,664	23,914	21,807	130,742	55,737	57,845	28,635	108,092	99,043	7	0	0	**597,336**
UBUS	2	718	19	116	448	435	2,758	1,232	1,325	672	2,567	2,348	0	0	0	**12,639**
Total	**315**	**76,209**	**1,713**	**8,198**	**29,550**	**27,076**	**163,085**	**69,767**	**72,664**	**36,048**	**136,224**	**116,451**	**8**	**0**	**0**	**737,308**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,015,266	1,828,249	1,828,249

EMFAC 2011
2020 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2020, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDA	GAS	5	1097.601204	1129.5953	765.503158	0.004%
Fresno	2020	LDA	DSL	5	3.039576937	487.08109	329.765357	0.000%
Fresno	2020	LDA	GAS	10	19368.49589	834.77968	565.727079	0.068%
Fresno	2020	LDA	DSL	10	53.63699778	443.70668	301.292224	0.000%
Fresno	2020	LDA	GAS	15	9051.364273	640.94058	434.371007	0.032%
Fresno	2020	LDA	DSL	15	25.06585843	378.48579	258.477977	0.000%
Fresno	2020	LDA	GAS	20	570961.7421	513.96372	348.309075	2.019%
Fresno	2020	LDA	DSL	20	1581.159357	334.54556	229.633409	0.006%
Fresno	2020	LDA	GAS	25	115652.1287	428.38541	290.303306	0.409%
Fresno	2020	LDA	DSL	25	320.2743836	306.00044	210.894972	0.001%
Fresno	2020	LDA	GAS	30	266829.8871	367.60468	249.119316	0.943%
Fresno	2020	LDA	DSL	30	738.9295648	289.29397	199.928012	0.003%
Fresno	2020	LDA	GAS	35	920286.3609	328.24025	222.443474	3.254%
Fresno	2020	LDA	DSL	35	2548.5404	282.45305	195.437288	0.009%
Fresno	2020	LDA	GAS	40	1530953.789	303.70517	205.819413	5.413%
Fresno	2020	LDA	DSL	40	4239.656111	284.69426	196.908534	0.015%
Fresno	2020	LDA	GAS	45	1340675.525	292.23901	198.049009	4.740%
Fresno	2020	LDA	DSL	45	3712.720433	296.27271	204.509208	0.013%
Fresno	2020	LDA	GAS	50	1834855.081	292.10301	197.955884	6.487%
Fresno	2020	LDA	DSL	50	5081.247577	318.53069	219.120456	0.018%
Fresno	2020	LDA	GAS	55	1221758.238	302.89634	205.27008	4.319%
Fresno	2020	LDA	DSL	55	3383.404003	354.16085	242.509876	0.012%
Fresno	2020	LDA	GAS	60	1512183.811	325.75529	220.762098	5.346%
Fresno	2020	LDA	DSL	60	4187.676879	407.75495	277.691718	0.015%
Fresno	2020	LDA	GAS	65	1544869.267	363.73237	246.499166	5.462%
Fresno	2020	LDA	DSL	65	4278.192318	486.79924	329.580336	0.015%
Fresno	2020	LDA	GAS	70	1451953.777	390.01281	264.308173	5.133%
Fresno	2020	LDA	DSL	70	4020.882357	603.41836	406.134954	0.014%
Fresno	2020	LDT1	GAS	5	160.3399232	1304.7967	925.652415	0.001%
Fresno	2020	LDT1	DSL	5	0.212505042	486.45442	323.971419	0.000%
Fresno	2020	LDT1	GAS	10	2829.391349	964.45342	684.23582	0.010%
Fresno	2020	LDT1	DSL	10	3.749907629	444.12974	296.951752	0.000%
Fresno	2020	LDT1	GAS	15	1322.24271	740.61424	525.449186	0.005%
Fresno	2020	LDT1	DSL	15	1.752421886	380.48738	256.32308	0.000%
Fresno	2020	LDT1	GAS	20	83407.31561	593.77137	421.24901	0.295%
Fresno	2020	LDT1	DSL	20	110.5431162	337.6106	228.950955	0.000%
Fresno	2020	LDT1	GAS	25	16894.71195	494.765	350.98776	0.060%
Fresno	2020	LDT1	DSL	25	22.39124832	309.75632	211.169055	0.000%
Fresno	2020	LDT1	GAS	30	38979.08188	424.63836	301.25086	0.138%
Fresno	2020	LDT1	DSL	30	51.6605658	293.45418	200.761924	0.000%
Fresno	2020	LDT1	GAS	35	134437.4047	379.17701	269.000862	0.475%
Fresno	2020	LDT1	DSL	35	178.1753487	286.77884	196.500452	0.001%
Fresno	2020	LDT1	GAS	40	223644.9863	350.87622	248.929757	0.791%
Fresno	2020	LDT1	DSL	40	296.4058539	288.9658	197.896581	0.001%
Fresno	2020	LDT1	GAS	45	195848.7412	337.63129	239.533452	0.692%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LDT1	DSL	45	259.5663607	300.26399	205.109234	0.001%
Fresno	2020	LDT1	GAS	50	268039.5871	337.46078	239.410422	0.948%
Fresno	2020	LDT1	DSL	50	355.2437845	321.98332	218.97465	0.001%
Fresno	2020	LDT1	GAS	55	178477.0744	349.92509	248.252412	0.631%
Fresno	2020	LDT1	DSL	55	236.5429175	356.75116	241.170106	0.001%
Fresno	2020	LDT1	GAS	60	220903.0487	376.34322	266.996146	0.781%
Fresno	2020	LDT1	DSL	60	292.7718184	409.04819	274.556024	0.001%
Fresno	2020	LDT1	GAS	65	225677.8211	420.22158	298.126155	0.798%
Fresno	2020	LDT1	DSL	65	299.1000053	486.17935	323.795817	0.001%
Fresno	2020	LDT1	GAS	70	212104.5317	450.56841	319.653386	0.750%
Fresno	2020	LDT1	DSL	70	281.110744	599.97604	396.44253	0.001%
Fresno	2020	LDT2	GAS	5	410.3073308	1536.0292	1143.76708	0.001%
Fresno	2020	LDT2	DSL	5	0.193123223	483.63558	352.949647	0.000%
Fresno	2020	LDT2	GAS	10	7240.367106	1135.2759	845.371167	0.026%
Fresno	2020	LDT2	DSL	10	3.40789224	441.45895	322.997862	0.000%
Fresno	2020	LDT2	GAS	15	3383.597905	871.73757	649.13865	0.012%
Fresno	2020	LDT2	DSL	15	1.59258996	378.03921	277.960266	0.000%
Fresno	2020	LDT2	GAS	20	213437.9851	698.95406	520.466327	0.755%
Fresno	2020	LDT2	DSL	20	100.4608962	335.3124	247.617766	0.000%
Fresno	2020	LDT2	GAS	25	43233.29642	582.47638	433.722102	0.153%
Fresno	2020	LDT2	DSL	25	20.34902432	307.5556	227.906247	0.000%
Fresno	2020	LDT2	GAS	30	99746.85881	499.88306	372.227237	0.353%
Fresno	2020	LDT2	DSL	30	46.94879405	291.3105	216.369771	0.000%
Fresno	2020	LDT2	GAS	35	344023.1716	446.36108	332.374045	1.216%
Fresno	2020	LDT2	DSL	35	161.9246321	284.65849	211.645838	0.001%
Fresno	2020	LDT2	GAS	40	572303.9925	413.02584	307.554824	2.023%
Fresno	2020	LDT2	DSL	40	269.3717451	286.83782	213.193489	0.001%
Fresno	2020	LDT2	GAS	45	501173.8359	397.43382	295.94458	1.772%
Fresno	2020	LDT2	DSL	45	235.8922431	298.09651	221.188859	0.001%
Fresno	2020	LDT2	GAS	50	685909.0183	397.23953	295.798871	2.425%
Fresno	2020	LDT2	DSL	50	322.8433094	319.73983	236.558891	0.001%
Fresno	2020	LDT2	GAS	55	456719.9404	411.91427	306.725826	1.615%
Fresno	2020	LDT2	DSL	55	214.9687115	354.38602	261.162921	0.001%
Fresno	2020	LDT2	GAS	60	565287.3873	443.00751	329.879711	1.999%
Fresno	2020	LDT2	DSL	60	266.0691583	406.50012	298.171814	0.001%
Fresno	2020	LDT2	GAS	65	577505.9743	494.65656	368.339783	2.042%
Fresno	2020	LDT2	DSL	65	271.8201986	483.36142	352.754954	0.001%
Fresno	2020	LDT2	GAS	70	542772.0652	530.38611	394.944181	1.919%
Fresno	2020	LDT2	DSL	70	255.4716835	596.75996	433.28506	0.001%
Fresno	2020	LHD1	GAS	5	21384.31271	2513.4972	2262.14749	0.076%
Fresno	2020	LHD1	DSL	5	8073.831436	521.44003	469.296029	0.029%
Fresno	2020	LHD1	GAS	10	55761.32258	2036.1281	1832.51532	0.197%
Fresno	2020	LHD1	DSL	10	26849.16852	521.44005	469.296042	0.095%
Fresno	2020	LHD1	GAS	15	126976.0519	1392.4297	1253.1867	0.449%
Fresno	2020	LHD1	DSL	15	58147.60848	521.44	469.296003	0.206%
Fresno	2020	LHD1	GAS	20	146719.8434	1006.0686	905.461733	0.519%
Fresno	2020	LHD1	DSL	20	63748.56088	521.43999	469.295993	0.225%
Fresno	2020	LHD1	GAS	25	113019.5197	768.01205	691.210844	0.400%
Fresno	2020	LHD1	DSL	25	68227.96575	521.44	469.295996	0.241%
Fresno	2020	LHD1	GAS	30	99946.34197	619.4336	557.490237	0.353%
Fresno	2020	LHD1	DSL	30	57593.04709	521.44001	469.296005	0.204%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	LHD1	GAS	35	37346.32043	527.84649	475.061842	0.132%
Fresno	2020	LHD1	DSL	35	30394.08805	521.44001	469.296012	0.107%
Fresno	2020	LHD1	GAS	40	11023.78163	475.23318	427.709861	0.039%
Fresno	2020	LHD1	DSL	40	16685.3603	521.44002	469.296021	0.059%
Fresno	2020	LHD1	GAS	45	13571.24509	452.05583	406.850248	0.048%
Fresno	2020	LHD1	DSL	45	18008.9918	521.44002	469.296015	0.064%
Fresno	2020	LHD1	GAS	50	100208.1816	454.3218	408.889624	0.354%
Fresno	2020	LHD1	DSL	50	69538.42058	521.44004	469.296036	0.246%
Fresno	2020	LHD1	GAS	55	27561.98152	482.41547	434.173925	0.097%
Fresno	2020	LHD1	DSL	55	41876.66483	521.43999	469.295994	0.148%
Fresno	2020	LHD2	GAS	5	2185.999834	2513.4972	2262.14751	0.008%
Fresno	2020	LHD2	DSL	5	2165.940834	521.32551	469.192959	0.008%
Fresno	2020	LHD2	GAS	10	5700.171632	2036.1281	1832.51531	0.020%
Fresno	2020	LHD2	DSL	10	7202.740987	521.32545	469.192908	0.025%
Fresno	2020	LHD2	GAS	15	12980.05837	1392.4297	1253.18673	0.046%
Fresno	2020	LHD2	DSL	15	15599.07284	521.32548	469.192929	0.055%
Fresno	2020	LHD2	GAS	20	14998.35728	1006.0684	905.461596	0.053%
Fresno	2020	LHD2	DSL	20	17101.62232	521.3255	469.192951	0.060%
Fresno	2020	LHD2	GAS	25	11553.35919	768.01208	691.210875	0.041%
Fresno	2020	LHD2	DSL	25	18303.29766	521.32547	469.192927	0.065%
Fresno	2020	LHD2	GAS	30	10216.96052	619.4336	557.490236	0.036%
Fresno	2020	LHD2	DSL	30	15450.30236	521.32548	469.192934	0.055%
Fresno	2020	LHD2	GAS	35	3817.707199	527.84656	475.061906	0.013%
Fresno	2020	LHD2	DSL	35	8153.724442	521.32547	469.192923	0.029%
Fresno	2020	LHD2	GAS	40	1126.900176	475.23317	427.709853	0.004%
Fresno	2020	LHD2	DSL	40	4476.12821	521.32553	469.192978	0.016%
Fresno	2020	LHD2	GAS	45	1387.31323	452.05583	406.850248	0.005%
Fresno	2020	LHD2	DSL	45	4831.21426	521.32552	469.192968	0.017%
Fresno	2020	LHD2	GAS	50	10243.72797	454.32179	408.889615	0.036%
Fresno	2020	LHD2	DSL	50	18654.84861	521.32553	469.192974	0.066%
Fresno	2020	LHD2	GAS	55	2817.508813	482.4155	434.173947	0.010%
Fresno	2020	LHD2	DSL	55	11234.11873	521.32552	469.192971	0.040%
Fresno	2020	MCY	GAS	5	16.68688392	263.60959	237.248635	0.000%
Fresno	2020	MCY	GAS	10	294.4601557	239.987	215.988302	0.001%
Fresno	2020	MCY	GAS	15	137.6083261	203.31025	182.979225	0.000%
Fresno	2020	MCY	GAS	20	8680.359343	177.28794	159.559145	0.031%
Fresno	2020	MCY	GAS	25	1758.264929	159.11187	143.200685	0.006%
Fresno	2020	MCY	GAS	30	4056.627639	147.00431	132.303882	0.014%
Fresno	2020	MCY	GAS	35	13991.15637	139.89607	125.906467	0.049%
Fresno	2020	MCY	GAS	40	23275.16288	137.24882	123.523938	0.082%
Fresno	2020	MCY	GAS	45	20382.35374	138.97664	125.078975	0.072%
Fresno	2020	MCY	GAS	50	27895.39084	145.4486	130.903738	0.099%
Fresno	2020	MCY	GAS	55	18574.45022	157.57522	141.817698	0.066%
Fresno	2020	MCY	GAS	60	22989.80272	177.00467	159.304207	0.081%
Fresno	2020	MCY	GAS	65	23486.72339	206.48665	185.837981	0.083%
Fresno	2020	MCY	GAS	70	22074.1257	250.51598	225.464381	0.078%
Fresno	2020	MDV	GAS	5	427.4652288	1956.688	1525.97278	0.002%
Fresno	2020	MDV	DSL	5	0.333527873	490.28924	377.108778	0.000%
Fresno	2020	MDV	GAS	10	7543.139266	1446.2357	1127.90657	0.027%
Fresno	2020	MDV	DSL	10	5.885501367	446.28971	343.748967	0.000%
Fresno	2020	MDV	GAS	15	3525.090445	1110.5412	866.11421	0.012%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	MDV	DSL	15	2.75043645	380.1288	293.586725	0.000%
Fresno	2020	MDV	GAS	20	222363.35	890.39433	694.407181	0.786%
Fresno	2020	MDV	DSL	20	173.4980433	335.55537	259.791799	0.001%
Fresno	2020	MDV	GAS	25	45041.19318	741.97753	578.642654	0.159%
Fresno	2020	MDV	DSL	25	35.14319288	306.59881	237.837356	0.000%
Fresno	2020	MDV	GAS	30	103917.9823	636.78632	496.616032	0.367%
Fresno	2020	MDV	DSL	30	81.08154619	289.65159	224.98822	0.000%
Fresno	2020	MDV	GAS	35	358409.259	568.60891	443.447127	1.267%
Fresno	2020	MDV	DSL	35	279.6472728	282.71202	219.726732	0.001%
Fresno	2020	MDV	GAS	40	596236.1499	526.15478	410.342796	2.108%
Fresno	2020	MDV	DSL	40	465.2106216	284.9856	221.450527	0.002%
Fresno	2020	MDV	GAS	45	522131.5284	506.29265	394.85277	1.846%
Fresno	2020	MDV	DSL	45	407.3908075	296.73091	230.355656	0.001%
Fresno	2020	MDV	GAS	50	714591.7653	506.04172	394.655526	2.526%
Fresno	2020	MDV	DSL	50	557.5570769	319.30972	247.474579	0.002%
Fresno	2020	MDV	GAS	55	475818.7393	524.73439	409.233126	1.682%
Fresno	2020	MDV	DSL	55	371.2554625	355.45334	274.878147	0.001%
Fresno	2020	MDV	GAS	60	588926.1182	564.34648	440.127202	2.082%
Fresno	2020	MDV	DSL	60	459.5070332	409.81987	316.098065	0.002%
Fresno	2020	MDV	GAS	65	601655.6237	630.1431	491.441651	2.127%
Fresno	2020	MDV	DSL	65	469.4391087	490.00332	376.891997	0.002%
Fresno	2020	MDV	GAS	70	565469.2796	675.65501	526.934139	1.999%
Fresno	2020	MDV	DSL	70	441.2049752	608.30305	466.585136	0.002%
Fresno	2020	MH	GAS	5	375.9017657	2513.4973	2262.14753	0.001%
Fresno	2020	MH	DSL	5	74.62377466	2390.0672	2151.06044	0.000%
Fresno	2020	MH	GAS	10	1889.661497	2036.1283	1832.51547	0.007%
Fresno	2020	MH	DSL	10	371.4490664	2170.188	1953.16921	0.001%
Fresno	2020	MH	GAS	15	2386.966339	1392.4297	1253.18671	0.008%
Fresno	2020	MH	DSL	15	501.3272751	1781.9066	1603.71592	0.002%
Fresno	2020	MH	GAS	20	2475.870442	1006.0686	905.461738	0.009%
Fresno	2020	MH	DSL	20	531.6758273	1462.2599	1316.03391	0.002%
Fresno	2020	MH	GAS	25	2758.692156	768.01205	691.210843	0.010%
Fresno	2020	MH	DSL	25	553.719262	1311.5663	1180.40971	0.002%
Fresno	2020	MH	GAS	30	3119.094445	619.43361	557.490248	0.011%
Fresno	2020	MH	DSL	30	665.8025648	1231.0993	1107.98936	0.002%
Fresno	2020	MH	GAS	35	3876.560955	527.84661	475.061951	0.014%
Fresno	2020	MH	DSL	35	785.0689398	1164.3217	1047.88949	0.003%
Fresno	2020	MH	GAS	40	4825.918952	475.2332	427.709878	0.017%
Fresno	2020	MH	DSL	40	974.5408363	1111.2334	1000.11009	0.003%
Fresno	2020	MH	GAS	45	4400.908252	452.05585	406.850268	0.016%
Fresno	2020	MH	DSL	45	798.019717	1071.8346	964.651153	0.003%
Fresno	2020	MH	GAS	50	4282.988184	454.32186	408.889674	0.015%
Fresno	2020	MH	DSL	50	893.1138315	1046.1252	941.512654	0.003%
Fresno	2020	MH	GAS	55	5601.758146	482.41557	434.174012	0.020%
Fresno	2020	MH	DSL	55	1308.777391	1034.1051	930.694616	0.005%
Fresno	2020	MH	GAS	60	6464.173618	541.20922	487.088296	0.023%
Fresno	2020	MH	DSL	60	1572.715418	1035.7744	932.196962	0.006%
Fresno	2020	MH	GAS	65	1010.10891	641.49794	577.348142	0.004%
Fresno	2020	MH	DSL	65	247.5006536	1051.1334	946.020045	0.001%
Fresno	2020	OBUS	GAS	5	223.1933909	2513.4974	2262.14768	0.001%
Fresno	2020	OBUS	DSL	5	189.4743925	3023.7787	2721.40084	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	OBUS	GAS	10	1121.995179	2036.1283	1832.51547	0.004%
Fresno	2020	OBUS	DSL	10	873.8793826	2435.1748	2191.65732	0.003%
Fresno	2020	OBUS	GAS	15	1417.27225	1392.4297	1253.18671	0.005%
Fresno	2020	OBUS	DSL	15	1150.490893	1981.8507	1783.66567	0.004%
Fresno	2020	OBUS	GAS	20	1470.059473	1006.0686	905.461718	0.005%
Fresno	2020	OBUS	DSL	20	1535.69351	1680.0018	1512.00159	0.005%
Fresno	2020	OBUS	GAS	25	1637.986093	768.01209	691.210882	0.006%
Fresno	2020	OBUS	DSL	25	1593.312243	1565.8826	1409.29435	0.006%
Fresno	2020	OBUS	GAS	30	1851.976584	619.43366	557.490296	0.007%
Fresno	2020	OBUS	DSL	30	2222.551712	1524.477	1372.02928	0.008%
Fresno	2020	OBUS	GAS	35	2301.725777	527.84661	475.061952	0.008%
Fresno	2020	OBUS	DSL	35	3281.369258	1506.8029	1356.12259	0.012%
Fresno	2020	OBUS	GAS	40	2865.411437	475.23323	427.709905	0.010%
Fresno	2020	OBUS	DSL	40	3502.618858	1398.0016	1258.20144	0.012%
Fresno	2020	OBUS	GAS	45	2613.059424	452.05584	406.850252	0.009%
Fresno	2020	OBUS	DSL	45	3919.848541	1422.5072	1280.25645	0.014%
Fresno	2020	OBUS	GAS	50	2543.043925	454.32186	408.889677	0.009%
Fresno	2020	OBUS	DSL	50	4186.335389	1378.9402	1241.04618	0.015%
Fresno	2020	OBUS	GAS	55	3326.069877	482.41555	434.173991	0.012%
Fresno	2020	OBUS	DSL	55	5486.643759	1338.9738	1205.07644	0.019%
Fresno	2020	OBUS	GAS	60	3838.132886	541.2092	487.088281	0.014%
Fresno	2020	OBUS	DSL	60	3711.118326	1163.509	1047.15807	0.013%
Fresno	2020	OBUS	GAS	65	599.756791	641.49795	577.348151	0.002%
Fresno	2020	OBUS	DSL	65	966.0730169	1343.8417	1209.45751	0.003%
Fresno	2020	SBUS	GAS	5	58.03696424	2513.497	2262.14732	0.000%
Fresno	2020	SBUS	DSL	5	153.6039937	2632.2332	2369.0099	0.001%
Fresno	2020	SBUS	GAS	10	203.4165827	2036.1281	1832.5153	0.001%
Fresno	2020	SBUS	DSL	10	538.3741248	2174.4303	1956.98731	0.002%
Fresno	2020	SBUS	GAS	15	406.8331817	1392.4295	1253.18659	0.001%
Fresno	2020	SBUS	DSL	15	1076.74825	1785.3958	1606.85622	0.004%
Fresno	2020	SBUS	GAS	20	552.2098641	1006.0685	905.461668	0.002%
Fresno	2020	SBUS	DSL	20	1461.510625	1408.4997	1267.64973	0.005%
Fresno	2020	SBUS	GAS	25	871.7004002	768.0121	691.21089	0.003%
Fresno	2020	SBUS	DSL	25	2307.092737	1314.1617	1182.74553	0.008%
Fresno	2020	SBUS	GAS	30	1045.811315	619.43358	557.490219	0.004%
Fresno	2020	SBUS	DSL	30	2767.904718	1233.5395	1110.18552	0.010%
Fresno	2020	SBUS	GAS	35	1073.393783	527.84651	475.061863	0.004%
Fresno	2020	SBUS	DSL	35	2840.905979	1166.633	1049.96972	0.010%
Fresno	2020	SBUS	GAS	40	724.5975211	475.23316	427.709842	0.003%
Fresno	2020	SBUS	DSL	40	1917.761723	1113.4423	1002.09811	0.007%
Fresno	2020	SBUS	GAS	45	347.6444581	452.05579	406.850211	0.001%
Fresno	2020	SBUS	DSL	45	920.0959117	1073.9674	966.570693	0.003%
Fresno	2020	SBUS	GAS	50	174.1108852	454.32177	408.889594	0.001%
Fresno	2020	SBUS	DSL	50	460.811981	1048.2083	943.387475	0.002%
Fresno	2020	SBUS	GAS	55	259.1529318	482.41547	434.173922	0.001%
Fresno	2020	SBUS	DSL	55	685.8891861	1036.165	932.548455	0.002%
Fresno	2020	SBUS	GAS	60	144.2307875	541.2091	487.088192	0.001%
Fresno	2020	SBUS	DSL	60	381.7295431	1037.8374	934.05363	0.001%
Fresno	2020	T6	GAS	5	757.7971042	2513.4975	2262.14774	0.003%
Fresno	2020	T6	DSL	5	3782.072492	2577.8739	2320.08648	0.013%
Fresno	2020	T6	GAS	10	3809.452781	2036.1283	1832.51547	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	T6	DSL	10	18825.7321	2129.5253	1916.57274	0.067%
Fresno	2020	T6	GAS	15	4811.99169	1392.4297	1253.18675	0.017%
Fresno	2020	T6	DSL	15	25408.20417	1748.5248	1573.67236	0.090%
Fresno	2020	T6	GAS	20	4991.217479	1006.0686	905.46177	0.018%
Fresno	2020	T6	DSL	20	26946.3239	1379.4122	1241.47096	0.095%
Fresno	2020	T6	GAS	25	5561.370137	768.01215	691.210939	0.020%
Fresno	2020	T6	DSL	25	28063.52768	1287.0224	1158.32015	0.099%
Fresno	2020	T6	GAS	30	6287.921467	619.43362	557.49026	0.022%
Fresno	2020	T6	DSL	30	33744.11845	1208.0651	1087.25862	0.119%
Fresno	2020	T6	GAS	35	7814.932614	527.84653	475.061878	0.028%
Fresno	2020	T6	DSL	35	39788.75993	1142.5404	1028.28635	0.141%
Fresno	2020	T6	GAS	40	9728.784867	475.23324	427.709914	0.034%
Fresno	2020	T6	DSL	40	49391.55144	1090.4482	981.403359	0.175%
Fresno	2020	T6	GAS	45	8871.986895	452.05589	406.850299	0.031%
Fresno	2020	T6	DSL	45	40445.13139	1051.7885	946.609636	0.143%
Fresno	2020	T6	GAS	50	8634.26726	454.32179	408.889615	0.031%
Fresno	2020	T6	DSL	50	45264.67932	1026.5613	923.905185	0.160%
Fresno	2020	T6	GAS	55	11292.83405	482.4156	434.174038	0.040%
Fresno	2020	T6	DSL	55	66331.28571	1014.7667	913.290006	0.235%
Fresno	2020	T6	GAS	60	13031.41533	541.20926	487.088332	0.046%
Fresno	2020	T6	DSL	60	79708.15566	1016.4046	914.764098	0.282%
Fresno	2020	T6	GAS	65	2036.323575	641.49801	577.34821	0.007%
Fresno	2020	T6	DSL	65	12543.79741	1031.475	928.327461	0.044%
Fresno	2020	T7	GAS	5	45.14811148	2513.4971	2262.14736	0.000%
Fresno	2020	T7	DSL	5	8396.704746	3977.8081	3580.02731	0.030%
Fresno	2020	T7	GAS	10	220.662119	2036.1283	1832.51544	0.001%
Fresno	2020	T7	DSL	10	32075.80037	3285.9804	2957.38233	0.113%
Fresno	2020	T7	GAS	15	240.6355065	1392.4297	1253.18671	0.001%
Fresno	2020	T7	DSL	15	39228.96626	2698.0747	2428.26726	0.139%
Fresno	2020	T7	GAS	20	411.241983	1006.0685	905.461655	0.001%
Fresno	2020	T7	DSL	20	97100.08386	2129.5835	1916.62514	0.343%
Fresno	2020	T7	GAS	25	536.6970104	768.01215	691.210933	0.002%
Fresno	2020	T7	DSL	25	88604.77385	1985.9498	1787.35483	0.313%
Fresno	2020	T7	GAS	30	980.1093934	619.43364	557.490278	0.003%
Fresno	2020	T7	DSL	30	149589.5276	1864.1142	1677.70278	0.529%
Fresno	2020	T7	GAS	35	1743.255924	527.84661	475.061945	0.006%
Fresno	2020	T7	DSL	35	269115.3006	1763.0057	1586.70517	0.951%
Fresno	2020	T7	GAS	40	1519.637782	475.23317	427.709849	0.005%
Fresno	2020	T7	DSL	40	253966.6678	1682.6245	1514.36201	0.898%
Fresno	2020	T7	GAS	45	1607.939024	452.0558	406.850223	0.006%
Fresno	2020	T7	DSL	45	355569.7933	1622.9703	1460.67329	1.257%
Fresno	2020	T7	GAS	50	1682.35955	454.3218	408.889618	0.006%
Fresno	2020	T7	DSL	50	369783.8463	1584.0433	1425.63901	1.307%
Fresno	2020	T7	GAS	55	2469.579288	482.41551	434.173958	0.009%
Fresno	2020	T7	DSL	55	450928.7666	1565.8435	1409.25918	1.594%
Fresno	2020	T7	GAS	60	609.4964239	541.20921	487.088286	0.002%
Fresno	2020	T7	DSL	60	137368.6558	1568.3709	1411.53379	0.486%
Fresno	2020	T7	GAS	65	326.6774339	641.49796	577.348164	0.001%
Fresno	2020	T7	DSL	65	75239.57125	1591.6254	1432.46284	0.266%
Fresno	2020	UBUS	GAS	5	142.5170016	2513.497	2262.14729	0.001%
Fresno	2020	UBUS	DSL	5	351.317801	2440.8645	2196.77806	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2020	UBUS	GAS	10	511.5367803	2036.1283	1832.51547	0.002%
Fresno	2020	UBUS	DSL	10	1260.986146	2440.8645	2196.77804	0.004%
Fresno	2020	UBUS	GAS	15	1023.073523	1392.4297	1253.18671	0.004%
Fresno	2020	UBUS	DSL	15	2521.972627	2440.8642	2196.77781	0.009%
Fresno	2020	UBUS	GAS	20	1350.100402	1006.0686	905.461701	0.005%
Fresno	2020	UBUS	DSL	20	3328.12413	2440.8647	2196.77822	0.012%
Fresno	2020	UBUS	GAS	25	2033.347957	768.01208	691.210868	0.007%
Fresno	2020	UBUS	DSL	25	5012.394	2440.8646	2196.77812	0.018%
Fresno	2020	UBUS	GAS	30	2544.884591	619.43361	557.490252	0.009%
Fresno	2020	UBUS	DSL	30	6273.37969	2440.8644	2196.77797	0.022%
Fresno	2020	UBUS	GAS	35	2493.975603	527.84654	475.061885	0.009%
Fresno	2020	UBUS	DSL	35	6147.88385	2440.8645	2196.77802	0.022%
Fresno	2020	UBUS	GAS	40	1797.928884	475.23316	427.709842	0.006%
Fresno	2020	UBUS	DSL	40	4432.06321	2440.8647	2196.77821	0.016%
Fresno	2020	UBUS	GAS	45	783.7715293	452.05586	406.850272	0.003%
Fresno	2020	UBUS	DSL	45	1932.070593	2440.8644	2196.77797	0.007%
Fresno	2020	UBUS	GAS	50	398.2134972	454.3218	408.889617	0.001%
Fresno	2020	UBUS	DSL	50	981.633661	2440.8646	2196.77811	0.003%
Fresno	2020	UBUS	GAS	55	493.7042317	482.41551	434.173958	0.002%
Fresno	2020	UBUS	DSL	55	1217.027328	2440.8644	2196.77795	0.004%
Fresno	2020	UBUS	GAS	60	808.0757296	541.20919	487.088268	0.003%
Fresno	2020	UBUS	DSL	60	1991.982525	2440.8644	2196.778	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide	0.445	Used 2010 emission factor projected by PG&E for BAU
Methane	0.000031	
Nitrous oxide	0.000011	

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	1,694,412,000	2,610	377007	26.3	9.3	345,142
Commercial	1,800,825,042	7,503	400684	27.9	9.9	366,817
Industrial	0		0	0.0	0.0	0
Total	**3,495,237,042**		**777,690**	**54.2**	**19.2**	**711,959**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	89,589,600	138	524,099	49.3	1.0	476,679
Commercial	96,725,642	403	565,845	53.2	1.1	514,647
Industrial	0		0	0.0	0.0	0
Total	**186,315,242**		**1,089,944**	**102.5**	**2.0**	**991,326**

Sources:

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2020

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	968	0.0663	0.0093	882
Fresno	649,200	581	0	0	529
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,082,000	1,085	0.291	0.08810	1,015
Fresno	649,200	651	0	0	609
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,138**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2020
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	Emissions (MMTCO2e)	36.11
	Population	40,643,643
	Emissions (MTCO2e per person)	0.89
Fresno		
	Population	649,200
	Emissions (MTCO2e per person)	576,784
	(estimated by using California per person emissions)	

Sources/Notes:
California Emissions from: California Air Resources Board. 2010. California GHG Emissions - Forecast (2008-2020) Website: http://www.arb.ca.gov/cc/inventory/data/tables/2020_ghg_emissions_forecast_2010-10-28.pdf
Accessed August 19, 2013.

California Population: California Department of Finance (DOF). 2013. Total Population Projections for California and Counties:July 1, 2015 to 2060 in 5-year Increments. Website: http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/Projections_Press_Release_2010-2060.pdf. Accessed August 19, 2013.

Community Greenhouse Gas Inventory

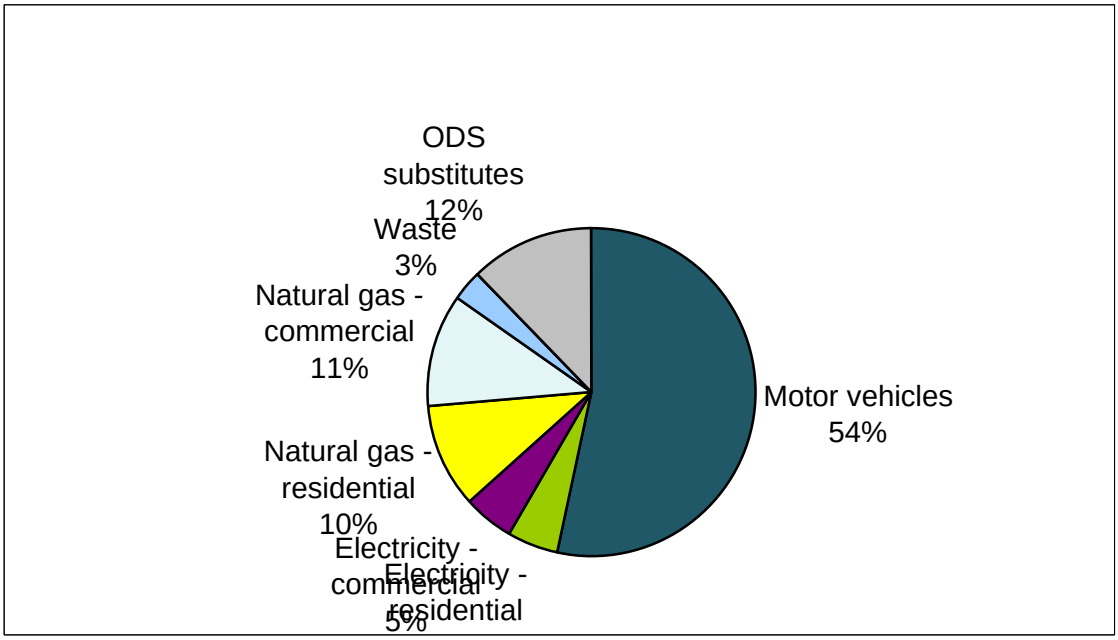
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**	**Without RPS**
Motor vehicles	3,036,848	2,205,409	3,036,848
Electricity - residential	271,756	271,756	315,237
Electricity - commercial	295,057	295,057	342,266
Natural gas - residential	573,160	519,166	519,166
Natural gas - commercial	632,169	564,560	632,169
Waste	177,508	177,508	177,508
Offroad equipment	1,314	1,314	1,314
ODS substitutes	694,734	694,734	694,734
Total	***5,682,546***	***4,729,504***	**5,719,242**



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	584	125,207	2,632	12,514	40,093	33,484	189,354	78,142	80,989	41,049	162,603	159,987	12	0	0	**926,067**
LDT1	101	21,588	454	2,157	6,911	5,772	32,644	13,473	13,964	7,077	28,034	27,583	2	0	0	**159,661**
LDT2	293	62,914	1,322	6,287	20,142	16,822	95,135	39,264	40,694	20,625	81,699	80,386	6	0	0	**465,297**
LHD1	79	18,609	345	1,490	4,378	3,430	18,531	7,452	7,627	3,888	15,765	0	0	0	0	**81,517**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	8	1,858	34	149	437	343	1,851	744	762	388	1,574	0	0	0	0	**8,141**
MCY	2	566	13	68	234	210	1,272	559	611	326	1,356	1,400	0	0	0	**6,615**
MDV	386	82,755	1,739	8,270	26,493	22,126	125,134	51,647	53,527	27,129	107,463	105,736	8	0	0	**612,028**
MH	4	1,057	20	85	249	195	1,053	423	433	221	896	919	0	0	0	**5,550**
OBUS	3	640	12	51	150	118	637	256	262	134	542	556	0	0	0	**3,358**
SBUS	1	145	3	12	34	27	144	58	59	30	122	126	0	0	0	**759**
T6	9	2,069	38	166	487	381	2,061	829	848	432	1,753	1,799	0	0	0	**10,864**
T7	1	238	4	19	56	44	237	95	97	50	201	207	0	0	0	**1,248**
UBUS	2	355	7	28	83	65	353	142	145	74	300	308	0	0	0	**1,862**
Total	**1,471**	**318,002**	**6,622**	**31,296**	**99,748**	**83,017**	**468,405**	**193,086**	**200,021**	**101,423**	**402,309**	**379,007**	**29**	**0**	**0**	**2,284,436**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	182	4	22	75	68	421	190	214	118	507	543	0	0	0	**2,344**
LDT1	0	13	0	2	6	5	31	14	16	9	37	40	0	0	0	**173**
LDT2	0	11	0	1	5	4	26	12	13	7	32	34	0	0	0	**146**
LHD1	10	2,899	79	470	1,808	1,757	11,136	4,974	5,352	2,714	10,366	0	0	0	0	**41,555**
LHD2	3	764	21	124	477	463	2,936	1,311	1,411	716	2,733	0	0	0	0	**10,956**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	20	0	2	8	8	47	21	24	13	56	60	0	0	0	**260**
MH	1	246	5	27	93	84	506	216	224	111	419	384	0	0	0	**2,314**
OBUS	4	923	20	103	370	350	2,196	910	996	490	1,816	1,443	0	0	0	**9,618**
SBUS	1	302	7	32	114	104	623	265	275	136	515	472	0	0	0	**2,845**
T6	51	12,194	272	1,280	4,597	4,192	25,132	10,714	11,119	5,504	20,778	19,039	1	0	0	**114,823**
T7	380	91,355	2,035	9,592	34,437	31,403	188,276	80,265	83,299	41,235	155,658	142,627	10	0	0	**860,192**
UBUS	3	987	27	160	616	598	3,792	1,694	1,822	924	3,530	3,229	0	0	0	**17,380**
Total	**454**	**109,898**	**2,470**	**11,815**	**42,605**	**39,037**	**235,122**	**100,586**	**104,766**	**51,978**	**196,447**	**167,870**	**11**	**0**	**0**	**1,063,059**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,347,495	3,036,848	3,036,848

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,034	0	**1,034**	5
5 - 10 MPH	859	1,004	0	**1,863**	5
10 - 15 MPH	167,394	216,081	459,549	**843,024**	10
15 - 20 MPH	5,656	8,370	8,841	**22,866**	15
20 - 25 MPH	24,751	41,371	70,532	**136,653**	20
25 - 30 MPH	101,092	133,862	290,863	**525,817**	25
30 - 35 MPH	112,039	177,305	221,483	**510,827**	30
35 - 40 MPH	659,988	855,145	1,723,155	**3,238,288**	35
40 - 45 MPH	295,148	360,153	791,178	**1,446,479**	40
45 - 50 MPH	251,077	330,845	974,418	**1,556,341**	45
50 - 55 MPH	135,795	191,825	461,743	**789,362**	50
55 - 60 MPH	602,719	716,634	1,695,018	**3,014,370**	55
60 - 65 MPH	577,808	717,782	1,461,979	**2,757,569**	60
65 - 70 MPH	32	42	115	**190**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,934,356**	**3,751,455**	**8,158,873**	**14,844,684**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2897	843024	22866	136653	525817	510827	3238288	1446479	1556341	789362	3014370	2757569	190	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1272	370168	10040	60004	230884	224302	1421917	635142	683382	346605	1323596	1210835	83	0	0
LDT1	189	54943	1490	8906	34269	33292	211050	94272	101432	51445	196457	179720	12	0	0
LDT2	470	136907	3713	22193	85393	82958	525898	234908	252750	128192	489533	447829	31	0	0
LHD1	77	22544	611	3654	14061	13660	86596	38681	41619	21109	80608	73741	5	0	0
LHD2	8	2251	61	365	1404	1364	8648	3863	4156	2108	8050	7364	1	0	0
MCY	20	5763	156	934	3595	3492	22139	9889	10640	5397	20608	18853	1	0	0
MDV	483	140560	3813	22785	87671	85172	539929	241176	259493	131613	502595	459777	32	0	0
MH	4	1281	35	208	799	776	4920	2198	2364	1199	4580	4189	0	0	0
OBUS	3	775	21	126	483	470	2977	1330	1431	726	2771	2535	0	0	0
SBUS	1	175	5	28	109	106	672	300	323	164	626	573	0	0	0
T6	9	2507	68	406	1564	1519	9629	4301	4628	2347	8964	8200	1	0	0
T7	1	288	8	47	180	174	1106	494	532	270	1029	942	0	0	0
UBUS	1	430	12	70	268	260	1650	737	793	402	1536	1405	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	988	27	160	616	599	3794	1695	1824	925	3532	3231	0	0	0
LDT1	0	73	2	12	45	44	280	125	135	68	261	238	0	0	0
LDT2	0	62	2	10	38	37	237	106	114	58	221	202	0	0	0
LHD1	47	13777	374	2233	8593	8348	52921	23639	25434	12900	49262	45065	3	0	0
LHD2	12	3632	99	589	2265	2201	13951	6232	6705	3401	12987	11880	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	110	3	18	68	66	421	188	202	103	392	358	0	0	0
MH	1	277	8	45	173	168	1064	475	511	259	991	906	0	0	0
OBUS	3	942	26	153	588	571	3619	1617	1740	882	3369	3082	0	0	0
SBUS	1	345	9	56	215	209	1324	591	636	323	1232	1127	0	0	0
T6	49	14224	386	2306	8872	8619	54638	24406	26259	13319	50860	46527	3	0	0
T7	237	68946	1870	11176	43003	41777	264839	118298	127283	64557	246526	225524	16	0	0
UBUS	4	1059	29	172	660	642	4067	1817	1955	991	3786	3464	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	344	73,750	1,550	7,371	23,616	19,722	111,533	46,027	47,704	24,178	95,776	94,236	7	0	0	**545,471**
LDT1	61	13,019	274	1,301	4,168	3,481	19,686	8,125	8,421	4,268	16,906	16,634	1	0	0	**96,282**
LDT2	197	42,332	890	4,231	13,553	11,319	64,012	26,419	27,381	13,878	54,972	54,088	4	0	0	**313,078**
LHD1	70	16,587	308	1,328	3,902	3,058	16,517	6,642	6,798	3,465	14,052	0	0	0	0	**72,658**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,656	31	133	390	305	1,649	663	679	346	1,403	0	0	0	0	**7,256**
MCY	2	505	12	60	209	187	1,133	498	545	291	1,208	1,248	0	0	0	**5,896**
MDV	266	57,011	1,198	5,697	18,251	15,243	86,205	35,580	36,875	18,689	74,031	72,842	6	0	0	**421,628**
MH	4	942	17	75	222	174	938	377	386	197	798	819	0	0	0	**4,947**
OBUS	2	570	11	46	134	105	568	228	234	119	483	496	0	0	0	**2,993**
SBUS	1	129	2	10	30	24	128	52	53	27	109	112	0	0	0	**676**
T6	8	1,844	34	148	434	340	1,837	739	756	385	1,563	1,604	0	0	0	**9,683**
T7	1	212	4	17	50	39	211	85	87	44	179	184	0	0	0	**1,112**
UBUS	1	316	6	25	74	58	315	127	130	66	268	275	0	0	0	**1,659**
Total	**964**	**208,872**	**4,336**	**20,443**	**65,031**	**54,055**	**304,733**	**125,563**	**130,049**	**65,954**	**261,749**	**242,537**	**19**	**0**	**0**	**1,484,303**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	109	2	13	45	41	252	113	128	70	303	324	0	0	0	**1,401**
LDT1	0	8	0	1	3	3	18	8	9	5	22	24	0	0	0	**102**
LDT2	0	8	0	1	3	3	18	8	9	5	21	23	0	0	0	**99**
LHD1	9	2,584	70	419	1,612	1,566	9,926	4,434	4,770	2,419	9,239	0	0	0	0	**37,039**
LHD2	2	681	18	110	425	413	2,617	1,169	1,258	638	2,436	0	0	0	0	**9,765**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	6	5	32	14	16	9	39	41	0	0	0	**178**
MH	1	219	5	24	83	75	451	192	200	99	373	342	0	0	0	**2,063**
OBUS	4	823	18	92	330	312	1,957	811	888	437	1,619	1,286	0	0	0	**8,572**
SBUS	1	269	6	28	102	93	555	237	246	122	459	420	0	0	0	**2,536**
T6	45	10,869	242	1,141	4,097	3,736	22,401	9,550	9,911	4,906	18,520	16,970	1	0	0	**102,344**
T7	339	81,426	1,813	8,550	30,695	27,990	167,815	71,542	74,247	36,754	138,741	127,126	9	0	0	**766,708**
UBUS	3	880	24	143	549	533	3,380	1,510	1,624	824	3,146	2,878	0	0	0	**15,491**
Total	**404**	**97,890**	**2,200**	**10,524**	**37,948**	**34,770**	**209,421**	**89,588**	**93,305**	**46,288**	**174,919**	**149,435**	**10**	**0**	**0**	**946,703**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,431,006	2,205,409	2,205,409

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,037,366,000	2,610	295418	31.6	11.2	271,756
Commercial	2,212,049,466	7,503	320747	34.3	12.2	295,057
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**616,165**	**65.9**	**23.4**	**566,813**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

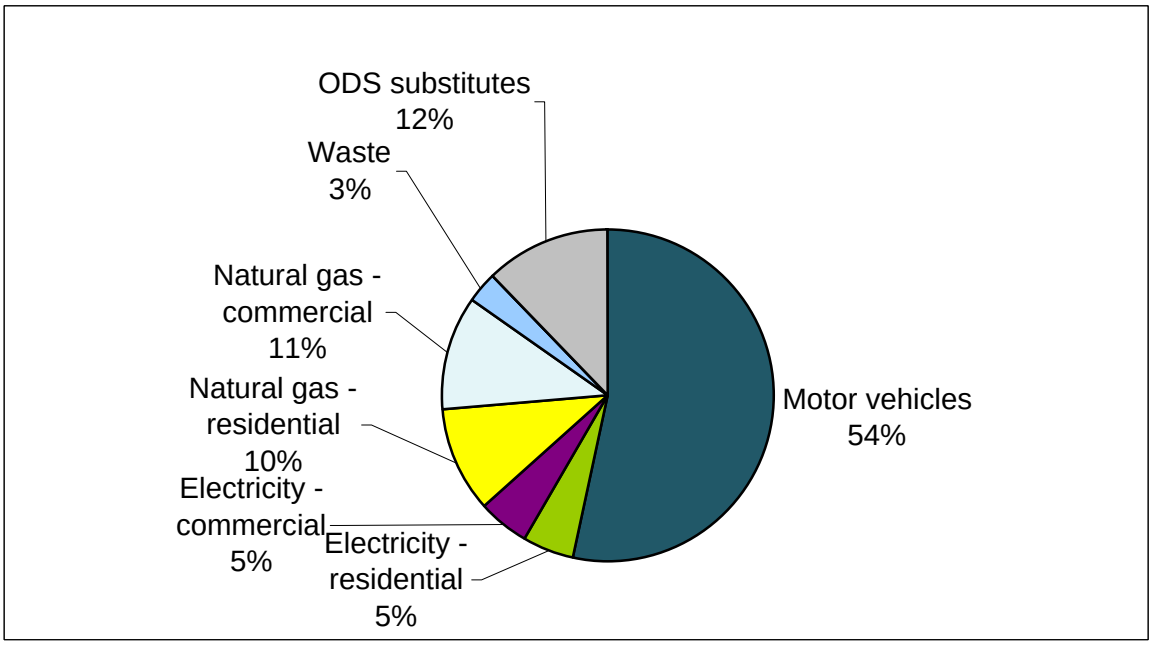
Summary
Year: 2035
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	780,600	Fresno COG
Employment	294,822	
County Information		
Population	1,301,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2035 population (780,600) and the 2035 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**	**Without RPS**	
Motor vehicles	3,036,848	2,205,409	3,036,848	
Electricity - residential	271,756	271,756	414,999	used 2010 factors
Electricity - commercial	295,057	295,057	450,581	used 2010 factors
Natural gas - residential	573,160	573,160	573,160	
Natural gas - commercial	632,169	632,169	632,169	
Waste	177,508	177,508	177,508	
Offroad equipment	1,314	1,314	1,314	
ODS substitutes	694,734	694,734	694,734	
Total	***5,682,546***	***4,851,107***	**5,981,314**	



Community Greenhouse Gas Inventory

Waste

Year: **2035**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	177,508	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,044	0	**1,044**	5
5 - 10 MPH	867	1,014	0	**1,881**	5
10 - 15 MPH	169,023	218,185	464,023	**851,231**	10
15 - 20 MPH	5,711	8,451	8,927	**23,089**	15
20 - 25 MPH	24,991	41,774	71,218	**137,984**	20
25 - 30 MPH	102,076	135,165	293,694	**530,936**	25
30 - 35 MPH	113,130	179,032	223,639	**515,800**	30
35 - 40 MPH	666,413	863,471	1,739,931	**3,269,815**	35
40 - 45 MPH	298,021	363,660	798,881	**1,460,562**	40
45 - 50 MPH	253,522	334,066	983,905	**1,571,493**	45
50 - 55 MPH	137,117	193,692	466,238	**797,047**	50
55 - 60 MPH	608,586	723,611	1,711,520	**3,043,717**	55
60 - 65 MPH	583,433	724,771	1,476,213	**2,784,416**	60
65 - 70 MPH	33	43	116	**191**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,962,924**	**3,787,978**	**8,238,306**	**14,989,208**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2925	851231	23089	137984	530936	515800	3269815	1460562	1571493	797047	3043717	2784416	191	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1284	373772	10138	60588	233131	226486	1435760	641326	690035	349980	1336482	1222624	84	0	0
LDT1	191	55478	1505	8993	34603	33617	213105	95190	102420	51946	198370	181470	12	0	0
LDT2	475	138240	3750	22409	86224	83766	531018	237195	255210	129440	494299	452189	31	0	0
LHD1	78	22763	617	3690	14198	13793	87439	39057	42024	21314	81393	74459	5	0	0
LHD2	8	2273	62	368	1418	1377	8732	3900	4197	2129	8128	7436	1	0	0
MCY	20	5820	158	943	3630	3526	22355	9985	10744	5449	20809	19036	1	0	0
MDV	488	141928	3850	23006	88524	86001	545186	243524	262020	132894	507488	464254	32	0	0
MH	4	1293	35	210	807	784	4968	2219	2387	1211	4624	4230	0	0	0
OBUS	3	782	21	127	488	474	3006	1343	1445	733	2798	2560	0	0	0
SBUS	1	177	5	29	110	107	679	303	326	166	632	578	0	0	0
T6	9	2531	69	410	1579	1534	9723	4343	4673	2370	9051	8280	1	0	0
T7	1	291	8	47	181	176	1117	499	537	272	1040	951	0	0	0
UBUS	1	434	12	70	271	263	1666	744	801	406	1551	1419	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	997	27	162	622	604	3831	1711	1841	934	3566	3263	0	0	0
LDT1	0	74	2	12	46	45	283	126	136	69	263	241	0	0	0
LDT2	0	62	2	10	39	38	239	107	115	58	223	204	0	0	0
LHD1	48	13911	377	2255	8677	8429	53436	23869	25682	13026	49741	45504	3	0	0
LHD2	13	3667	99	594	2287	2222	14087	6292	6770	3434	13113	11996	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	111	3	18	69	67	425	190	204	104	396	362	0	0	0
MH	1	280	8	45	174	169	1074	480	516	262	1000	915	0	0	0
OBUS	3	951	26	154	593	577	3655	1632	1756	891	3402	3112	0	0	0
SBUS	1	348	9	56	217	211	1337	597	642	326	1244	1138	0	0	0
T6	49	14362	390	2328	8958	8703	55170	24643	26515	13448	51355	46980	3	0	0
T7	239	69617	1888	11285	43422	42184	267417	119450	128522	65185	248926	227720	16	0	0
UBUS	4	1069	29	173	667	648	4107	1835	1974	1001	3823	3497	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	584	125,207	2,632	12,514	40,093	33,484	189,354	78,142	80,989	41,049	162,603	159,987	12	0	0	**926,067**
LDT1	101	21,588	454	2,157	6,911	5,772	32,644	13,473	13,964	7,077	28,034	27,583	2	0	0	**159,661**
LDT2	293	62,914	1,322	6,287	20,142	16,822	95,135	39,264	40,694	20,625	81,699	80,386	6	0	0	**465,297**
LHD1	79	18,609	345	1,490	4,378	3,430	18,531	7,452	7,627	3,888	15,765	0	0	0	0	**81,517**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	8	1,858	34	149	437	343	1,851	744	762	388	1,574	0	0	0	0	**8,141**
MCY	2	566	13	68	234	210	1,272	559	611	326	1,356	1,400	0	0	0	**6,615**
MDV	386	82,755	1,739	8,270	26,493	22,126	125,134	51,647	53,527	27,129	107,463	105,736	8	0	0	**612,028**
MH	4	1,057	20	85	249	195	1,053	423	433	221	896	919	0	0	0	**5,550**
OBUS	3	640	12	51	150	118	637	256	262	134	542	556	0	0	0	**3,358**
SBUS	1	145	3	12	34	27	144	58	59	30	122	126	0	0	0	**759**
T6	9	2,069	38	166	487	381	2,061	829	848	432	1,753	1,799	0	0	0	**10,864**
T7	1	238	4	19	56	44	237	95	97	50	201	207	0	0	0	**1,248**
UBUS	2	355	7	28	83	65	353	142	145	74	300	308	0	0	0	**1,862**
Total	**1,471**	**318,002**	**6,622**	**31,296**	**99,748**	**83,017**	**468,405**	**193,086**	**200,021**	**101,423**	**402,309**	**379,007**	**29**	**0**	**0**	**2,284,436**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	182	4	22	75	68	421	190	214	118	507	543	0	0	0	**2,344**
LDT1	0	13	0	2	6	5	31	14	16	9	37	40	0	0	0	**173**
LDT2	0	11	0	1	5	4	26	12	13	7	32	34	0	0	0	**146**
LHD1	10	2,899	79	470	1,808	1,757	11,136	4,974	5,352	2,714	10,366	0	0	0	0	**41,555**
LHD2	3	764	21	124	477	463	2,936	1,311	1,411	716	2,733	0	0	0	0	**10,956**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	20	0	2	8	8	47	21	24	13	56	60	0	0	0	**260**
MH	1	246	5	27	93	84	506	216	224	111	419	384	0	0	0	**2,314**
OBUS	4	923	20	103	370	350	2,196	910	996	490	1,816	1,443	0	0	0	**9,618**
SBUS	1	302	7	32	114	104	623	265	275	136	515	472	0	0	0	**2,845**
T6	51	12,194	272	1,280	4,597	4,192	25,132	10,714	11,119	5,504	20,778	19,039	1	0	0	**114,823**
T7	380	91,355	2,035	9,592	34,437	31,403	188,276	80,265	83,299	41,235	155,658	142,627	10	0	0	**860,192**
UBUS	3	987	27	160	616	598	3,792	1,694	1,822	924	3,530	3,229	0	0	0	**17,380**
Total	**454**	**109,898**	**2,470**	**11,815**	**42,605**	**39,037**	**235,122**	**100,586**	**104,766**	**51,978**	**196,447**	**167,870**	**11**	**0**	**0**	**1,063,059**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,347,495	3,036,848	3,036,848

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 14,989,208 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 5,471,060,920 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,034	0	**1,034**	5
5 - 10 MPH	859	1,004	0	**1,863**	5
10 - 15 MPH	167,394	216,081	459,549	**843,024**	10
15 - 20 MPH	5,656	8,370	8,841	**22,866**	15
20 - 25 MPH	24,751	41,371	70,532	**136,653**	20
25 - 30 MPH	101,092	133,862	290,863	**525,817**	25
30 - 35 MPH	112,039	177,305	221,483	**510,827**	30
35 - 40 MPH	659,988	855,145	1,723,155	**3,238,288**	35
40 - 45 MPH	295,148	360,153	791,178	**1,446,479**	40
45 - 50 MPH	251,077	330,845	974,418	**1,556,341**	45
50 - 55 MPH	135,795	191,825	461,743	**789,362**	50
55 - 60 MPH	602,719	716,634	1,695,018	**3,014,370**	55
60 - 65 MPH	577,808	717,782	1,461,979	**2,757,569**	60
65 - 70 MPH	32	42	115	**190**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**2,934,356**	**3,751,455**	**8,158,873**	**14,844,684**	

Source:
Fehr and Peers. 2013. 2035 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 25 years of VMT growth between 2010 and 2035 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	2897	843024	22866	136653	525817	510827	3238288	1446479	1556341	789362	3014370	2757569	190	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1272	370168	10040	60004	230884	224302	1421917	635142	683382	346605	1323596	1210835	83	0	0
LDT1	189	54943	1490	8906	34269	33292	211050	94272	101432	51445	196457	179720	12	0	0
LDT2	470	136907	3713	22193	85393	82958	525898	234908	252750	128192	489533	447829	31	0	0
LHD1	77	22544	611	3654	14061	13660	86596	38681	41619	21109	80608	73741	5	0	0
LHD2	8	2251	61	365	1404	1364	8648	3863	4156	2108	8050	7364	1	0	0
MCY	20	5763	156	934	3595	3492	22139	9889	10640	5397	20608	18853	1	0	0
MDV	483	140560	3813	22785	87671	85172	539929	241176	259493	131613	502595	459777	32	0	0
MH	4	1281	35	208	799	776	4920	2198	2364	1199	4580	4189	0	0	0
OBUS	3	775	21	126	483	470	2977	1330	1431	726	2771	2535	0	0	0
SBUS	1	175	5	28	109	106	672	300	323	164	626	573	0	0	0
T6	9	2507	68	406	1564	1519	9629	4301	4628	2347	8964	8200	1	0	0
T7	1	288	8	47	180	174	1106	494	532	270	1029	942	0	0	0
UBUS	1	430	12	70	268	260	1650	737	793	402	1536	1405	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	3	988	27	160	616	599	3794	1695	1824	925	3532	3231	0	0	0
LDT1	0	73	2	12	45	44	280	125	135	68	261	238	0	0	0
LDT2	0	62	2	10	38	37	237	106	114	58	221	202	0	0	0
LHD1	47	13777	374	2233	8593	8348	52921	23639	25434	12900	49262	45065	3	0	0
LHD2	12	3632	99	589	2265	2201	13951	6232	6705	3401	12987	11880	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	110	3	18	68	66	421	188	202	103	392	358	0	0	0
MH	1	277	8	45	173	168	1064	475	511	259	991	906	0	0	0
OBUS	3	942	26	153	588	571	3619	1617	1740	882	3369	3082	0	0	0
SBUS	1	345	9	56	215	209	1324	591	636	323	1232	1127	0	0	0
T6	49	14224	386	2306	8872	8619	54638	24406	26259	13319	50860	46527	3	0	0
T7	237	68946	1870	11176	43003	41777	264839	118298	127283	64557	246526	225524	16	0	0
UBUS	4	1059	29	172	660	642	4067	1817	1955	991	3786	3464	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	344	73,750	1,550	7,371	23,616	19,722	111,533	46,027	47,704	24,178	95,776	94,236	7	0	0	**545,471**
LDT1	61	13,019	274	1,301	4,168	3,481	19,686	8,125	8,421	4,268	16,906	16,634	1	0	0	**96,282**
LDT2	197	42,332	890	4,231	13,553	11,319	64,012	26,419	27,381	13,878	54,972	54,088	4	0	0	**313,078**
LHD1	70	16,587	308	1,328	3,902	3,058	16,517	6,642	6,798	3,465	14,052	0	0	0	0	**72,658**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions
Year: 2035
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	7	1,656	31	133	390	305	1,649	663	679	346	1,403	0	0	0	0	**7,256**
MCY	2	505	12	60	209	187	1,133	498	545	291	1,208	1,248	0	0	0	**5,896**
MDV	266	57,011	1,198	5,697	18,251	15,243	86,205	35,580	36,875	18,689	74,031	72,842	6	0	0	**421,628**
MH	4	942	17	75	222	174	938	377	386	197	798	819	0	0	0	**4,947**
OBUS	2	570	11	46	134	105	568	228	234	119	483	496	0	0	0	**2,993**
SBUS	1	129	2	10	30	24	128	52	53	27	109	112	0	0	0	**676**
T6	8	1,844	34	148	434	340	1,837	739	756	385	1,563	1,604	0	0	0	**9,683**
T7	1	212	4	17	50	39	211	85	87	44	179	184	0	0	0	**1,112**
UBUS	1	316	6	25	74	58	315	127	130	66	268	275	0	0	0	**1,659**
Total	**964**	**208,872**	**4,336**	**20,443**	**65,031**	**54,055**	**304,733**	**125,563**	**130,049**	**65,954**	**261,749**	**242,537**	**19**	**0**	**0**	**1,484,303**

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	0	109	2	13	45	41	252	113	128	70	303	324	0	0	0	**1,401**
LDT1	0	8	0	1	3	3	18	8	9	5	22	24	0	0	0	**102**
LDT2	0	8	0	1	3	3	18	8	9	5	21	23	0	0	0	**99**
LHD1	9	2,584	70	419	1,612	1,566	9,926	4,434	4,770	2,419	9,239	0	0	0	0	**37,039**
LHD2	2	681	18	110	425	413	2,617	1,169	1,258	638	2,436	0	0	0	0	**9,765**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	14	0	2	6	5	32	14	16	9	39	41	0	0	0	**178**
MH	1	219	5	24	83	75	451	192	200	99	373	342	0	0	0	**2,063**
OBUS	4	823	18	92	330	312	1,957	811	888	437	1,619	1,286	0	0	0	**8,572**
SBUS	1	269	6	28	102	93	555	237	246	122	459	420	0	0	0	**2,536**
T6	45	10,869	242	1,141	4,097	3,736	22,401	9,550	9,911	4,906	18,520	16,970	1	0	0	**102,344**
T7	339	81,426	1,813	8,550	30,695	27,990	167,815	71,542	74,247	36,754	138,741	127,126	9	0	0	**766,708**
UBUS	3	880	24	143	549	533	3,380	1,510	1,624	824	3,146	2,878	0	0	0	**15,491**
Total	**404**	**97,890**	**2,200**	**10,524**	**37,948**	**34,770**	**209,421**	**89,588**	**93,305**	**46,288**	**174,919**	**149,435**	**10**	**0**	**0**	**946,703**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,431,006	2,205,409	2,205,409

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,037,366,000	2,610	295418	31.6	11.2	271,756
Commercial	2,212,049,466	7,503	320747	34.3	12.2	295,057
Industrial	0		0	0.0	0.0	0
Total	**4,249,415,466**		**616,165**	**65.9**	**23.4**	**566,813**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	107,722,800	138	630,178	59.2	1.2	573,160
Commercial	118,813,266	403	695,058	65.3	1.3	632,169
Industrial	0		0	0.0	0.0	0
Total	**226,536,066**		**1,325,236**	**124.6**	**2.5**	**1,205,329**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment

Year: 2035

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

		Emissions (tons/year)			Emissions
Location	**Population**	**CO2**	**CH4**	**N2O**	**MTCO2e**
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year assessed; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2035
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	780,600
	Emissions (MTCO2e per person)	694,734
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

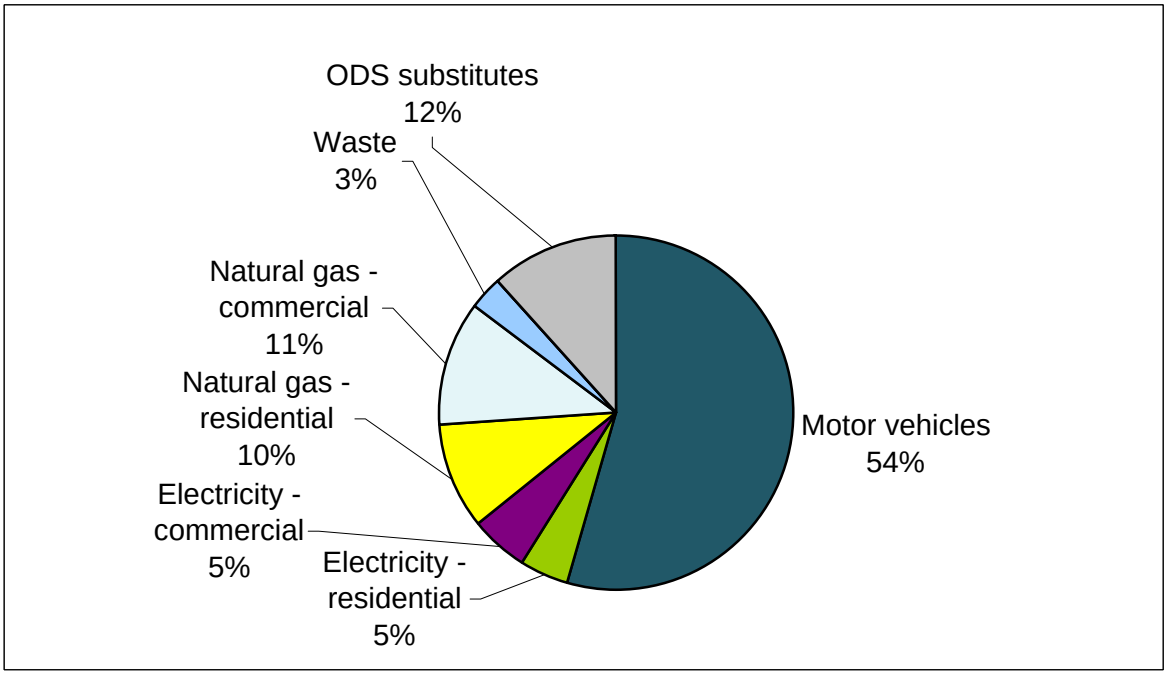
Summary
Year: 2050
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	912,600	Fresno COG
Employment	362,145	
County Information		
Population	1,521,000	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2050 population (912,600) and the 2050 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	3,745,122	2,711,894
Electricity - residential	317,710	317,710
Electricity - commercial	362,433	362,433
Natural gas - residential	670,082	670,082
Natural gas - commercial	776,525	776,525
Waste	207,525	207,525
Offroad equipment	1,314	1,314
ODS substitutes	812,214	812,214
Total	***6,892,926***	5,859,698



3%

Community Greenhouse Gas Inventory

Waste

Year: **2050**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	207,525	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,485,093 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,747,058,945 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,287	0	**1,287**	5
5 - 10 MPH	1,069	1,251	0	**2,320**	5
10 - 15 MPH	208,444	269,072	572,246	**1,049,761**	10
15 - 20 MPH	7,043	10,422	11,009	**28,474**	15
20 - 25 MPH	30,820	51,517	87,828	**170,165**	20
25 - 30 MPH	125,883	166,689	362,192	**654,764**	25
30 - 35 MPH	139,515	220,787	275,798	**636,099**	30
35 - 40 MPH	821,839	1,064,855	2,145,729	**4,032,424**	35
40 - 45 MPH	367,528	448,475	985,202	**1,801,204**	40
45 - 50 MPH	312,650	411,980	1,213,378	**1,938,008**	45
50 - 55 MPH	169,096	238,867	574,977	**982,940**	50
55 - 60 MPH	750,525	892,376	2,110,693	**3,753,594**	55
60 - 65 MPH	719,505	893,806	1,820,505	**3,433,817**	60
65 - 70 MPH	40	52	143	**236**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,653,958**	**4,671,436**	**10,159,699**	**18,485,093**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3607	1049761	28474	170165	654764	636099	4032424	1801204	1938008	982940	3753594	3433817	236	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1584	460945	12503	74719	287504	279308	1770618	790900	850970	431604	1648185	1507772	104	0	0
LDT1	235	68417	1856	11090	42673	41457	262807	117391	126307	64062	244635	223794	15	0	0
LDT2	586	170481	4624	27635	106334	103302	654865	292515	314732	159629	609583	557651	38	0	0
LHD1	96	28072	761	4550	17509	17010	107832	48167	51825	26285	100376	91825	6	0	0
LHD2	10	2803	76	454	1749	1699	10769	4810	5176	2625	10024	9170	1	0	0
MCY	25	7177	195	1163	4476	4349	27568	12314	13250	6720	25662	23476	2	0	0
MDV	601	175030	4748	28372	109171	106059	672338	300320	323130	163888	625847	572530	39	0	0
MH	5	1595	43	259	995	966	6126	2736	2944	1493	5703	5217	0	0	0
OBUS	3	965	26	156	602	585	3707	1656	1781	904	3450	3156	0	0	0
SBUS	1	218	6	35	136	132	837	374	402	204	779	713	0	0	0
T6	11	3122	85	506	1947	1892	11991	5356	5763	2923	11162	10211	1	0	0
T7	1	359	10	58	224	217	1377	615	662	336	1282	1173	0	0	0
UBUS	2	535	15	87	334	324	2055	918	987	501	1913	1750	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1230	33	199	767	745	4725	2111	2271	1152	4398	4023	0	0	0
LDT1	0	91	2	15	57	55	349	156	168	85	325	297	0	0	0
LDT2	0	77	2	12	48	47	295	132	142	72	275	251	0	0	0
LHD1	59	17156	465	2781	10700	10395	65899	29436	31671	16063	61342	56116	4	0	0
LHD2	16	4523	123	733	2821	2740	17373	7760	8349	4235	16171	14794	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	136	4	22	85	83	524	234	252	128	488	446	0	0	0
MH	1	345	9	56	215	209	1325	592	637	323	1233	1128	0	0	0
OBUS	4	1173	32	190	732	711	4507	2013	2166	1099	4195	3838	0	0	0
SBUS	1	429	12	70	268	260	1649	736	792	402	1535	1404	0	0	0
T6	61	17712	480	2871	11048	10733	68037	30391	32699	16585	63333	57937	4	0	0
T7	295	85853	2329	13917	53549	52022	329786	147309	158497	80388	306983	280830	19	0	0
UBUS	5	1319	36	214	822	799	5065	2262	2434	1235	4715	4313	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	720	154,409	3,245	15,432	49,444	41,293	233,517	96,366	99,878	50,622	200,527	197,301	15	0	0	**1,142,050**
LDT1	124	26,623	559	2,661	8,523	7,118	40,258	16,616	17,220	8,728	34,572	34,017	3	0	0	**196,898**
LDT2	362	77,587	1,630	7,754	24,839	20,745	117,323	48,422	50,185	25,435	100,753	99,134	8	0	0	**573,816**
LHD1	97	22,949	426	1,838	5,399	4,230	22,853	9,190	9,406	4,795	19,442	0	0	0	0	**100,529**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Regulation)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	10	2,292	43	184	539	422	2,282	918	939	479	1,942	0	0	0	0	**10,039**
MCY	3	698	16	83	288	259	1,568	689	754	402	1,672	1,727	0	0	0	**8,158**
MDV	476	102,056	2,144	10,199	32,671	27,287	154,319	63,693	66,011	33,457	132,526	130,396	10	0	0	**754,769**
MH	6	1,304	24	104	307	240	1,298	522	534	272	1,105	1,134	0	0	0	**6,845**
OBUS	3	789	15	63	186	145	786	316	323	165	668	686	0	0	0	**4,142**
SBUS	1	178	3	14	42	33	177	71	73	37	151	155	0	0	0	**936**
T6	11	2,552	47	204	600	470	2,541	1,022	1,046	533	2,162	2,219	0	0	0	**13,398**
T7	1	293	5	23	69	54	292	117	120	61	248	255	0	0	0	**1,539**
UBUS	2	437	8	35	103	81	435	175	179	91	370	380	0	0	0	**2,296**
Total	**1,815**	**392,168**	**8,167**	**38,596**	**123,012**	**102,379**	**577,649**	**238,118**	**246,671**	**125,078**	**496,138**	**467,402**	**36**	**0**	**0**	**2,817,228**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	225	5	27	92	84	519	234	264	145	626	670	0	0	0	**2,890**
LDT1	0	17	0	2	7	6	38	17	19	11	46	49	0	0	0	**213**
LDT2	0	14	0	2	6	5	32	15	16	9	39	42	0	0	0	**181**
LHD1	12	3,575	97	580	2,230	2,166	13,733	6,134	6,600	3,348	12,784	0	0	0	0	**51,247**
LHD2	3	943	26	153	588	571	3,621	1,617	1,740	883	3,370	0	0	0	0	**13,511**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	25	1	3	10	9	58	26	29	16	69	74	0	0	0	**321**
MH	1	303	7	33	114	104	624	266	276	137	516	473	0	0	0	**2,854**
OBUS	5	1,138	25	127	457	432	2,708	1,122	1,229	604	2,240	1,779	0	0	0	**11,861**
SBUS	2	373	8	39	140	128	768	327	340	168	635	582	0	0	0	**3,508**
T6	63	15,039	335	1,579	5,669	5,170	30,994	13,213	13,713	6,788	25,624	23,479	2	0	0	**141,603**
T7	469	112,661	2,509	11,829	42,469	38,727	232,187	98,985	102,727	50,852	191,961	175,891	12	0	0	**1,060,812**
UBUS	4	1,217	33	197	759	738	4,676	2,089	2,248	1,140	4,353	3,982	0	0	0	**21,433**
Total	**560**	**135,529**	**3,046**	**14,571**	**52,542**	**48,141**	**289,958**	**124,046**	**129,201**	**64,101**	**242,263**	**207,022**	**14**	**0**	**0**	**1,310,993**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,128,221	3,745,122	3,745,122

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 18,253,855 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 6,662,657,075 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,271	0	**1,271**	5
5 - 10 MPH	1,056	1,235	0	**2,291**	5
10 - 15 MPH	205,836	265,706	565,087	**1,036,629**	10
15 - 20 MPH	6,955	10,292	10,871	**28,118**	15
20 - 25 MPH	30,435	50,872	86,730	**168,037**	20
25 - 30 MPH	124,308	164,604	357,661	**646,573**	25
30 - 35 MPH	137,770	218,025	272,348	**628,142**	30
35 - 40 MPH	811,558	1,051,535	2,118,888	**3,981,981**	35
40 - 45 MPH	362,930	442,865	972,877	**1,778,672**	40
45 - 50 MPH	308,739	406,826	1,198,199	**1,913,764**	45
50 - 55 MPH	166,981	235,879	567,785	**970,644**	50
55 - 60 MPH	741,136	881,213	2,084,289	**3,706,639**	55
60 - 65 MPH	710,505	882,625	1,797,731	**3,390,862**	60
65 - 70 MPH	40	52	141	**233**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,608,249**	**4,612,999**	**10,032,608**	**18,253,855**	

Source:
Fehr and Peers. 2013. 2050 VMT was found by using multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 40 years of VMT growth between 2010 and 2050 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3562	1036629	28118	168037	646573	628142	3981981	1778672	1913764	970644	3706639	3390862	233	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1564	455179	12346	73784	283907	275814	1748469	781006	840325	426205	1627567	1488911	102	0	0
LDT1	232	67561	1833	10952	42139	40938	259519	115922	124727	63260	241574	220994	15	0	0
LDT2	578	168348	4566	27289	105003	102010	646673	288856	310795	157632	601958	550675	38	0	0
LHD1	95	27721	752	4494	17290	16797	106484	47564	51177	25956	99121	90676	6	0	0
LHD2	10	2768	75	449	1727	1677	10634	4750	5111	2592	9899	9055	1	0	0
MCY	24	7087	192	1149	4420	4294	27224	12160	13084	6636	25341	23182	2	0	0
MDV	594	172840	4688	28017	107805	104732	663927	296563	319087	161838	618018	565368	39	0	0
MH	5	1575	43	255	982	954	6050	2702	2907	1475	5631	5151	0	0	0
OBUS	3	953	26	154	594	577	3660	1635	1759	892	3407	3117	0	0	0
SBUS	1	215	6	35	134	130	827	369	397	202	770	704	0	0	0
T6	11	3083	84	500	1923	1868	11841	5289	5691	2886	11022	10083	1	0	0
T7	1	354	10	57	221	215	1360	607	654	331	1266	1158	0	0	0
UBUS	2	528	14	86	329	320	2029	906	975	495	1889	1728	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1215	33	197	758	736	4666	2084	2242	1137	4343	3973	0	0	0
LDT1	0	90	2	15	56	54	344	154	165	84	321	293	0	0	0
LDT2	0	76	2	12	47	46	291	130	140	71	271	248	0	0	0
LHD1	58	16941	460	2746	10566	10265	65075	29068	31275	15863	60575	55414	4	0	0
LHD2	15	4466	121	724	2786	2706	17155	7663	8245	4182	15969	14609	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	135	4	22	84	82	518	231	249	126	482	441	0	0	0
MH	1	341	9	55	212	206	1308	584	629	319	1218	1114	0	0	0
OBUS	4	1159	31	188	723	702	4451	1988	2139	1085	4143	3790	0	0	0
SBUS	1	424	11	69	264	257	1628	727	782	397	1515	1386	0	0	0
T6	60	17491	474	2835	10909	10598	67186	30011	32290	16377	62540	57213	4	0	0
T7	291	84779	2300	13743	52879	51372	325661	145466	156515	79383	303142	277317	19	0	0
UBUS	4	1302	35	211	812	789	5002	2234	2404	1219	4656	4259	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	423	90,687	1,906	9,064	29,039	24,252	137,147	56,597	58,660	29,731	117,772	115,877	9	0	0	**670,742**
LDT1	75	16,008	336	1,600	5,125	4,280	24,207	9,991	10,355	5,248	20,788	20,454	2	0	0	**118,393**
LDT2	243	52,054	1,094	5,202	16,665	13,918	78,713	32,487	33,670	17,065	67,596	66,510	5	0	0	**384,978**
LHD1	87	20,396	378	1,634	4,798	3,760	20,310	8,168	8,360	4,261	17,279	0	0	0	0	**89,344**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2050
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,037	38	163	479	375	2,028	816	835	426	1,726	0	0	0	0	**8,922**
MCY	2	621	14	74	256	230	1,394	613	670	357	1,486	1,535	0	0	0	**7,250**
MDV	327	70,103	1,473	7,006	22,442	18,743	106,003	43,751	45,344	22,982	91,033	89,570	7	0	0	**518,457**
MH	5	1,159	21	93	273	214	1,154	464	475	242	982	1,007	0	0	0	**6,083**
OBUS	3	701	13	56	165	129	698	281	287	146	594	610	0	0	0	**3,681**
SBUS	1	158	3	13	37	29	158	63	65	33	134	138	0	0	0	**832**
T6	10	2,268	42	182	534	418	2,259	908	930	474	1,921	1,972	0	0	0	**11,907**
T7	1	260	5	21	61	48	259	104	107	54	221	226	0	0	0	**1,368**
UBUS	2	389	7	31	91	72	387	156	159	81	329	338	0	0	0	**2,040**
Total	**1,185**	**256,841**	**5,331**	**25,137**	**79,966**	**66,469**	**374,716**	**154,399**	**159,916**	**81,101**	**321,861**	**298,237**	**23**	**0**	**0**	**1,825,183**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	134	3	16	55	50	309	139	157	87	373	399	0	0	0	**1,722**
LDT1	0	10	0	1	4	4	23	10	11	6	27	29	0	0	0	**126**
LDT2	0	9	0	1	4	4	22	10	11	6	26	28	0	0	0	**122**
LHD1	11	3,177	86	515	1,982	1,925	12,205	5,452	5,866	2,975	11,361	0	0	0	0	**45,545**
LHD2	3	838	23	136	523	508	3,218	1,437	1,547	784	2,995	0	0	0	0	**12,008**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	17	0	2	7	6	39	18	20	11	47	51	0	0	0	**219**
MH	1	269	6	29	102	93	555	237	246	122	459	420	0	0	0	**2,537**
OBUS	4	1,012	22	113	406	384	2,406	997	1,092	537	1,990	1,581	0	0	0	**10,541**
SBUS	1	331	7	35	125	114	682	291	302	149	564	517	0	0	0	**3,118**
T6	56	13,365	298	1,403	5,038	4,594	27,545	11,743	12,187	6,033	22,773	20,867	1	0	0	**125,848**
T7	416	100,127	2,230	10,513	37,744	34,418	206,354	87,972	91,298	45,195	170,604	156,322	11	0	0	**942,787**
UBUS	4	1,082	29	175	675	656	4,156	1,856	1,997	1,013	3,869	3,539	0	0	0	**19,048**
Total	**497**	**120,371**	**2,705**	**12,940**	**46,664**	**42,755**	**257,516**	**110,162**	**114,734**	**56,918**	**215,090**	**183,753**	**13**	**0**	**0**	**1,164,119**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	2,989,301	2,711,894	2,711,894

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
*EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	690.6105816	1132.0738	673.304157	0.002%
Fresno	2035	LDA	DSL	5	1.8428816	503.98095	303.820128	0.000%
Fresno	2035	LDA	GAS	10	35638.70556	834.33041	496.221479	0.094%
Fresno	2035	LDA	DSL	10	95.10122957	455.13953	274.429687	0.000%
Fresno	2035	LDA	GAS	15	21241.01664	646.51746	384.518119	0.056%
Fresno	2035	LDA	DSL	15	56.68125803	381.69808	230.236122	0.000%
Fresno	2035	LDA	GAS	20	808500.6477	514.41562	305.950589	2.136%
Fresno	2035	LDA	DSL	20	2157.468978	332.21956	200.462311	0.006%
Fresno	2035	LDA	GAS	25	197184.9121	428.33796	254.755245	0.521%
Fresno	2035	LDA	DSL	25	526.184285	300.07648	181.120132	0.001%
Fresno	2035	LDA	GAS	30	537842.6996	368.21896	218.999388	1.421%
Fresno	2035	LDA	DSL	30	1435.223272	281.26432	169.799873	0.004%
Fresno	2035	LDA	GAS	35	1366088.421	328.47892	195.363966	3.608%
Fresno	2035	LDA	DSL	35	3645.382029	273.56113	165.164459	0.010%
Fresno	2035	LDA	GAS	40	1943582.491	303.47195	180.491197	5.134%
Fresno	2035	LDA	DSL	40	5186.414182	276.08485	166.683111	0.014%
Fresno	2035	LDA	GAS	45	1929011.91	292.32892	173.863779	5.095%
Fresno	2035	LDA	DSL	45	5147.532356	289.12263	174.528631	0.014%
Fresno	2035	LDA	GAS	50	2232462.568	292.1258	173.742948	5.897%
Fresno	2035	LDA	DSL	50	5957.284783	314.18613	189.610649	0.016%
Fresno	2035	LDA	GAS	55	1665080.069	303.02659	180.226197	4.398%
Fresno	2035	LDA	DSL	55	4443.235664	354.30714	213.753563	0.012%
Fresno	2035	LDA	GAS	60	1897400.144	325.91705	193.840412	5.012%
Fresno	2035	LDA	DSL	60	5063.177272	414.65641	250.068876	0.013%
Fresno	2035	LDA	GAS	65	2035032.499	363.783	216.361367	5.375%
Fresno	2035	LDA	DSL	65	5430.446516	503.66351	303.629111	0.014%
Fresno	2035	LDA	GAS	70	1953744.04	390.12334	232.027326	5.161%
Fresno	2035	LDA	DSL	70	5213.529627	634.9815	382.650018	0.014%
Fresno	2035	LDT1	GAS	5	102.505054	1314.7679	800.56989	0.000%
Fresno	2035	LDT1	DSL	5	0.136006444	504.82718	301.829718	0.000%
Fresno	2035	LDT1	GAS	10	5289.735537	969.2076	590.161462	0.014%
Fresno	2035	LDT1	DSL	10	7.018562029	455.72464	272.471938	0.000%
Fresno	2035	LDT1	GAS	15	3152.734078	750.8486	457.196034	0.008%
Fresno	2035	LDT1	DSL	15	4.183131754	381.89043	228.327408	0.000%
Fresno	2035	LDT1	GAS	20	120003.0938	597.5229	363.837256	0.317%
Fresno	2035	LDT1	DSL	20	159.223291	332.14738	198.586677	0.000%
Fresno	2035	LDT1	GAS	25	29267.50821	497.46337	302.908369	0.077%
Fresno	2035	LDT1	DSL	25	38.8329089	299.83242	179.265976	0.000%
Fresno	2035	LDT1	GAS	30	79830.22013	427.66259	260.40672	0.211%
Fresno	2035	LDT1	DSL	30	105.9208623	280.91966	167.958278	0.000%
Fresno	2035	LDT1	GAS	35	202764.0257	381.5275	232.315209	0.536%
Fresno	2035	LDT1	DSL	35	269.032684	273.17532	163.328035	0.001%
Fresno	2035	LDT1	GAS	40	288479.5847	352.52979	214.659347	0.762%
Fresno	2035	LDT1	DSL	40	382.762388	275.71251	164.844988	0.001%
Fresno	2035	LDT1	GAS	45	286316.8661	339.57319	206.769651	0.756%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	379.892857	288.82002	172.681802	0.001%
Fresno	2035	LDT1	GAS	50	331357.0651	339.33117	206.622144	0.875%
Fresno	2035	LDT1	DSL	50	439.65337	314.01753	187.74707	0.001%
Fresno	2035	LDT1	GAS	55	247142.3572	351.98542	214.327262	0.653%
Fresno	2035	LDT1	DSL	55	327.915092	354.35305	211.86316	0.001%
Fresno	2035	LDT1	GAS	60	281624.8653	378.57999	230.521082	0.744%
Fresno	2035	LDT1	DSL	60	373.667387	415.02501	248.13815	0.001%
Fresno	2035	LDT1	GAS	65	302053.17	422.57263	257.308816	0.798%
Fresno	2035	LDT1	DSL	65	400.772191	504.50805	301.638916	0.001%
Fresno	2035	LDT1	GAS	70	289987.7843	453.15713	275.931745	0.766%
Fresno	2035	LDT1	DSL	70	384.763509	636.52822	380.57209	0.001%
Fresno	2035	LDT2	GAS	5	255.4230734	1537.7072	1044.72708	0.001%
Fresno	2035	LDT2	DSL	5	0.115068342	502.58125	342.876199	0.000%
Fresno	2035	LDT2	GAS	10	13181.01512	1133.5198	770.121871	0.035%
Fresno	2035	LDT2	DSL	10	5.938059729	454.17178	309.953162	0.000%
Fresno	2035	LDT2	GAS	15	7856.01344	878.16719	596.631776	0.021%
Fresno	2035	LDT2	DSL	15	3.539141521	381.37983	260.447709	0.000%
Fresno	2035	LDT2	GAS	20	299024.8642	698.82978	474.789734	0.790%
Fresno	2035	LDT2	DSL	20	134.7109823	332.33894	227.095244	0.000%
Fresno	2035	LDT2	GAS	25	72929.06082	581.81597	395.289098	0.193%
Fresno	2035	LDT2	DSL	25	32.8546126	300.48012	205.428217	0.000%
Fresno	2035	LDT2	GAS	30	198921.7045	500.17663	339.823036	0.525%
Fresno	2035	LDT2	DSL	30	89.6144222	281.83435	192.747317	0.000%
Fresno	2035	LDT2	GAS	35	505249.3773	446.2161	303.162106	1.335%
Fresno	2035	LDT2	DSL	35	227.615306	274.19932	187.554772	0.001%
Fresno	2035	LDT2	GAS	40	718836.1816	412.29527	280.11649	1.899%
Fresno	2035	LDT2	DSL	40	323.836374	276.70072	189.255964	0.001%
Fresno	2035	LDT2	GAS	45	713447.1657	397.14374	269.822318	1.885%
Fresno	2035	LDT2	DSL	45	321.408637	289.62318	198.044466	0.001%
Fresno	2035	LDT2	GAS	50	825678.7517	396.86153	269.630532	2.181%
Fresno	2035	LDT2	DSL	50	371.969048	314.46502	214.939279	0.001%
Fresno	2035	LDT2	GAS	55	615831.7597	411.66227	279.686188	1.627%
Fresno	2035	LDT2	DSL	55	277.432793	354.23118	241.984048	0.001%
Fresno	2035	LDT2	GAS	60	701755.5784	442.76497	300.817625	1.854%
Fresno	2035	LDT2	DSL	60	316.141556	414.0467	282.664287	0.001%
Fresno	2035	LDT2	GAS	65	752659.027	494.21508	335.773267	1.988%
Fresno	2035	LDT2	DSL	65	339.0736	502.26661	342.662214	0.001%
Fresno	2035	LDT2	GAS	70	722594.3024	529.98661	360.076591	1.909%
Fresno	2035	LDT2	DSL	70	325.529436	632.42323	431.181097	0.001%
Fresno	2035	LHD1	GAS	5	28730.83376	2513.4971	2262.14741	0.076%
Fresno	2035	LHD1	DSL	5	10879.47172	519.044	467.1396	0.029%
Fresno	2035	LHD1	GAS	10	74917.97247	2036.1283	1832.51546	0.198%
Fresno	2035	LHD1	DSL	10	36179.20697	519.04392	467.139527	0.096%
Fresno	2035	LHD1	GAS	15	170598.308	1392.4297	1253.18676	0.451%
Fresno	2035	LHD1	DSL	15	78353.78669	519.04397	467.139573	0.207%
Fresno	2035	LHD1	GAS	20	197125.0326	1006.0685	905.461657	0.521%
Fresno	2035	LHD1	DSL	20	85901.05561	519.04403	467.139624	0.227%
Fresno	2035	LHD1	GAS	25	151847.0565	768.01202	691.210821	0.401%
Fresno	2035	LHD1	DSL	25	91937.0507	519.04403	467.139624	0.243%
Fresno	2035	LHD1	GAS	30	134282.6251	619.43358	557.490222	0.355%
Fresno	2035	LHD1	DSL	30	77606.52044	519.04398	467.139584	0.205%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50176.54222	527.84646	475.061813	0.133%
Fresno	2035	LHD1	DSL	35	40955.97348	519.04399	467.13959	0.108%
Fresno	2035	LHD1	GAS	40	14810.97147	475.23314	427.70983	0.039%
Fresno	2035	LHD1	DSL	40	22483.49154	519.04403	467.139628	0.059%
Fresno	2035	LHD1	GAS	45	18233.60859	452.05583	406.850246	0.048%
Fresno	2035	LHD1	DSL	45	24267.07928	519.04407	467.139664	0.064%
Fresno	2035	LHD1	GAS	50	134634.4239	454.32182	408.889636	0.356%
Fresno	2035	LHD1	DSL	50	93702.88848	519.04402	467.139615	0.248%
Fresno	2035	LHD1	GAS	55	37030.82405	482.41548	434.17393	0.098%
Fresno	2035	LHD1	DSL	55	56428.72821	519.04399	467.139593	0.149%
Fresno	2035	LHD2	GAS	5	2869.22626	2513.4973	2262.14755	0.008%
Fresno	2035	LHD2	DSL	5	2868.083817	519.10791	467.197122	0.008%
Fresno	2035	LHD2	GAS	10	7481.739717	2036.1282	1832.51541	0.020%
Fresno	2035	LHD2	DSL	10	9537.686436	519.10792	467.197126	0.025%
Fresno	2035	LHD2	GAS	15	17036.93043	1392.4296	1253.1866	0.045%
Fresno	2035	LHD2	DSL	15	20655.89581	519.10791	467.197119	0.055%
Fresno	2035	LHD2	GAS	20	19686.03938	1006.0685	905.461663	0.052%
Fresno	2035	LHD2	DSL	20	22645.53381	519.10792	467.197126	0.060%
Fresno	2035	LHD2	GAS	25	15164.32093	768.01204	691.210836	0.040%
Fresno	2035	LHD2	DSL	25	24236.76085	519.10797	467.197177	0.064%
Fresno	2035	LHD2	GAS	30	13410.23552	619.43357	557.490209	0.035%
Fresno	2035	LHD2	DSL	30	20458.89806	519.10794	467.197147	0.054%
Fresno	2035	LHD2	GAS	35	5010.918084	527.84649	475.061841	0.013%
Fresno	2035	LHD2	DSL	35	10796.95529	519.10789	467.1971	0.029%
Fresno	2035	LHD2	GAS	40	1479.108812	475.23314	427.709828	0.004%
Fresno	2035	LHD2	DSL	40	5927.175615	519.10788	467.197088	0.016%
Fresno	2035	LHD2	GAS	45	1820.912953	452.05583	406.850243	0.005%
Fresno	2035	LHD2	DSL	45	6397.37166	519.1079	467.197108	0.017%
Fresno	2035	LHD2	GAS	50	13445.36839	454.32177	408.889595	0.036%
Fresno	2035	LHD2	DSL	50	24702.27926	519.10786	467.197078	0.065%
Fresno	2035	LHD2	GAS	55	3698.110984	482.41546	434.173911	0.010%
Fresno	2035	LHD2	DSL	55	14875.93575	519.1079	467.197112	0.039%
Fresno	2035	MCY	GAS	5	10.7527472	266.3941	239.754687	0.000%
Fresno	2035	MCY	GAS	10	554.8915779	242.30076	218.070684	0.001%
Fresno	2035	MCY	GAS	15	330.7208003	205.03074	184.52767	0.001%
Fresno	2035	MCY	GAS	20	12588.28568	178.73877	160.864893	0.033%
Fresno	2035	MCY	GAS	25	3070.152177	160.51344	144.462093	0.008%
Fresno	2035	MCY	GAS	30	8374.163837	148.52267	133.670406	0.022%
Fresno	2035	MCY	GAS	35	21269.87913	141.67529	127.507762	0.056%
Fresno	2035	MCY	GAS	40	30261.41652	139.43553	125.491979	0.080%
Fresno	2035	MCY	GAS	45	30034.5498	141.74257	127.568309	0.079%
Fresno	2035	MCY	GAS	50	34759.24992	149.01587	134.114283	0.092%
Fresno	2035	MCY	GAS	55	25925.15673	162.25023	146.025203	0.068%
Fresno	2035	MCY	GAS	60	29542.35713	183.22816	164.905344	0.078%
Fresno	2035	MCY	GAS	65	31685.28107	214.9121	193.42089	0.084%
Fresno	2035	MCY	GAS	70	30419.62513	262.13732	235.92359	0.080%
Fresno	2035	MDV	GAS	5	262.238077	1969.99	1370.33855	0.001%
Fresno	2035	MDV	DSL	5	0.204451984	504.23305	348.357588	0.000%
Fresno	2035	MDV	GAS	10	13532.69976	1452.2532	1010.20434	0.036%
Fresno	2035	MDV	DSL	10	10.55066914	455.31385	314.587226	0.000%
Fresno	2035	MDV	GAS	15	8065.620673	1125.0378	782.583902	0.021%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6.28830171	381.75539	263.807654	0.000%
Fresno	2035	MDV	GAS	20	307003.1737	895.31583	622.79059	0.811%
Fresno	2035	MDV	DSL	20	239.3527774	332.19804	229.596761	0.001%
Fresno	2035	MDV	GAS	25	74874.88875	745.37717	518.48947	0.198%
Fresno	2035	MDV	DSL	25	58.3756578	300.00377	207.37211	0.000%
Fresno	2035	MDV	GAS	30	204229.1639	640.79385	445.741211	0.539%
Fresno	2035	MDV	DSL	30	159.2257691	281.16164	194.364833	0.000%
Fresno	2035	MDV	GAS	35	518729.9462	571.66991	397.658678	1.370%
Fresno	2035	MDV	DSL	35	404.4240135	273.44619	189.03863	0.001%
Fresno	2035	MDV	GAS	40	738015.5598	528.22783	367.441432	1.949%
Fresno	2035	MDV	DSL	40	575.3884012	275.97394	190.783609	0.002%
Fresno	2035	MDV	GAS	45	732482.7386	508.81188	353.935103	1.935%
Fresno	2035	MDV	DSL	45	571.0747511	289.03251	199.798324	0.002%
Fresno	2035	MDV	GAS	50	847708.7407	508.44835	353.682037	2.239%
Fresno	2035	MDV	DSL	50	660.909941	314.13588	217.127918	0.002%
Fresno	2035	MDV	GAS	55	632262.8254	527.40799	366.870322	1.670%
Fresno	2035	MDV	DSL	55	492.9390699	354.32083	244.868774	0.001%
Fresno	2035	MDV	GAS	60	720479.1957	567.25767	394.590335	1.903%
Fresno	2035	MDV	DSL	60	561.7163156	414.7662	286.595991	0.001%
Fresno	2035	MDV	GAS	65	772740.798	633.17673	440.444571	2.041%
Fresno	2035	MDV	DSL	65	602.4616994	503.91512	348.138109	0.002%
Fresno	2035	MDV	GAS	70	741873.9381	679.00227	472.320926	1.960%
Fresno	2035	MDV	DSL	70	578.3965673	635.44234	438.935218	0.002%
Fresno	2035	MH	GAS	5	497.3752863	2513.4973	2262.1476	0.001%
Fresno	2035	MH	DSL	5	100.0550334	2409.4505	2168.50544	0.000%
Fresno	2035	MH	GAS	10	2500.309919	2036.1282	1832.51539	0.007%
Fresno	2035	MH	DSL	10	498.0362855	2187.7883	1969.00946	0.001%
Fresno	2035	MH	GAS	15	3158.320021	1392.4296	1253.18668	0.008%
Fresno	2035	MH	DSL	15	672.1760852	1796.3577	1616.72197	0.002%
Fresno	2035	MH	GAS	20	3275.953644	1006.0686	905.461752	0.009%
Fresno	2035	MH	DSL	20	712.8672028	1474.1187	1326.70683	0.002%
Fresno	2035	MH	GAS	25	3650.169749	768.01215	691.210938	0.010%
Fresno	2035	MH	DSL	25	742.4228737	1322.2031	1189.98279	0.002%
Fresno	2035	MH	GAS	30	4127.036754	619.43365	557.490288	0.011%
Fresno	2035	MH	DSL	30	892.7034	1241.0834	1116.97508	0.002%
Fresno	2035	MH	GAS	35	5129.280755	527.84659	475.061927	0.014%
Fresno	2035	MH	DSL	35	1052.614868	1173.7643	1056.38785	0.003%
Fresno	2035	MH	GAS	40	6385.425554	475.23323	427.709904	0.017%
Fresno	2035	MH	DSL	40	1306.657549	1120.2454	1008.22088	0.003%
Fresno	2035	MH	GAS	45	5823.071722	452.05586	406.850274	0.015%
Fresno	2035	MH	DSL	45	1069.979251	1080.5271	972.474412	0.003%
Fresno	2035	MH	GAS	50	5667.045641	454.32184	408.889656	0.015%
Fresno	2035	MH	DSL	50	1197.480732	1054.6092	949.148305	0.003%
Fresno	2035	MH	GAS	55	7411.979173	482.41554	434.173983	0.020%
Fresno	2035	MH	DSL	55	1754.799517	1042.4917	938.242513	0.005%
Fresno	2035	MH	GAS	60	8553.086166	541.20922	487.088295	0.023%
Fresno	2035	MH	DSL	60	2108.685765	1044.1745	939.757077	0.006%
Fresno	2035	MH	GAS	65	1336.527842	641.49795	577.348151	0.004%
Fresno	2035	MH	DSL	65	331.8471551	1059.658	953.692172	0.001%
Fresno	2035	OBUS	GAS	5	300.9471355	2513.4972	2262.14751	0.001%
Fresno	2035	OBUS	DSL	5	245.7914613	3000.8453	2700.76078	0.001%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1512.863815	2036.1285	1832.51567	0.004%
Fresno	2035	OBUS	DSL	10	1133.620685	2416.3788	2174.74096	0.003%
Fresno	2035	OBUS	GAS	15	1911.006427	1392.4297	1253.18671	0.005%
Fresno	2035	OBUS	DSL	15	1492.448843	1966.4595	1769.81355	0.004%
Fresno	2035	OBUS	GAS	20	1982.183026	1006.0686	905.461765	0.005%
Fresno	2035	OBUS	DSL	20	1992.144412	1667.5831	1500.82475	0.005%
Fresno	2035	OBUS	GAS	25	2208.610212	768.01209	691.210878	0.006%
Fresno	2035	OBUS	DSL	25	2066.889037	1554.2995	1398.86952	0.005%
Fresno	2035	OBUS	GAS	30	2497.148374	619.4336	557.49024	0.007%
Fresno	2035	OBUS	DSL	30	2883.156009	1513.4747	1362.12724	0.008%
Fresno	2035	OBUS	GAS	35	3103.576479	527.84663	475.061971	0.008%
Fresno	2035	OBUS	DSL	35	4256.683632	1496.2431	1346.61875	0.011%
Fresno	2035	OBUS	GAS	40	3863.633016	475.23318	427.70986	0.010%
Fresno	2035	OBUS	DSL	40	4543.694778	1388.0184	1249.21658	0.012%
Fresno	2035	OBUS	GAS	45	3523.369062	452.05586	406.85027	0.009%
Fresno	2035	OBUS	DSL	45	5084.936748	1412.7021	1271.43191	0.013%
Fresno	2035	OBUS	GAS	50	3428.962485	454.3218	408.889619	0.009%
Fresno	2035	OBUS	DSL	50	5430.630913	1369.3928	1232.45348	0.014%
Fresno	2035	OBUS	GAS	55	4484.770489	482.41554	434.173989	0.012%
Fresno	2035	OBUS	DSL	55	7117.427162	1329.5933	1196.63399	0.019%
Fresno	2035	OBUS	GAS	60	5175.220475	541.20921	487.088287	0.014%
Fresno	2035	OBUS	DSL	60	4814.166097	1154.5349	1039.08143	0.013%
Fresno	2035	OBUS	GAS	65	808.6937362	641.49789	577.348105	0.002%
Fresno	2035	OBUS	DSL	65	1253.216836	1334.3475	1200.91276	0.003%
Fresno	2035	SBUS	GAS	5	77.84897258	2513.497	2262.14728	0.000%
Fresno	2035	SBUS	DSL	5	153.2615459	2617.434	2355.69059	0.000%
Fresno	2035	SBUS	GAS	10	272.85665	2036.1281	1832.51532	0.001%
Fresno	2035	SBUS	DSL	10	537.1738631	2162.205	1945.98453	0.001%
Fresno	2035	SBUS	GAS	15	545.7133238	1392.4296	1253.1866	0.001%
Fresno	2035	SBUS	DSL	15	1074.347726	1775.3578	1597.82198	0.003%
Fresno	2035	SBUS	GAS	20	740.7171077	1006.0685	905.461637	0.002%
Fresno	2035	SBUS	DSL	20	1458.252304	1400.5807	1260.52261	0.004%
Fresno	2035	SBUS	GAS	25	1169.271698	768.01209	691.210884	0.003%
Fresno	2035	SBUS	DSL	25	2301.949259	1306.7731	1176.09577	0.006%
Fresno	2035	SBUS	GAS	30	1402.818632	619.43357	557.490213	0.004%
Fresno	2035	SBUS	DSL	30	2761.733897	1226.6041	1103.94372	0.007%
Fresno	2035	SBUS	GAS	35	1439.816931	527.84649	475.061843	0.004%
Fresno	2035	SBUS	DSL	35	2834.572408	1160.0738	1044.06647	0.007%
Fresno	2035	SBUS	GAS	40	971.9525215	475.23313	427.709817	0.003%
Fresno	2035	SBUS	DSL	40	1913.486228	1107.1822	996.464003	0.005%
Fresno	2035	SBUS	GAS	45	466.3194211	452.0558	406.850224	0.001%
Fresno	2035	SBUS	DSL	45	918.0446319	1067.9293	961.136336	0.002%
Fresno	2035	SBUS	GAS	50	233.5469216	454.32174	408.889568	0.001%
Fresno	2035	SBUS	DSL	50	459.7846378	1042.315	938.083462	0.001%
Fresno	2035	SBUS	GAS	55	347.619697	482.4154	434.173862	0.001%
Fresno	2035	SBUS	DSL	55	684.3600513	1030.3393	927.305381	0.002%
Fresno	2035	SBUS	GAS	60	193.4666775	541.20909	487.088184	0.001%
Fresno	2035	SBUS	DSL	60	380.8785078	1032.0023	928.802094	0.001%
Fresno	2035	T6	GAS	5	973.5269487	2513.4972	2262.1475	0.003%
Fresno	2035	T6	DSL	5	5137.502657	2559.9333	2303.93998	0.014%
Fresno	2035	T6	GAS	10	4893.928522	2036.1282	1832.5154	0.013%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25572.55286	2114.705	1903.23447	0.068%
Fresno	2035	T6	GAS	15	6181.870759	1392.4296	1253.18662	0.016%
Fresno	2035	T6	DSL	15	34514.07045	1736.3561	1562.72049	0.091%
Fresno	2035	T6	GAS	20	6412.118155	1006.0686	905.461739	0.017%
Fresno	2035	T6	DSL	20	36603.42601	1369.8122	1232.83102	0.097%
Fresno	2035	T6	GAS	25	7144.581859	768.01214	691.210928	0.019%
Fresno	2035	T6	DSL	25	38121.01655	1278.0654	1150.2589	0.101%
Fresno	2035	T6	GAS	30	8077.967694	619.43366	557.49029	0.021%
Fresno	2035	T6	DSL	30	45837.43399	1199.6577	1079.69191	0.121%
Fresno	2035	T6	GAS	35	10039.68785	527.84662	475.06196	0.027%
Fresno	2035	T6	DSL	35	54048.37171	1134.589	1021.13006	0.143%
Fresno	2035	T6	GAS	40	12498.37693	475.23322	427.709895	0.033%
Fresno	2035	T6	DSL	40	67092.63964	1082.8593	974.573342	0.177%
Fresno	2035	T6	GAS	45	11397.66629	452.05587	406.850281	0.030%
Fresno	2035	T6	DSL	45	54939.97548	1044.4686	940.021765	0.145%
Fresno	2035	T6	GAS	50	11092.27173	454.32181	408.889633	0.029%
Fresno	2035	T6	DSL	50	61486.76705	1019.417	917.475324	0.162%
Fresno	2035	T6	GAS	55	14507.68041	482.41554	434.173988	0.038%
Fresno	2035	T6	DSL	55	90103.28526	1007.7045	906.93402	0.238%
Fresno	2035	T6	GAS	60	16741.19979	541.20927	487.088343	0.044%
Fresno	2035	T6	DSL	60	108274.1968	1009.3309	908.397853	0.286%
Fresno	2035	T6	GAS	65	2616.024468	641.49796	577.348162	0.007%
Fresno	2035	T6	DSL	65	17039.2801	1024.2965	921.866823	0.045%
Fresno	2035	T7	GAS	5	47.10131666	2513.4974	2262.14768	0.000%
Fresno	2035	T7	DSL	5	11173.31499	3956.4896	3560.84066	0.030%
Fresno	2035	T7	GAS	10	230.2084577	2036.1282	1832.51536	0.001%
Fresno	2035	T7	DSL	10	42682.57987	3268.3696	2941.53267	0.113%
Fresno	2035	T7	GAS	15	251.045954	1392.4295	1253.18658	0.001%
Fresno	2035	T7	DSL	15	52201.14437	2683.6148	2415.2533	0.138%
Fresno	2035	T7	GAS	20	429.0332322	1006.0686	905.461705	0.001%
Fresno	2035	T7	DSL	20	128970.4852	2117.0983	1905.38845	0.341%
Fresno	2035	T7	GAS	25	559.9157108	768.01216	691.210943	0.001%
Fresno	2035	T7	DSL	25	117904.473	1975.3064	1777.77576	0.311%
Fresno	2035	T7	GAS	30	1022.511277	619.43356	557.490202	0.003%
Fresno	2035	T7	DSL	30	199055.5773	1854.1237	1668.71137	0.526%
Fresno	2035	T7	GAS	35	1818.673148	527.84658	475.061926	0.005%
Fresno	2035	T7	DSL	35	358105.961	1753.5572	1578.20146	0.946%
Fresno	2035	T7	GAS	40	1585.380627	475.23322	427.709894	0.004%
Fresno	2035	T7	DSL	40	337948.0001	1673.6067	1506.246	0.893%
Fresno	2035	T7	GAS	45	1677.502011	452.05583	406.850251	0.004%
Fresno	2035	T7	DSL	45	473149.1008	1614.2722	1452.84502	1.250%
Fresno	2035	T7	GAS	50	1755.142041	454.32187	408.889685	0.005%
Fresno	2035	T7	DSL	50	492063.4364	1575.5539	1417.9985	1.300%
Fresno	2035	T7	GAS	55	2576.418962	482.41549	434.173944	0.007%
Fresno	2035	T7	DSL	55	600041.2421	1557.4516	1401.70645	1.585%
Fresno	2035	T7	GAS	60	635.8645954	541.2092	487.088277	0.002%
Fresno	2035	T7	DSL	60	182793.5252	1559.9654	1403.96887	0.483%
Fresno	2035	T7	GAS	65	340.8102276	641.49795	577.348155	0.001%
Fresno	2035	T7	DSL	65	100119.6844	1583.0953	1424.78576	0.264%
Fresno	2035	UBUS	GAS	5	191.1678639	2513.4971	2262.14738	0.001%
Fresno	2035	UBUS	DSL	5	471.246816	2299.614	2069.65261	0.001%

EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNE (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686.159464	2036.1282	1832.51542	0.002%
Fresno	2035	UBUS	DSL	10	1691.447896	2299.6141	2069.65266	0.004%
Fresno	2035	UBUS	GAS	15	1372.318955	1392.4296	1253.18661	0.004%
Fresno	2035	UBUS	DSL	15	3382.895703	2299.614	2069.65258	0.009%
Fresno	2035	UBUS	GAS	20	1810.982614	1006.0686	905.46172	0.005%
Fresno	2035	UBUS	DSL	20	4464.243052	2299.6139	2069.65251	0.012%
Fresno	2035	UBUS	GAS	25	2727.469681	768.01208	691.210871	0.007%
Fresno	2035	UBUS	DSL	25	6723.47014	2299.6141	2069.65273	0.018%
Fresno	2035	UBUS	GAS	30	3413.62903	619.43358	557.490218	0.009%
Fresno	2035	UBUS	DSL	30	8414.91731	2299.614	2069.65263	0.022%
Fresno	2035	UBUS	GAS	35	3345.34119	527.8465	475.061852	0.009%
Fresno	2035	UBUS	DSL	35	8246.58158	2299.6139	2069.65249	0.022%
Fresno	2035	UBUS	GAS	40	2411.685638	475.23317	427.70985	0.006%
Fresno	2035	UBUS	DSL	40	5945.03267	2299.614	2069.6526	0.016%
Fresno	2035	UBUS	GAS	45	1051.32669	452.05584	406.85026	0.003%
Fresno	2035	UBUS	DSL	45	2591.619522	2299.6141	2069.65268	0.007%
Fresno	2035	UBUS	GAS	50	534.151171	454.32179	408.889615	0.001%
Fresno	2035	UBUS	DSL	50	1316.733031	2299.6141	2069.65267	0.003%
Fresno	2035	UBUS	GAS	55	662.23948	482.4155	434.173949	0.002%
Fresno	2035	UBUS	DSL	55	1632.482756	2299.614	2069.6526	0.004%
Fresno	2035	UBUS	GAS	60	1083.927567	541.2092	487.088279	0.003%
Fresno	2035	UBUS	DSL	60	2671.983695	2299.614	2069.65263	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2050

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,381,886,000	2,610	345373	36.9	13.1	317,710
Commercial	2,717,173,935	7,503	393990	42.1	14.9	362,433
Industrial	0		0	0.0	0.0	0
Total	**5,099,059,935**		**739,364**	**79.0**	**28.0**	**680,144**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	125,938,800	138	736,742	69.3	1.4	670,082
Commercial	145,944,435	403	853,775	80.3	1.6	776,525
Industrial	0		0	0.0	0.0	0
Total	**271,883,235**		**1,590,517**	**149.5**	**3.0**	**1,446,607**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
*OFFROAD only provides emissions rates up to 2040. Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population.

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2050
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	912,600
	Emissions (MTCO2e per person)	812,214
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Community Greenhouse Gas Inventory

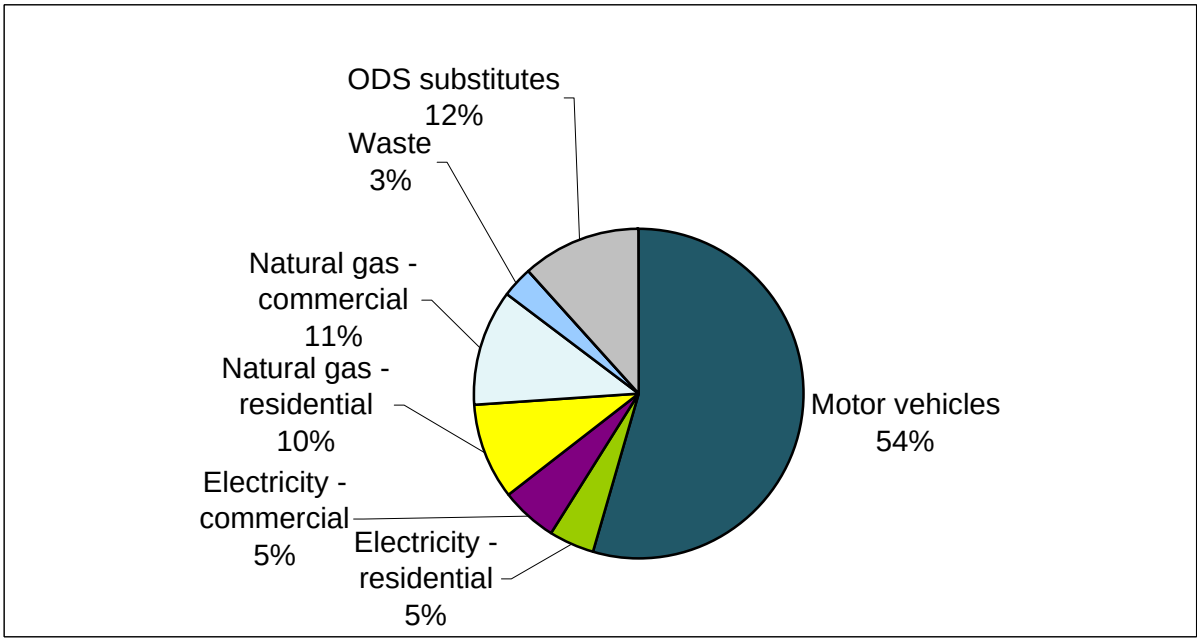
Summary
Year: 2056
Prepared by FirstCarbon Solutions

	Data	Source
City Information		
Population	970,000	Fresno COG
Employment	393,200	
County Information		
Population	1,616,667	Fresno COG

-Fresno Council of Governments (Fresno COG), San Joaquin Valley Demographic Forecasts 2010 to 2050. Produced under contract by: The Planning Center|DC&E. March 2012.

-Employment: Took the 2010 population (545,000) and 2010 employment (183,825) and cross multiplied with the 2056 population and the 2056 employment number (X).

Emissions (MTCO2e/year)	**Without Regulation**	**With Pavley I and LCFS**
Motor vehicles	4,028,432	2,914,488
Electricity - residential	337,694	337,694
Electricity - commercial	393,513	393,513
Natural gas - residential	712,228	712,228
Natural gas - commercial	843,115	843,115
Waste	220,578	220,578
Offroad equipment	1,314	1,314
ODS substitutes	863,300	863,300
Total	***7,400,173***	***6,286,229***



Community Greenhouse Gas Inventory

Waste

Year: **2056**

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Waste Emissions

Emissions (MTCO2e)*	220,578	
Emissions (MTCO2e/person)	0.2274	2010 waste emissions per person

Notes:

*Emissions were calucated by multiplying the 2010 per capita rate by the population for this year.

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,883,447 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,257,458,155 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.54% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,384	0	**1,384**	5
5 - 10 MPH	1,150	1,345	0	**2,496**	5
10 - 15 MPH	224,212	289,426	615,535	**1,129,173**	10
15 - 20 MPH	7,576	11,210	11,842	**30,628**	15
20 - 25 MPH	33,152	55,414	94,472	**183,038**	20
25 - 30 MPH	135,406	179,299	389,591	**704,296**	25
30 - 35 MPH	150,069	237,489	296,661	**684,218**	30
35 - 40 MPH	884,009	1,145,409	2,308,049	**4,337,467**	35
40 - 45 MPH	395,330	482,401	1,059,730	**1,937,461**	40
45 - 50 MPH	336,301	443,145	1,305,167	**2,084,613**	45
50 - 55 MPH	181,888	256,936	618,473	**1,057,297**	50
55 - 60 MPH	807,301	959,882	2,270,362	**4,037,545**	55
60 - 65 MPH	773,934	961,421	1,958,222	**3,693,577**	60
65 - 70 MPH	43	56	154	**254**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,930,371**	**5,024,819**	**10,928,257**	**19,883,447**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3880	1129173	30628	183038	704296	684218	4337467	1937461	2084613	1057297	4037545	3693577	254	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	1132	834	647	514	428	368	328	303	292	292	303	326	364	390	0
LDT1	1315	969	751	598	497	428	382	353	340	339	352	379	423	453	0
LDT2	1538	1134	878	699	582	500	446	412	397	397	412	443	494	530	0
LHD1	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
LHD2	2513	2036	1392	1006	768	619	528	475	452	454	482	0	0	0	0
MCY	266	242	205	179	161	149	142	139	142	149	162	183	215	262	0
MDV	1970	1452	1125	895	745	641	572	528	509	508	527	567	633	679	0
MH	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
OBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
SBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0
T6	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0
T7	2513	2036	1392	1006	768	619	528	475	452	454	482	541	641	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2513	2036	1392	1006	768	619	528	475	452	454	482	541	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	504	455	382	332	300	281	274	276	289	314	354	415	504	635	0
LDT1	505	456	382	332	300	281	273	276	289	314	354	415	505	637	0
LDT2	503	454	381	332	300	282	274	277	290	314	354	414	502	632	0
LHD1	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
LHD2	519	519	519	519	519	519	519	519	519	519	519	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	504	455	382	332	300	281	273	276	289	314	354	415	504	635	0
MH	2409	2188	1796	1474	1322	1241	1174	1120	1081	1055	1042	1044	1060	0	0
OBUS	3001	2416	1966	1668	1554	1513	1496	1388	1413	1369	1330	1155	1334	0	0
SBUS	2617	2162	1775	1401	1307	1227	1160	1107	1068	1042	1030	1032	0	0	0
T6	2560	2115	1736	1370	1278	1200	1135	1083	1044	1019	1008	1009	1024	0	0
T7	3956	3268	2684	2117	1975	1854	1754	1674	1614	1576	1557	1560	1583	0	0
UBUS	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1704	495815	13449	80371	309253	300437	1904561	850730	915344	464254	1772866	1621832	111	0	0
LDT1	253	73592	1996	11929	45901	44593	282688	126271	135861	68908	263141	240723	17	0	0
LDT2	630	183378	4974	29725	114377	111117	704404	314643	338541	171705	655697	599836	41	0	0
LHD1	104	30196	819	4895	18834	18297	115990	51810	55745	28274	107969	98771	7	0	0
LHD2	10	3016	82	489	1881	1827	11583	5174	5567	2824	10782	9864	1	0	0
MCY	27	7720	209	1251	4815	4678	29654	13246	14252	7228	27603	25252	2	0	0
MDV	647	188270	5107	30518	117429	114082	723198	323038	347574	176286	673191	615841	42	0	0
MH	6	1715	47	278	1070	1039	6590	2943	3167	1606	6134	5611	0	0	0
OBUS	4	1038	28	168	647	629	3987	1781	1916	972	3711	3395	0	0	0
SBUS	1	234	6	38	146	142	901	402	433	220	838	767	0	0	0
T6	12	3358	91	544	2094	2035	12898	5761	6199	3144	12006	10983	1	0	0
T7	1	386	10	63	241	234	1481	662	712	361	1379	1261	0	0	0
UBUS	2	575	16	93	359	349	2210	987	1062	539	2057	1882	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	5	1323	36	214	825	802	5082	2270	2443	1239	4731	4328	0	0	0
LDT1	0	98	3	16	61	59	375	168	180	91	349	319	0	0	0
LDT2	0	83	2	13	52	50	317	142	153	77	295	270	0	0	0
LHD1	63	18453	501	2991	11510	11182	70884	31663	34067	17279	65983	60362	4	0	0
LHD2	17	4865	132	789	3034	2948	18687	8347	8981	4555	17395	15913	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	1	147	4	24	92	89	564	252	271	137	525	480	0	0	0
MH	1	371	10	60	231	225	1425	637	685	347	1327	1214	0	0	0
OBUS	4	1262	34	205	787	765	4848	2166	2330	1182	4513	4128	0	0	0
SBUS	2	462	13	75	288	280	1773	792	852	432	1651	1510	0	0	0
T6	65	19052	517	3088	11883	11545	73184	32690	35173	17839	68124	62320	4	0	0
T7	317	92348	2505	14970	57600	55958	354734	158453	170487	86470	330205	302074	21	0	0
UBUS	5	1418	38	230	885	859	5448	2434	2618	1328	5071	4639	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	774	166,090	3,491	16,600	53,185	44,417	251,182	103,656	107,434	54,452	215,696	212,226	16	0	0	**1,228,443**
LDT1	133	28,637	602	2,862	9,168	7,657	43,303	17,872	18,523	9,388	37,188	36,590	3	0	0	**211,793**
LDT2	389	83,457	1,754	8,340	26,718	22,315	126,198	52,085	53,981	27,359	108,375	106,633	8	0	0	**617,224**
LHD1	105	24,685	458	1,977	5,808	4,550	24,582	9,886	10,118	5,157	20,913	0	0	0	0	**108,133**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (without Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	10	2,465	46	197	580	454	2,455	987	1,010	515	2,088	0	0	0	0	**10,799**
MCY	3	751	17	90	310	279	1,687	742	811	432	1,798	1,858	0	0	0	**8,775**
MDV	512	109,777	2,307	10,970	35,143	29,351	165,992	68,511	71,005	35,987	142,551	140,260	11	0	0	**811,866**
MH	6	1,402	26	112	330	259	1,397	562	575	293	1,188	1,219	0	0	0	**7,363**
OBUS	4	849	16	68	200	156	845	340	348	177	719	738	0	0	0	**4,455**
SBUS	1	192	4	15	45	35	191	77	79	40	162	167	0	0	0	**1,006**
T6	12	2,745	51	220	646	506	2,733	1,099	1,125	573	2,325	2,387	0	0	0	**14,411**
T7	1	315	6	25	74	58	314	126	129	66	267	274	0	0	0	**1,655**
UBUS	2	470	9	38	111	87	468	188	193	98	398	409	0	0	0	**2,469**
Total	**1,952**	**421,835**	**8,785**	**41,515**	**132,317**	**110,124**	**621,347**	**256,132**	**265,331**	**134,540**	**533,670**	**502,760**	**39**	**0**	**0**	**3,030,345**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	242	5	29	99	91	558	252	284	156	673	721	0	0	0	**3,109**
LDT1	0	18	0	2	7	7	41	19	21	12	50	53	0	0	0	**229**
LDT2	0	15	0	2	6	6	35	16	18	10	42	45	0	0	0	**194**
LHD1	13	3,846	104	623	2,399	2,330	14,772	6,598	7,100	3,601	13,751	0	0	0	0	**55,123**
LHD2	3	1,014	28	164	632	614	3,895	1,740	1,872	949	3,625	0	0	0	0	**14,534**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	27	1	3	11	10	62	28	31	17	75	80	0	0	0	**345**
MH	1	326	7	36	123	112	672	286	297	147	555	509	0	0	0	**3,070**
OBUS	5	1,224	27	137	491	465	2,912	1,207	1,322	650	2,409	1,914	0	0	0	**12,758**
SBUS	2	401	9	42	151	138	826	352	365	181	683	626	0	0	0	**3,774**
T6	67	16,176	360	1,699	6,098	5,561	33,338	14,213	14,750	7,302	27,562	25,255	2	0	0	**152,315**
T7	504	121,184	2,699	12,724	45,682	41,657	249,751	106,473	110,498	54,699	206,483	189,197	13	0	0	**1,141,060**
UBUS	4	1,310	36	212	817	793	5,030	2,247	2,418	1,226	4,682	4,283	0	0	0	**23,054**
Total	**602**	**145,781**	**3,277**	**15,673**	**56,516**	**51,783**	**311,893**	**133,429**	**138,974**	**68,950**	**260,590**	**222,682**	**15**	**0**	**0**	**1,410,166**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	4,440,511	4,028,432	4,028,432

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Vehicle Miles Traveled

Vehicle miles traveled / day 19,617,524 Source: Fehr and Peers. 2013
Vehicle miles traveled / year 7,160,396,260 Source: VMT per day * 365 days/year
Annual Growth Rate in VMT: 2.48% Source: Fresno COG

Speed bins	AM peak	PM peak	Off peak	Total	Speed
0 - 5 MPH	0	1,366	0	**1,366**	5
5 - 10 MPH	1,135	1,327	0	**2,462**	5
10 - 15 MPH	221,214	285,555	607,302	**1,114,071**	10
15 - 20 MPH	7,474	11,060	11,684	**30,218**	15
20 - 25 MPH	32,708	54,673	93,209	**180,590**	20
25 - 30 MPH	133,595	176,901	384,380	**694,876**	25
30 - 35 MPH	148,062	234,312	292,694	**675,068**	30
35 - 40 MPH	872,186	1,130,091	2,277,181	**4,279,457**	35
40 - 45 MPH	390,043	475,949	1,045,557	**1,911,549**	40
45 - 50 MPH	331,803	437,218	1,287,712	**2,056,733**	45
50 - 55 MPH	179,455	253,500	610,201	**1,043,157**	50
55 - 60 MPH	796,504	947,045	2,239,998	**3,983,546**	55
60 - 65 MPH	763,583	948,563	1,932,032	**3,644,178**	60
65 - 70 MPH	43	56	152	**250**	65
70 - 75 MPH	0	0	0	**0**	70
>75 MPH	0	0	0	**0**	75
Total	**3,877,806**	**4,957,617**	**10,782,101**	**19,617,524**	

Source:
Fehr and Peers. 2013. 2056 VMT was found by multiplying the 2010 VMT numbers found previously with the annual growth rate multiplied by the 46 years of VMT growth between 2010 and 2056 and adding that to the 2010 VMT.

Annual VMT Growth Rate: Was found by interpolating between 2011 and 2056 VMT: [((2056 VMT-2011 VMT)/2011 VMT))/45 years=.0248)].

2010 VMT found by backcasting the
2011 Existing Daily VMT By Speed Bin: Origin-Destination Method

Speed bins	AM peak	PM peak	Off peak	Total
0 - 5 MPH	0	638	0	638
5 - 10 MPH	530	620	0	1,150
10 - 15 MPH	103,322	133,374	283,652	520,348
15 - 20 MPH	3,491	5,166	5,457	14,114
20 - 25 MPH	15,277	25,536	43,535	84,348
25 - 30 MPH	62,398	82,625	179,532	324,555
30 - 35 MPH	69,155	109,440	136,708	315,303
35 - 40 MPH	407,371	527,830	1,063,600	1,998,801
40 - 45 MPH	182,177	222,301	488,347	892,825
45 - 50 MPH	154,975	204,211	601,450	960,636
50 - 55 MPH	83,818	118,402	285,006	487,226
55 - 60 MPH	372,022	442,335	1,046,233	1,860,590
60 - 65 MPH	356,646	443,044	902,392	1,702,082
65 - 70 MPH	20	26	71	117
70 - 75 MPH	0	0	0	0
>75 MPH	0	0	0	0
	1,811,202	2,315,548	5,035,983	9,162,733

VMT/day per speed bin

Speed (mph)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
VMT/day	3828	1114071	30218	180590	694876	675068	4279457	1911549	2056733	1043157	3983546	3644178	250	0	0

Vehicle Class using EMFAC2011 VMT percentages

	GAS	DSL
LDA	43.91%	0.12%
LDT1	6.52%	0.01%
LDT2	16.24%	0.01%
LHD1	2.67%	1.63%
LHD2	0.27%	0.43%
MCY	0.68%	0.00%
MDV	16.67%	0.01%
MH	0.15%	0.03%
OBUS	0.09%	0.11%
SBUS	0.02%	0.04%
T6	0.30%	1.69%
T7	0.03%	8.18%
UBUS	0.05%	0.13%

		%	Includes
GAS	Heavy duty	0.6%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	42.4%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	44.6%	LDA, MCY
DSL	Heavy duty	10.2%	MH, OBUS, SBUS, T6, T7, UBUS
	Light trucks	2.1%	MDV, LDT1, LDT2, LHD1, LHD2
	Passenger	0.1%	LDA, MCY
Total		100.0%	

Emission factors (g CO2/mile)

GAS Speed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
LDA	673	496	385	306	255	219	195	180	174	174	180	194	216	232	0
LDT1	801	590	457	364	303	260	232	215	207	207	214	231	257	276	0
LDT2	1045	770	597	475	395	340	303	280	270	270	280	301	336	360	0
LHD1	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
LHD2	2262	1833	1253	905	691	557	475	428	407	409	434	0	0	0	0
MCY	240	218	185	161	144	134	128	125	128	134	146	165	193	236	0
MDV	1370	1010	783	623	518	446	398	367	354	354	367	395	440	472	0
MH	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
OBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
SBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0
T6	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0
T7	2262	1833	1253	905	691	557	475	428	407	409	434	487	577	0	0

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

UBUS	2262	1833	1253	905	691	557	475	428	407	409	434	487	0	0	0

Emission factors (g CO2/mile)

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	304	274	230	200	181	170	165	167	175	190	214	250	304	383	0
LDT1	302	272	228	199	179	168	163	165	173	188	212	248	302	381	0
LDT2	343	310	260	227	205	193	188	189	198	215	242	283	343	431	0
LHD1	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
LHD2	467	467	467	467	467	467	467	467	467	467	467	0	0	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	348	315	264	230	207	194	189	191	200	217	245	287	348	439	0
MH	2169	1969	1617	1327	1190	1117	1056	1008	972	949	938	940	954	0	0
OBUS	2701	2175	1770	1501	1399	1362	1347	1249	1271	1232	1197	1039	1201	0	0
SBUS	2356	1946	1598	1261	1176	1104	1044	996	961	938	927	929	0	0	0
T6	2304	1903	1563	1233	1150	1080	1021	975	940	917	907	908	922	0	0
T7	3561	2942	2415	1905	1778	1669	1578	1506	1453	1418	1402	1404	1425	0	0
UBUS	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	0	0	0

VMT/day by Vehicle Class and speed

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	1681	489183	13269	79296	305117	296419	1879089	839352	903102	458045	1749156	1600141	110	0	0
LDT1	249	72608	1969	11770	45287	43996	278907	124582	134044	67986	259621	237504	16	0	0
LDT2	622	180925	4907	29328	112848	109631	694983	310435	334013	169409	646927	591814	41	0	0
LHD1	102	29792	808	4829	18582	18052	114438	51117	55000	27895	106525	97450	7	0	0
LHD2	10	2975	81	482	1856	1803	11428	5105	5493	2786	10638	9732	1	0	0
MCY	26	7617	207	1235	4751	4615	29257	13069	14061	7132	27234	24914	2	0	0
MDV	638	185752	5038	30110	115859	112556	713526	318718	342925	173929	664188	607604	42	0	0
MH	6	1693	46	274	1056	1026	6501	2904	3125	1585	6052	5536	0	0	0
OBUS	4	1024	28	166	639	621	3934	1757	1891	959	3662	3350	0	0	0
SBUS	1	231	6	38	144	140	889	397	427	217	827	757	0	0	0
T6	11	3313	90	537	2066	2007	12725	5684	6116	3102	11846	10836	1	0	0
T7	1	380	10	62	237	231	1462	653	702	356	1360	1245	0	0	0
UBUS	2	568	15	92	354	344	2181	974	1048	532	2030	1857	0	0	0

DSL **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**
LDA	4	1305	35	212	814	791	5014	2240	2410	1222	4668	4270	0	0	0
LDT1	0	96	3	16	60	58	370	165	178	90	344	315	0	0	0
LDT2	0	82	2	13	51	49	313	140	150	76	291	267	0	0	0
LHD1	63	18206	494	2951	11356	11032	69936	31239	33612	17048	65100	59554	4	0	0
LHD2	16	4800	130	778	2994	2908	18437	8235	8861	4494	17162	15700	1	0	0
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MDV	0	145	4	23	90	88	556	248	267	136	518	474	0	0	0
MH	1	366	10	59	228	222	1406	628	676	343	1309	1197	0	0	0
OBUS	4	1245	34	202	777	755	4783	2137	2299	1166	4452	4073	0	0	0
SBUS	2	455	12	74	284	276	1750	782	841	426	1629	1490	0	0	0
T6	65	18797	510	3047	11724	11390	72205	32253	34702	17601	67213	61487	4	0	0
T7	313	91113	2471	14769	56830	55209	349990	156333	168207	85313	325789	298034	20	0	0
UBUS	5	1399	38	227	873	848	5375	2401	2583	1310	5004	4577	0	0	0

Emissions (tons CO2/year) - converted from grams by multiplying by 1.1E-6 and converted to annual emissions by multiplying by 365 days/year

GAS **Speed**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	454	97,461	2,048	9,741	31,209	26,064	147,393	60,826	63,042	31,952	126,570	124,534	10	0	0	**720,850**
LDT1	80	17,204	362	1,719	5,508	4,600	26,015	10,737	11,128	5,640	22,341	21,982	2	0	0	**127,238**
LDT2	261	55,943	1,176	5,591	17,910	14,958	84,593	34,914	36,185	18,340	72,646	71,478	5	0	0	**413,738**
LHD1	93	21,919	407	1,756	5,157	4,041	21,828	8,778	8,984	4,580	18,570	0	0	0	0	**96,018**

Community Greenhouse Gas Inventory
Motor Vehicle Emissions (with Pavley I and LCFS)
Year: 2056
Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

LHD2	9	2,189	41	175	515	404	2,180	877	897	457	1,854	0	0	0	0	**9,589**
MCY	3	667	15	80	276	248	1,498	658	720	384	1,597	1,650	0	0	0	**7,792**
MDV	351	75,341	1,583	7,529	24,119	20,144	113,922	47,020	48,731	24,698	97,834	96,262	7	0	0	**557,189**
MH	5	1,245	23	100	293	230	1,240	499	510	260	1,055	1,083	0	0	0	**6,538**
OBUS	3	753	14	60	177	139	750	302	309	157	638	655	0	0	0	**3,956**
SBUS	1	170	3	14	40	31	170	68	70	36	144	148	0	0	0	**894**
T6	10	2,437	45	195	573	449	2,427	976	999	509	2,065	2,119	0	0	0	**12,797**
T7	1	280	5	22	66	52	279	112	115	58	237	243	0	0	0	**1,470**
UBUS	2	418	8	33	98	77	416	167	171	87	354	363	0	0	0	**2,193**
Total	**1,274**	**276,029**	**5,730**	**27,015**	**85,940**	**71,435**	**402,710**	**165,934**	**171,862**	**87,159**	**345,906**	**320,517**	**25**	**0**	**0**	**1,961,534**

DSL Speed	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**Total**
LDA	1	144	3	17	59	54	333	150	169	93	401	429	0	0	0	**1,851**
LDT1	0	11	0	1	4	4	24	11	12	7	29	31	0	0	0	**135**
LDT2	0	10	0	1	4	4	24	11	12	7	28	30	0	0	0	**131**
LHD1	12	3,415	93	554	2,130	2,069	13,117	5,859	6,304	3,197	12,210	0	0	0	0	**48,947**
LHD2	3	900	24	146	562	546	3,458	1,545	1,662	843	3,219	0	0	0	0	**12,905**
MCY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
MDV	0	18	0	2	8	7	42	19	21	12	51	55	0	0	0	**235**
MH	1	289	6	32	109	99	596	254	264	131	493	452	0	0	0	**2,726**
OBUS	5	1,087	24	122	436	413	2,586	1,072	1,174	577	2,139	1,699	0	0	0	**11,329**
SBUS	1	356	8	37	134	122	733	313	324	161	606	556	0	0	0	**3,351**
T6	60	14,364	320	1,508	5,415	4,938	29,603	12,620	13,097	6,484	24,474	22,426	2	0	0	**135,250**
T7	448	107,607	2,397	11,299	40,564	36,990	221,770	94,544	98,118	48,571	183,349	168,000	12	0	0	**1,013,219**
UBUS	4	1,163	32	188	725	705	4,467	1,995	2,147	1,089	4,158	3,804	0	0	0	**20,471**
Total	**534**	**129,364**	**2,908**	**13,907**	**50,150**	**45,950**	**276,754**	**118,392**	**123,305**	**61,170**	**231,158**	**197,481**	**13**	**0**	**0**	**1,251,085**

Total Emissions

	tons/year	**metric tons/ year**	**MTCO2e/ year**
Carbon dioxide	3,212,619	2,914,488	2,914,488

EMFAC 2011
2035 Estimated Annual Emission Rates
EMFAC 2007 Vehicle Categories
Fresno COUNTY
San Joaquin Valley AIR BASIN
San Joaquin Valley Unified APCD

EMFAC2011: EMFAC Emission Rates Database. (Enter: region - County: Fresno, year - 2035, season - annual average, vehicle category - EMFAC2007, model year - aggregated, speed - all speeds, fuel - all) Website: http://www.arb.ca.gov/emfac/
*EMFAC only provides emissions rates up to 2035. Later years are assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDA	GAS	5	691	1132.07	673.30	0.002%
Fresno	2035	LDA	DSL	5	2	503.98	303.82	0.000%
Fresno	2035	LDA	GAS	10	35639	834.33	496.22	0.094%
Fresno	2035	LDA	DSL	10	95	455.14	274.43	0.000%
Fresno	2035	LDA	GAS	15	21241	646.52	384.52	0.056%
Fresno	2035	LDA	DSL	15	57	381.70	230.24	0.000%
Fresno	2035	LDA	GAS	20	808501	514.42	305.95	2.136%
Fresno	2035	LDA	DSL	20	2157	332.22	200.46	0.006%
Fresno	2035	LDA	GAS	25	197185	428.34	254.76	0.521%
Fresno	2035	LDA	DSL	25	526	300.08	181.12	0.001%
Fresno	2035	LDA	GAS	30	537843	368.22	219.00	1.421%
Fresno	2035	LDA	DSL	30	1435	281.26	169.80	0.004%
Fresno	2035	LDA	GAS	35	1366088	328.48	195.36	3.608%
Fresno	2035	LDA	DSL	35	3645	273.56	165.16	0.010%
Fresno	2035	LDA	GAS	40	1943582	303.47	180.49	5.134%
Fresno	2035	LDA	DSL	40	5186	276.08	166.68	0.014%
Fresno	2035	LDA	GAS	45	1929012	292.33	173.86	5.095%
Fresno	2035	LDA	DSL	45	5148	289.12	174.53	0.014%
Fresno	2035	LDA	GAS	50	2232463	292.13	173.74	5.897%
Fresno	2035	LDA	DSL	50	5957	314.19	189.61	0.016%
Fresno	2035	LDA	GAS	55	1665080	303.03	180.23	4.398%
Fresno	2035	LDA	DSL	55	4443	354.31	213.75	0.012%
Fresno	2035	LDA	GAS	60	1897400	325.92	193.84	5.012%
Fresno	2035	LDA	DSL	60	5063	414.66	250.07	0.013%
Fresno	2035	LDA	GAS	65	2035032	363.78	216.36	5.375%
Fresno	2035	LDA	DSL	65	5430	503.66	303.63	0.014%
Fresno	2035	LDA	GAS	70	1953744	390.12	232.03	5.161%
Fresno	2035	LDA	DSL	70	5214	634.98	382.65	0.014%
Fresno	2035	LDT1	GAS	5	103	1314.77	800.57	0.000%
Fresno	2035	LDT1	DSL	5	0	504.83	301.83	0.000%
Fresno	2035	LDT1	GAS	10	5290	969.21	590.16	0.014%
Fresno	2035	LDT1	DSL	10	7	455.72	272.47	0.000%
Fresno	2035	LDT1	GAS	15	3153	750.85	457.20	0.008%
Fresno	2035	LDT1	DSL	15	4	381.89	228.33	0.000%
Fresno	2035	LDT1	GAS	20	120003	597.52	363.84	0.317%
Fresno	2035	LDT1	DSL	20	159	332.15	198.59	0.000%
Fresno	2035	LDT1	GAS	25	29268	497.46	302.91	0.077%
Fresno	2035	LDT1	DSL	25	39	299.83	179.27	0.000%
Fresno	2035	LDT1	GAS	30	79830	427.66	260.41	0.211%
Fresno	2035	LDT1	DSL	30	106	280.92	167.96	0.000%
Fresno	2035	LDT1	GAS	35	202764	381.53	232.32	0.536%
Fresno	2035	LDT1	DSL	35	269	273.18	163.33	0.001%
Fresno	2035	LDT1	GAS	40	288480	352.53	214.66	0.762%
Fresno	2035	LDT1	DSL	40	383	275.71	164.84	0.001%
Fresno	2035	LDT1	GAS	45	286317	339.57	206.77	0.756%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LDT1	DSL	45	380	288.82	172.68	0.001%
Fresno	2035	LDT1	GAS	50	331357	339.33	206.62	0.875%
Fresno	2035	LDT1	DSL	50	440	314.02	187.75	0.001%
Fresno	2035	LDT1	GAS	55	247142	351.99	214.33	0.653%
Fresno	2035	LDT1	DSL	55	328	354.35	211.86	0.001%
Fresno	2035	LDT1	GAS	60	281625	378.58	230.52	0.744%
Fresno	2035	LDT1	DSL	60	374	415.03	248.14	0.001%
Fresno	2035	LDT1	GAS	65	302053	422.57	257.31	0.798%
Fresno	2035	LDT1	DSL	65	401	504.51	301.64	0.001%
Fresno	2035	LDT1	GAS	70	289988	453.16	275.93	0.766%
Fresno	2035	LDT1	DSL	70	385	636.53	380.57	0.001%
Fresno	2035	LDT2	GAS	5	255	1537.71	1044.73	0.001%
Fresno	2035	LDT2	DSL	5	0	502.58	342.88	0.000%
Fresno	2035	LDT2	GAS	10	13181	1133.52	770.12	0.035%
Fresno	2035	LDT2	DSL	10	6	454.17	309.95	0.000%
Fresno	2035	LDT2	GAS	15	7856	878.17	596.63	0.021%
Fresno	2035	LDT2	DSL	15	4	381.38	260.45	0.000%
Fresno	2035	LDT2	GAS	20	299025	698.83	474.79	0.790%
Fresno	2035	LDT2	DSL	20	135	332.34	227.10	0.000%
Fresno	2035	LDT2	GAS	25	72929	581.82	395.29	0.193%
Fresno	2035	LDT2	DSL	25	33	300.48	205.43	0.000%
Fresno	2035	LDT2	GAS	30	198922	500.18	339.82	0.525%
Fresno	2035	LDT2	DSL	30	90	281.83	192.75	0.000%
Fresno	2035	LDT2	GAS	35	505249	446.22	303.16	1.335%
Fresno	2035	LDT2	DSL	35	228	274.20	187.55	0.001%
Fresno	2035	LDT2	GAS	40	718836	412.30	280.12	1.899%
Fresno	2035	LDT2	DSL	40	324	276.70	189.26	0.001%
Fresno	2035	LDT2	GAS	45	713447	397.14	269.82	1.885%
Fresno	2035	LDT2	DSL	45	321	289.62	198.04	0.001%
Fresno	2035	LDT2	GAS	50	825679	396.86	269.63	2.181%
Fresno	2035	LDT2	DSL	50	372	314.47	214.94	0.001%
Fresno	2035	LDT2	GAS	55	615832	411.66	279.69	1.627%
Fresno	2035	LDT2	DSL	55	277	354.23	241.98	0.001%
Fresno	2035	LDT2	GAS	60	701756	442.76	300.82	1.854%
Fresno	2035	LDT2	DSL	60	316	414.05	282.66	0.001%
Fresno	2035	LDT2	GAS	65	752659	494.22	335.77	1.988%
Fresno	2035	LDT2	DSL	65	339	502.27	342.66	0.001%
Fresno	2035	LDT2	GAS	70	722594	529.99	360.08	1.909%
Fresno	2035	LDT2	DSL	70	326	632.42	431.18	0.001%
Fresno	2035	LHD1	GAS	5	28731	2513.50	2262.15	0.076%
Fresno	2035	LHD1	DSL	5	10879	519.04	467.14	0.029%
Fresno	2035	LHD1	GAS	10	74918	2036.13	1832.52	0.198%
Fresno	2035	LHD1	DSL	10	36179	519.04	467.14	0.096%
Fresno	2035	LHD1	GAS	15	170598	1392.43	1253.19	0.451%
Fresno	2035	LHD1	DSL	15	78354	519.04	467.14	0.207%
Fresno	2035	LHD1	GAS	20	197125	1006.07	905.46	0.521%
Fresno	2035	LHD1	DSL	20	85901	519.04	467.14	0.227%
Fresno	2035	LHD1	GAS	25	151847	768.01	691.21	0.401%
Fresno	2035	LHD1	DSL	25	91937	519.04	467.14	0.243%
Fresno	2035	LHD1	GAS	30	134283	619.43	557.49	0.355%
Fresno	2035	LHD1	DSL	30	77607	519.04	467.14	0.205%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	LHD1	GAS	35	50177	527.85	475.06	0.133%
Fresno	2035	LHD1	DSL	35	40956	519.04	467.14	0.108%
Fresno	2035	LHD1	GAS	40	14811	475.23	427.71	0.039%
Fresno	2035	LHD1	DSL	40	22483	519.04	467.14	0.059%
Fresno	2035	LHD1	GAS	45	18234	452.06	406.85	0.048%
Fresno	2035	LHD1	DSL	45	24267	519.04	467.14	0.064%
Fresno	2035	LHD1	GAS	50	134634	454.32	408.89	0.356%
Fresno	2035	LHD1	DSL	50	93703	519.04	467.14	0.248%
Fresno	2035	LHD1	GAS	55	37031	482.42	434.17	0.098%
Fresno	2035	LHD1	DSL	55	56429	519.04	467.14	0.149%
Fresno	2035	LHD2	GAS	5	2869	2513.50	2262.15	0.008%
Fresno	2035	LHD2	DSL	5	2868	519.11	467.20	0.008%
Fresno	2035	LHD2	GAS	10	7482	2036.13	1832.52	0.020%
Fresno	2035	LHD2	DSL	10	9538	519.11	467.20	0.025%
Fresno	2035	LHD2	GAS	15	17037	1392.43	1253.19	0.045%
Fresno	2035	LHD2	DSL	15	20656	519.11	467.20	0.055%
Fresno	2035	LHD2	GAS	20	19686	1006.07	905.46	0.052%
Fresno	2035	LHD2	DSL	20	22646	519.11	467.20	0.060%
Fresno	2035	LHD2	GAS	25	15164	768.01	691.21	0.040%
Fresno	2035	LHD2	DSL	25	24237	519.11	467.20	0.064%
Fresno	2035	LHD2	GAS	30	13410	619.43	557.49	0.035%
Fresno	2035	LHD2	DSL	30	20459	519.11	467.20	0.054%
Fresno	2035	LHD2	GAS	35	5011	527.85	475.06	0.013%
Fresno	2035	LHD2	DSL	35	10797	519.11	467.20	0.029%
Fresno	2035	LHD2	GAS	40	1479	475.23	427.71	0.004%
Fresno	2035	LHD2	DSL	40	5927	519.11	467.20	0.016%
Fresno	2035	LHD2	GAS	45	1821	452.06	406.85	0.005%
Fresno	2035	LHD2	DSL	45	6397	519.11	467.20	0.017%
Fresno	2035	LHD2	GAS	50	13445	454.32	408.89	0.036%
Fresno	2035	LHD2	DSL	50	24702	519.11	467.20	0.065%
Fresno	2035	LHD2	GAS	55	3698	482.42	434.17	0.010%
Fresno	2035	LHD2	DSL	55	14876	519.11	467.20	0.039%
Fresno	2035	MCY	GAS	5	11	266.39	239.75	0.000%
Fresno	2035	MCY	GAS	10	555	242.30	218.07	0.001%
Fresno	2035	MCY	GAS	15	331	205.03	184.53	0.001%
Fresno	2035	MCY	GAS	20	12588	178.74	160.86	0.033%
Fresno	2035	MCY	GAS	25	3070	160.51	144.46	0.008%
Fresno	2035	MCY	GAS	30	8374	148.52	133.67	0.022%
Fresno	2035	MCY	GAS	35	21270	141.68	127.51	0.056%
Fresno	2035	MCY	GAS	40	30261	139.44	125.49	0.080%
Fresno	2035	MCY	GAS	45	30035	141.74	127.57	0.079%
Fresno	2035	MCY	GAS	50	34759	149.02	134.11	0.092%
Fresno	2035	MCY	GAS	55	25925	162.25	146.03	0.068%
Fresno	2035	MCY	GAS	60	29542	183.23	164.91	0.078%
Fresno	2035	MCY	GAS	65	31685	214.91	193.42	0.084%
Fresno	2035	MCY	GAS	70	30420	262.14	235.92	0.080%
Fresno	2035	MDV	GAS	5	262	1969.99	1370.34	0.001%
Fresno	2035	MDV	DSL	5	0	504.23	348.36	0.000%
Fresno	2035	MDV	GAS	10	13533	1452.25	1010.20	0.036%
Fresno	2035	MDV	DSL	10	11	455.31	314.59	0.000%
Fresno	2035	MDV	GAS	15	8066	1125.04	782.58	0.021%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	MDV	DSL	15	6	381.76	263.81	0.000%
Fresno	2035	MDV	GAS	20	307003	895.32	622.79	0.811%
Fresno	2035	MDV	DSL	20	239	332.20	229.60	0.001%
Fresno	2035	MDV	GAS	25	74875	745.38	518.49	0.198%
Fresno	2035	MDV	DSL	25	58	300.00	207.37	0.000%
Fresno	2035	MDV	GAS	30	204229	640.79	445.74	0.539%
Fresno	2035	MDV	DSL	30	159	281.16	194.36	0.000%
Fresno	2035	MDV	GAS	35	518730	571.67	397.66	1.370%
Fresno	2035	MDV	DSL	35	404	273.45	189.04	0.001%
Fresno	2035	MDV	GAS	40	738016	528.23	367.44	1.949%
Fresno	2035	MDV	DSL	40	575	275.97	190.78	0.002%
Fresno	2035	MDV	GAS	45	732483	508.81	353.94	1.935%
Fresno	2035	MDV	DSL	45	571	289.03	199.80	0.002%
Fresno	2035	MDV	GAS	50	847709	508.45	353.68	2.239%
Fresno	2035	MDV	DSL	50	661	314.14	217.13	0.002%
Fresno	2035	MDV	GAS	55	632263	527.41	366.87	1.670%
Fresno	2035	MDV	DSL	55	493	354.32	244.87	0.001%
Fresno	2035	MDV	GAS	60	720479	567.26	394.59	1.903%
Fresno	2035	MDV	DSL	60	562	414.77	286.60	0.001%
Fresno	2035	MDV	GAS	65	772741	633.18	440.44	2.041%
Fresno	2035	MDV	DSL	65	602	503.92	348.14	0.002%
Fresno	2035	MDV	GAS	70	741874	679.00	472.32	1.960%
Fresno	2035	MDV	DSL	70	578	635.44	438.94	0.002%
Fresno	2035	MH	GAS	5	497	2513.50	2262.15	0.001%
Fresno	2035	MH	DSL	5	100	2409.45	2168.51	0.000%
Fresno	2035	MH	GAS	10	2500	2036.13	1832.52	0.007%
Fresno	2035	MH	DSL	10	498	2187.79	1969.01	0.001%
Fresno	2035	MH	GAS	15	3158	1392.43	1253.19	0.008%
Fresno	2035	MH	DSL	15	672	1796.36	1616.72	0.002%
Fresno	2035	MH	GAS	20	3276	1006.07	905.46	0.009%
Fresno	2035	MH	DSL	20	713	1474.12	1326.71	0.002%
Fresno	2035	MH	GAS	25	3650	768.01	691.21	0.010%
Fresno	2035	MH	DSL	25	742	1322.20	1189.98	0.002%
Fresno	2035	MH	GAS	30	4127	619.43	557.49	0.011%
Fresno	2035	MH	DSL	30	893	1241.08	1116.98	0.002%
Fresno	2035	MH	GAS	35	5129	527.85	475.06	0.014%
Fresno	2035	MH	DSL	35	1053	1173.76	1056.39	0.003%
Fresno	2035	MH	GAS	40	6385	475.23	427.71	0.017%
Fresno	2035	MH	DSL	40	1307	1120.25	1008.22	0.003%
Fresno	2035	MH	GAS	45	5823	452.06	406.85	0.015%
Fresno	2035	MH	DSL	45	1070	1080.53	972.47	0.003%
Fresno	2035	MH	GAS	50	5667	454.32	408.89	0.015%
Fresno	2035	MH	DSL	50	1197	1054.61	949.15	0.003%
Fresno	2035	MH	GAS	55	7412	482.42	434.17	0.020%
Fresno	2035	MH	DSL	55	1755	1042.49	938.24	0.005%
Fresno	2035	MH	GAS	60	8553	541.21	487.09	0.023%
Fresno	2035	MH	DSL	60	2109	1044.17	939.76	0.006%
Fresno	2035	MH	GAS	65	1337	641.50	577.35	0.004%
Fresno	2035	MH	DSL	65	332	1059.66	953.69	0.001%
Fresno	2035	OBUS	GAS	5	301	2513.50	2262.15	0.001%
Fresno	2035	OBUS	DSL	5	246	3000.85	2700.76	0.001%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	OBUS	GAS	10	1513	2036.13	1832.52	0.004%
Fresno	2035	OBUS	DSL	10	1134	2416.38	2174.74	0.003%
Fresno	2035	OBUS	GAS	15	1911	1392.43	1253.19	0.005%
Fresno	2035	OBUS	DSL	15	1492	1966.46	1769.81	0.004%
Fresno	2035	OBUS	GAS	20	1982	1006.07	905.46	0.005%
Fresno	2035	OBUS	DSL	20	1992	1667.58	1500.82	0.005%
Fresno	2035	OBUS	GAS	25	2209	768.01	691.21	0.006%
Fresno	2035	OBUS	DSL	25	2067	1554.30	1398.87	0.005%
Fresno	2035	OBUS	GAS	30	2497	619.43	557.49	0.007%
Fresno	2035	OBUS	DSL	30	2883	1513.47	1362.13	0.008%
Fresno	2035	OBUS	GAS	35	3104	527.85	475.06	0.008%
Fresno	2035	OBUS	DSL	35	4257	1496.24	1346.62	0.011%
Fresno	2035	OBUS	GAS	40	3864	475.23	427.71	0.010%
Fresno	2035	OBUS	DSL	40	4544	1388.02	1249.22	0.012%
Fresno	2035	OBUS	GAS	45	3523	452.06	406.85	0.009%
Fresno	2035	OBUS	DSL	45	5085	1412.70	1271.43	0.013%
Fresno	2035	OBUS	GAS	50	3429	454.32	408.89	0.009%
Fresno	2035	OBUS	DSL	50	5431	1369.39	1232.45	0.014%
Fresno	2035	OBUS	GAS	55	4485	482.42	434.17	0.012%
Fresno	2035	OBUS	DSL	55	7117	1329.59	1196.63	0.019%
Fresno	2035	OBUS	GAS	60	5175	541.21	487.09	0.014%
Fresno	2035	OBUS	DSL	60	4814	1154.53	1039.08	0.013%
Fresno	2035	OBUS	GAS	65	809	641.50	577.35	0.002%
Fresno	2035	OBUS	DSL	65	1253	1334.35	1200.91	0.003%
Fresno	2035	SBUS	GAS	5	78	2513.50	2262.15	0.000%
Fresno	2035	SBUS	DSL	5	153	2617.43	2355.69	0.000%
Fresno	2035	SBUS	GAS	10	273	2036.13	1832.52	0.001%
Fresno	2035	SBUS	DSL	10	537	2162.21	1945.98	0.001%
Fresno	2035	SBUS	GAS	15	546	1392.43	1253.19	0.001%
Fresno	2035	SBUS	DSL	15	1074	1775.36	1597.82	0.003%
Fresno	2035	SBUS	GAS	20	741	1006.07	905.46	0.002%
Fresno	2035	SBUS	DSL	20	1458	1400.58	1260.52	0.004%
Fresno	2035	SBUS	GAS	25	1169	768.01	691.21	0.003%
Fresno	2035	SBUS	DSL	25	2302	1306.77	1176.10	0.006%
Fresno	2035	SBUS	GAS	30	1403	619.43	557.49	0.004%
Fresno	2035	SBUS	DSL	30	2762	1226.60	1103.94	0.007%
Fresno	2035	SBUS	GAS	35	1440	527.85	475.06	0.004%
Fresno	2035	SBUS	DSL	35	2835	1160.07	1044.07	0.007%
Fresno	2035	SBUS	GAS	40	972	475.23	427.71	0.003%
Fresno	2035	SBUS	DSL	40	1913	1107.18	996.46	0.005%
Fresno	2035	SBUS	GAS	45	466	452.06	406.85	0.001%
Fresno	2035	SBUS	DSL	45	918	1067.93	961.14	0.002%
Fresno	2035	SBUS	GAS	50	234	454.32	408.89	0.001%
Fresno	2035	SBUS	DSL	50	460	1042.31	938.08	0.001%
Fresno	2035	SBUS	GAS	55	348	482.42	434.17	0.001%
Fresno	2035	SBUS	DSL	55	684	1030.34	927.31	0.002%
Fresno	2035	SBUS	GAS	60	193	541.21	487.09	0.001%
Fresno	2035	SBUS	DSL	60	381	1032.00	928.80	0.001%
Fresno	2035	T6	GAS	5	974	2513.50	2262.15	0.003%
Fresno	2035	T6	DSL	5	5138	2559.93	2303.94	0.014%
Fresno	2035	T6	GAS	10	4894	2036.13	1832.52	0.013%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	T6	DSL	10	25573	2114.70	1903.23	0.068%
Fresno	2035	T6	GAS	15	6182	1392.43	1253.19	0.016%
Fresno	2035	T6	DSL	15	34514	1736.36	1562.72	0.091%
Fresno	2035	T6	GAS	20	6412	1006.07	905.46	0.017%
Fresno	2035	T6	DSL	20	36603	1369.81	1232.83	0.097%
Fresno	2035	T6	GAS	25	7145	768.01	691.21	0.019%
Fresno	2035	T6	DSL	25	38121	1278.07	1150.26	0.101%
Fresno	2035	T6	GAS	30	8078	619.43	557.49	0.021%
Fresno	2035	T6	DSL	30	45837	1199.66	1079.69	0.121%
Fresno	2035	T6	GAS	35	10040	527.85	475.06	0.027%
Fresno	2035	T6	DSL	35	54048	1134.59	1021.13	0.143%
Fresno	2035	T6	GAS	40	12498	475.23	427.71	0.033%
Fresno	2035	T6	DSL	40	67093	1082.86	974.57	0.177%
Fresno	2035	T6	GAS	45	11398	452.06	406.85	0.030%
Fresno	2035	T6	DSL	45	54940	1044.47	940.02	0.145%
Fresno	2035	T6	GAS	50	11092	454.32	408.89	0.029%
Fresno	2035	T6	DSL	50	61487	1019.42	917.48	0.162%
Fresno	2035	T6	GAS	55	14508	482.42	434.17	0.038%
Fresno	2035	T6	DSL	55	90103	1007.70	906.93	0.238%
Fresno	2035	T6	GAS	60	16741	541.21	487.09	0.044%
Fresno	2035	T6	DSL	60	108274	1009.33	908.40	0.286%
Fresno	2035	T6	GAS	65	2616	641.50	577.35	0.007%
Fresno	2035	T6	DSL	65	17039	1024.30	921.87	0.045%
Fresno	2035	T7	GAS	5	47	2513.50	2262.15	0.000%
Fresno	2035	T7	DSL	5	11173	3956.49	3560.84	0.030%
Fresno	2035	T7	GAS	10	230	2036.13	1832.52	0.001%
Fresno	2035	T7	DSL	10	42683	3268.37	2941.53	0.113%
Fresno	2035	T7	GAS	15	251	1392.43	1253.19	0.001%
Fresno	2035	T7	DSL	15	52201	2683.61	2415.25	0.138%
Fresno	2035	T7	GAS	20	429	1006.07	905.46	0.001%
Fresno	2035	T7	DSL	20	128970	2117.10	1905.39	0.341%
Fresno	2035	T7	GAS	25	560	768.01	691.21	0.001%
Fresno	2035	T7	DSL	25	117904	1975.31	1777.78	0.311%
Fresno	2035	T7	GAS	30	1023	619.43	557.49	0.003%
Fresno	2035	T7	DSL	30	199056	1854.12	1668.71	0.526%
Fresno	2035	T7	GAS	35	1819	527.85	475.06	0.005%
Fresno	2035	T7	DSL	35	358106	1753.56	1578.20	0.946%
Fresno	2035	T7	GAS	40	1585	475.23	427.71	0.004%
Fresno	2035	T7	DSL	40	337948	1673.61	1506.25	0.893%
Fresno	2035	T7	GAS	45	1678	452.06	406.85	0.004%
Fresno	2035	T7	DSL	45	473149	1614.27	1452.85	1.250%
Fresno	2035	T7	GAS	50	1755	454.32	408.89	0.005%
Fresno	2035	T7	DSL	50	492063	1575.55	1418.00	1.300%
Fresno	2035	T7	GAS	55	2576	482.42	434.17	0.007%
Fresno	2035	T7	DSL	55	600041	1557.45	1401.71	1.585%
Fresno	2035	T7	GAS	60	636	541.21	487.09	0.002%
Fresno	2035	T7	DSL	60	182794	1559.97	1403.97	0.483%
Fresno	2035	T7	GAS	65	341	641.50	577.35	0.001%
Fresno	2035	T7	DSL	65	100120	1583.10	1424.79	0.264%
Fresno	2035	UBUS	GAS	5	191	2513.50	2262.15	0.001%
Fresno	2035	UBUS	DSL	5	471	2299.61	2069.65	0.001%

assumed to use the same emission rates.

Area	CalYr	Veh	Fuel	Speed (Miles/hr)	VMT (miles/day)	CO2_RUNEX (gms/mile)	CO2_RUNEX(Pa (gms/mile)	Percent of Total VMT
Fresno	2035	UBUS	GAS	10	686	2036.13	1832.52	0.002%
Fresno	2035	UBUS	DSL	10	1691	2299.61	2069.65	0.004%
Fresno	2035	UBUS	GAS	15	1372	1392.43	1253.19	0.004%
Fresno	2035	UBUS	DSL	15	3383	2299.61	2069.65	0.009%
Fresno	2035	UBUS	GAS	20	1811	1006.07	905.46	0.005%
Fresno	2035	UBUS	DSL	20	4464	2299.61	2069.65	0.012%
Fresno	2035	UBUS	GAS	25	2727	768.01	691.21	0.007%
Fresno	2035	UBUS	DSL	25	6723	2299.61	2069.65	0.018%
Fresno	2035	UBUS	GAS	30	3414	619.43	557.49	0.009%
Fresno	2035	UBUS	DSL	30	8415	2299.61	2069.65	0.022%
Fresno	2035	UBUS	GAS	35	3345	527.85	475.06	0.009%
Fresno	2035	UBUS	DSL	35	8247	2299.61	2069.65	0.022%
Fresno	2035	UBUS	GAS	40	2412	475.23	427.71	0.006%
Fresno	2035	UBUS	DSL	40	5945	2299.61	2069.65	0.016%
Fresno	2035	UBUS	GAS	45	1051	452.06	406.85	0.003%
Fresno	2035	UBUS	DSL	45	2592	2299.61	2069.65	0.007%
Fresno	2035	UBUS	GAS	50	534	454.32	408.89	0.001%
Fresno	2035	UBUS	DSL	50	1317	2299.61	2069.65	0.003%
Fresno	2035	UBUS	GAS	55	662	482.42	434.17	0.002%
Fresno	2035	UBUS	DSL	55	1632	2299.61	2069.65	0.004%
Fresno	2035	UBUS	GAS	60	1084	541.21	487.09	0.003%
Fresno	2035	UBUS	DSL	60	2672	2299.61	2069.65	0.007%

Community Greenhouse Gas Inventory
Energy
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Electricity

Emission Factors (lbs/kWh)

Carbon dioxide *	0.290
Methane	0.000031
Nitrous oxide	0.000011

	(kWh/year)	Per capita (kWh/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	2,531,700,000	2,610	367097	39.2	13.9	337,694
Commercial	2,950,179,600	7,503	427776	45.7	16.2	393,513
Industrial	0		0	0.0	0.0	0
Total	**5,481,879,600**		**794,873**	**85.0**	**30.2**	**731,206**

Natural Gas

Emission Factors (lbs/therm)

Carbon dioxide	11.7
Methane	0.001
Nitrous oxide	0.00002

	(therms/year)	Per capita (therms/person or employee/year)	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Residential	133,860,000	138	783,081	73.6	1.5	712,228
Commercial	158,459,600	403	926,989	87.2	1.7	843,115
Industrial	0		0	0.0	0.0	0
Total	**292,319,600**		**1,710,070**	**160.8**	**3.2**	**1,555,342**

Notes and Sources:

*Used the 2020 emission factor.

- Emission factors for methane and nitrous oxide: California Air Resources Board (ARB). 2010. Local Government Operations Protocol. Version 1.1. (Electricity is from Table G.7 for 2005 and natural gas is from Table G.3 and converted)

- Emission factors for carbon dioxide from: PG&E 2013. Pacific Gas and Electric Company. ; PG&E. 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.

- Residential per capita is based on the population; commercial per capita is based on the number of employees

- Per capita emission rates are from the year 2010 based on actual usage from PG&E. The electricity and natural gas usage for this year are calculated as the per capita rate multiplied by the projected population.

Community Greenhouse Gas Inventory
Offroad Equipment
Year: 2056

Prepared by FirstCarbon Solutions

Note: data entry values are in yellow

Agricultural Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	896	0.0329	0.0081	815
Fresno	780,600	537	0	0	489
Percent Fresno/Fresno County	60.0%				

Other Equipment

Location	Year 2035 Population	Emissions (tons/year) CO2	CH4	N2O	Emissions MTCO2e
Fresno County	1,301,000	1,468	0.384	0.12457	1,375
Fresno	780,600	881	0	0	825
Percent Fresno/Fresno County	60.0%				

Total Fresno	**1,314**

Notes:
Emissions for Fresno County are from OFFROAD2007 for the year 2035; emissions from Fresno are apportioned based on population in 2035

The "other" category includes: recreational equipment (off-road vehicles, all terrain vehicles), construction and mining equipment, industrial equipment, lawn and garden equipment, light commercial equipment, logging equipment, recreational equipment, airport ground support equipment, transport refrigeration units, military tactical support equipment, railyard operations, pleasure craft (boats).

Community Greenhouse Gas Inventory
Ozone Depleting Substance Substitutes
Year: 2056
Prepared by FirstCarbon Solutions
Note: data entry values are in yellow

California		
	2020 Emissions (MTCO2e per person)*	0.89
Fresno		
	Population	970,000
	Emissions (MTCO2e per person)	863,300
	(estimated by using 2020 California per person emissions)	

Sources/Notes:
* 2020 California per capita emissions rate.

Appendix G: Storm Drainage

G.1 - Storm Drainage Technical Report

Storm Drainage Technical Report

for the

City of Fresno General Plan Update MEIR

6/17/2013

Introduction

The City of Fresno (City) is in the process of developing their General Plan Update. The last update to the City's General Plan was in 2002. The General Plan Update, in part, encourages infill projects and facilitates revitalization. The Master Environmental Impact Report evaluates the impacts associated with the General Plan Update and proposes mitigation measures. The Fresno Metropolitan Flood Control District (FMFCD) develops and maintains the Storm Drainage Master Plan (SDMP) for the Fresno-Clovis Metropolitan Area, including which includes the planning area for the General Plan Update.

The SDMP consists of 134 drainage areas, with each drainage area being a self contained watershed consisting of a collection system and a disposal system. In all cases, the collection system consists of storm drainage inlets, manholes, pipelines, and outfall structures. In most cases, the disposal facility is a recharge basin capable of storing the runoff from 6 inches of rainfall on the watershed. However, some drainage areas drain directly to pump stations that lift the runoff into a nearby canal. Or, in case of 10 drainage areas, the runoff is discharged into the San Joaquin River after having been detained in a water quality basin. The design level of service for the collection system is a 2-year return frequency rainfall intensity regime. The drainage facilities in the drainage areas vary as to the level of completion from completely installed to no facilities installed. This condition exists because the District has a two pronged method of implementing the SDMP. For the developed areas of the cities, the SDMP has been funded and then implemented either through assessment district proceedings, through federal and state grants, low interest clean water loans, or through a drainage fee program, or a combination of these funding mechanisms. This approached was necessary because the storm drainage system is "playing catch-up" in the developed areas to provide service and there was insufficient development to generate drainage fees to fund the system. In undeveloped areas, FMFCD implements the SDMP in anticipation of development through the purchase of retention basins, and as development occurs to install collection systems and excavate the retention basins. Funding of the SDMP in developing areas occurs through the drainage fees charged by the Cities of Fresno and Clovis and Fresno County on properties as they receive entitlements to develop and through developer constructed facilities. The FMFCD administers the drainage fees, which are transferred from the cities and the County to the District on a semi-annual basis. Developer constructed projects are administered by FMFCD through developer agreements where FMFCD will accept for ownership and maintenance storm drainage facilities constructed by developers in lieu of paying drainage fees.

The SDMP is updated on an ongoing basis by FMFCD as staff time is available to conform with the most current land using planning documents, which in this case is the 2025 General Plan, and in anticipation of development in newly developing areas, such as the west side of the City of Fresno and the South East Growth Area (SEGA). The SDMP is also updated to reflect the construction of new developments, capital improvement projects, and developer constructed projects.

The SDMP is maintained in three digital formats, the Geographic Information Systems geodatabase which contains the geospatial information of the collection and disposal systems is maintained in ESRI™ ArcInfo®,

the hydrologic and hydraulic modeling of the collection systems is maintained in a FMFCD software system, and the retention and water quality basin schematic designs are maintained as AutoDesk™ AutoCad® dwg files. FMFCD also maintains record drawings of all constructed facilities in hardcopy format.

Changes to land use can have impacts on drainage area collection facilities and disposal facilities depending on whether the change increases or decreases runoff rate and volume from a drainage area. Land use changes that increase runoff rates and volumes will have a negative impact on the drainage area collection and disposal facilities. Conversely, land use changes the decrease runoff rates and volumes can have a positive impact on the drainage area collection and disposal facilities. A prime contributor to runoff rate and volume is the amount of impervious area within the drainage area. Imperviousness is directly tied to the type of land use, e.g. single family home developments tend to have less impervious surfaces (roofs, concrete, and pavement) than multi-family developments and shopping center developments tend to have more impervious surfaces than multi-family developments. A gauge of the amount of imperviousness of a drainage area is its Equivalent Area, known in the engineering community as CA. The CA of a drainage area is the sum of the products of the area (A) for each individual land use times the runoff factor (C) for the land use, hence the term CA. The drainage area CA is calculated as the sum of all of the individual land use areas times their runoff factors. A chart of the standard FMFCD runoff factors (C factors) is included in Appendix A of this report.

Collection systems are negatively impacted by increases in CA because the increased equivalent area results in increase peak runoff rates. Increasing peak runoff rates will increase friction losses in pipelines, which could result in decrease in the ability of the pipeline collection system to convey the peak runoff rates from the storm drain inlets to the retention and detention basins. The decrease in the pipeline collection system's capability to convey peak stormwater runoff could result in flooding at the inlets and at manhole locations.

Retention and detention basin are negatively impacted by increases in CA because the increased equivalent area will increase the runoff volume resulting from a rainfall event on the drainage area. The basins have fixed volumes based on the calculation of the runoff that would result from 6 inches of rainfall on the drainage area. Increasing the runoff volume creates a deficit between what the retention or detention basin for the watershed can store and what the runoff volume that will occur. The deficit will result in flooding of streets at the basin locations.

The FMFCD grading design criteria requires that, as far as possible, the water due to flooding at basins and inlets cannot exceed the finish floors of adjacent building before it can flow out of the catchment area for the basin or the inlet. This grading requirement seeks to ensure that buildings are not flooded due to drainage collection or disposal system failures. However, there are locations within the Planning Boundary where development predates the grading design criteria and flooding of buildings can occur before the ponding at the inlets and basins can flow out of the catchment area.

Summary of Analysis

The Technical Evaluation of the impacts of land use changes on the SDMP was limited to comparisons of the changes in Equivalent Area (CA) for each drainage area. The comparisons were made between the present day condition and the 2025 General Plan land uses at full build out and between the 2025 General Plan land uses and the General Plan Update land uses at full building out.

The methodology that was employed to calculate the CAs for these two conditions was straight forward. The land uses for the three conditions were provided by the City of Fresno Planning and Development Department in the form of geodatabases. In addition, the land uses utilized by FMFCD in their master

planning process were also furnished FMFCD in the form of geodatabases. All of the geodatabases were georeferenced to California State Plane Coordinate System, Zone 4, Foot, NAD83 Datum. The Existing Land Use (ELU) geodatabase information was inserted into and ESRI ArcMap mxd file and the standard FMFCD runoff factors (C factors) were assigned to the various land uses in the land uses in the attribute file using Python scripting. This produced an ESRI shape file that provided georeferenced land uses C factors. The georeferenced land uses with C factors were cut using the drainage area topology and then dissolved by drainage area to produce an attribute table for each drainage area that contained land use, C factor and area for the drainage area. Finally, the product of each land use times its C factor was calculated and each of the products were summed to calculate the total Equivalent Area, CA, for the drainage area. The vacant land use was assigned a C factor of 0.20 to represent open land. The same procedure was used with the General Plan Update land uses to assign C factors to the Planned Land Uses and calculate the total CA for each drainage area. The 2025 General Plan land uses were used for the General Plan Update.

A different procedure was used to develop the C factors for the 2025 General Plan update. In this case, the FMFCD land uses and C factors were joined with the City of Fresno 2025 General Plan land uses to create the 2025 General Plan Condition. This methodology was used because FMFCD does not have C factors assigned to the entire City in their geodatabase. Therefore it was necessary to "fill in the holes" in the FMFCD C factors with another source. The source of the fill in information was the 2025 General Plan land uses as this was the land use information that matched most closely to the present master planning work by FMFCD. Standard FMFCD C factors were assigned to the 2025 General Plan land uses. From that point, on the methodology of calculating the overall drainage area CA was the same as that used for the ELU and the General Plan Update.

The Existing Land Use, the 2025 General Plan land use and the General Plan Update land use geodatabases excluded the street rights of ways from the land use areas. The FMFCD land use areas included the street rights of ways, which are usually included in the master planning process as having the same C factor as the adjacent land use. It was necessary to normalize the land use areas for each drainage area by including the streets in the Existing Land Use, the 2025 General Plan land use and the General Plan Update land use. This was accomplished by determining the gross area for each drainage area, the net area of the drainage area as the total of the areas of the individual land uses within the drainage area, and distributing the missing area to the total area for each land use. This resulted in effect, to determining the average C factor for the drainage area and applying it to the difference between the gross area of the drainage area and the net area of the watershed.

There are areas within the planning boundary, primarily within the Southeast Growth Area (SEGA), that have not been master planned by FMFCD. These areas are being studied for the optimal drainage area configuration and master planning of the areas will follow the optimization study.

The Fulton Corridor Specific Plan and Community Plan EIR Technical Report evaluated the impacts to the existing and proposed storm drainage facilities within the planning boundary for the specific plan utilizing the same methodology previously discussed in this report

Results – Impacts to Drainage Area CA

The results of comparing the total Equivalent Area, CA for the Existing Condition Land Use to the 2025 General Plan Land Use and the 2025 General Plan Land Use to the General Plan Update are discussed in this section and presented in the appendixes to this report. Generally speaking, the aggregate increase in CA from the Existing Land Use Condition to the 2025 General Plan Land Use condition was 27 percent for all drainage areas within the planning boundary. The maximum increase in any drainage

area was 246 percent, which occurred in Drainage Area CS. The minimum change was a negative 13 percent, which occurred in Drainage Area DF. The increase in Drainage Area CS, and in fact most of the drainage areas where the CA increased, was due to the relatively large portion of the drainage area that is undeveloped at present, but is planned to be developed. The increases in CA indicates the need for the implementation of the SDMP as the properties within the drainage area develop. Decreases in drainage area CA are not considered triggers for drainage system review or master plan changes.

The results of the comparison of the change in CA for Existing Land Use Condition to the 2025 Land Use Condition are shown Table 1 below and graphically as bar charts and in map form in Appendix B of this report.

Table 1 – Change in CA - Existing Land Use Compared to 2025 General Plan Land Use

Drainage Area Designation	Drainage Area Size acres	ELU Drainage Area CA Equivalent acres	2025 General Plan Drainage Area CA Equivalent acres	Change in CA
A	524.89	410.87	207.97	-1.59%
AA	441.57	158.63	212.93	2.77%
AB	780.55	69.22	268.33	8.00%
AC	670.33	186.17	253.93	17.69%
AD	387.59	146.95	116.01	-8.35%
AE	616.35	398.43	218.03	8.95%
AF	433.95	123.15	225.32	8.28%
AG	730.31	49.01	401.77	15.45%
AH	752.69	135.98	450.65	28.71%
AI	506.14	218.24	244.37	55.05%
AJ	393.78	129.70	140.33	16.12%
AK	1136.90	167.38	495.81	33.07%
AL	968.12	144.13	395.15	27.86%
AN	656.10	60.54	221.23	12.80%
AO	676.97	336.69	321.82	81.50%
AR	409.65	429.02	260.36	188.10%
AS	900.16	144.30	450.26	87.09%
AU	376.72	259.95	180.80	120.58%
AV	852.11	88.15	518.89	112.61%

Drainage Area Designation	Drainage Area Size acres	ELU Drainage Area CA Equivalent acres	2025 General Plan Drainage Area CA Equivalent acres	Change in CA
AW1	325.20	53.87	238.97	90.87%
AW2	344.11	39.77	252.82	50.46%
AX	349.48	68.45	254.07	190.18%
AY	317.24	296.80	230.07	73.54%
AZ	158.96	281.37	119.22	192.27%
B	500.74	217.23	201.92	-1.81%
BB	1095.24	137.47	403.90	-7.68%
BD	519.99	97.98	273.94	108.61%
BE	450.54	755.64	142.62	22.44%
BF	375.41	254.92	134.80	17.24%
BG	754.47	32.59	369.28	96.24%
BH	1014.87	84.00	320.33	9.17%
BK	288.25	247.49	320.33	20.62%
BL	787.71	60.94	435.85	166.99%
BM	1511.13	652.92	636.00	45.19%
BO	564.55	192.24	230.40	37.49%
BP	145.69	132.89	91.03	28.44%
BQ	589.20	843.60	314.58	109.93%
BR	279.66	280.49	175.33	192.58%
BS	1154.59	300.70	553.03	109.06%
BU	1041.13	266.80	594.06	44.59%
BV	635.38	62.14	242.05	52.59%
BW	221.17	82.22	71.92	3.91%
BZ	652.39	234.98	212.62	14.21%
C	414.91	71.33	151.13	2.85%
CC	1002.30	150.32	411.40	3.25%
CD	606.19	154.80	296.50	140.77%

Drainage Area Designation	Drainage Area Size acres	ELU Drainage Area CA Equivalent acres	2025 General Plan Drainage Area CA Equivalent acres	Change in CA
CE	245.52	174.06	167.85	242.45%
CG	536.87	185.48	207.23	52.39%
CH	881.44	889.69	390.45	78.90%
CI	456.50	146.90	175.72	35.48%
CJ	673.23	248.78	322.40	92.61%
CK	540.35	152.04	234.52	62.71%
CL	181.02	355.03	58.27	-3.75%
CM	775.23	170.12	352.78	4.78%
CN	884.11	969.96	473.53	10.38%
CO1	402.21	395.92	146.29	1.38%
CO2	512.38	296.22	271.14	4.30%
CP	311.21	202.76	185.58	110.53%
CQ	217.80	145.91	94.10	74.70%
CS	198.84	459.82	137.61	246.03%
CU	289.59	214.99	193.41	182.57%
CW	805.43	162.54	346.54	16.76%
CX	799.46	287.82	283.34	0.70%
CY	605.40	300.97	216.39	-0.39%
CZ	393.42	299.94	142.44	3.61%
D	320.11	320.78	104.06	6.20%
DD	2036.45	217.05	765.20	1.26%
DE	859.29	186.18	338.26	32.69%
DF	103.56	169.73	28.31	-13.12%
DG	276.75	128.06	84.89	1.07%
DH	500.68	173.74	259.86	5.00%
DI	256.43	190.20	69.11	13.42%
DK	2155.94	45.48	731.32	12.01%

Drainage Area Designation	Drainage Area Size acres	ELU Drainage Area CA Equivalent acres	2025 General Plan Drainage Area CA Equivalent acres	Change in CA
DN	816.14	283.11	344.84	79.38%
E	358.83	1007.51	138.57	4.27%
EE	2352.82	135.08	859.27	1.86%
EF	850.13	86.99	313.42	11.74%
EG	900.52	231.12	372.80	23.98%
EH	905.79	162.70	469.92	76.13%
EI	217.46	83.93	118.41	90.55%
EJ	307.89	226.11	125.49	52.63%
EK	724.12	361.78	233.70	-0.54%
EL	133.32	347.11	92.30	29.40%
EM	558.76	49.24	228.59	52.07%
EN	594.48	295.07	294.44	90.21%
EO	748.61	97.48	317.22	82.24%
F	479.72	142.96	192.13	3.58%
FF	1900.89	174.41	966.72	8.66%
G	418.21	215.68	158.32	7.77%
GG	650.39	718.74	270.81	8.86%
H	415.82	135.22	154.91	1.89%
HH	919.86	410.87	605.52	70.55%
I	510.75	158.63	169.63	-0.29%
II1	2013.53	69.22	1160.34	19.63%
II2	1012.62	186.17	441.62	11.54%
II3	730.00	146.95	332.84	12.36%
II4	540.71	398.43	210.71	3.92%
J	438.59	123.15	149.63	2.55%
JJ	1175.72	49.01	481.16	4.64%
K	610.03	135.98	221.75	3.15%

Drainage Area Designation	Drainage Area Size acres	ELU Drainage Area CA Equivalent acres	2025 General Plan Drainage Area CA Equivalent acres	Change in CA
KK	333.11	218.24	195.88	20.51%
L	599.61	129.70	290.09	0.79%
LL	546.42	167.38	399.81	32.84%
M	630.97	144.13	301.50	0.52%
MM	906.17	60.54	305.19	-4.86%
N	496.46	336.69	238.71	9.98%
NN	789.22	429.02	284.03	52.56%
O	440.53	144.30	170.47	0.44%
OO	376.67	259.95	155.85	21.70%
P	507.99	88.15	190.20	9.47%
PP	487.79	53.87	196.10	3.10%
Q	138.55	39.77	46.64	2.55%
R	755.79	68.45	314.75	11.18%
RR	2405.52	296.80	1140.05	13.16%
SS	519.90	281.37	218.02	61.40%
T	318.56	217.23	208.15	139.29%
TT	798.12	137.47	340.07	47.14%
U	313.56	97.98	164.02	0.81%
UU1	226.05	755.64	92.03	9.64%
UU2	542.16	254.92	232.22	2.70%
UU3	1171.46	32.59	518.55	43.33%
V	775.97	84.00	357.75	3.06%
VV	122.38	247.49	46.47	-5.63%
W	667.38	60.94	392.19	32.91%
WW	190.75	652.92	101.49	4.11%
X	432.19	192.24	149.87	4.83%
XX	422.99	132.89	236.47	35.58%

Drainage Area Designation	Drainage Area Size acres	ELU Drainage Area CA Equivalent acres	2025 General Plan Drainage Area CA Equivalent acres	Change in CA
Y	654.25	843.60	232.48	7.79%
Z	1709.74	280.49	765.22	6.47%
ZZ	413.48	300.70	223.24	65.09%

The comparison of the 2025 General Plan land uses to the General Plan Update land uses resulted in an aggregated increase in CA for the planning area of 5.2 percent for all of the drainage areas within the planning boundary. The greatest change in Equivalent Area (CA) was in Drainage Area BR where a large amount of land within in the Fresno Yosemite International Airport takeoff and landing clear zone was changed from industrial land use in the 2025 General Plan to open space in the 2035 General Plan Update resulted in a 57 percent decrease in CA. The largest increase in CA was in Drainage Area U of 13.5 percent where land that was designated as open space in the 2025 General Plan was changed to the industrial land use in the 2035 General Plan Update.

In general, increases in CA in drainage areas was due to the change in land uses from multifamily land uses in the 2025 General Plan to single family land uses in the General Plan Update or from industrial land uses in the 2025 General Plan to single family land uses in the General Plan Update. An increase in CA that exceeds 5 percent indicates the need for possibly updating the SDMP to determine the impacts to the collection system and mitigation measures to reduce runoff volumes to mitigate impacts to retention and detention basin capacities or the implementation of the SDMP as the properties within the drainage area develop. Decreases in drainage area CA are not considered triggers for drainage system review or master plan changes.

Ten drainage areas showed a change in CA that equaled or was greater than 5 percent. These drainage areas are: C, AV, AG, N, MM, VV, KK, NN, and U. All other drainage areas decreased in CA or the change was less than 5 percent.

The results of the comparison of the change in CA for the 2025 Land Use Condition to the General Plan Update are shown Table 2 below and graphically as bar charts and in map form in Appendix C of this report.

Table 2 – Change in CA - 2025 General Plan Land Use Compared to General Plan Update Land Use

Drainage Area Designation	Drainage Area Size acres	2025 General Plan Drainage Area CA Equivalent acres	2035 General Plan Drainage Area CA Equivalent acres	Change in CA
A	524.89	207.97	209.22	0.60%
AA	441.57	212.93	209.51	-1.60%
AB	780.55	268.33	245.06	-8.67%
AC	670.33	253.93	250.32	-1.42%

Drainage Area Designation	Drainage Area Size acres	2025 General Plan Drainage Area CA Equivalent acres	2035 General Plan Drainage Area CA Equivalent acres	Change in CA
AD	387.59	116.01	116.22	0.18%
AE	616.35	218.03	226.34	3.81%
AF	433.95	225.32	228.76	1.53%
AG	730.31	401.77	428.48	6.65%
AH	752.69	450.65	454.38	0.83%
AI	506.14	244.37	217.13	-11.15%
AJ	393.78	140.33	129.86	-7.46%
AK	1136.90	495.81	448.02	-9.64%
AL	968.12	395.15	344.78	-12.75%
AN	656.10	221.23	206.56	-6.63%
AO	676.97	321.82	250.48	-22.17%
AR	409.65	260.36	257.47	-1.11%
AS	900.16	450.26	291.97	-8.01%
AU	376.72	180.80	115.31	-36.22%
AV	852.11	518.89	553.38	6.65%
AW1	325.20	238.97	234.28	-1.96%
AW2	344.11	252.82	250.91	-0.76%
AX	349.48	254.07	252.42	-0.65%
AY	317.24	230.07	227.45	-1.14%
AZ	158.96	119.22	119.12	-0.09%
B	500.74	201.92	206.35	4.06%
BB	1095.24	403.90	398.72	-1.28%
BD	519.99	273.94	198.15	-27.67%
BE	450.54	142.62	129.62	-9.11%
BF	375.41	134.80	131.04	-2.79%
BG	754.47	369.28	282.10	-23.61%
BH	1014.87	320.33	315.67	-1.45%

Drainage Area Designation	Drainage Area Size acres	2025 General Plan Drainage Area CA Equivalent acres	2035 General Plan Drainage Area CA Equivalent acres	Change in CA
BK	288.25	320.33	153.00	3.23%
BL	787.71	435.85	394.78	-9.42%
BM	1511.13	636.00	583.13	-8.31%
BO	564.55	230.40	232.08	0.73%
BP	145.69	91.03	70.90	-22.12%
BQ	589.20	314.58	265.41	-15.63%
BR	279.66	175.33	75.28	-57.06%
BS	1154.59	553.03	378.91	-31.48%
BU	1041.13	594.06	617.54	3.95%
BV	635.38	242.05	205.46	-15.12%
BW	221.17	71.92	66.94	-6.92%
BZ	652.39	212.62	193.98	-8.77%
C	414.91	151.13	159.34	5.45%
CC	1002.30	411.40	409.72	-0.41%
CD	606.19	296.50	245.33	-17.26%
CE	245.52	167.85	164.39	-2.06%
CG	536.87	207.23	169.88	-18.02%
CH	881.44	390.45	271.03	-30.59%
CI	456.50	175.72	91.12	-48.14%
CJ	673.23	322.40	201.46	-37.51%
CK	540.35	234.52	171.28	-26.96%
CL	181.02	58.27	60.48	3.79%
CM	775.23	352.78	361.61	2.50%
CN	884.11	473.53	437.96	-7.51%
CO1	402.21	146.29	145.09	-0.82%
CO2	512.38	271.14	277.80	2.46%
CP	311.21	185.58	108.94	-41.30%

Drainage Area Designation	Drainage Area Size acres	2025 General Plan Drainage Area CA Equivalent acres	2035 General Plan Drainage Area CA Equivalent acres	Change in CA
CQ	217.80	94.10	72.64	-22.81%
CS	198.84	137.61	92.94	-32.46%
CU	289.59	193.41	181.13	-6.35%
CW	805.43	346.54	338.27	-2.39%
CX	799.46	283.34	285.34	0.71%
CY	605.40	216.39	213.12	-1.51%
CZ	393.42	142.44	138.28	-2.92%
D	320.11	104.06	99.36	-4.52%
DD	2036.45	765.20	769.22	0.53%
DE	859.29	338.26	296.66	-12.30%
DF	103.56	28.31	28.71	1.38%
DG	276.75	84.89	85.86	1.14%
DH	500.68	259.86	260.22	0.14%
DI	256.43	69.11	60.64	-12.26%
DK	2155.94	731.32	671.83	-8.13%
DN	816.14	344.84	253.29	-24.04%
E	358.83	138.57	133.47	-6.16%
EE	2352.82	859.27	845.75	-1.57%
EF	850.13	313.42	307.02	-2.04%
EG	900.52	372.80	340.33	-8.71%
EH	905.79	469.92	441.85	-5.97%
EI	217.46	118.41	57.92	-51.08%
EJ	307.89	125.49	93.68	-25.35%
EK	724.12	233.70	235.08	0.59%
EL	133.32	92.30	96.85	4.93%
EM	558.76	228.59	223.77	-2.11%
EN	594.48	294.44	283.73	-3.64%

Drainage Area Designation	Drainage Area Size acres	2025 General Plan Drainage Area CA Equivalent acres	2035 General Plan Drainage Area CA Equivalent acres	Change in CA
EO	748.61	317.22	244.78	-22.84%
F	479.72	192.13	189.02	-1.62%
FF	1900.89	966.72	941.54	-2.60%
G	418.21	158.32	148.06	-6.48%
GG	650.39	270.81	270.71	-0.04%
H	415.82	154.91	152.44	-1.59%
HH	919.86	605.52	622.66	2.83%
I	510.75	169.63	164.47	-3.05%
II1	2013.53	1160.34	1165.03	0.40%
II2	1012.62	441.62	458.14	3.74%
II3	730.00	332.84	333.62	0.24%
II4	540.71	210.71	210.98	0.13%
J	438.59	149.63	147.53	-1.41%
JJ	1175.72	481.16	471.47	-2.01%
K	610.03	221.75	215.30	-2.91%
KK	333.11	195.88	215.11	10.90%
L	599.61	290.09	284.73	-1.85%
LL	546.42	399.81	392.68	-1.78%
M	630.97	301.50	303.46	0.65%
MM	906.17	305.19	329.01	7.80%
N	496.46	238.71	256.50	7.45%
NN	789.22	284.03	320.35	12.79%
O	440.53	170.47	166.51	-2.32%
OO	376.67	155.85	153.99	-1.19%
P	507.99	190.20	177.20	-6.83%
PP	487.79	196.10	202.30	3.16%
Q	138.55	46.64	43.04	-7.71%

Drainage Area Designation	Drainage Area Size acres	2025 General Plan Drainage Area CA Equivalent acres	2035 General Plan Drainage Area CA Equivalent acres	Change in CA
R	755.79	314.75	295.26	-6.19%
RR	2405.52	1140.05	1106.95	-2.90%
SS	519.90	218.02	174.01	-20.19%
T	318.56	208.15	211.31	1.52%
TT	798.12	340.07	305.01	-10.31%
U	313.56	164.02	186.18	13.51%
UU1	226.05	92.03	89.99	-2.21%
UU2	542.16	232.22	228.31	-1.69%
UU3	1171.46	518.55	522.92	0.84%
V	775.97	357.75	350.01	-2.16%
VV	122.38	46.47	51.44	10.70%
W	667.38	392.19	390.91	-0.33%
WW	190.75	101.49	97.79	-3.64%
X	432.19	149.87	155.57	3.80%
XX	422.99	236.47	243.54	2.99%
Y	654.25	232.48	232.68	0.09%
Z	1709.74	765.22	755.85	-1.22%
ZZ	413.48	223.24	219.22	-1.80%

The results of the similar analysis performed in the Fulton Corridor Specific Plan and Community Plan EIR Technical Report found that the land uses for the specific plan will not result in an increase in CA within the planning boundary. The proposed land uses are not expected to cause any reduction in service level for the FF and II-1 drainage areas collection systems which provide runoff collection service for the Fulton Corridor Specific Plan and Community Plan area.

Results of Impacts to Retention Basins – Existing Condition to 2025 General Plan

A comparison of the retention basins storage capacities using data provided by the FMFCD, shows that 37 drainage areas will have increases in CA that will result in runoff volumes that will exceed the design capacity of the basins in the Existing Condition to the 2025 General Plan condition. FMFCD has linked these basins to downstream basins with planned or existing pipelines and pump stations that are designed to move the excess runoff from these basins to the downstream basins. The net effect is that there is sufficient storage for the expected runoff volumes when this capability to move water is taken into

account. The 2025 Required Storage was calculated without including supplemental capacity since the comparison was between the storage capacity provided and storage capacity required for the land uses. Those basins that show 0 acre feet in the Storage Provided column are 0 because no basin storage volume was provided by FMFCD. No basin geometric design may be available for these basins or the basins are sufficiently old that the calculated storage volume was not recorded. Table 3 below shows the 38 basins and their storage conditions.

Table 3 – Comparison of Existing Basin Storage to Storage Required for 2025 General Plan Land Uses

Drainage Area Designation	Total Storage Provided a-f	2025 Required Storage a-f	Storage Deficit a-f
II1	176.7	580.17	403.47
DD	165.4	382.60	217.20
EE	212.8	429.64	216.84
EG	24.1	186.40	162.30
CJ	0.0	161.20	161.20
CC	46.6	205.70	159.10
BB	58.6	201.95	143.35
II3	65.5	166.42	100.92
II2	132.8	220.81	88.01
BR	0.0	87.66	87.66
BK	75.7	160.17	84.47
V	99.8	178.87	79.07
BL	141.4	217.93	76.53
MM	80.3	152.60	72.30
Z	313.0	382.61	69.61

Drainage Area Designation	Total Storage Provided a-f	2025 Required Storage a-f	Storage Deficit a-f
F	37.0	96.06	59.06
II4	50.1	105.35	55.25
M	98.0	150.75	52.75
G	27.0	79.16	52.16
JJ	193.8	240.58	46.78
BP	0.0	45.51	45.51
H	0.0	77.45	42.75
DG	34.7	42.45	42.45
CM	0.0	176.39	36.19
K	140.2	110.88	28.38
I	82.5	84.82	27.22
CH	173.6	195.22	21.62
HH	283.0	302.76	19.76
DH1	111.8	129.93	18.13
UU2	98.1	116.11	18.01
B/E	85.4	100.96	15.56
AC	116.0	126.96	10.96
CO2	127.7	135.57	7.87
Y	110.9	116.24	5.34
P	90.2	95.10	4.90

Drainage Area Designation	Total Storage Provided a-f	2025 Required Storage a-f	Storage Deficit a-f
AA	103.9	106.46	2.56
PP	96.2	98.05	1.85
L	144.0	145.05	1.05

Results of Impacts to Retention Basins –2025 General Plan to General Plan Update

The storage capacities for the drainage area retention basins were compared to the required storage capacities resulting from the 2025 General Plan to 2035 General Plan Update land uses. The comparison shows that the retention basin for Drainage Area U will have increases in CA that will result in runoff volumes that will exceed the design capacity of the basin in the 2035 General Plan Update when compared to the Existing Condition to the 2025 General Plan condition. The total count of basins that have storage deficiencies when compared to the Existing Condition decreases to 35 from 37 for the 2025 General Plan condition. Drainage Areas CH, L and P, which had storage deficiencies in the 2025 General Plan condition do not have a deficiency in the 2035 General Plan Update condition. The 2035 General Plan Update Required Storage was calculated without including supplemental capacity since the comparison to make the comparisons equivalent to the 2025 General Plan condition. Table 4 shows the information for the Drainage Area U retention basin.

Table 4 – Comparison of Existing Basin Storage to Storage Required for 2035 General Plan Update Land Uses

Drainage Area Designation	Total Storage Provided a-f	2025 Required Storage a-f	Storage Deficit a-f
U	89.1	93.1	4.0

The results of the similar analysis performed in the Fulton Corridor Specific Plan and Community Plan EIR Technical Report found that the land uses for the specific plan will not result in an increase in CA within the planning boundary. The proposed land uses are not expected to cause any reduction in service level for the FF and II-1 drainage areas retention basins which provide runoff disposal for the Fulton Corridor Specific Plan and Community Plan area.

.

Appendix A

FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

RECOMMENDED DESIGN "C" FACTORS
FOR
RESIDENTIAL LAND USE DESIGNATIONS

Land Use Designation	Allowable Density and Land Use Zoning	"C" Factor	Recommended Design "C" Factor
Rural Density	0 to 0.7 Units/Ac		0.29
	AE-20	0.15	
	AE-5	0.18	
	R-A	0.20	
Low Density	0 to 2.0 Units/Ac		0.29
	R-A	0.20	
	R-1-E	0.24	
	R-1-A	0.24	
	R-1-B	0.26	
Medium-Low Density	2.0 to 5.0 Units/Ac		0.29
	R-1-A	0.24	
	R-1-B	0.26	
	R-1-C	0.27	
Medium Density	5.0 to 10.0 Units/Ac		0.32
	R-1-C	0.27	
	R-1	0.29	
	R-2-A	0.32	
Medium-High Density	10.0 to 23.0 Units/Ac		0.42
	R-2-A	0.32	
	R-2	0.35	
	R-3-A	0.42	
High Density	23.0 to 44.0 Units/Ac		0.55
	R-3-A	0.42	
	R-3	0.48	
	R-4	0.55	

FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

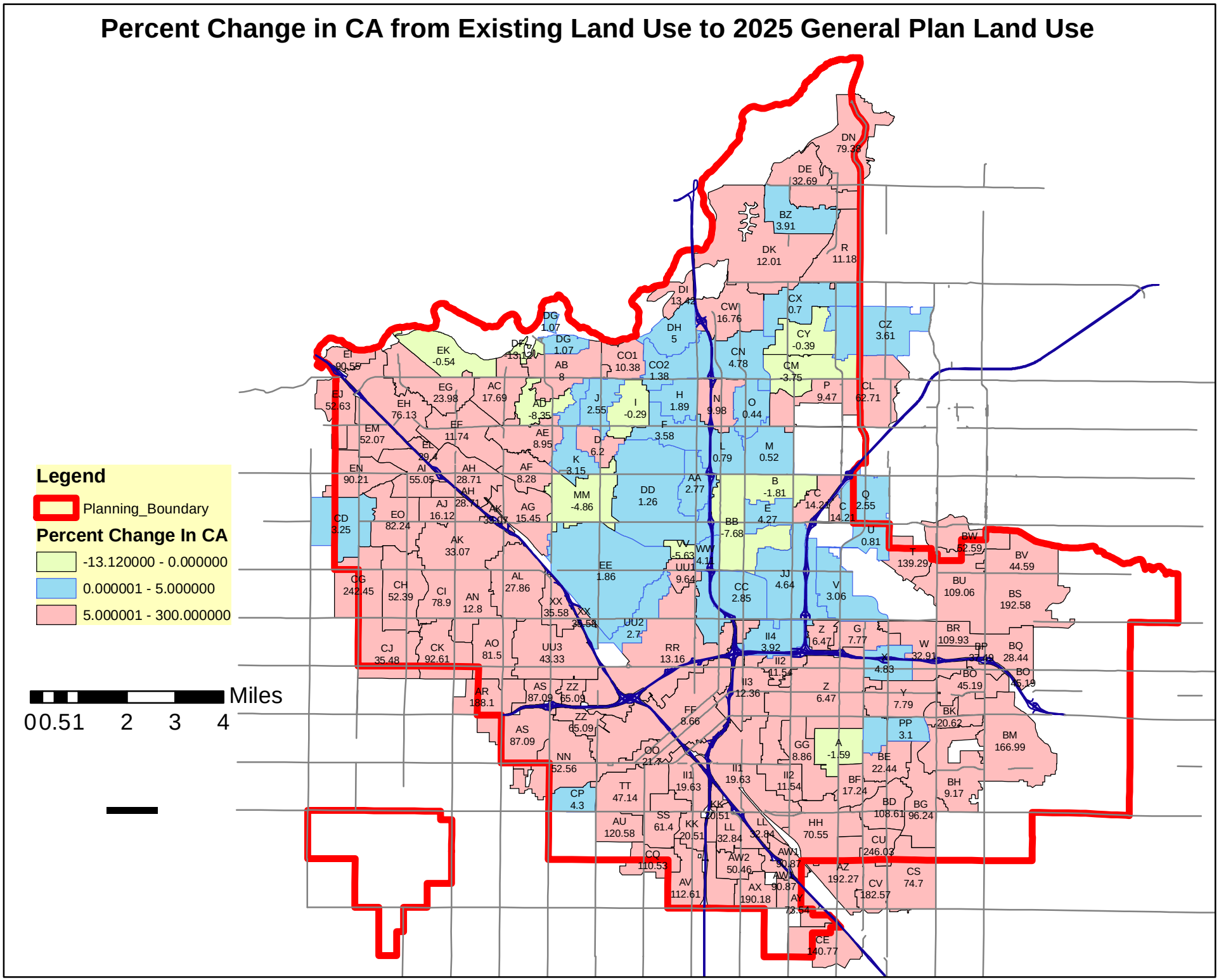
RECOMMENDED DESIGN "C" FACTORS
FOR
COMMERCIAL AND INDUSTRIAL LAND USE DESIGNATIONS

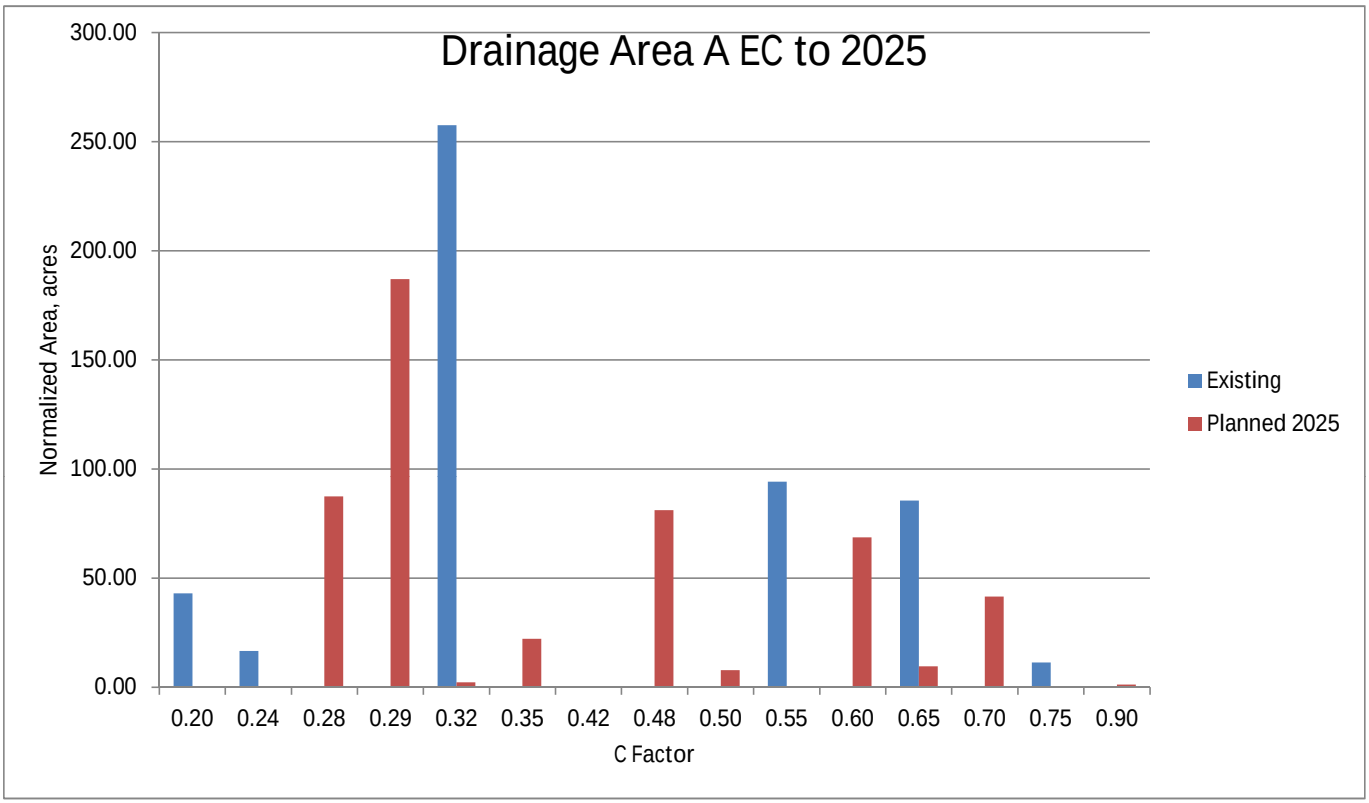
Land Use Designation	Allowable Land Use Zonings	"C" Factor	Recommended Design "C" Factor
Neighborhood Commercial	C-1 C-L	0.70 0.70	0.70
Community Commercial	C-2 C-L	0.70 0.70	0.70
Regional Shopping Center	C-3 C-4	0.70 0.70	0.70
General Heavy Strip	C-5 C-6 C-P	0.70 0.70 0.60	0.70
Office Commercial	R-P C-P RP-L	0.65 0.60 0.55	0.65
Light Industrial	M-1-P M-1 C-M	0.55 0.60 0.65	0.65
Heavy Industrial	M-1-P M-1 M-2 M-3	0.55 0.60 0.65 0.75	0.75

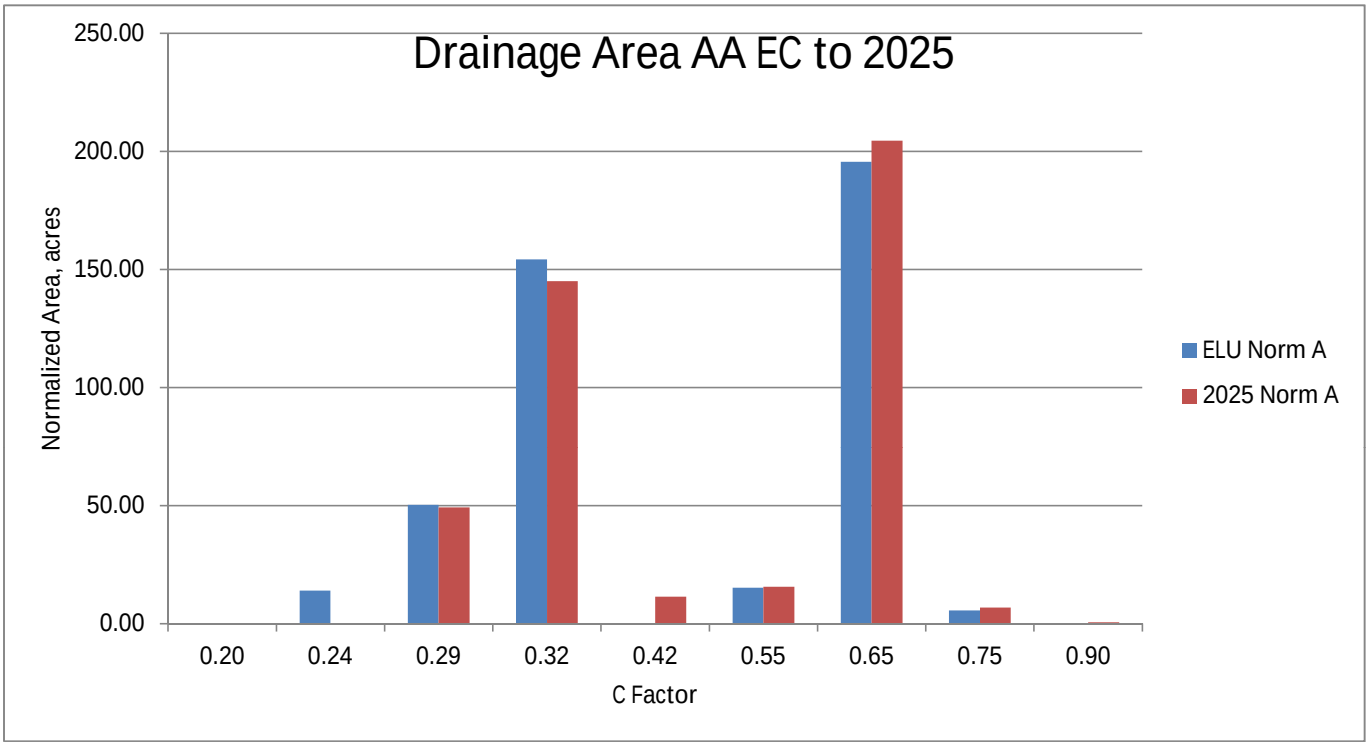
Revised 3/29/83

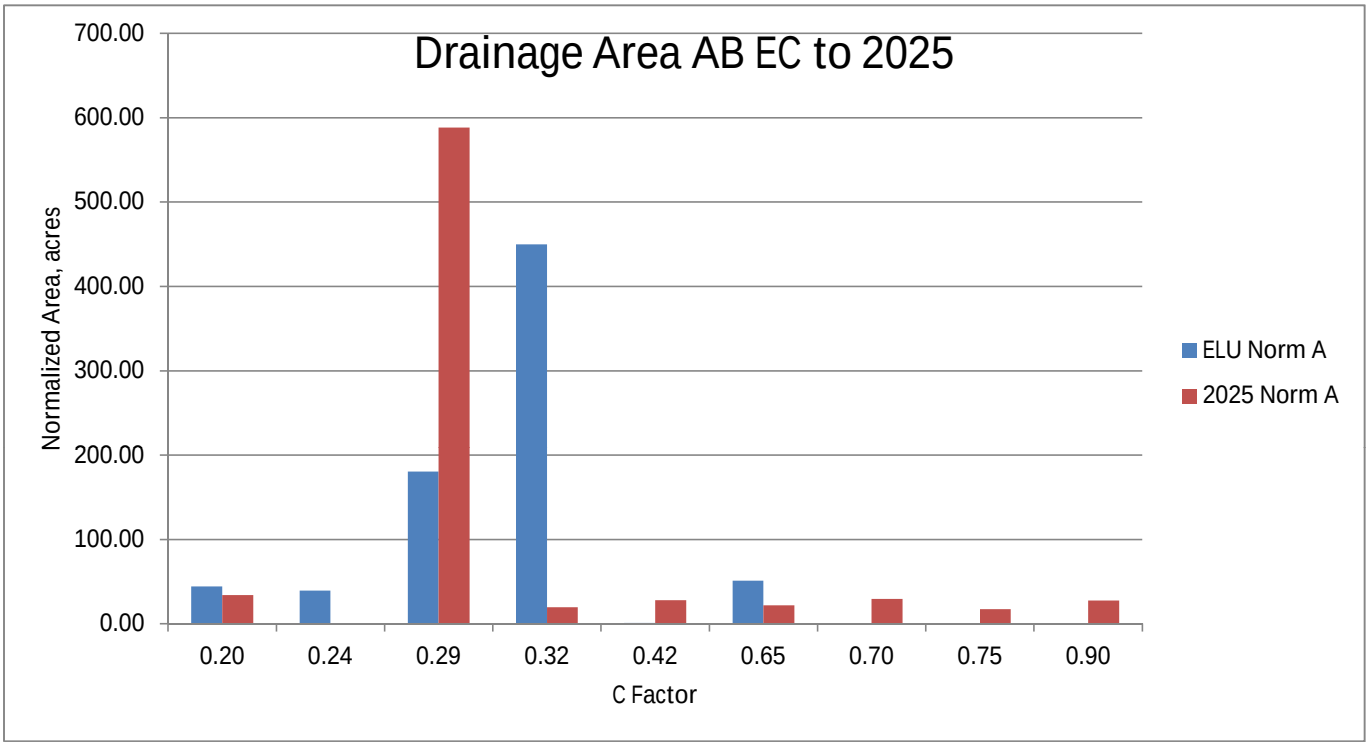
Appendix B

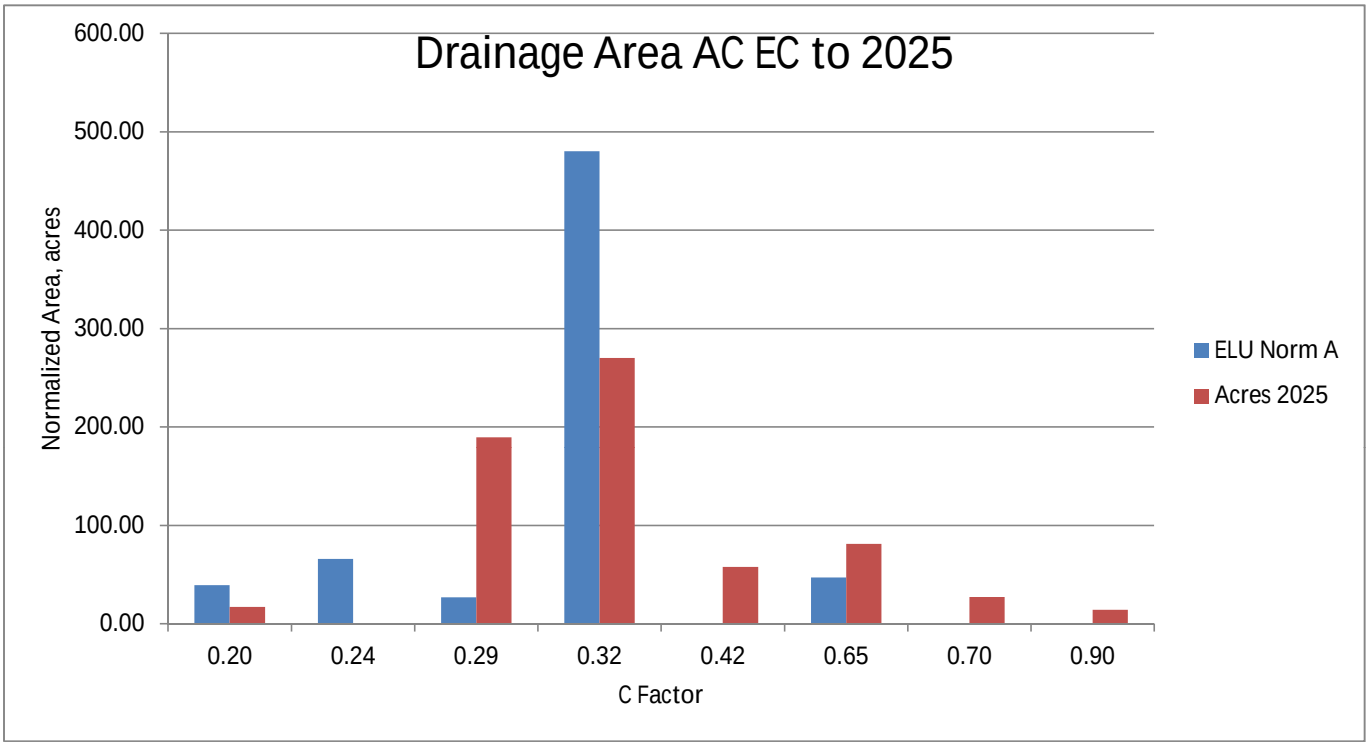
Percent Change in CA from Existing Land Use to 2025 General Plan Land Use

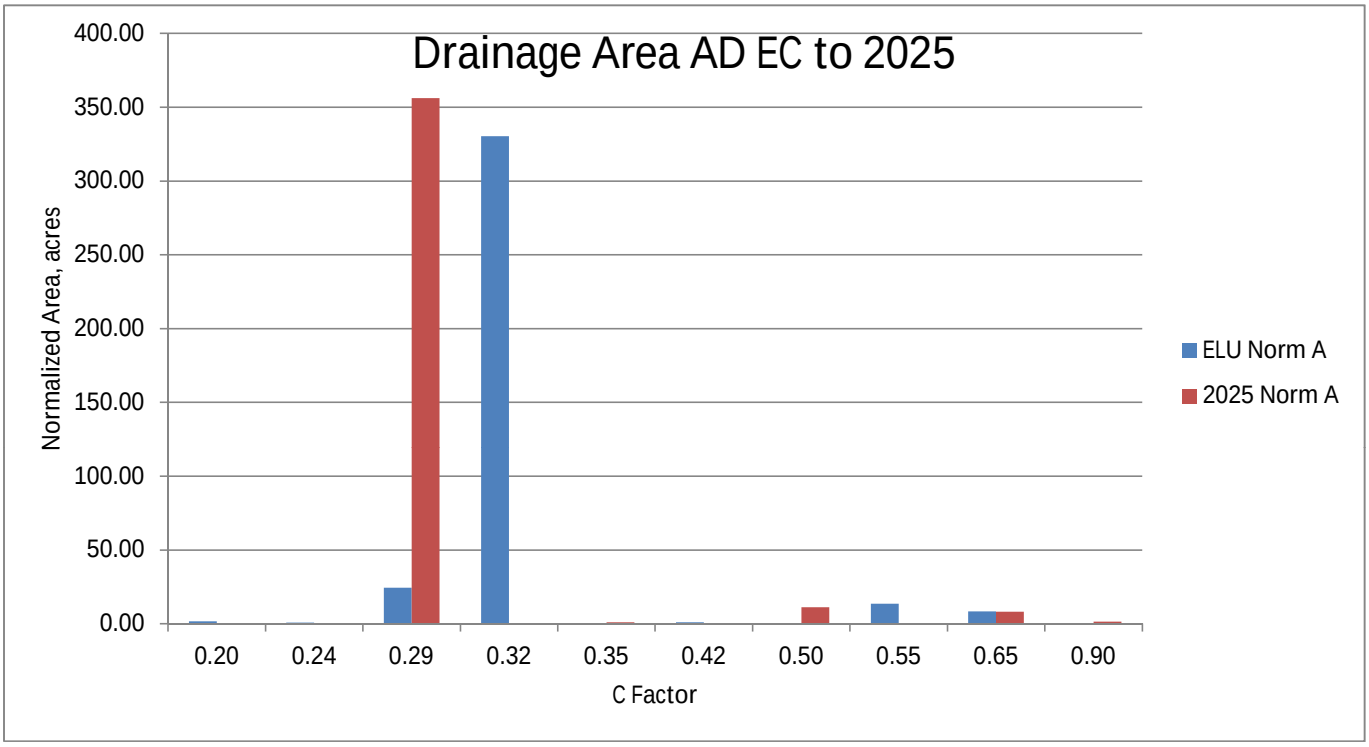


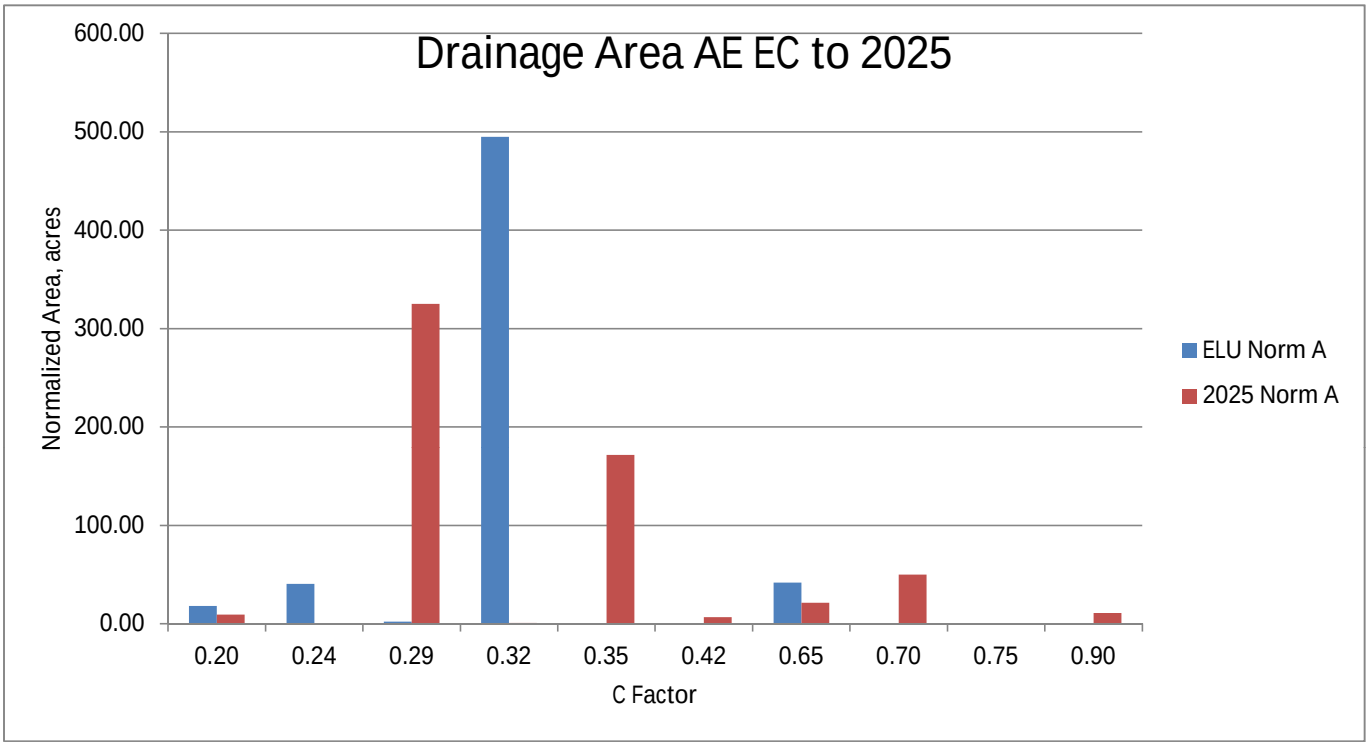

Drainage Area A EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.28
0.29
0.32
0.35
0.42
0.48
0.50
0.55
0.60
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

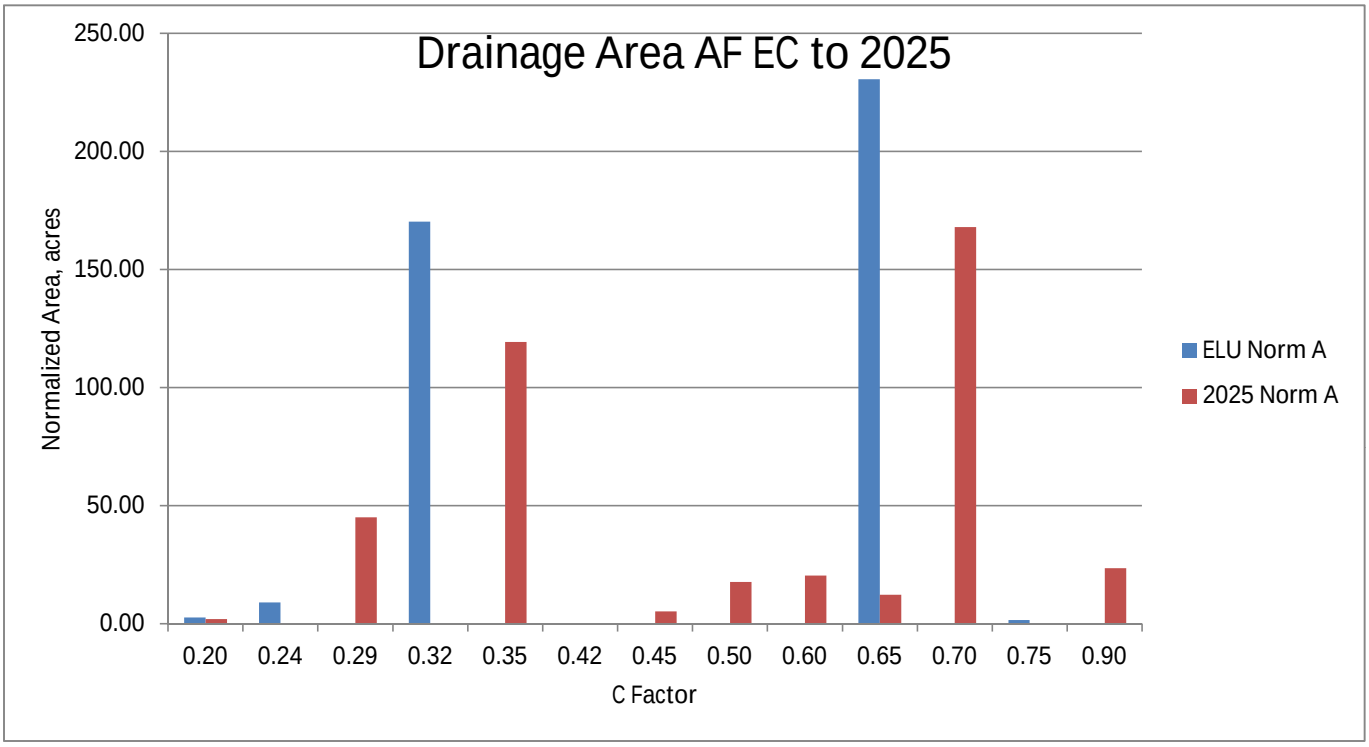

Drainage Area AA EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

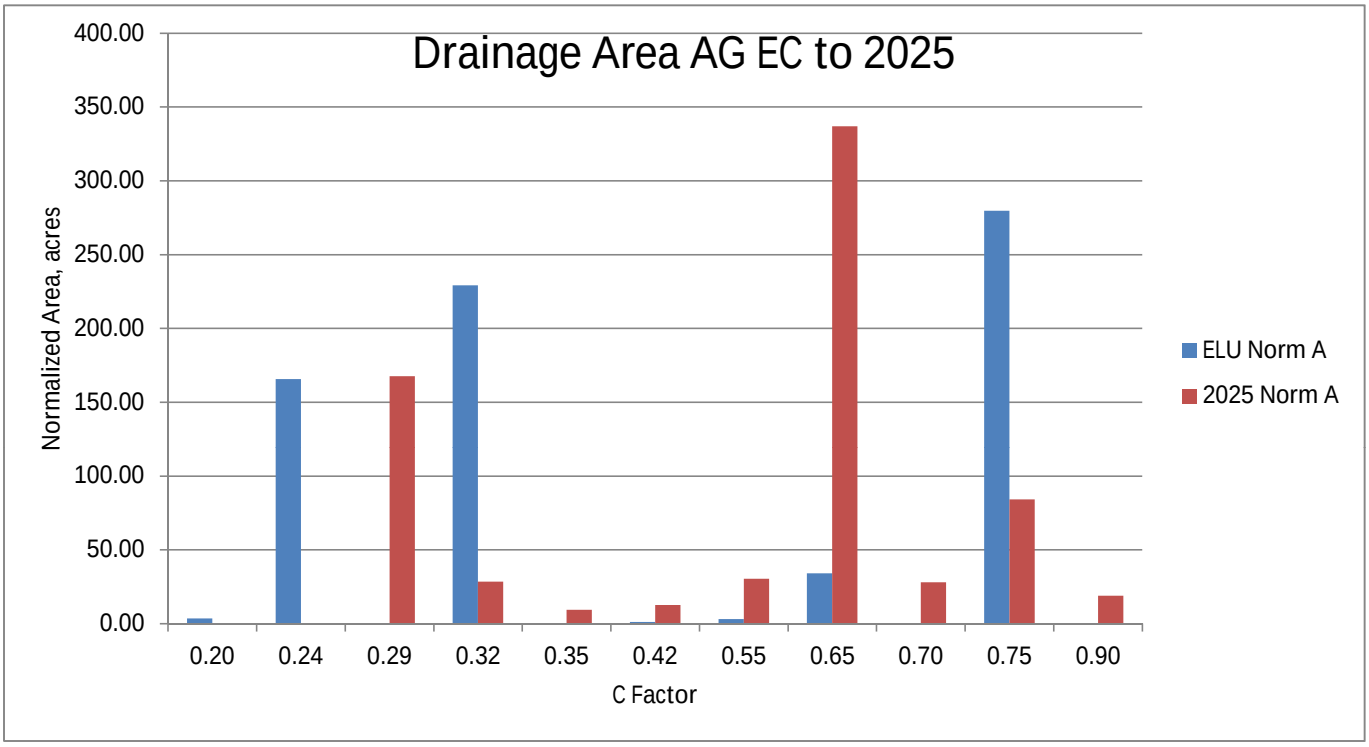

Drainage Area AB EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

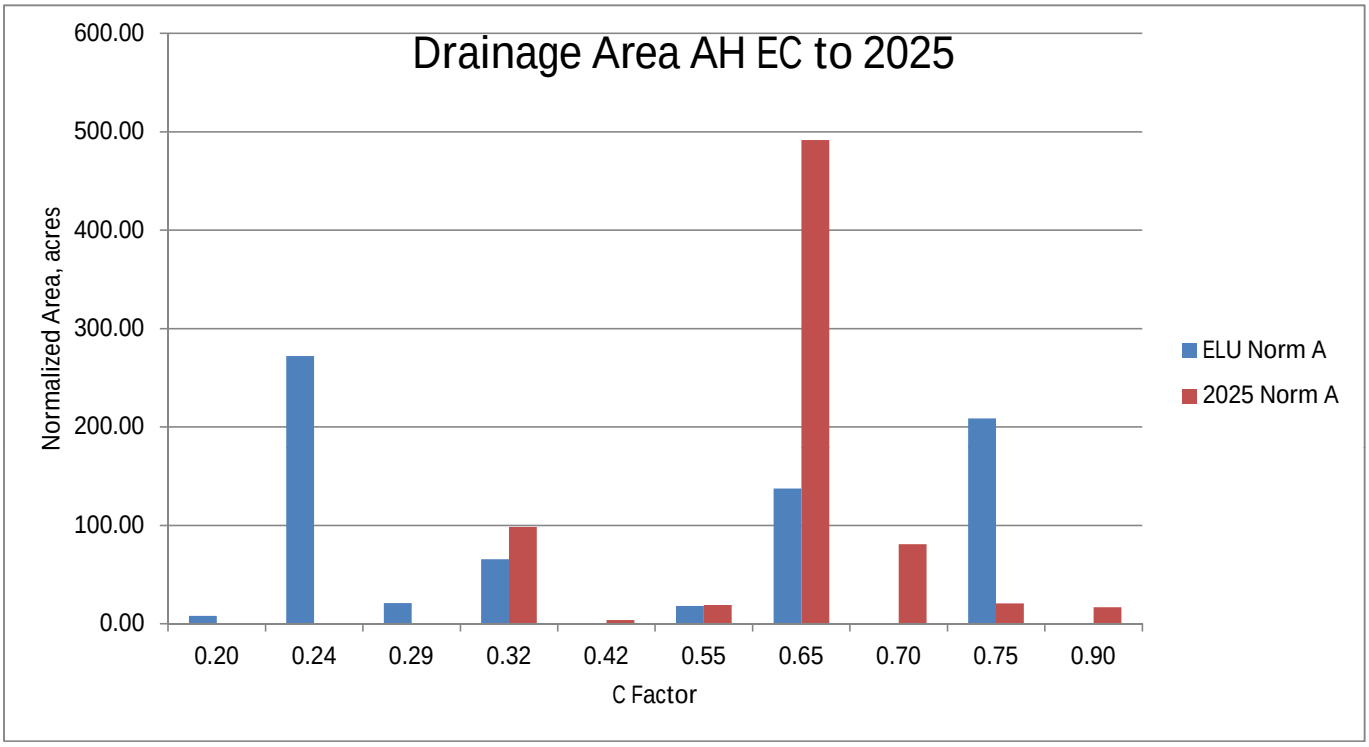

Drainage Area AC EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.65
0.70
0.90
C Factor
ELU Norm A
Acres 2025

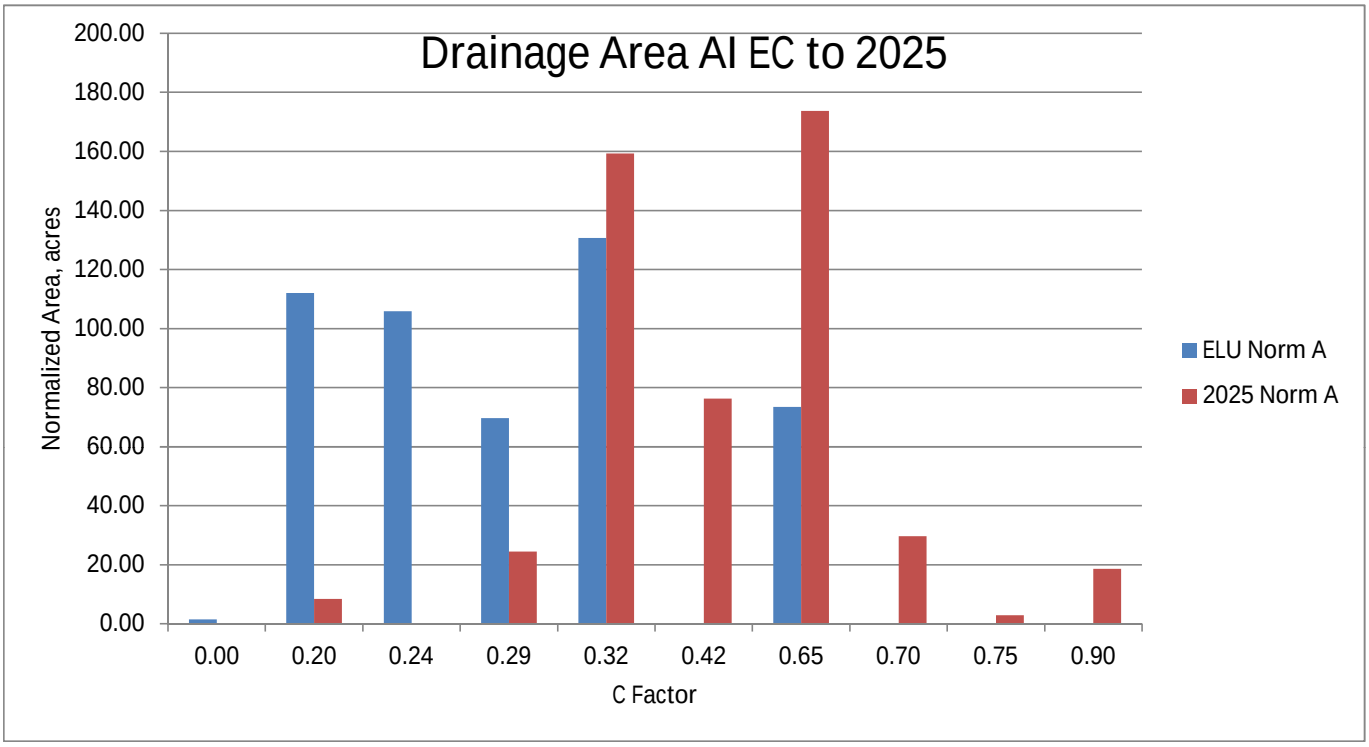

Drainage Area AD EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.50
0.55
0.65
0.90
C Factor
ELU Norm A
2025 Norm A

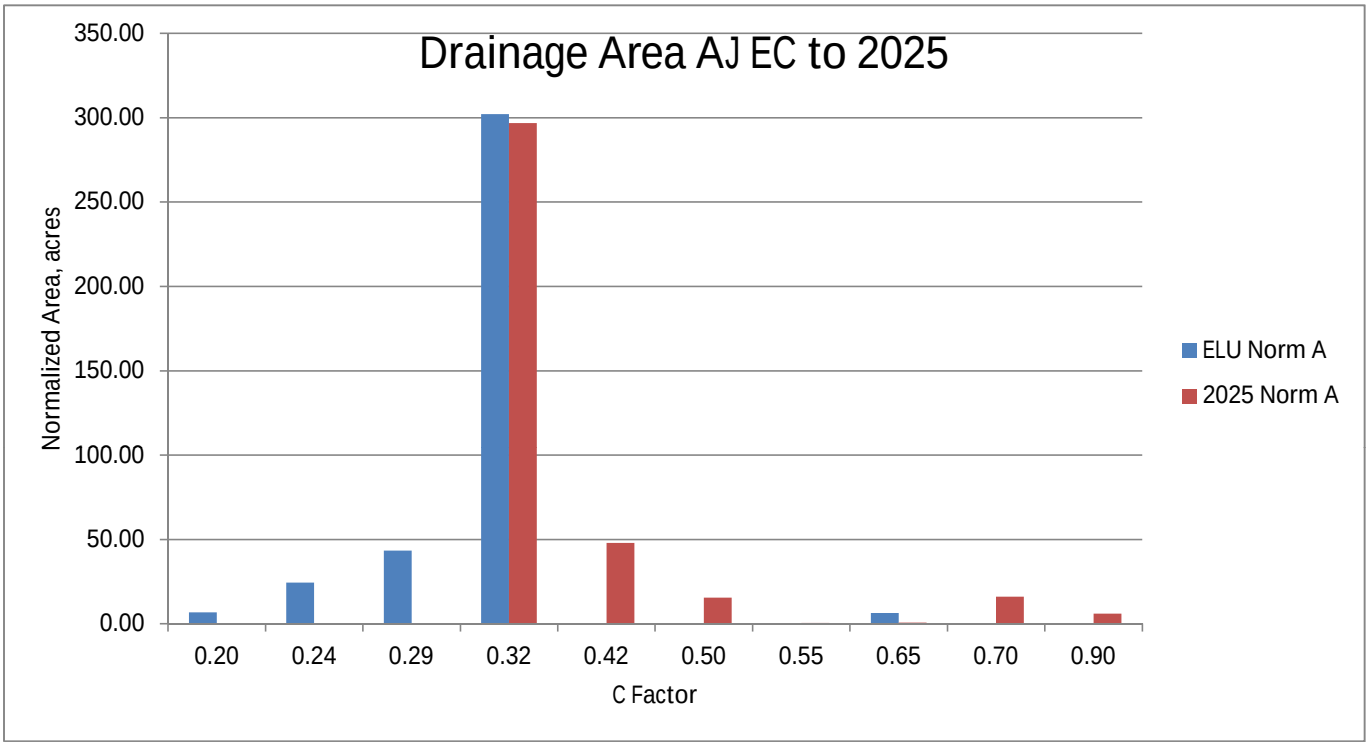

Drainage Area AE EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

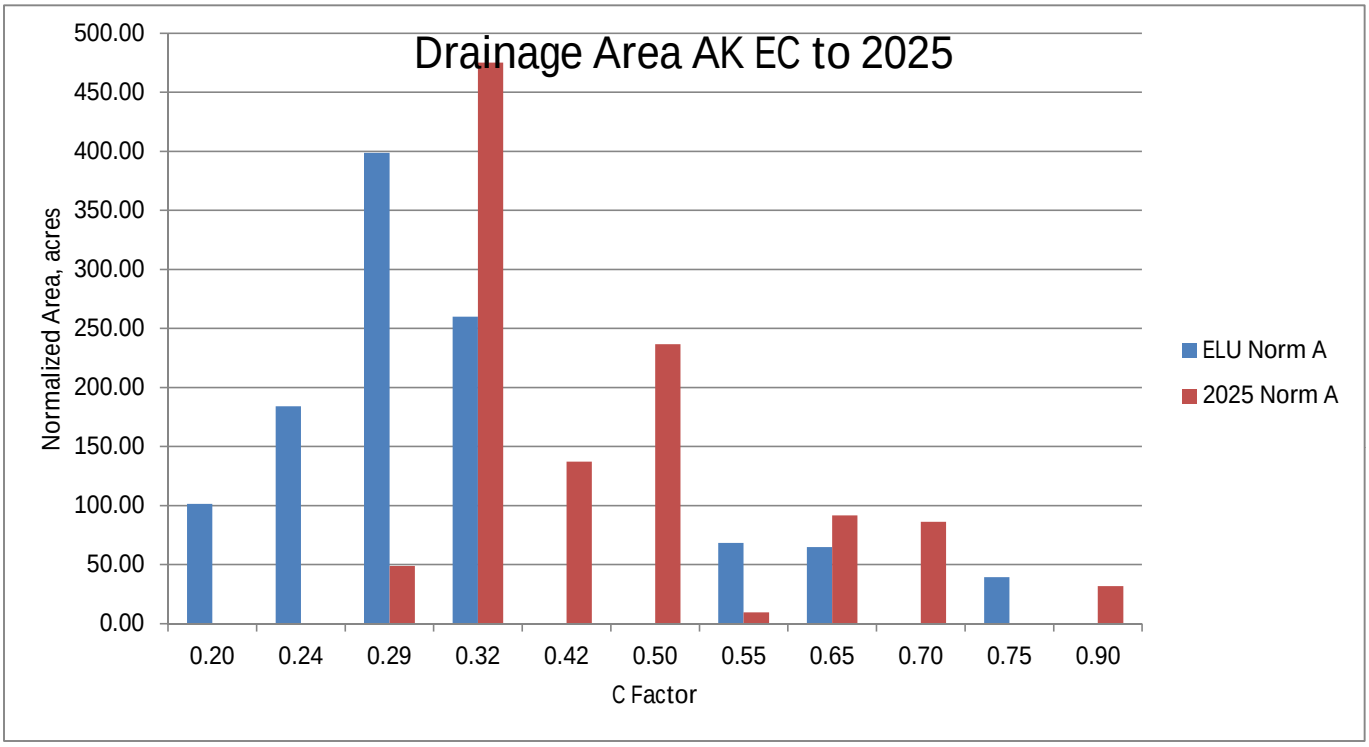

Drainage Area AF EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.45
0.50
0.60
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

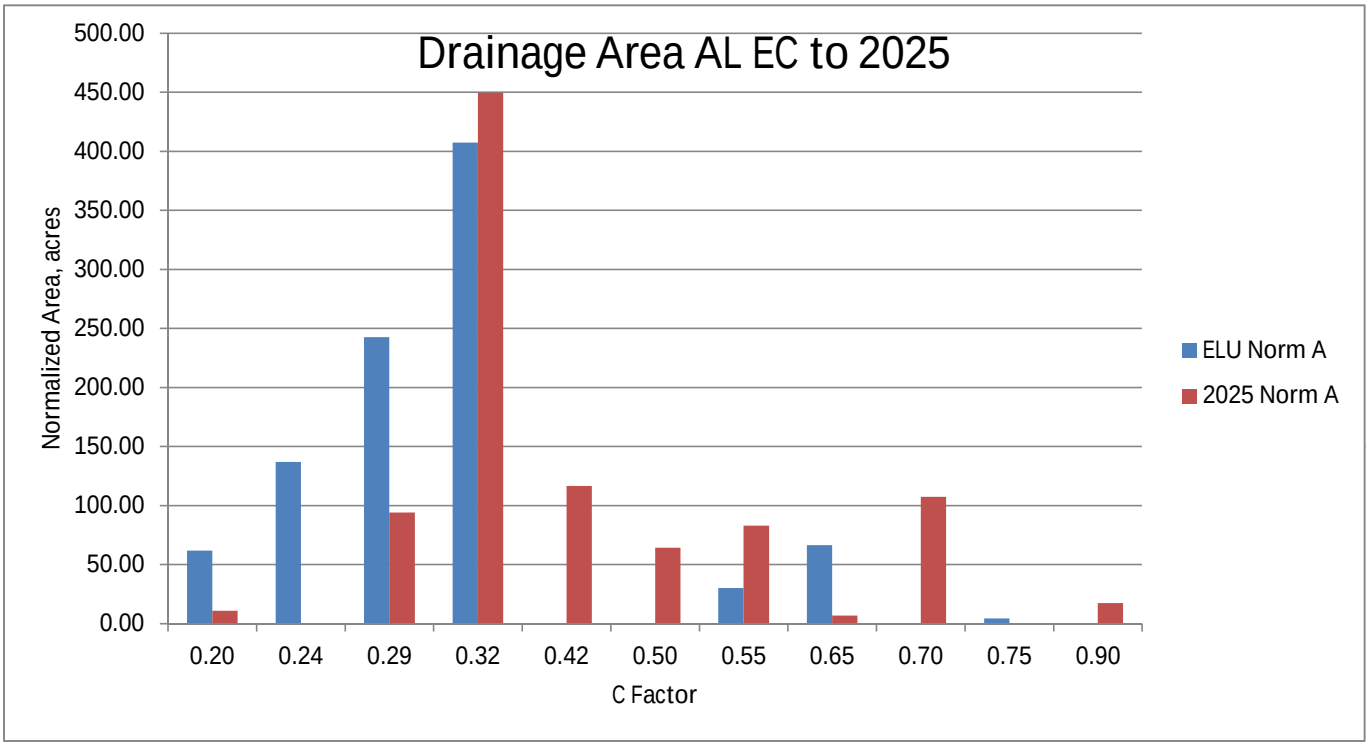

Drainage Area AG EC to 2025
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

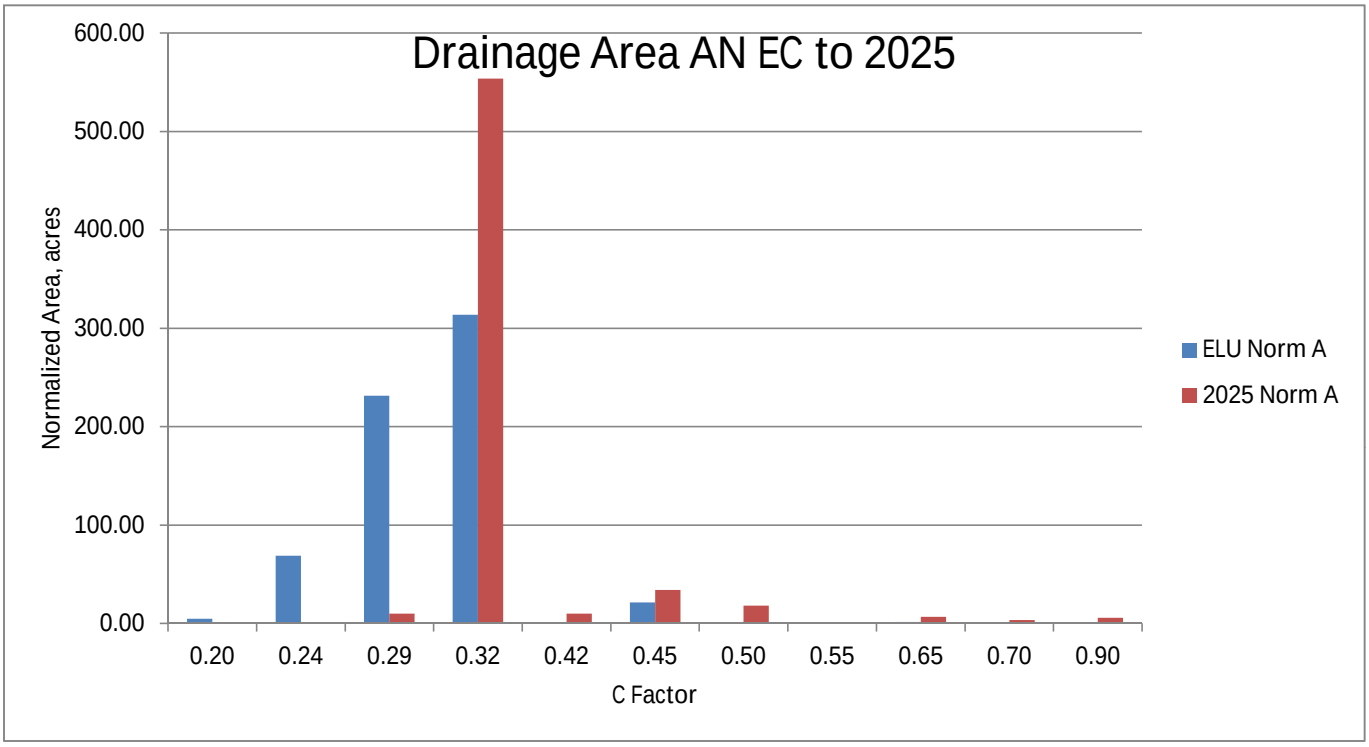

Drainage Area AH EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

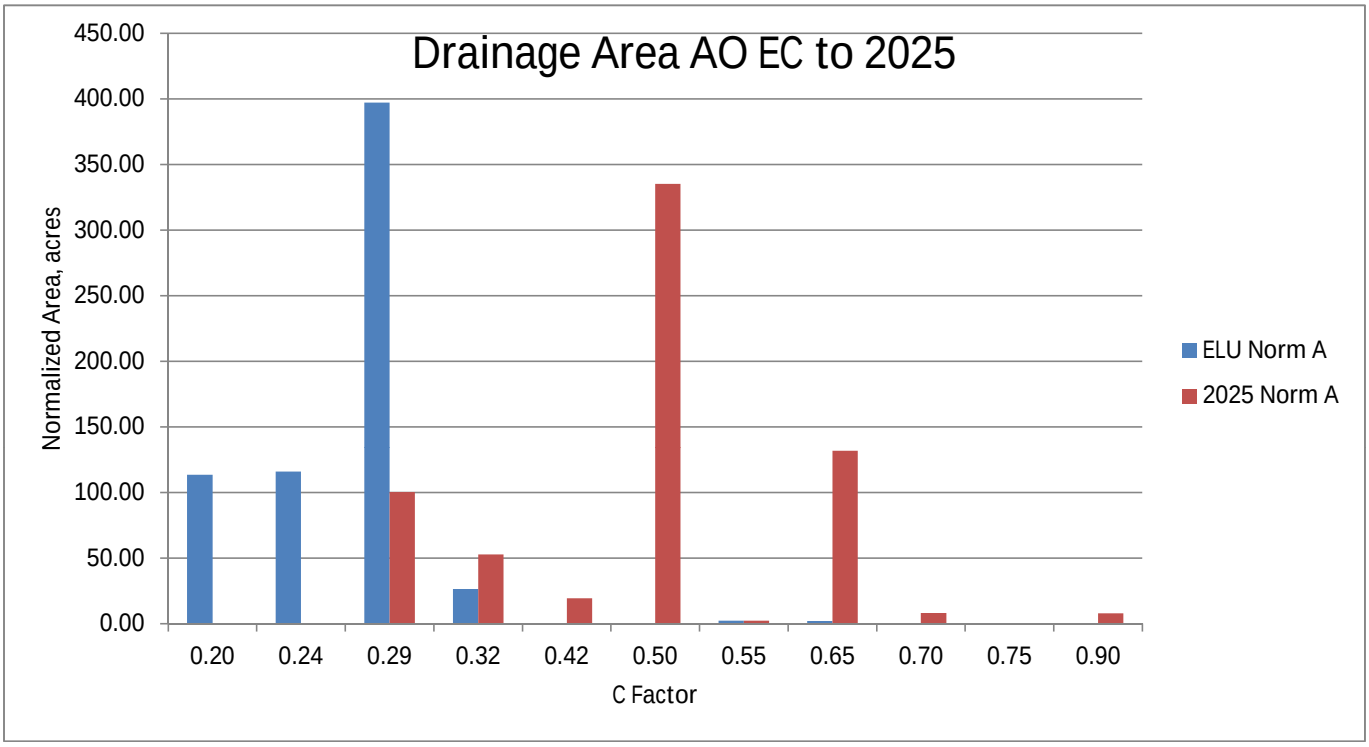

Drainage Area AI EC to 2025
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.00
0.20
0.24
0.29
0.32
0.42
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

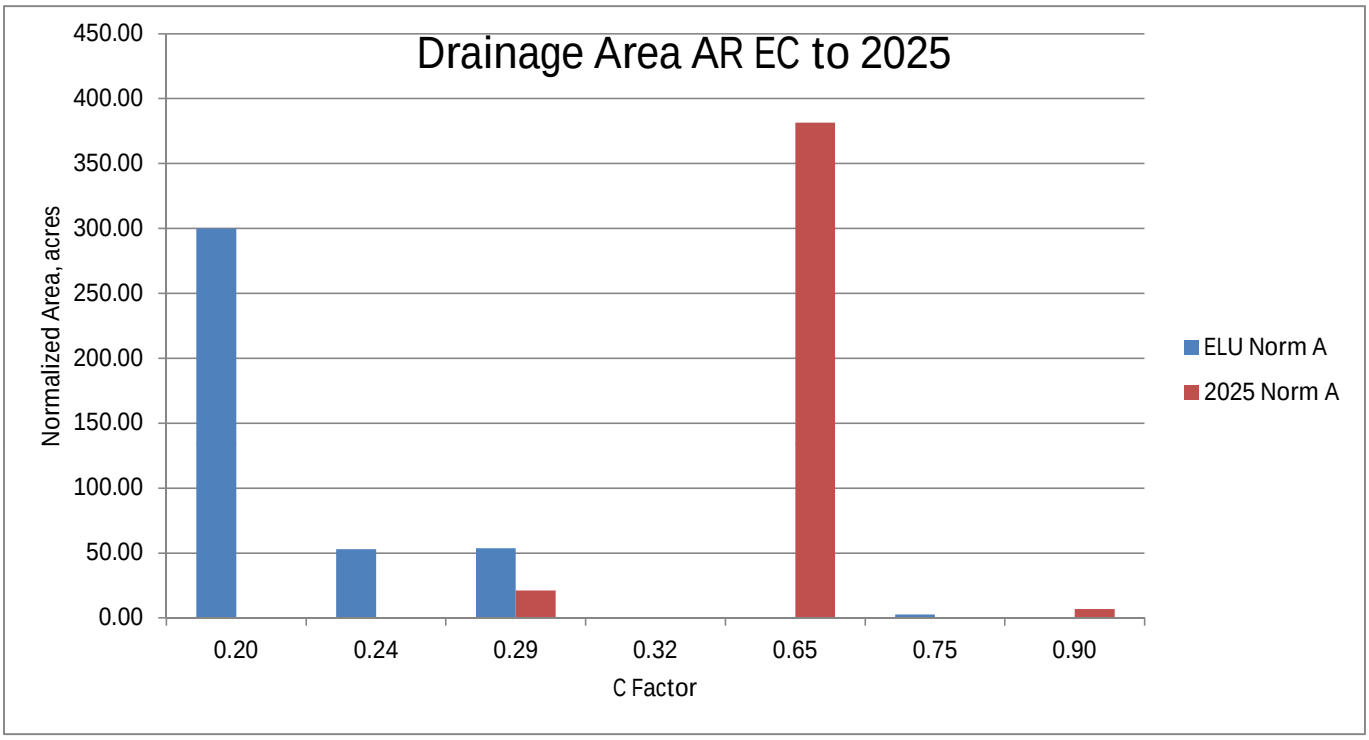

Drainage Area AJ EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
ELU Norm A
2025 Norm A

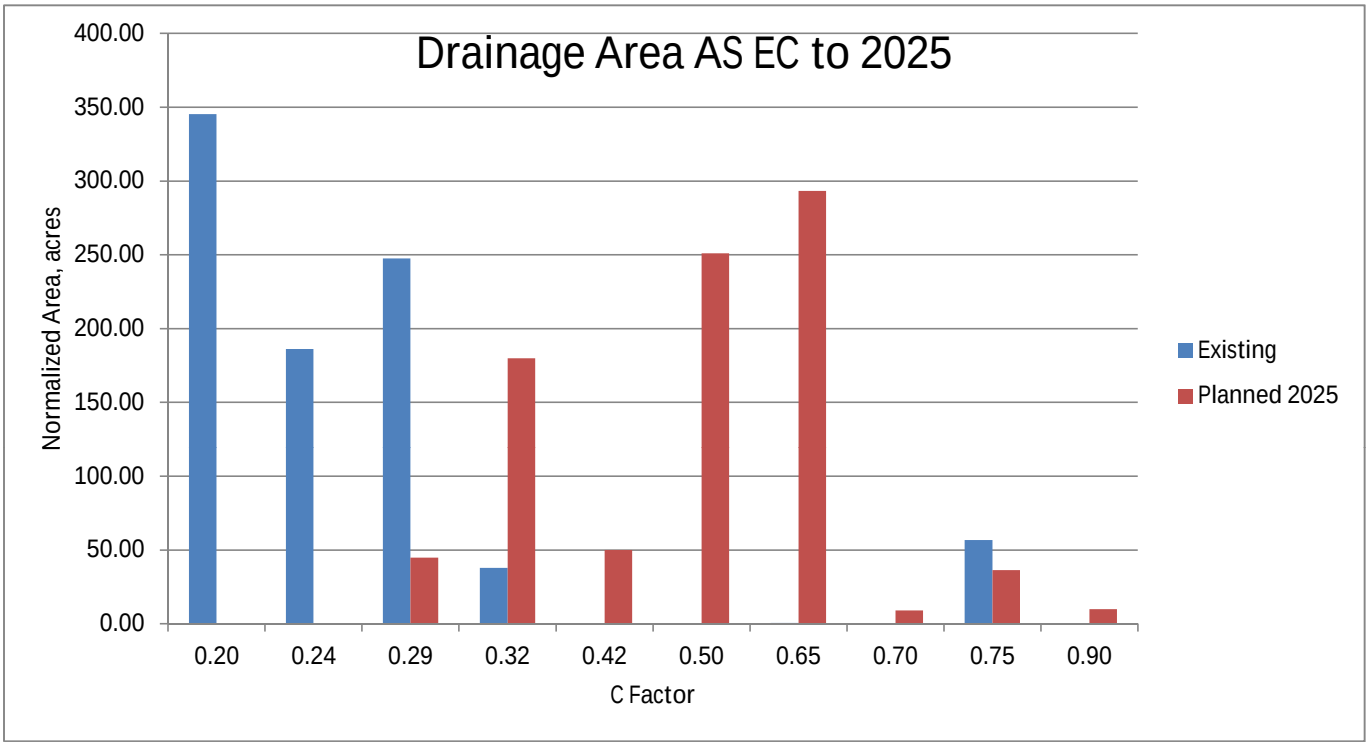

Drainage Area AK EC to 2025
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

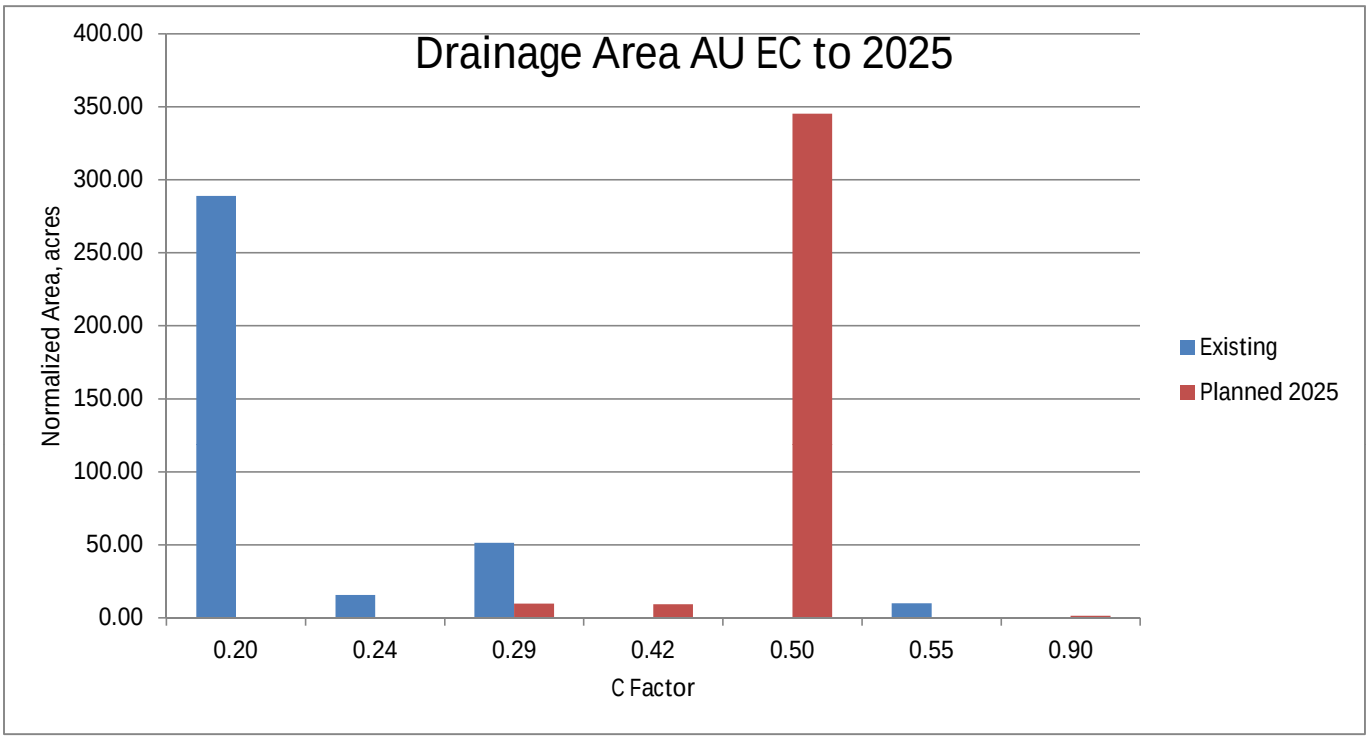

Drainage Area AL EC to 2025
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

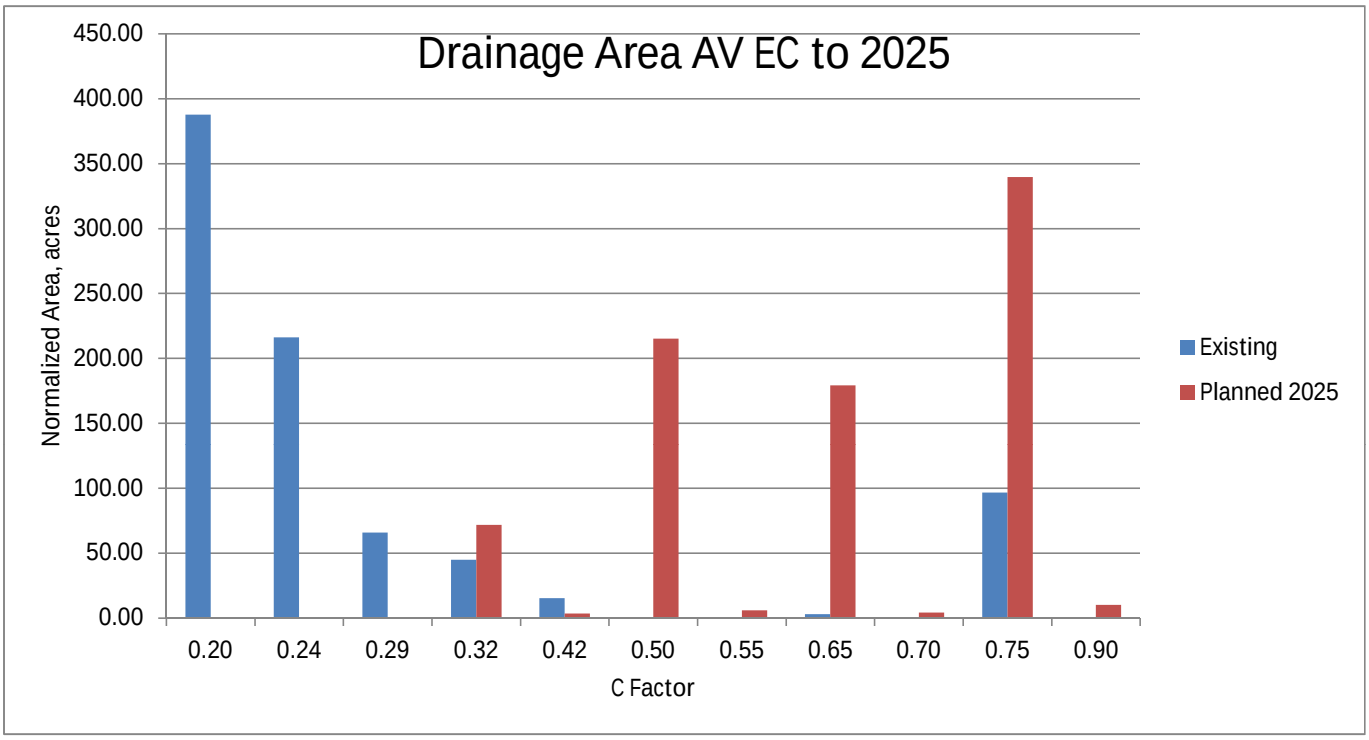

Drainage Area AN EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.90
C Factor
ELU Norm A
2025 Norm A

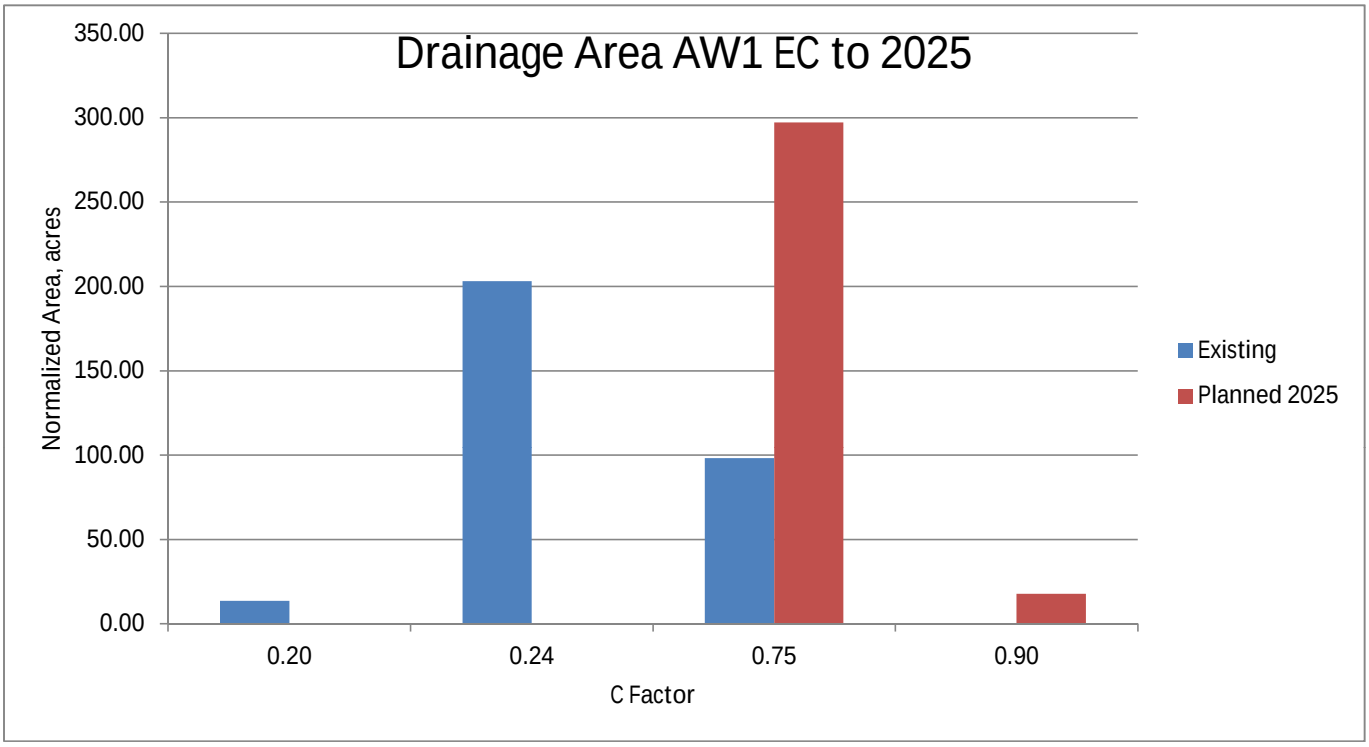

Drainage Area AO EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

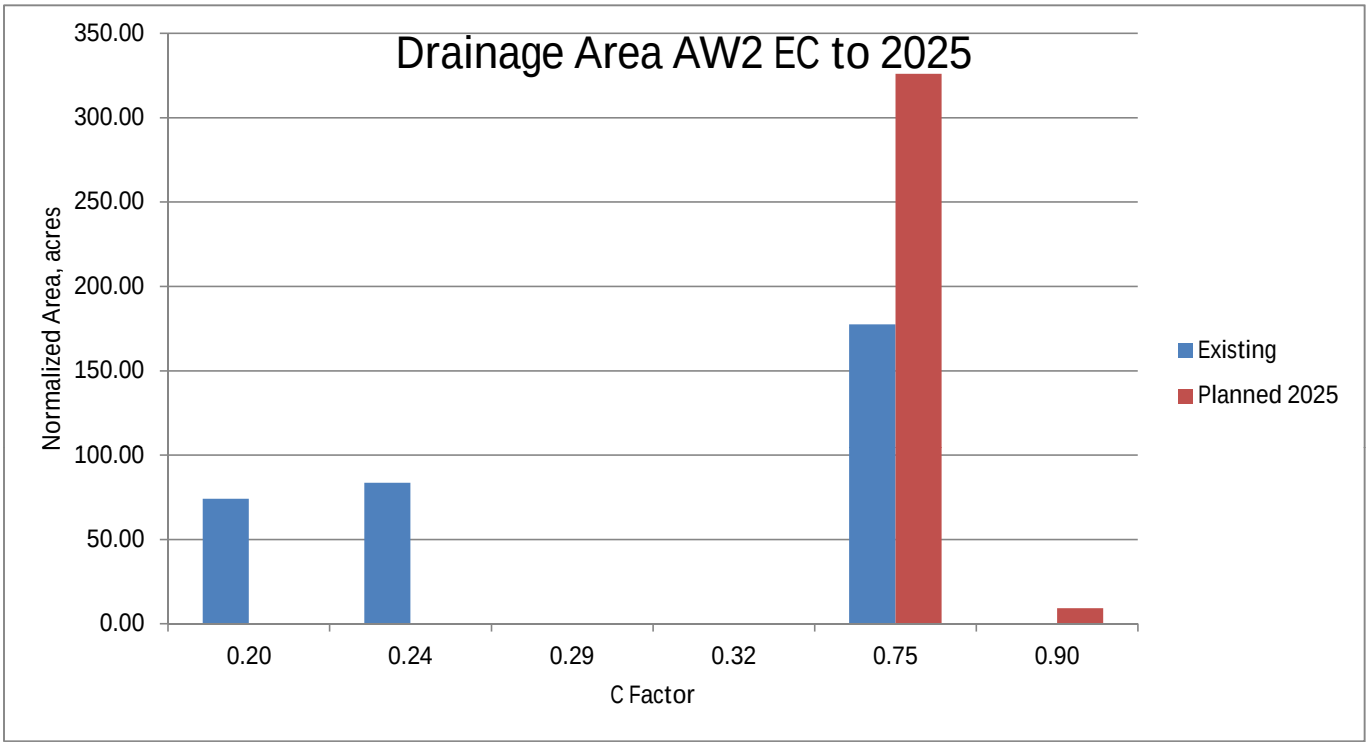

Drainage Area AR EC to 2025
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.65
0.75
0.90
C Factor
ELU Norm A
2025 Norm A

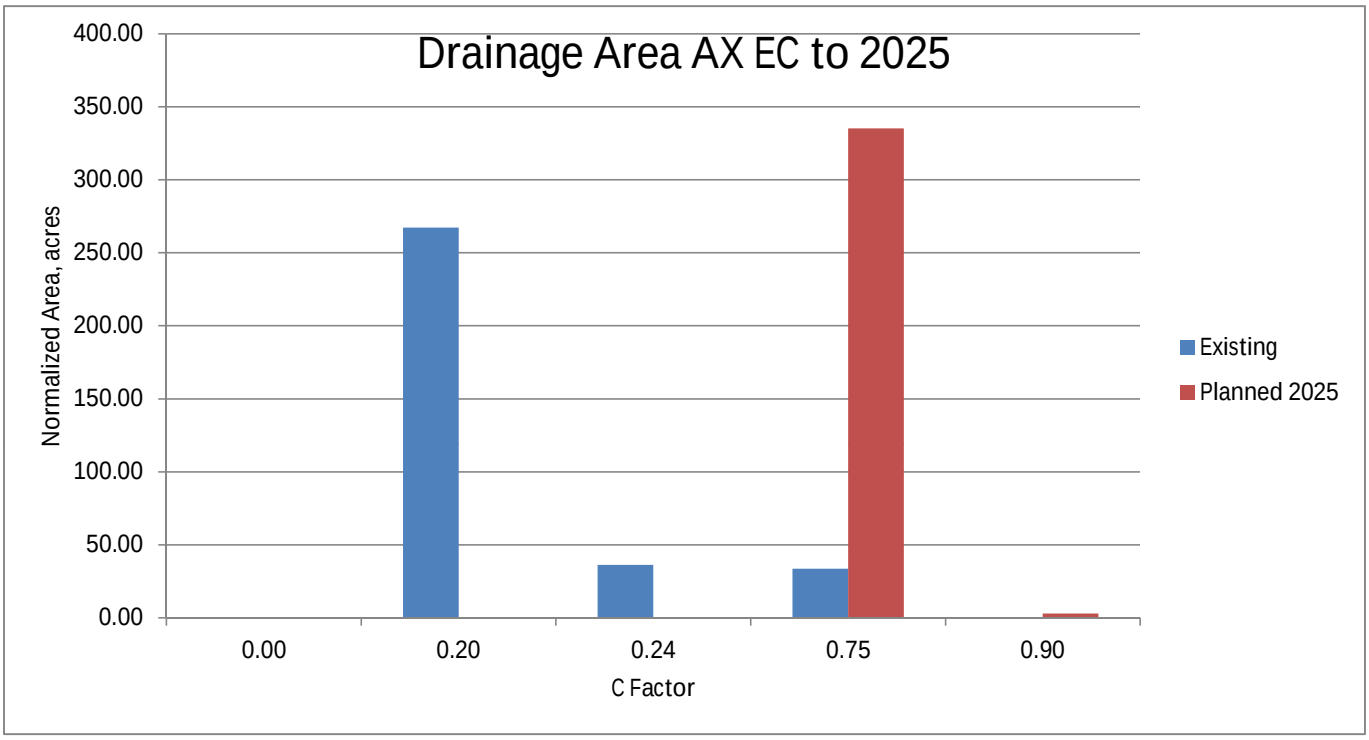

Drainage Area AS EC to 2025
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

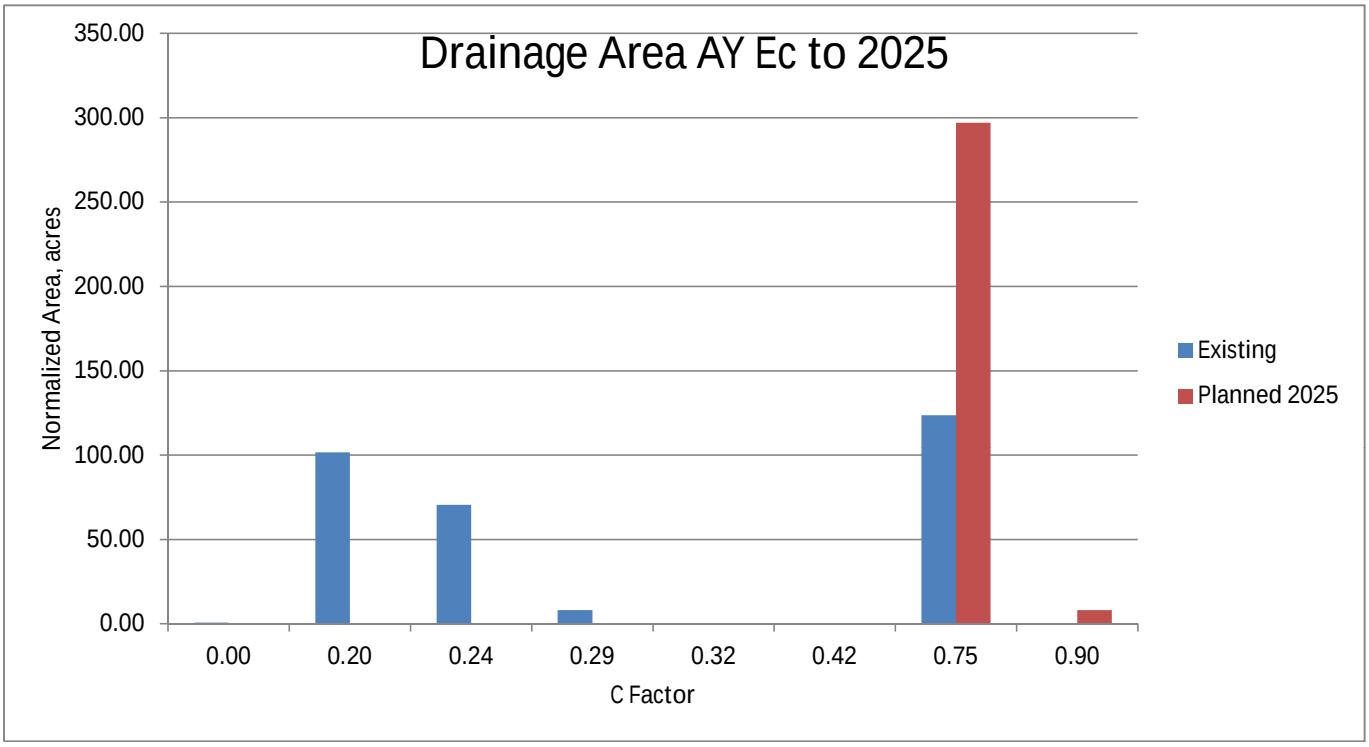

Drainage Area AU EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.42
0.50
0.55
0.90
C Factor
Existing
Planned 2025

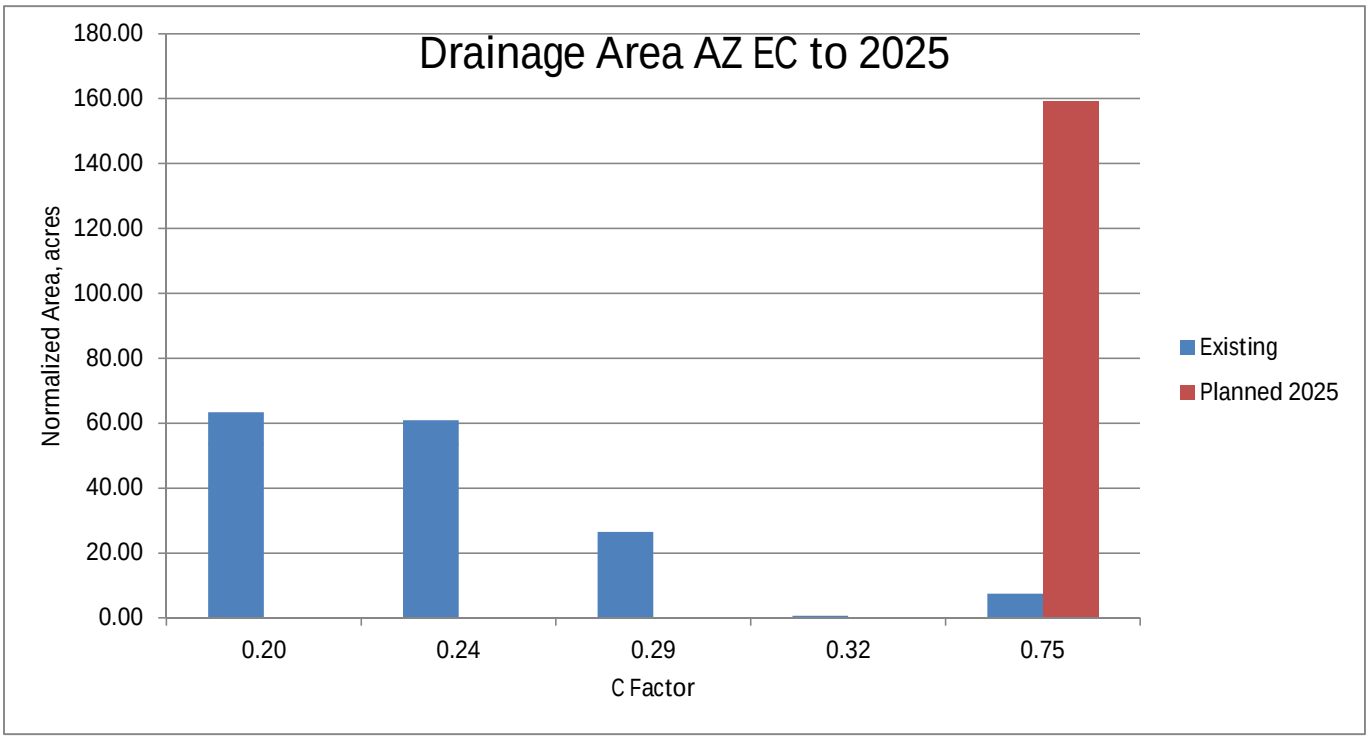

Drainage Area AV EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

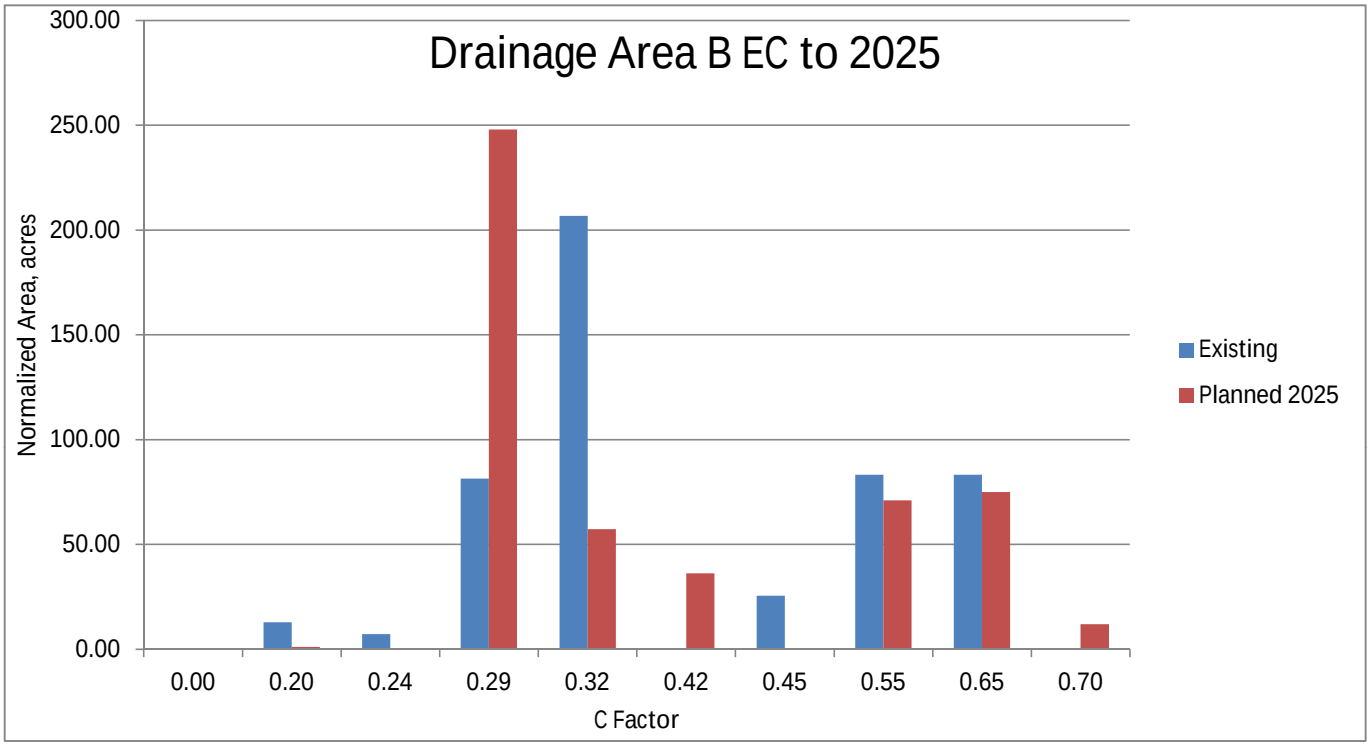

Drainage Area AW1 EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.75
0.90
C Factor
Existing
Planned 2025

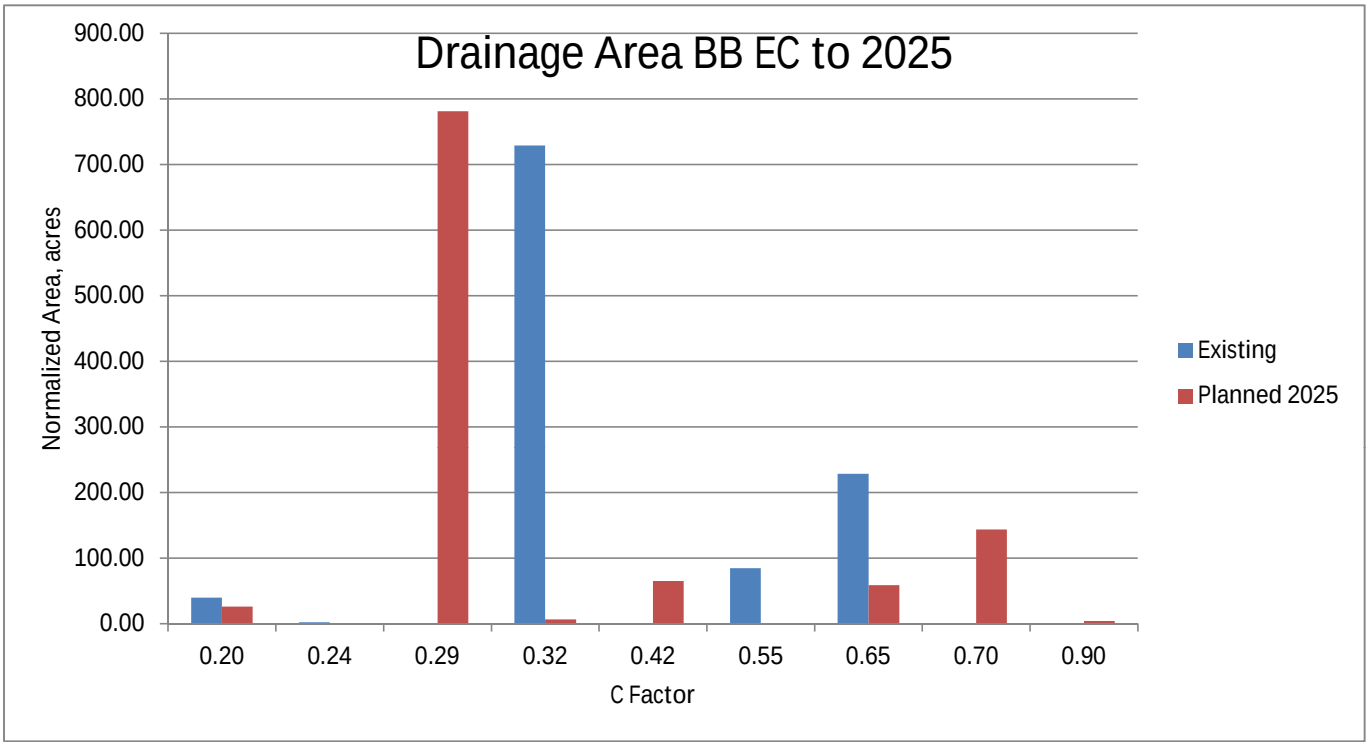

Drainage Area AW2 EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.75
0.90
C Factor
Existing
Planned 2025

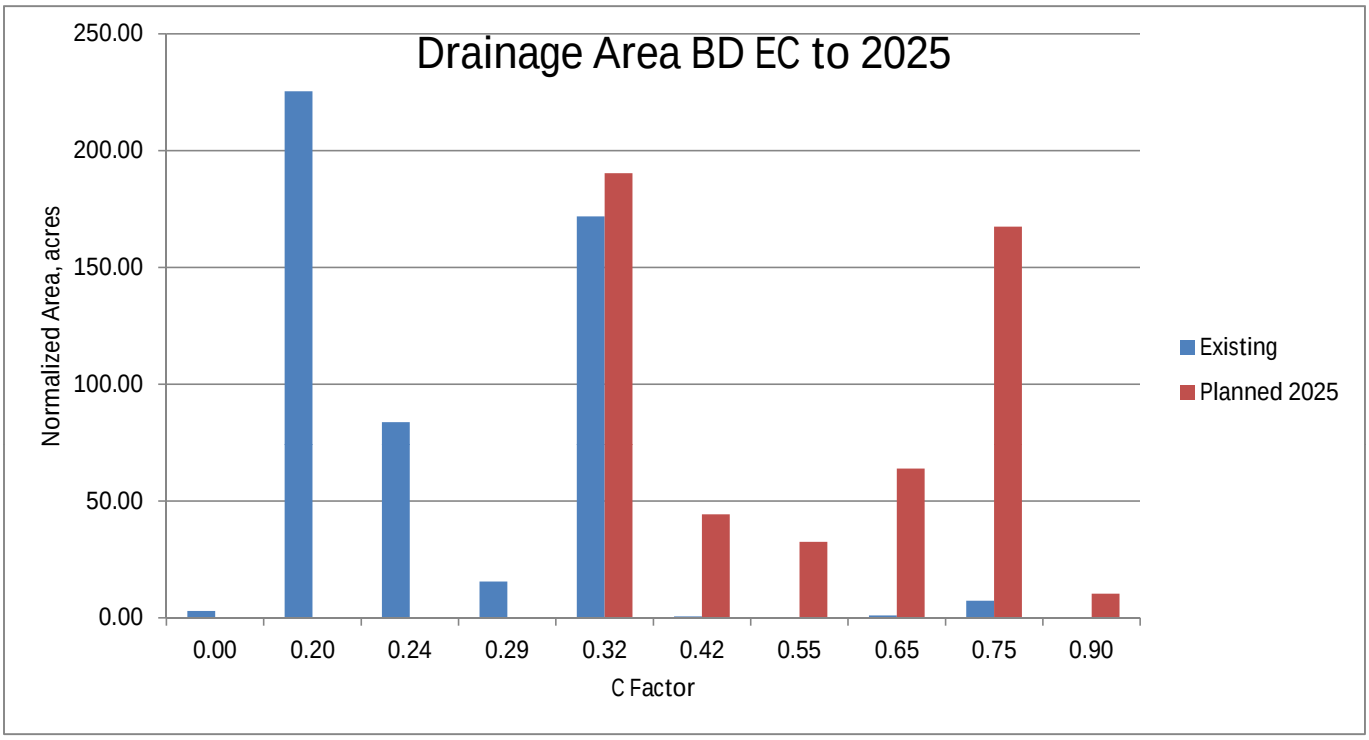

Drainage Area AX EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.75
0.90
C Factor
Existing
Planned 2025

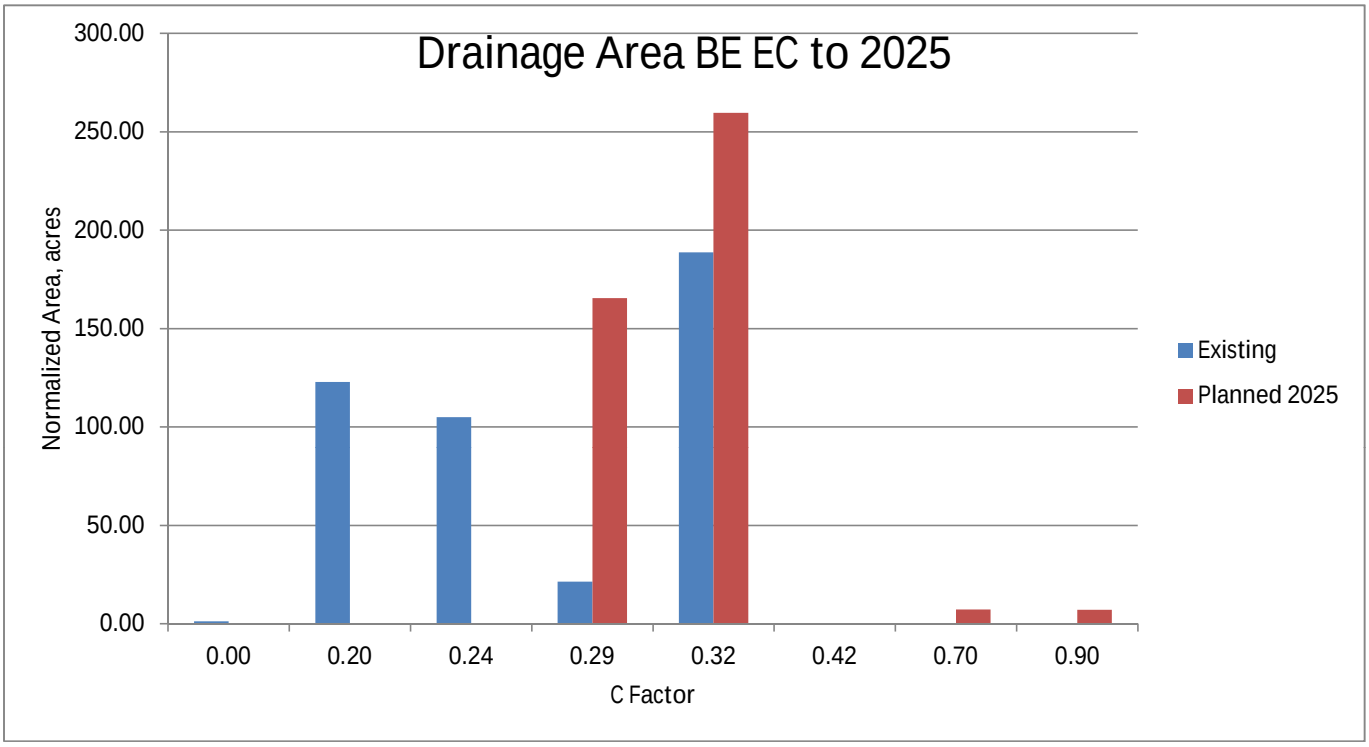

Drainage Area AY Ec to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.75
0.90
C Factor
Existing
Planned 2025

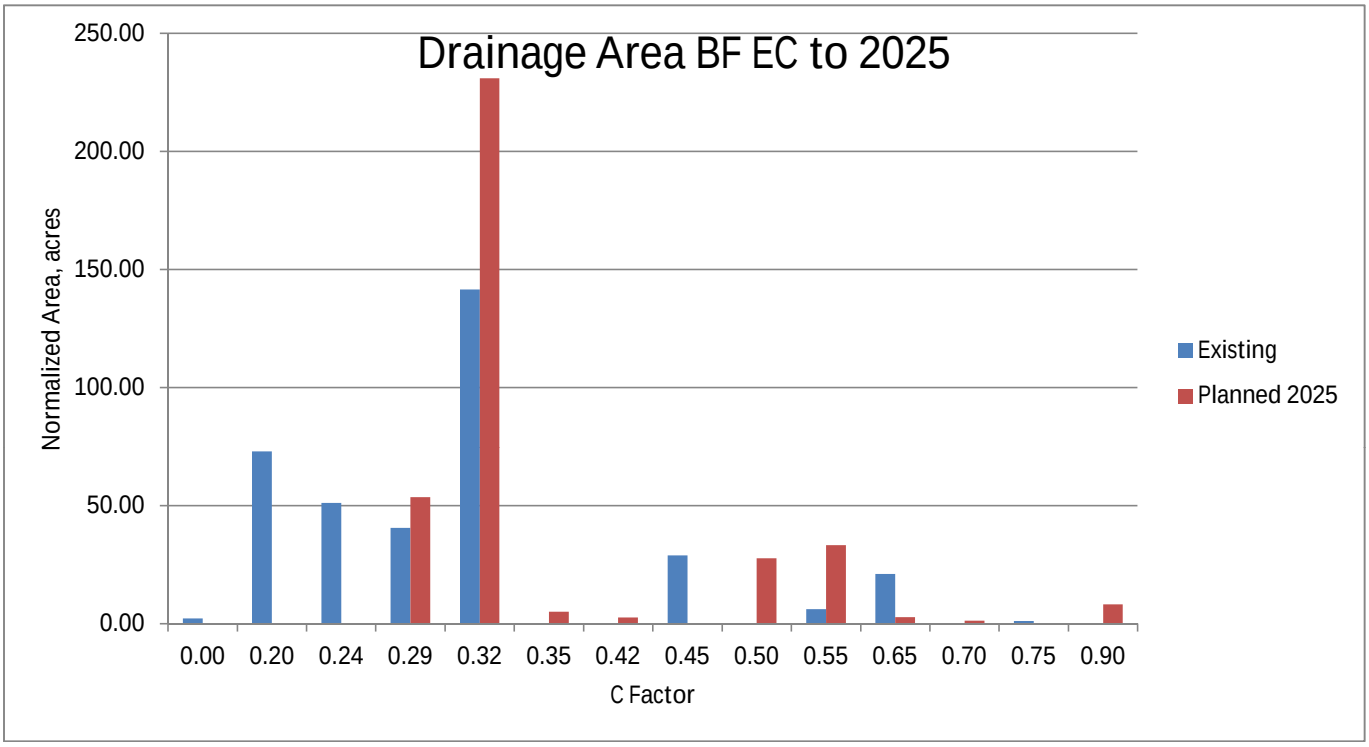

Drainage Area AZ EC to 2025
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.75
C Factor
Existing
Planned 2025

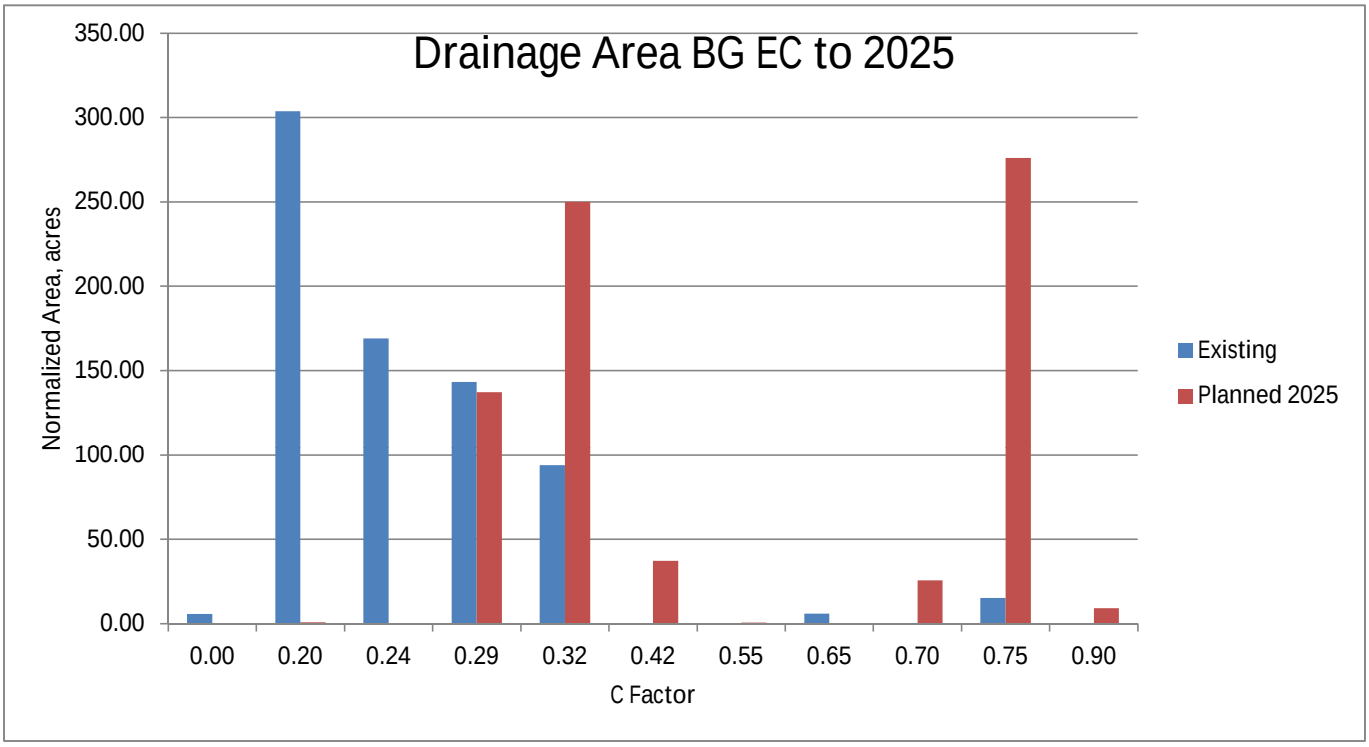

Drainage Area B EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
C Factor
Existing
Planned 2025

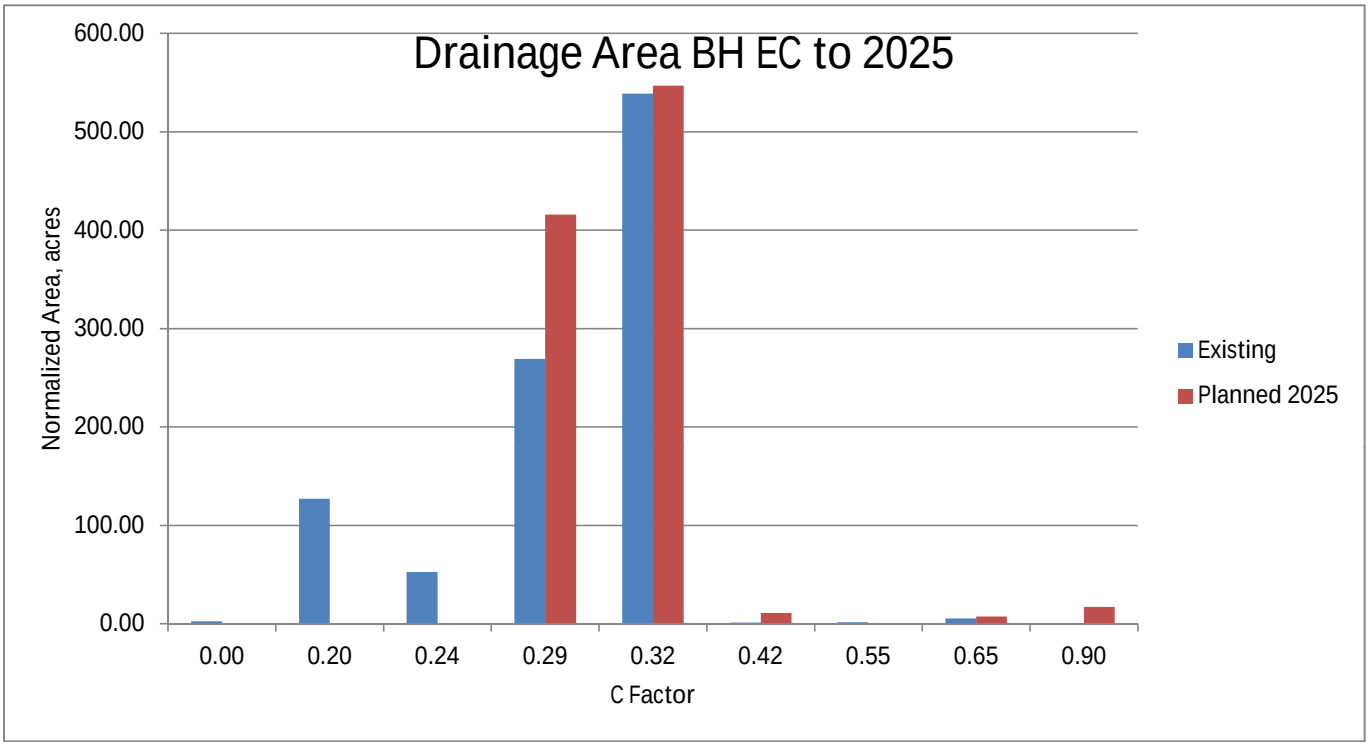

Drainage Area BB EC to 2025
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

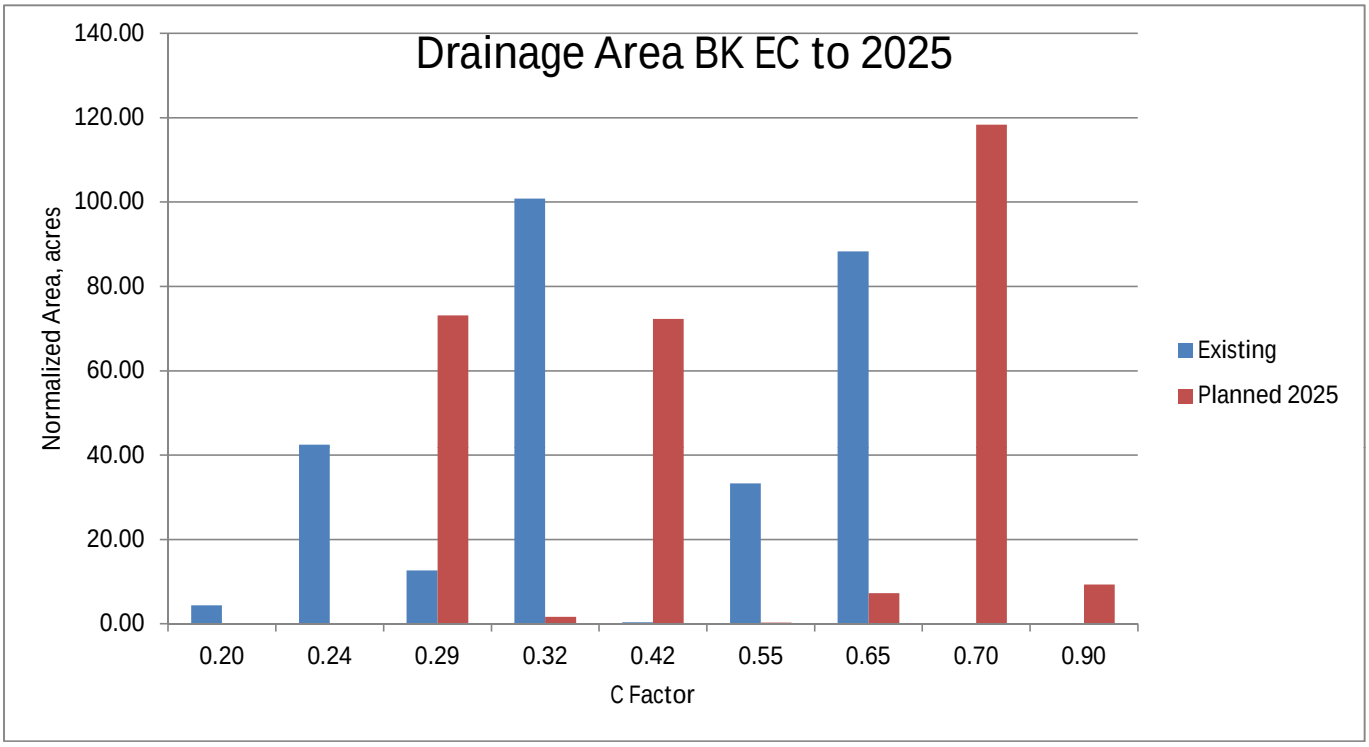

Drainage Area BD EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
Existing
Planned 2025

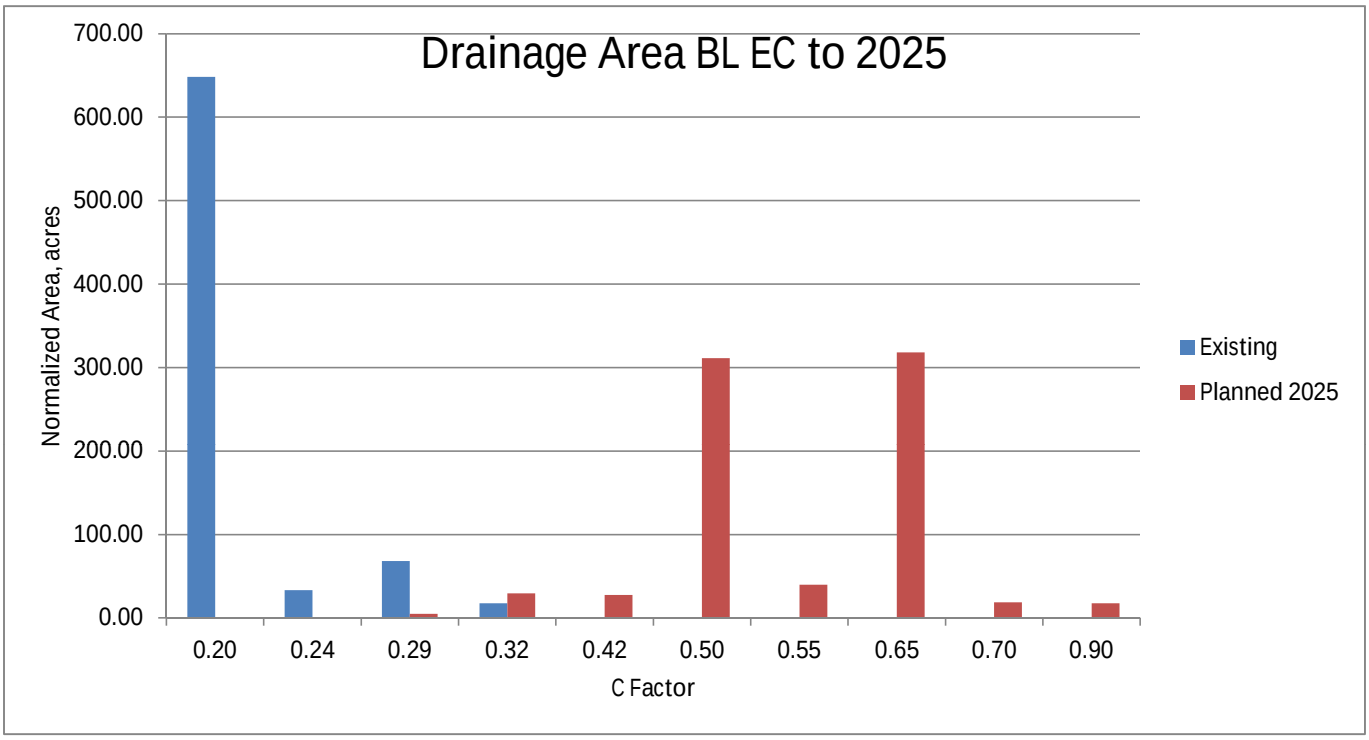

Drainage Area BE EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.70
0.90
C Factor
Existing
Planned 2025

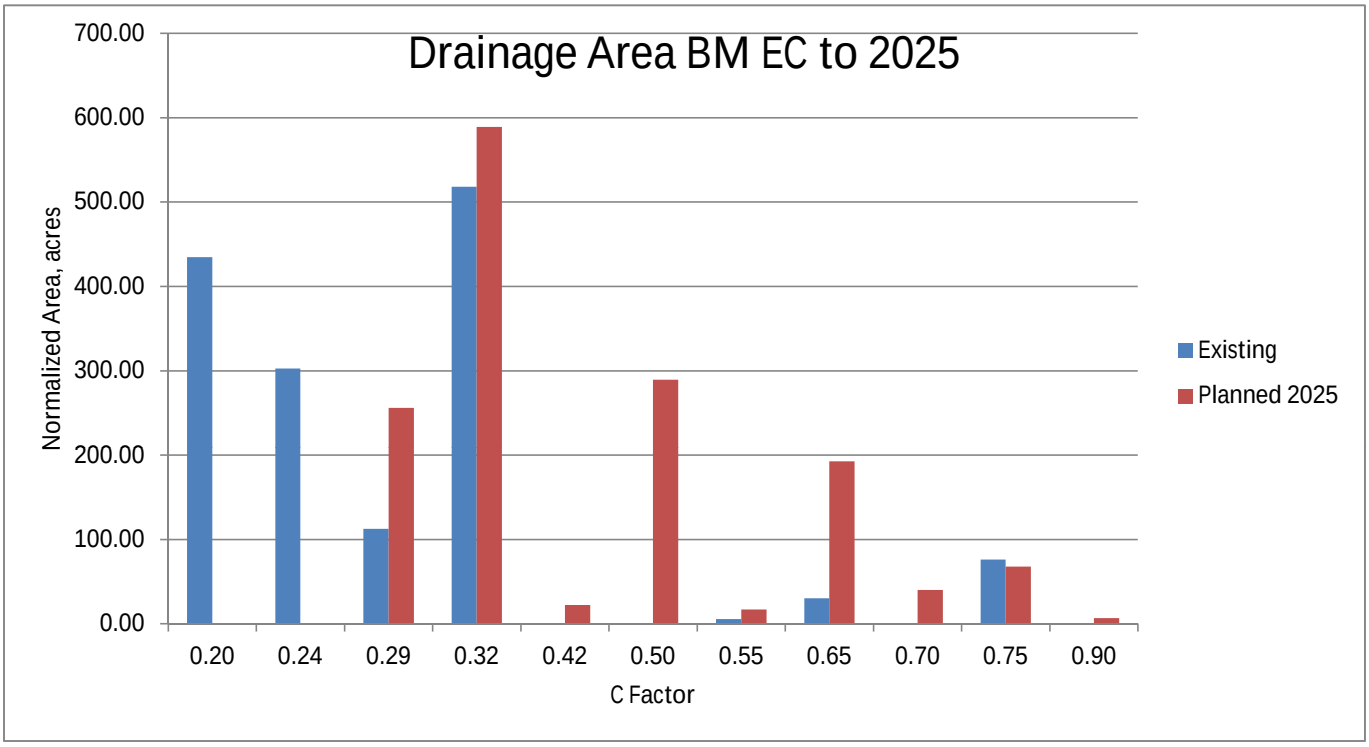

Drainage Area BF EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.35
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

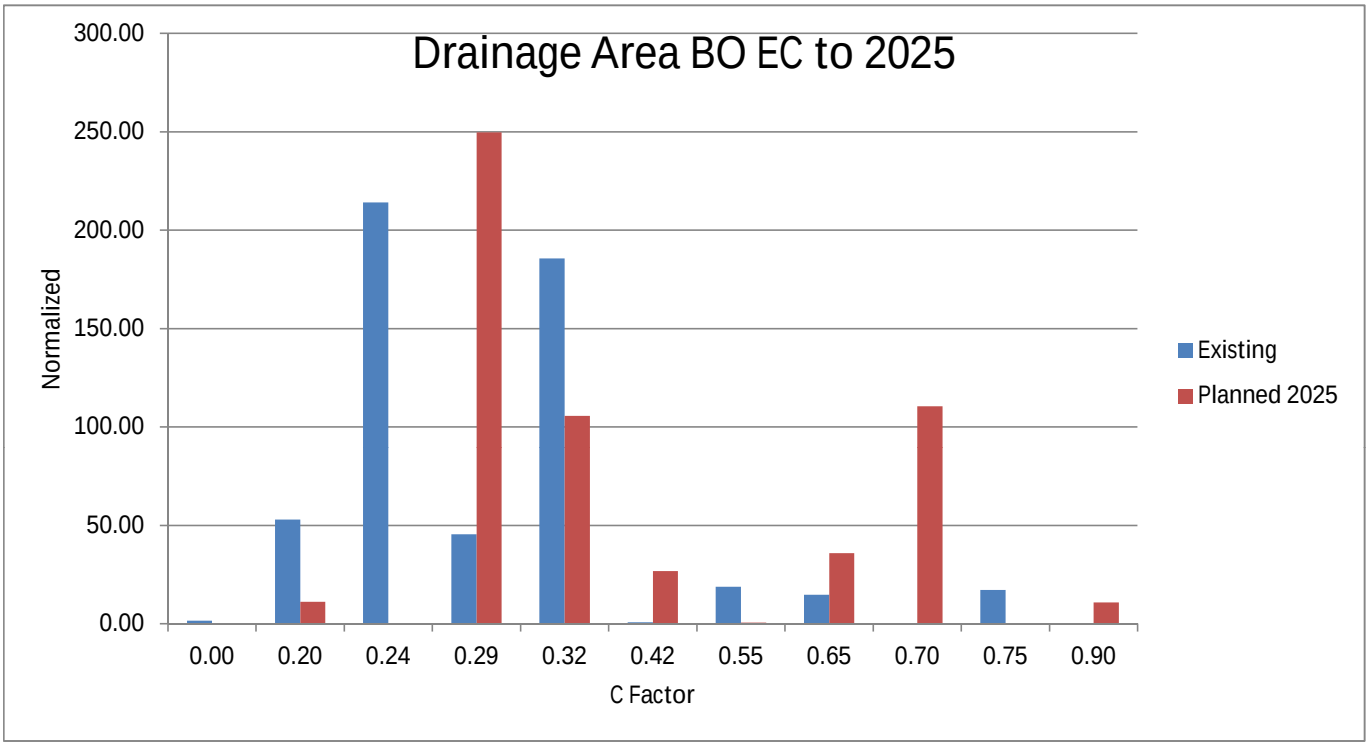

Drainage Area BG EC to 2025
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

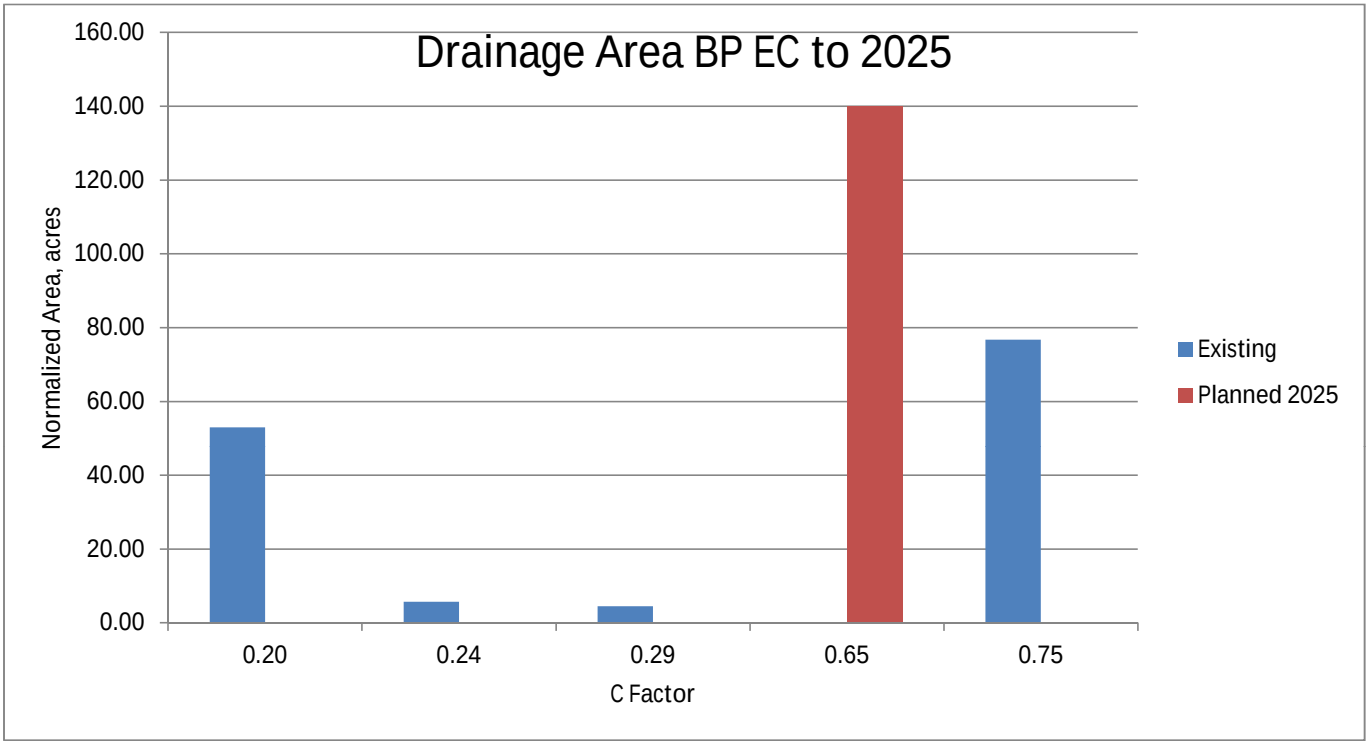

Drainage Area BH EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
Existing
Planned 2025

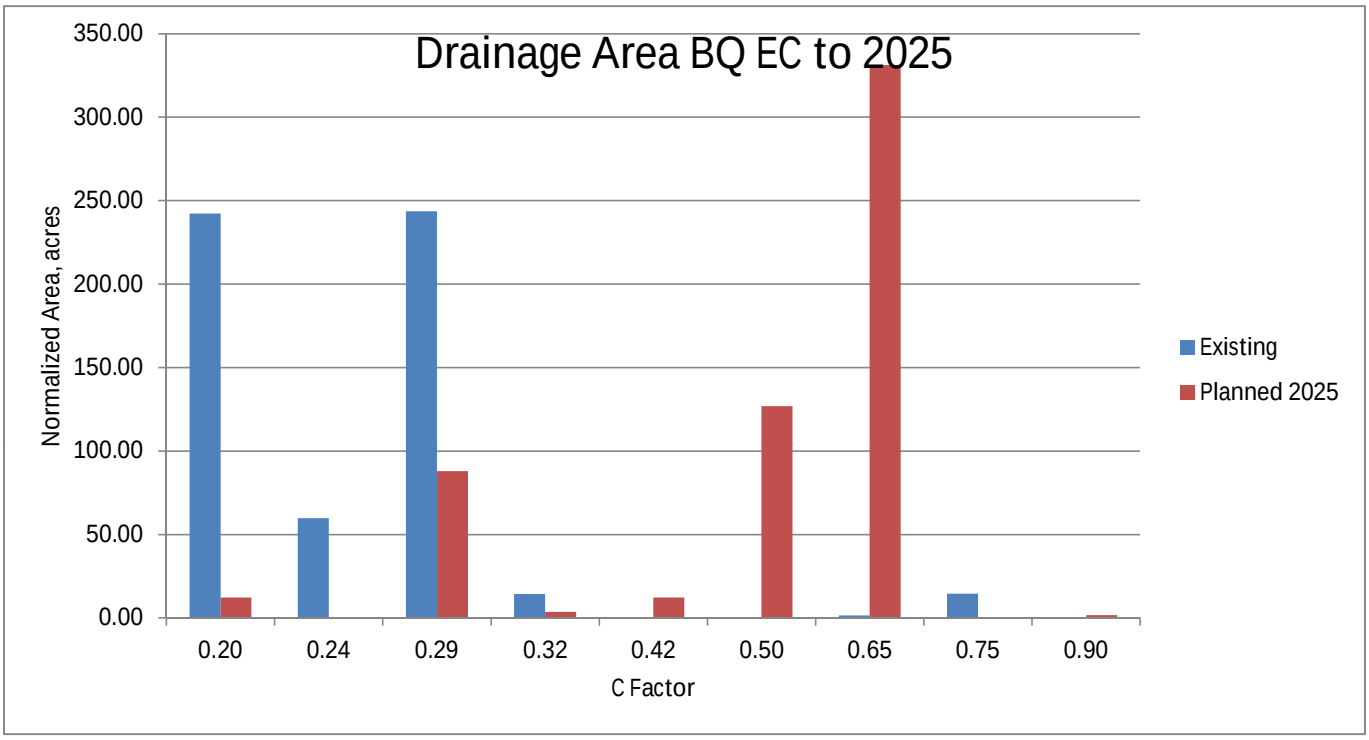

Drainage Area BK EC to 2025
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

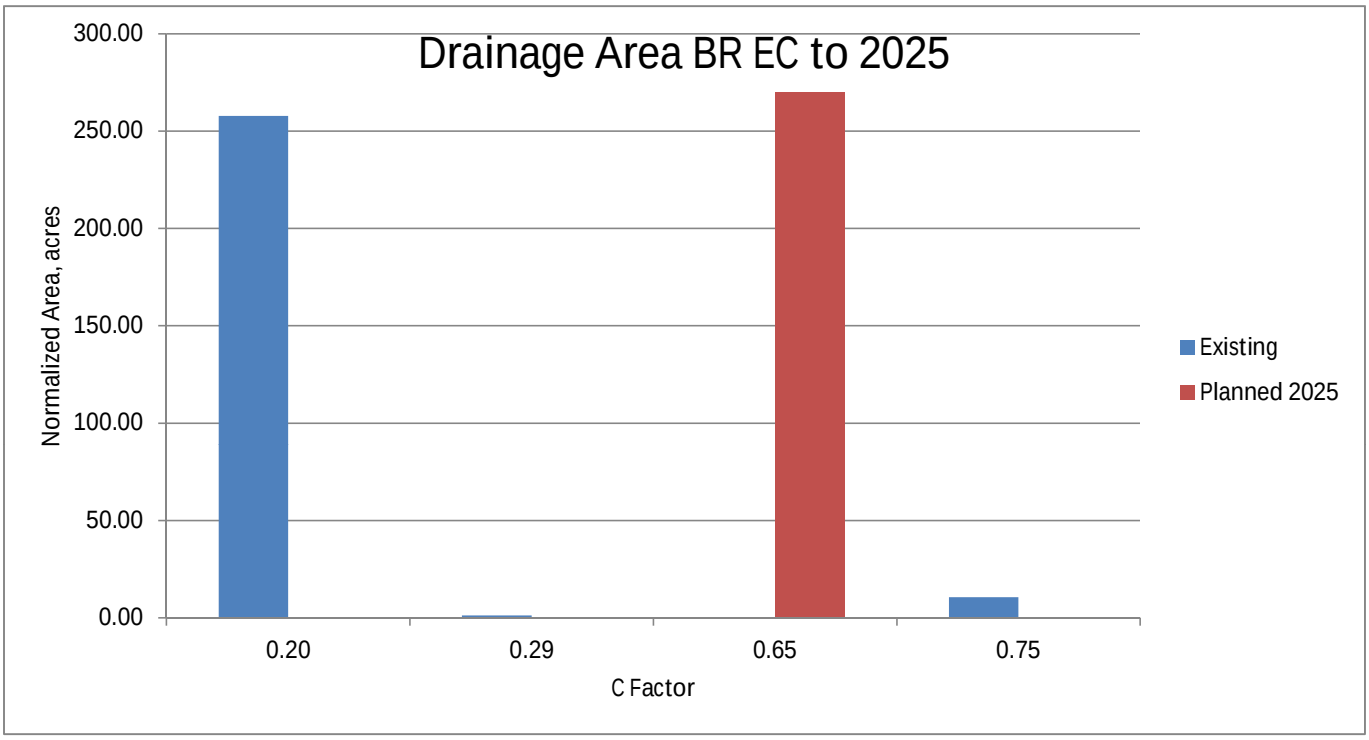

Drainage Area BL EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

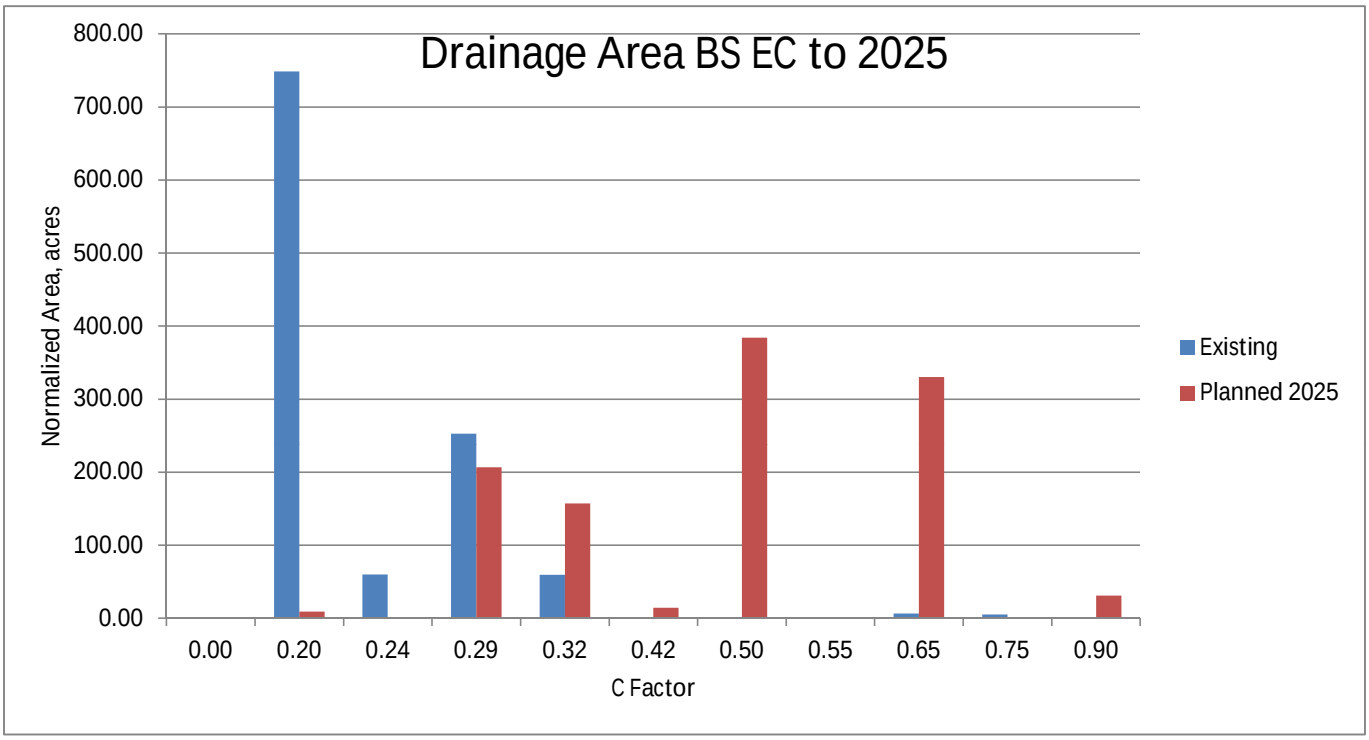

Drainage Area BM EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

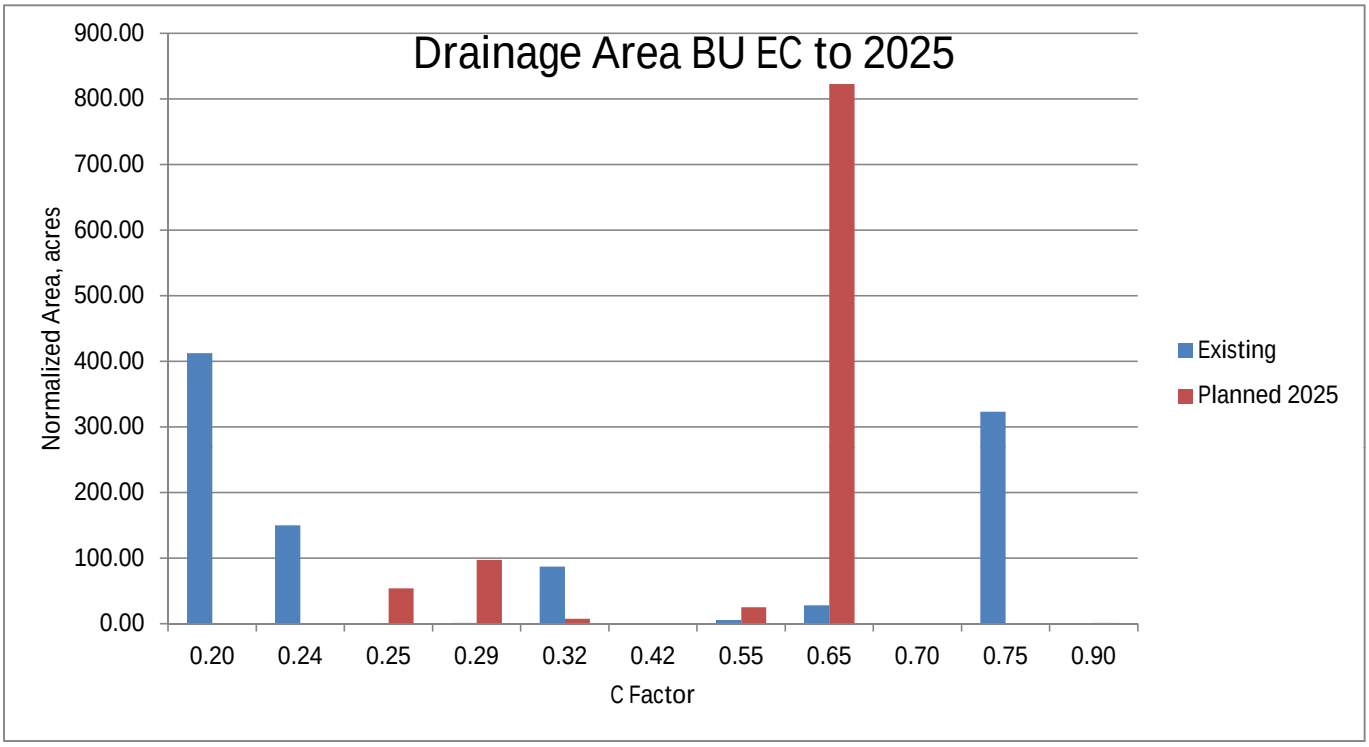

Drainage Area BO EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

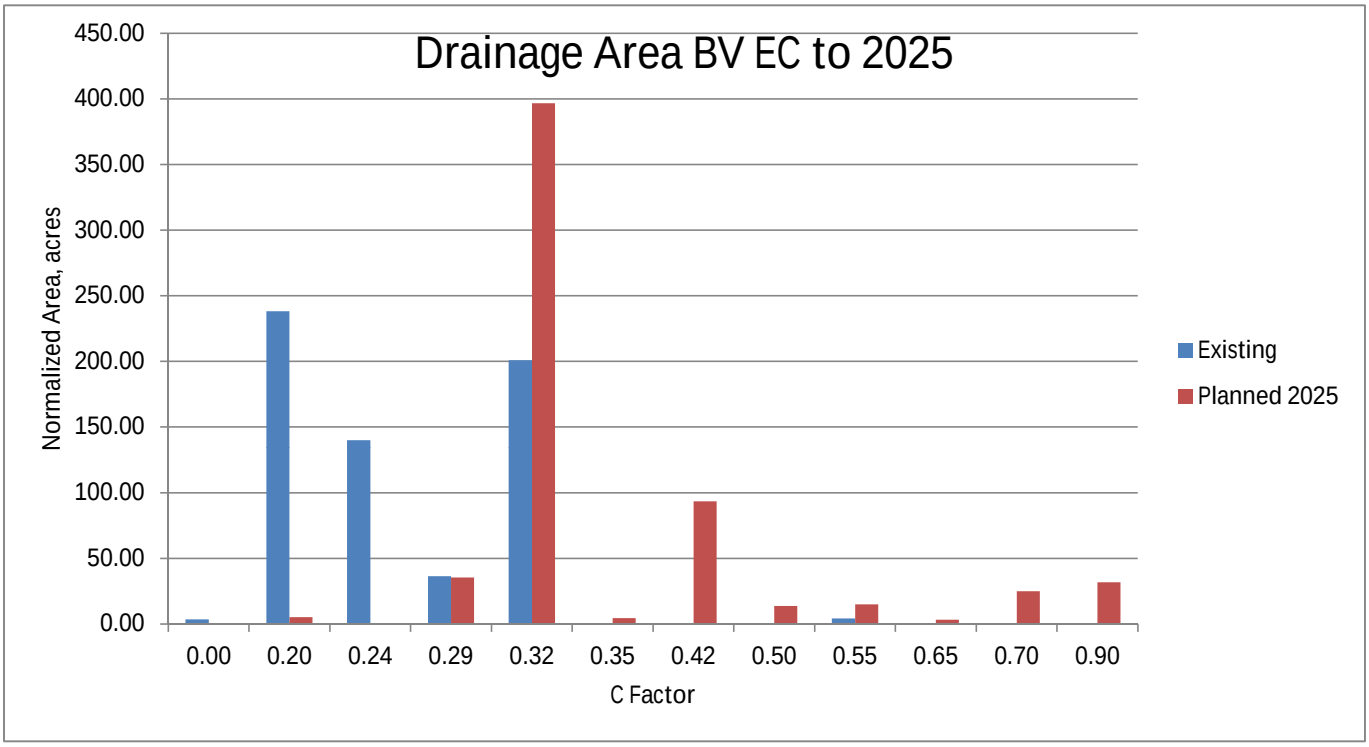

Drainage Area BP EC to 2025
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.65
0.75
C Factor
Existing
Planned 2025

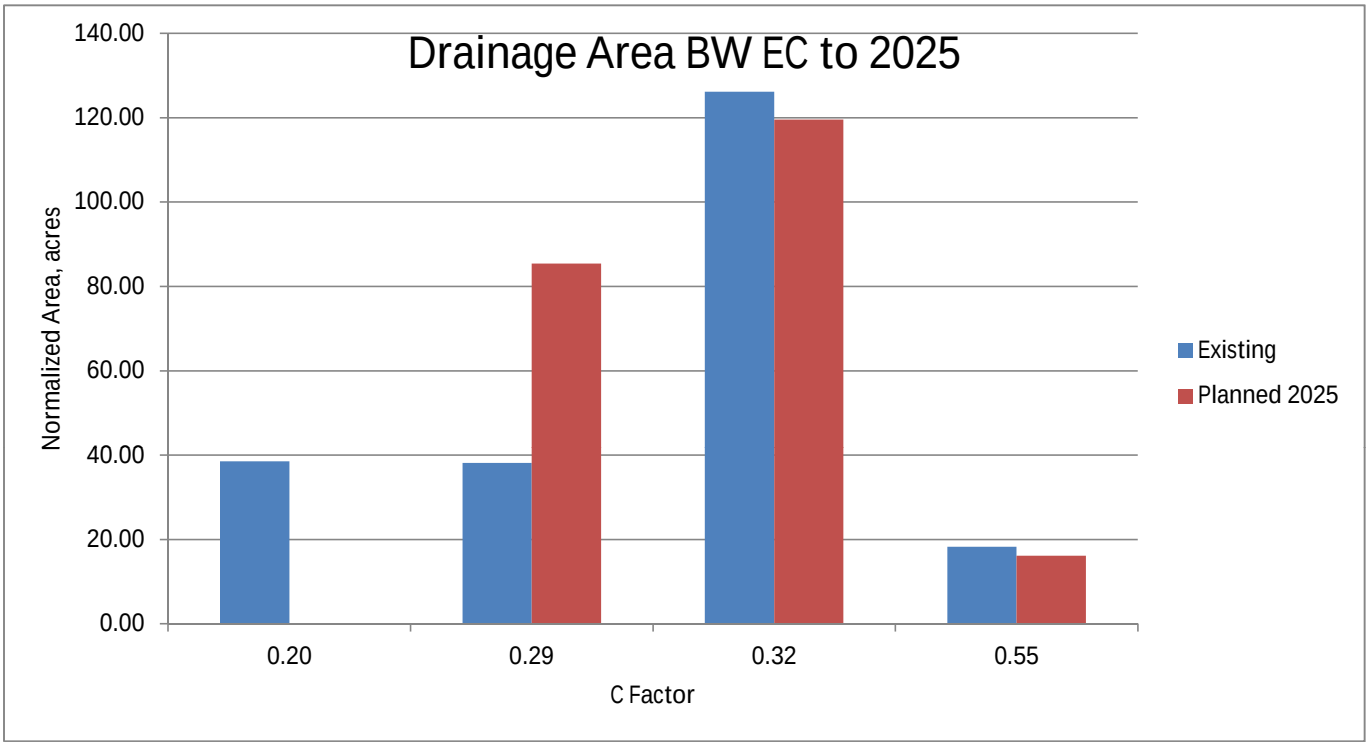

Drainage Area BQ EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.65
0.75
0.90
C Factor
Existing
Planned 2025

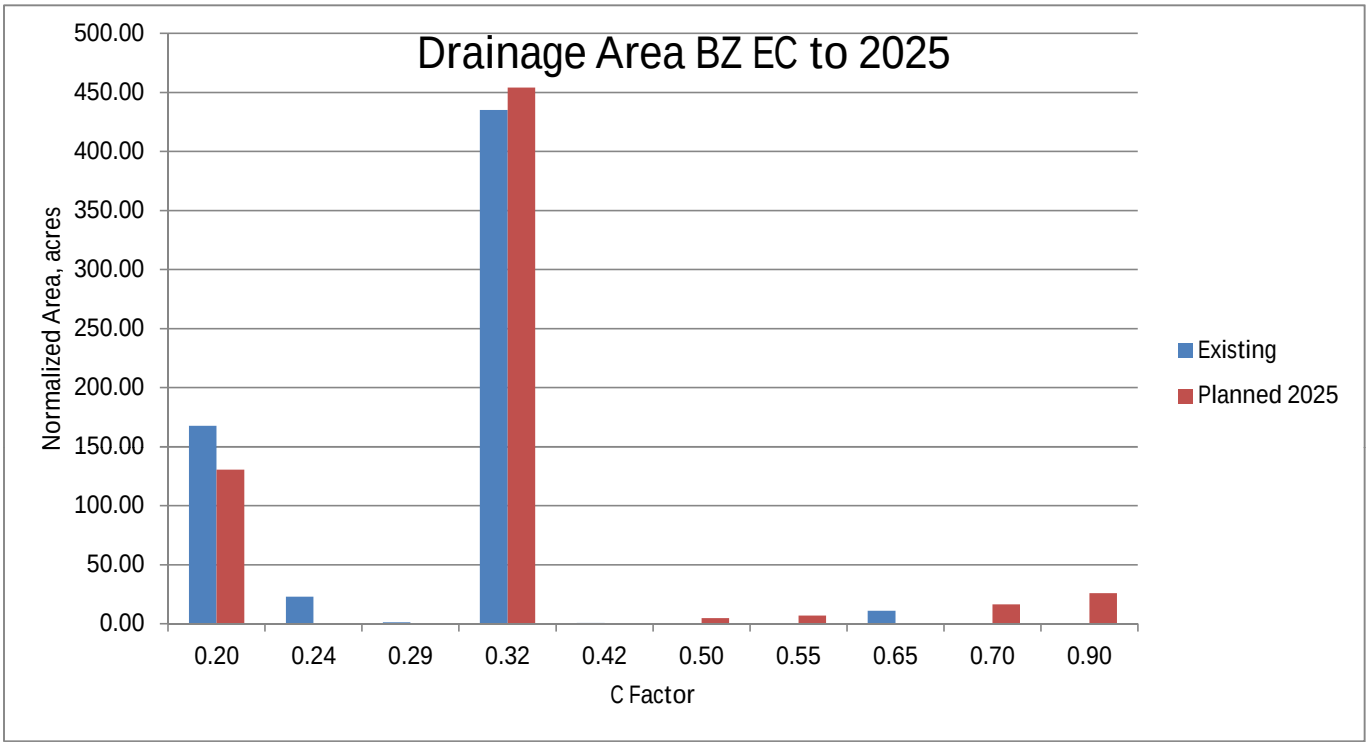

Drainage Area BR EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.65
0.75
C Factor
Existing
Planned 2025

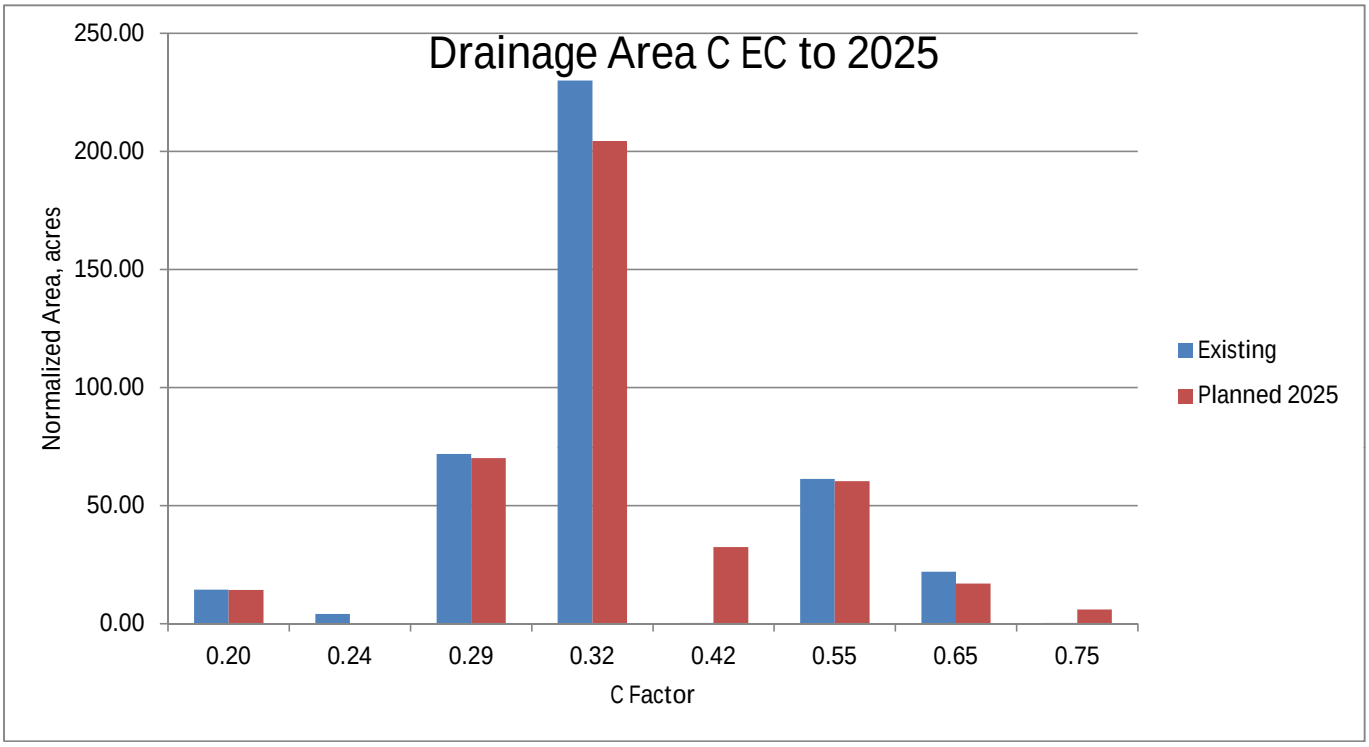

Drainage Area BS EC to 2025
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.75
0.90
C Factor
Existing
Planned 2025

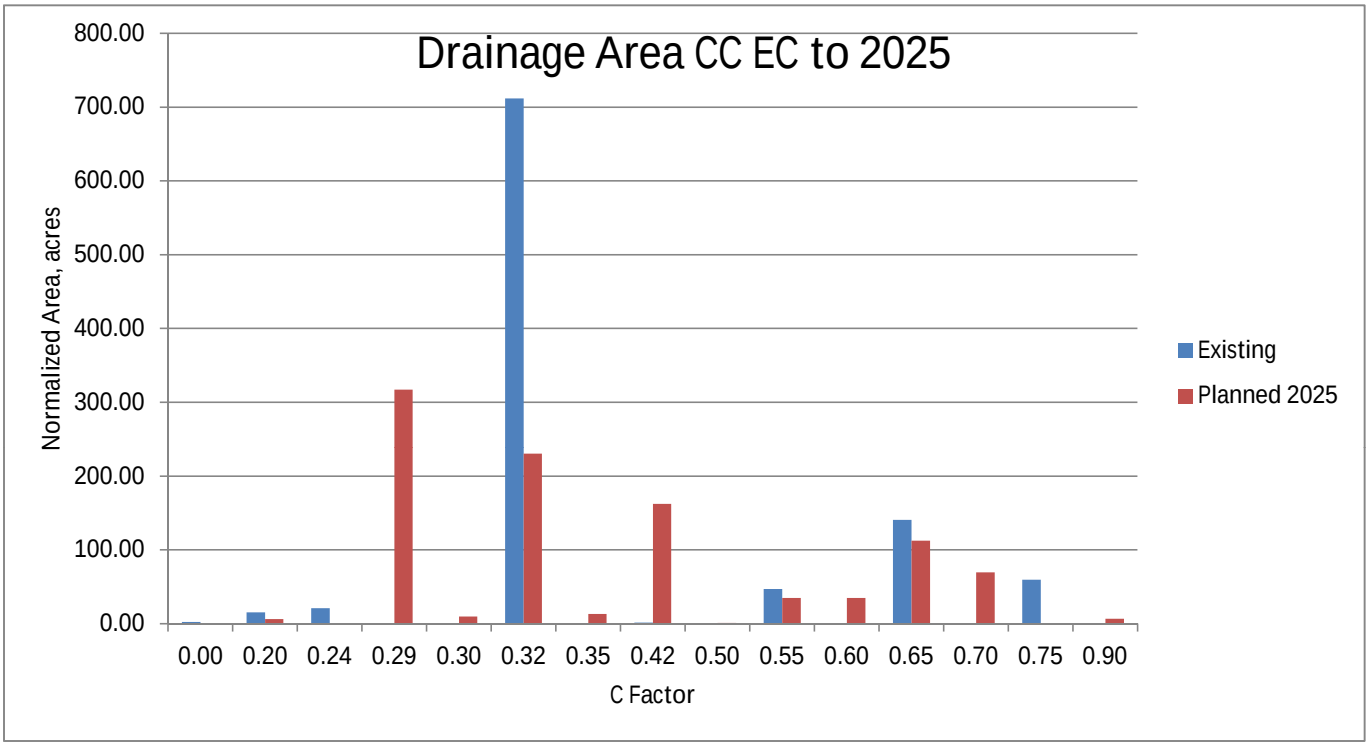

Drainage Area BU EC to 2025
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.25
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

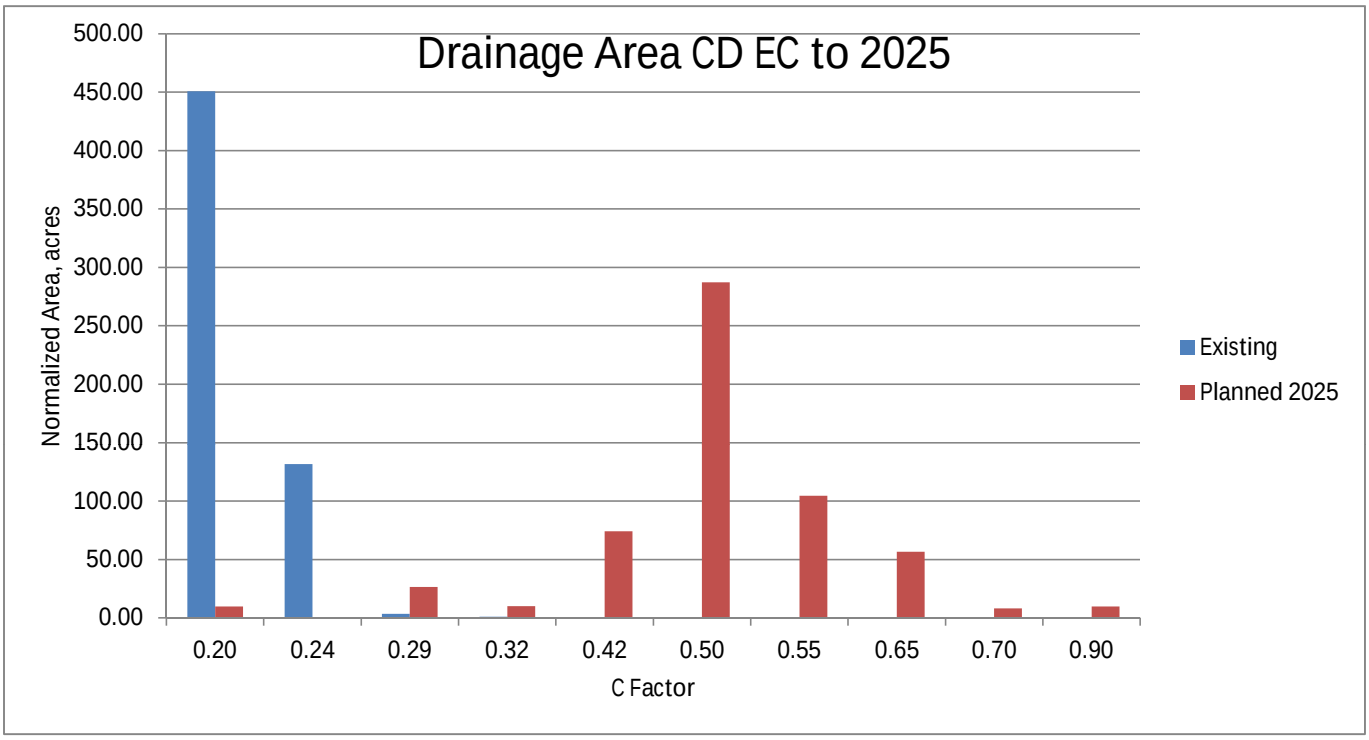

Drainage Area BV EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.00
0.20
0.24
0.29
0.32
0.35
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

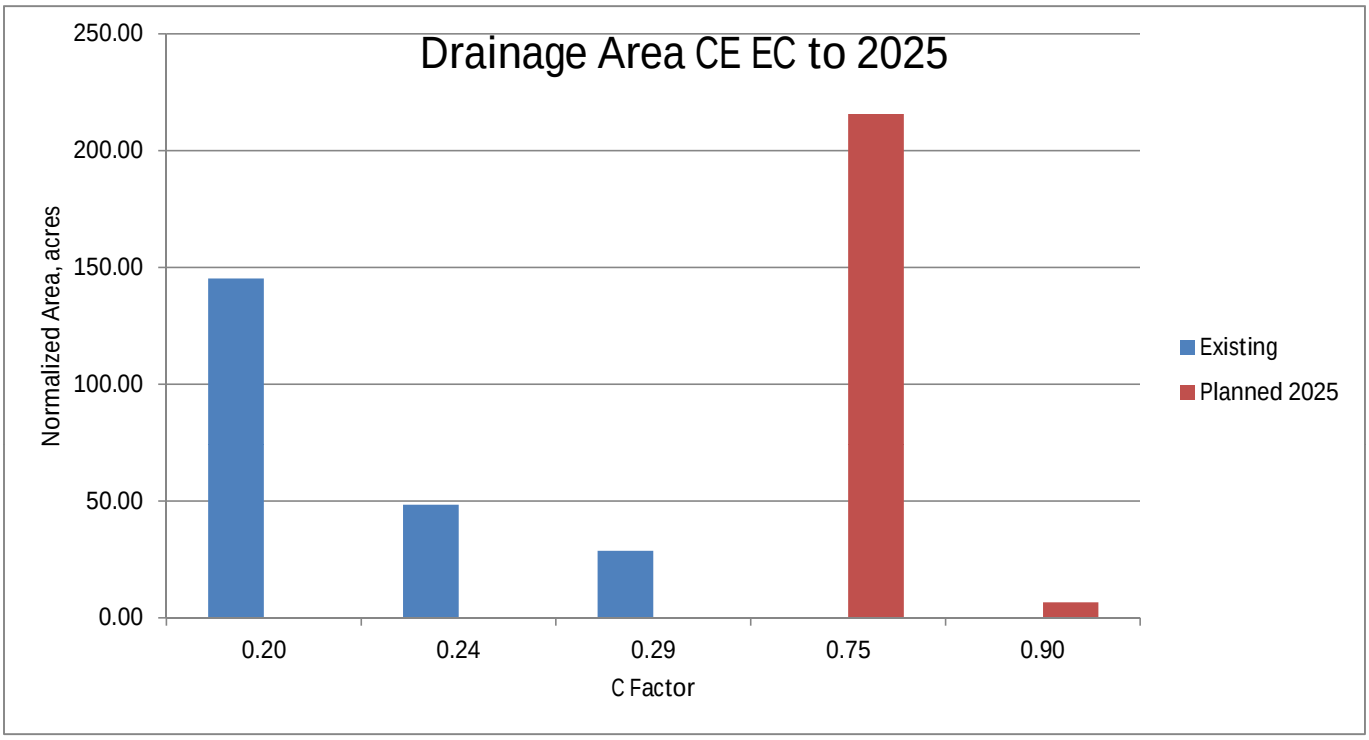

Drainage Area BW EC to 2025
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.55
C Factor
Existing
Planned 2025

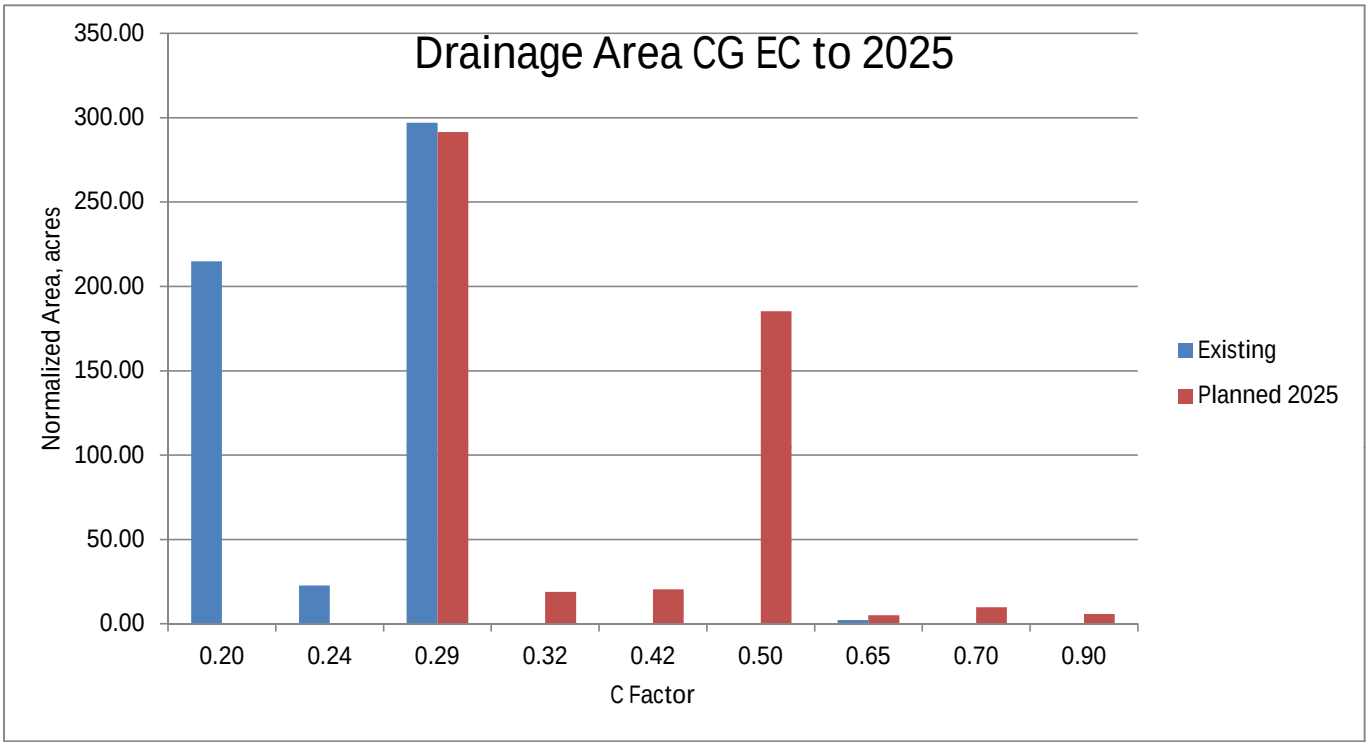

Drainage Area BZ EC to 2025
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

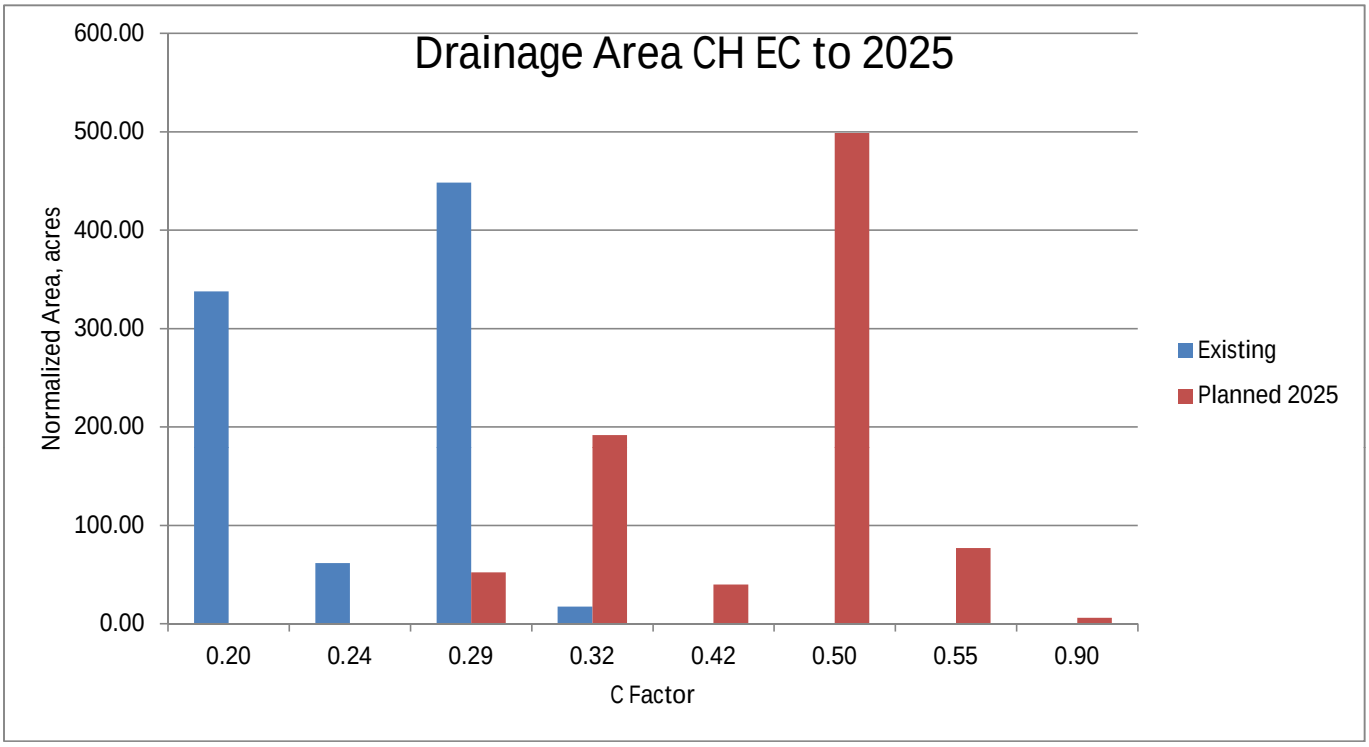

Drainage Area C EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
C Factor
Existing
Planned 2025

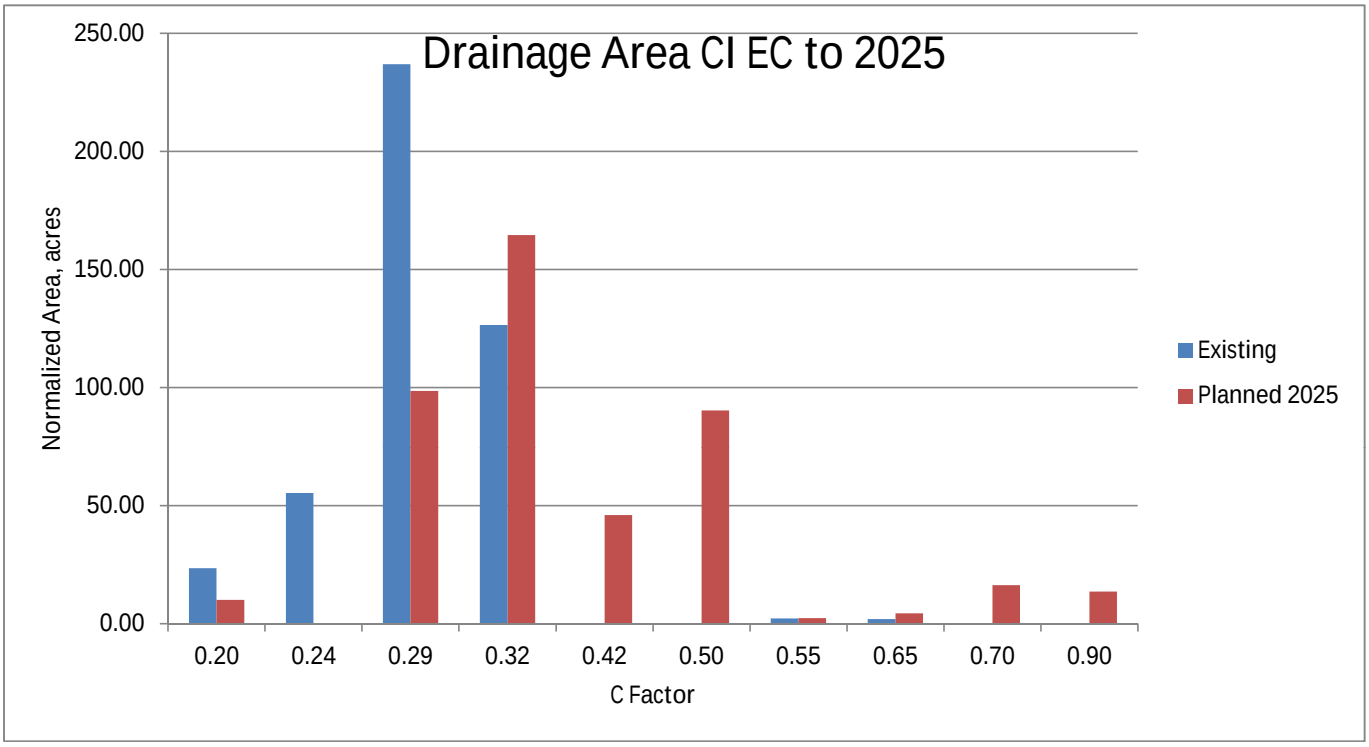

Drainage Area CC EC to 2025
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.30
0.32
0.35
0.42
0.50
0.55
0.60
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

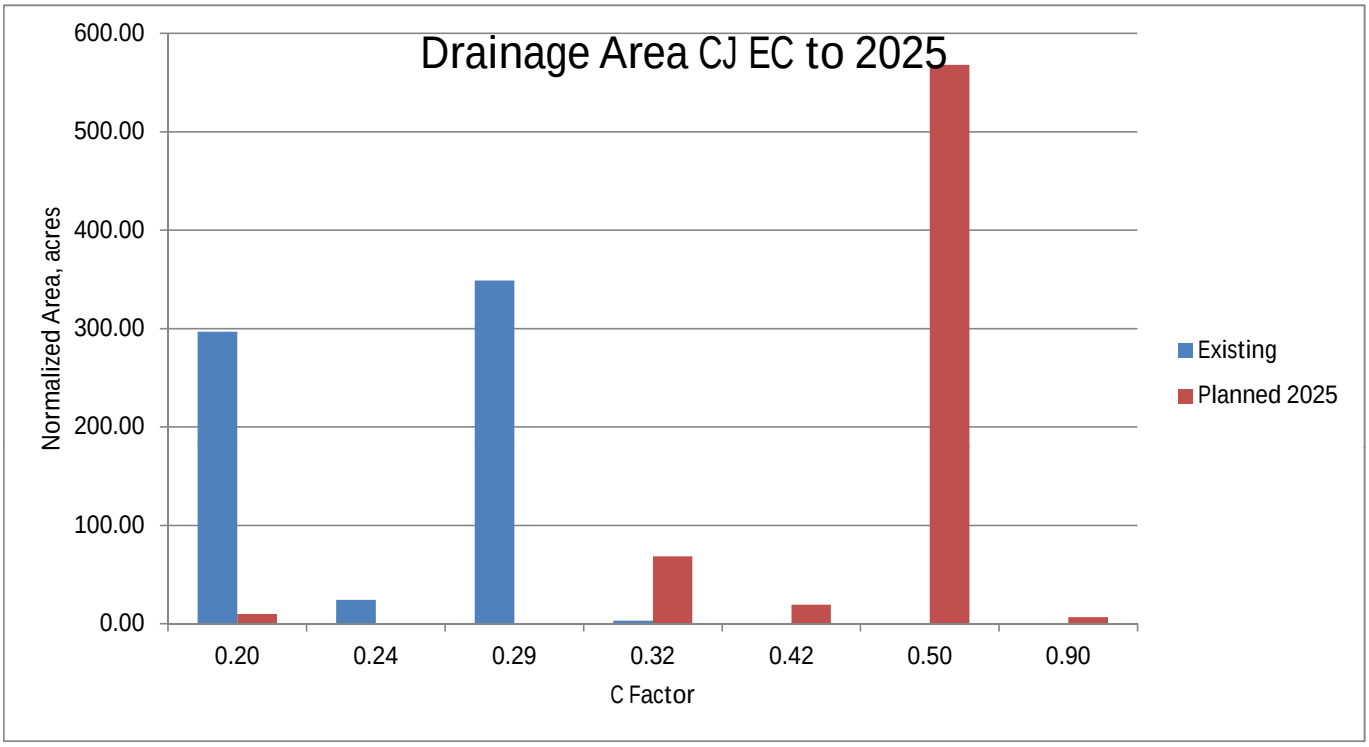

Drainage Area CD EC to 2025
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

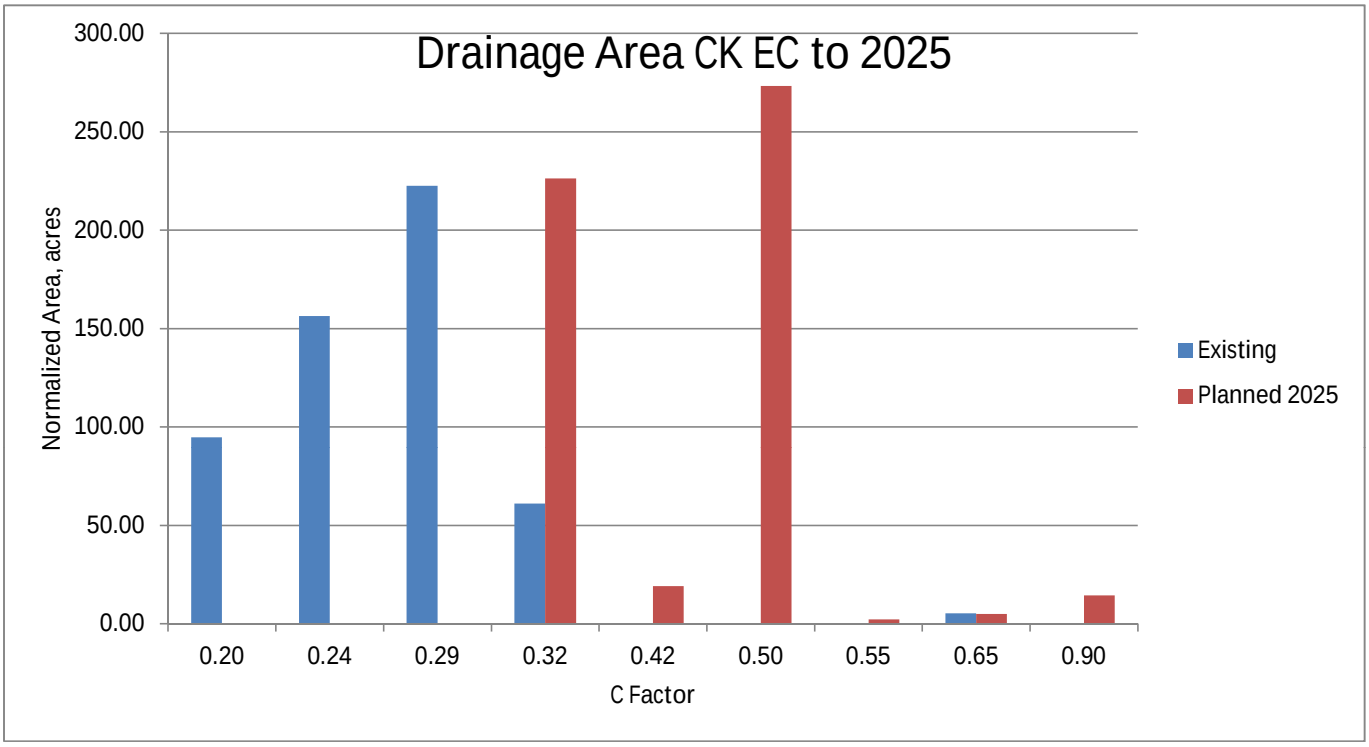

Drainage Area CE EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.75
0.90
C Factor
Existing
Planned 2025

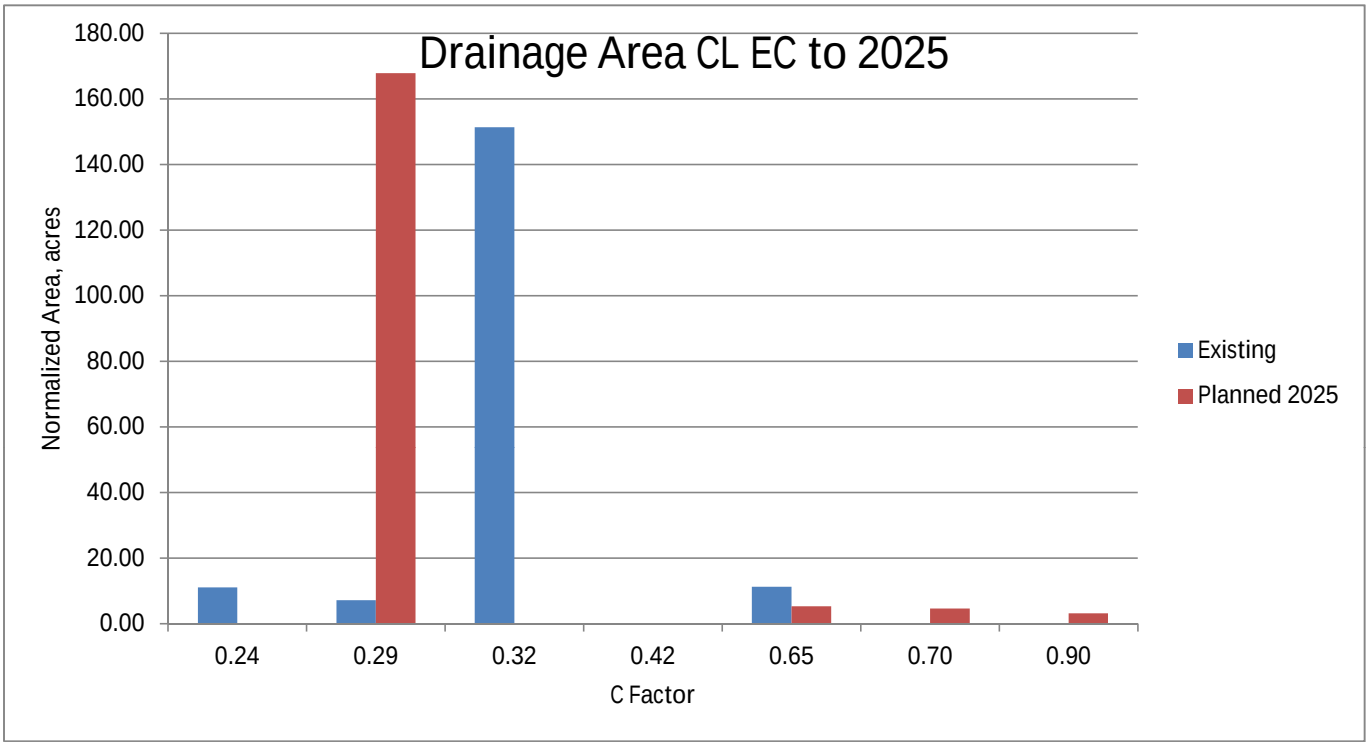

Drainage Area CG EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.65
0.70
0.90
C Factor
Existing
Planned 2025

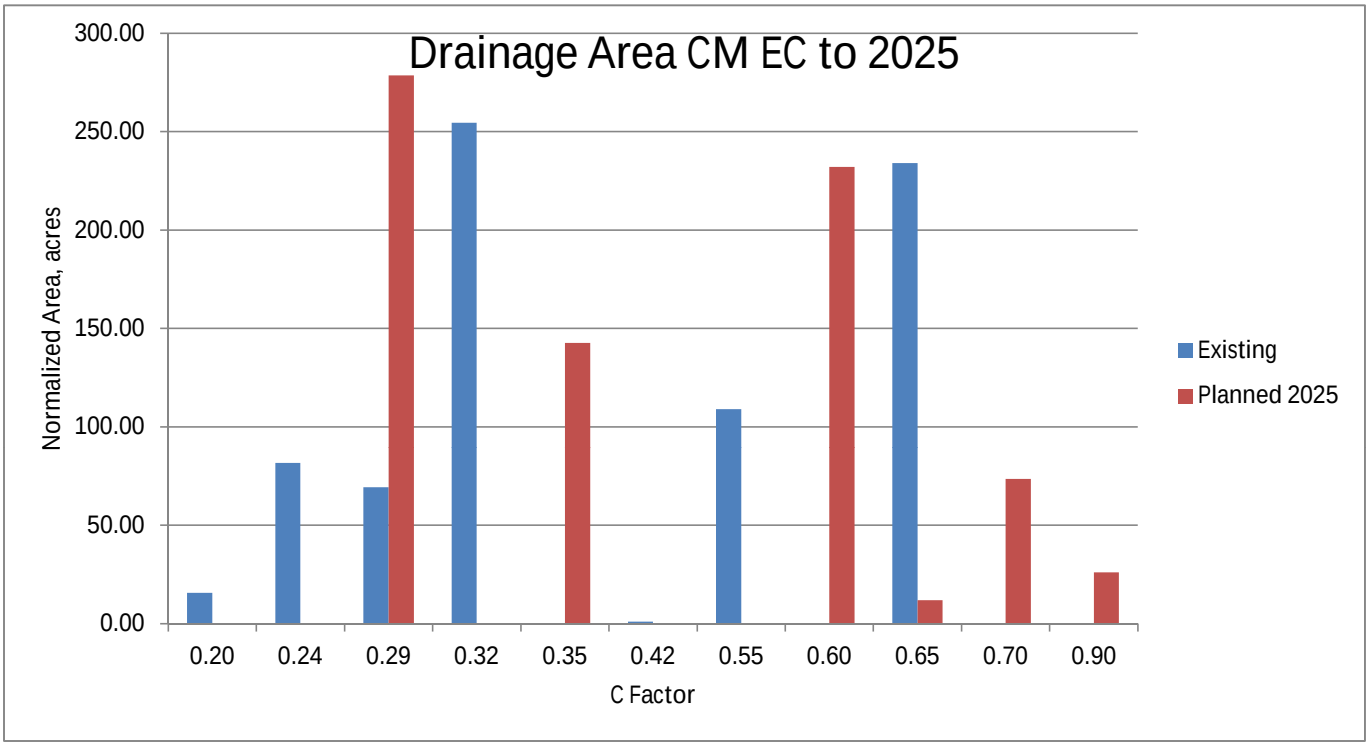

Drainage Area CH EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.90
C Factor
Existing
Planned 2025

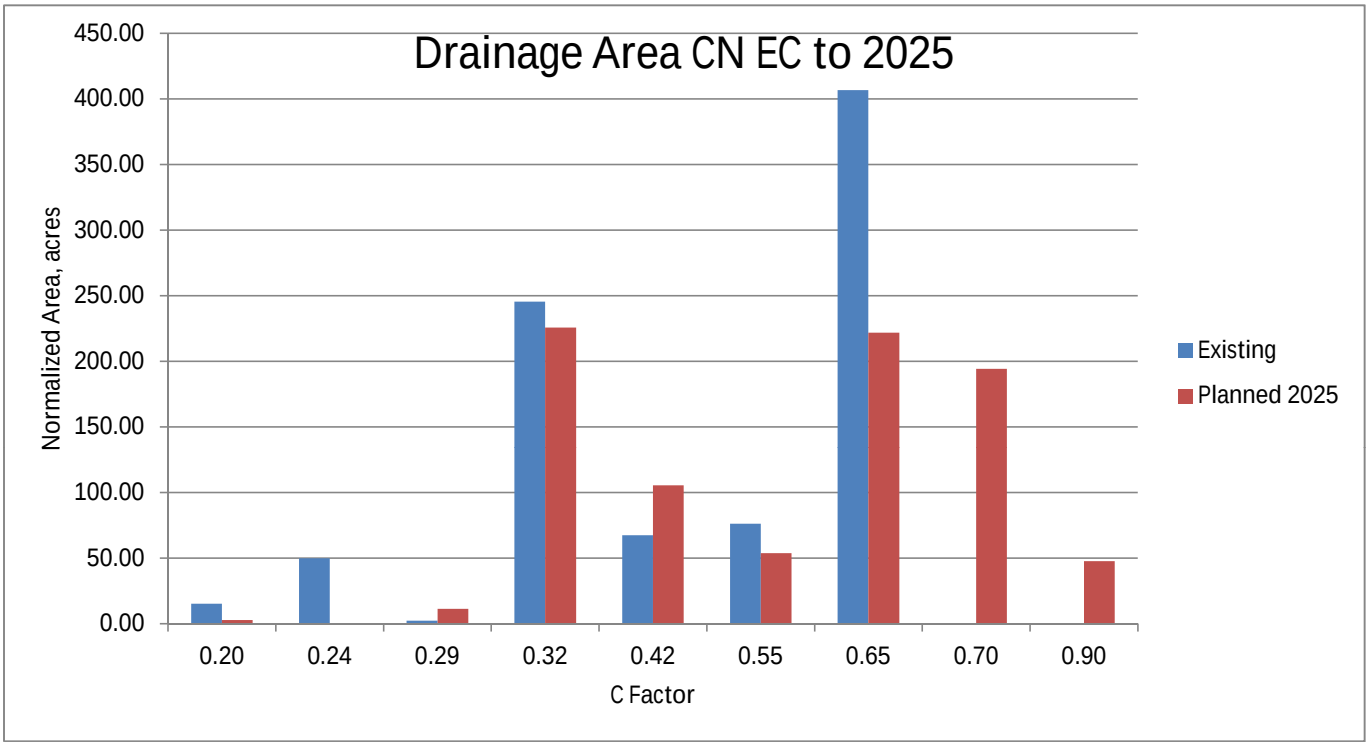

Drainage Area CI EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

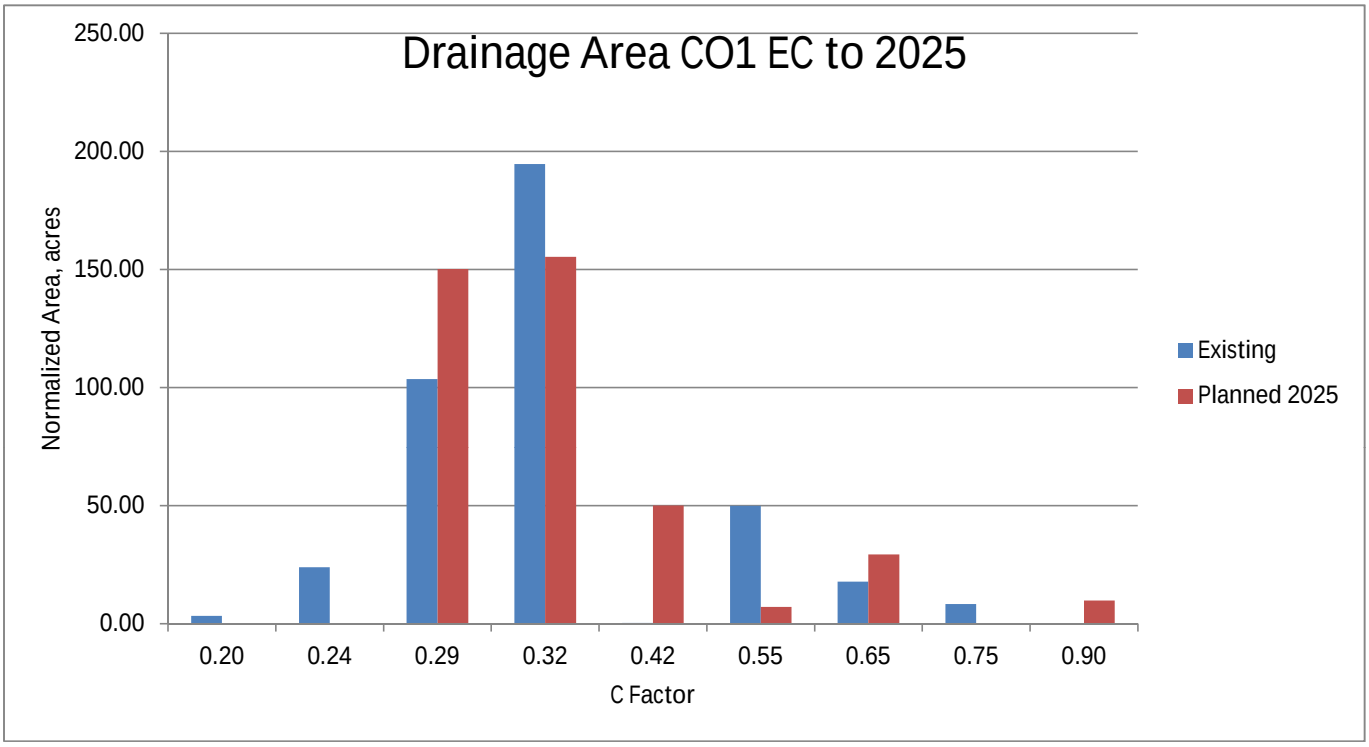

Drainage Area CJ EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.90
C Factor
Existing
Planned 2025

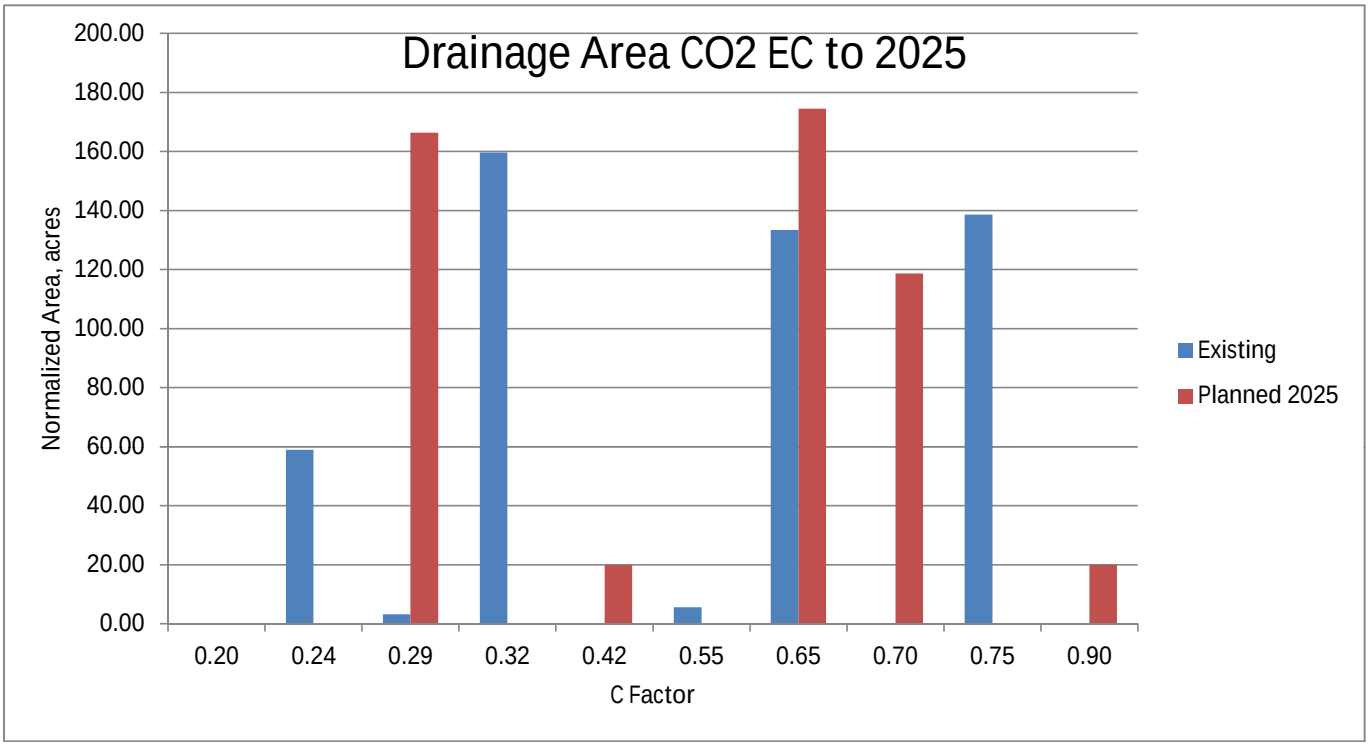

Drainage Area CK EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.90
C Factor
Existing
Planned 2025

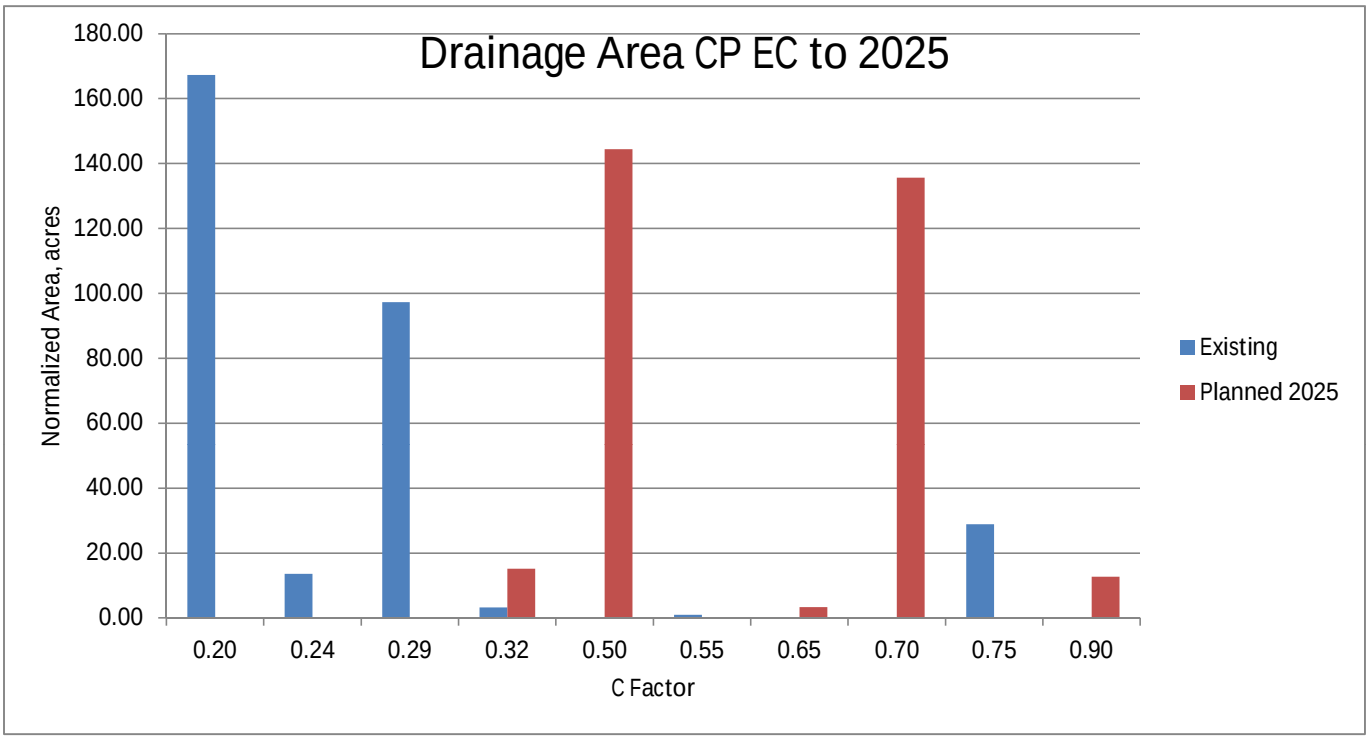

Drainage Area CL EC to 2025
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.24
0.29
0.32
0.42
0.65
0.70
0.90
C Factor
Existing
Planned 2025

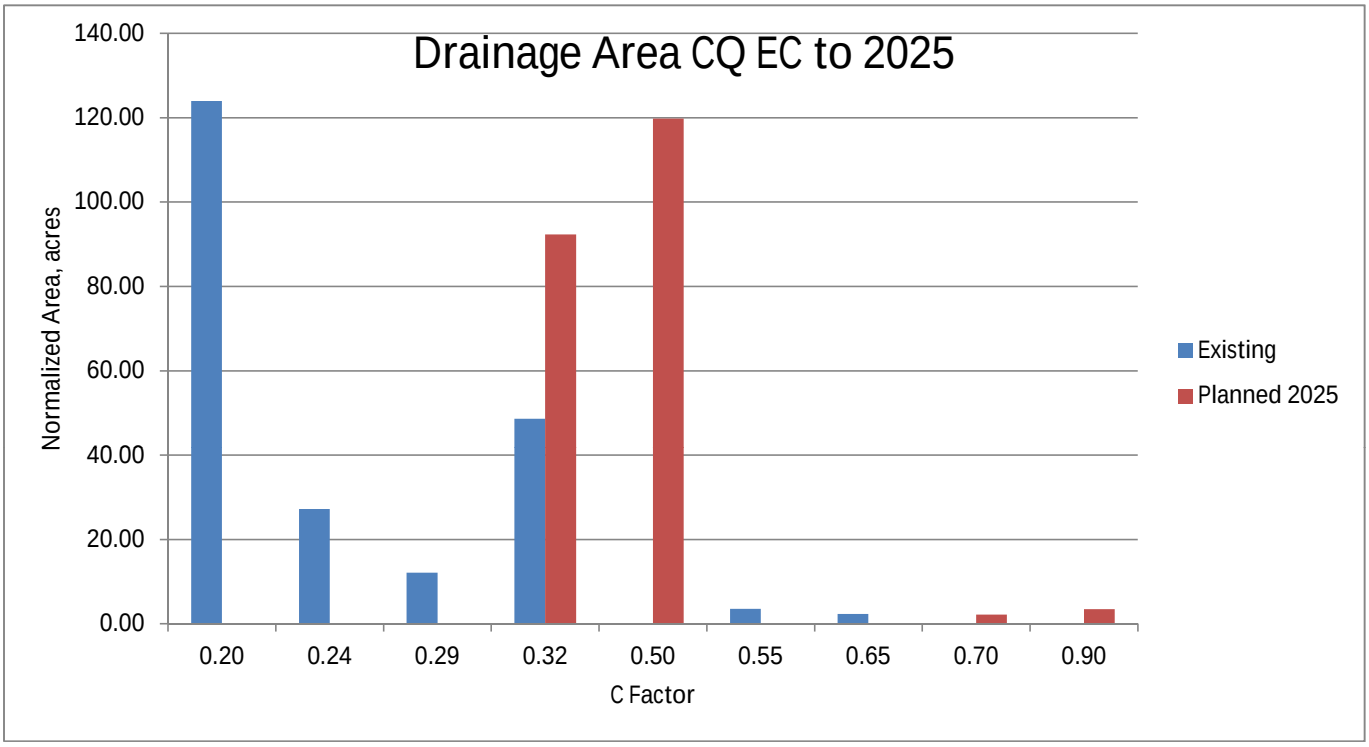

Drainage Area CM EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.55
0.60
0.65
0.70
0.90
C Factor
Existing
Planned 2025

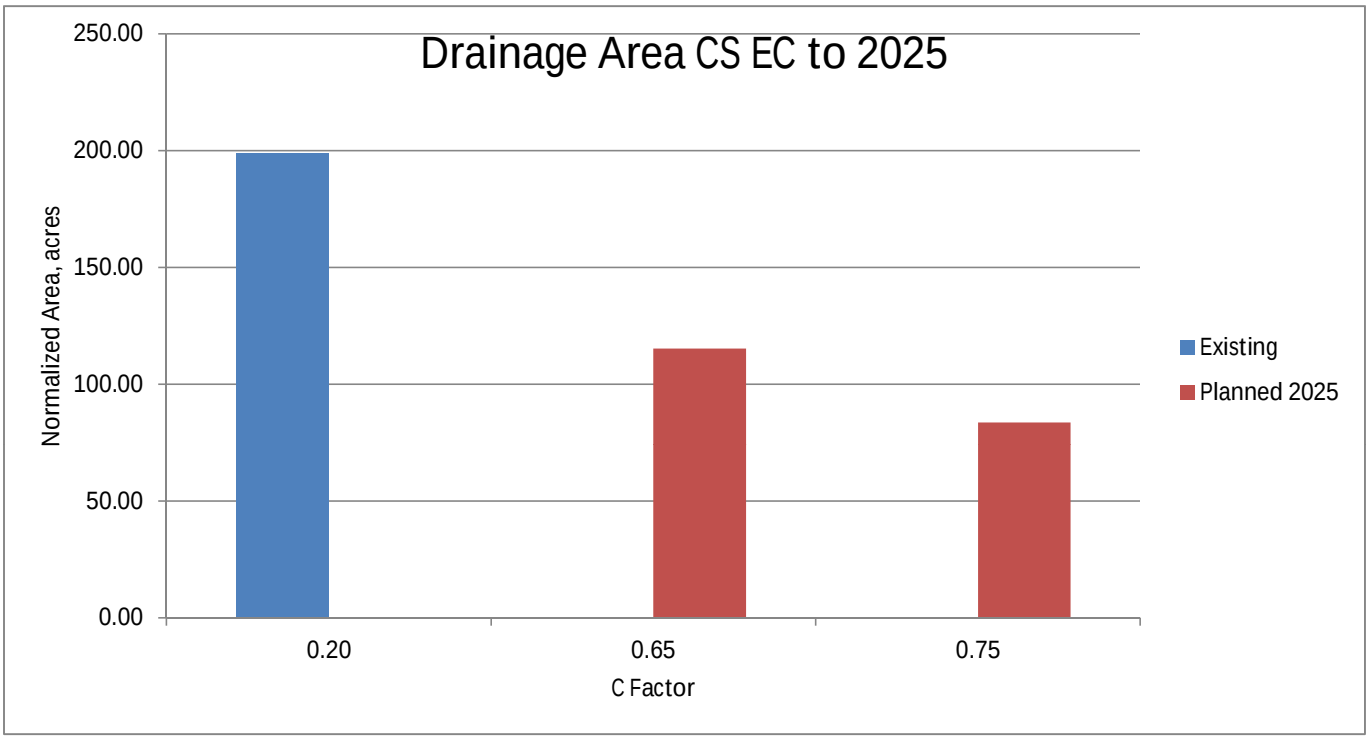

Drainage Area CN EC to 2025
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

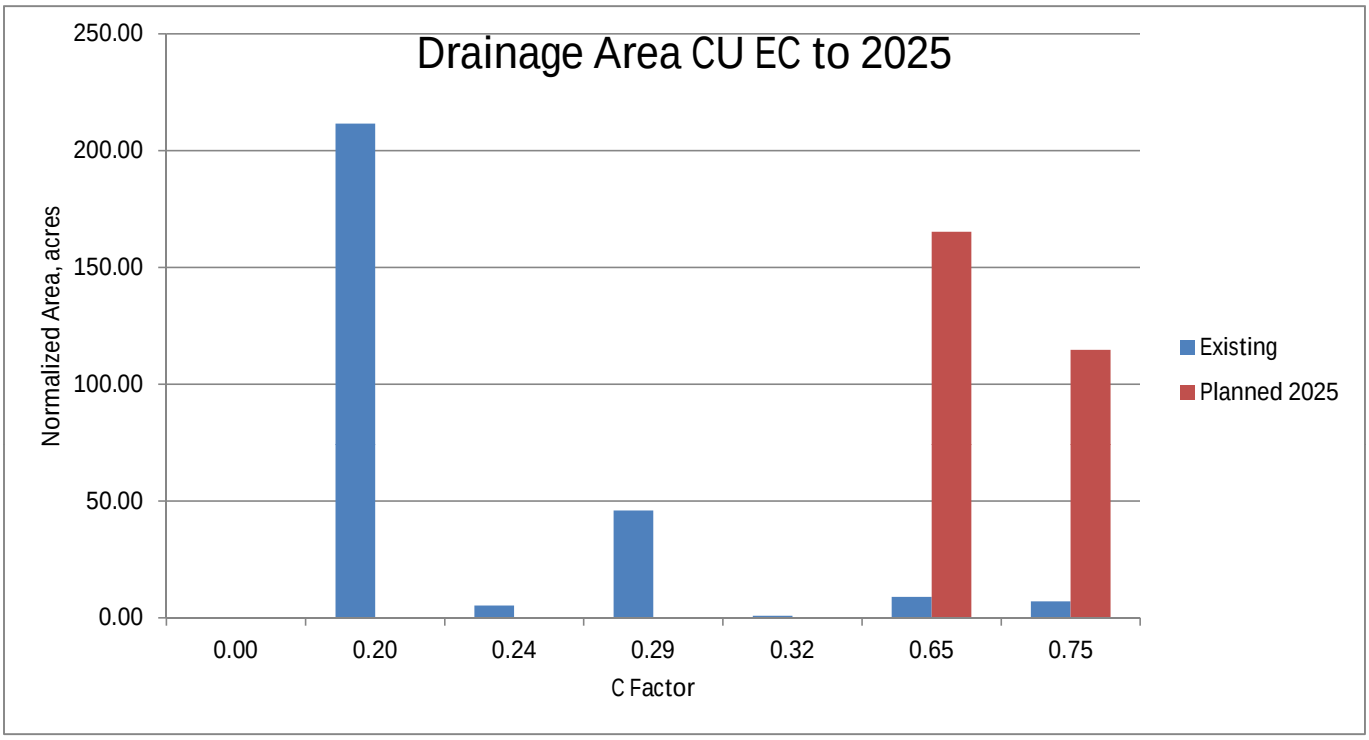

Drainage Area CO1 EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
Existing
Planned 2025

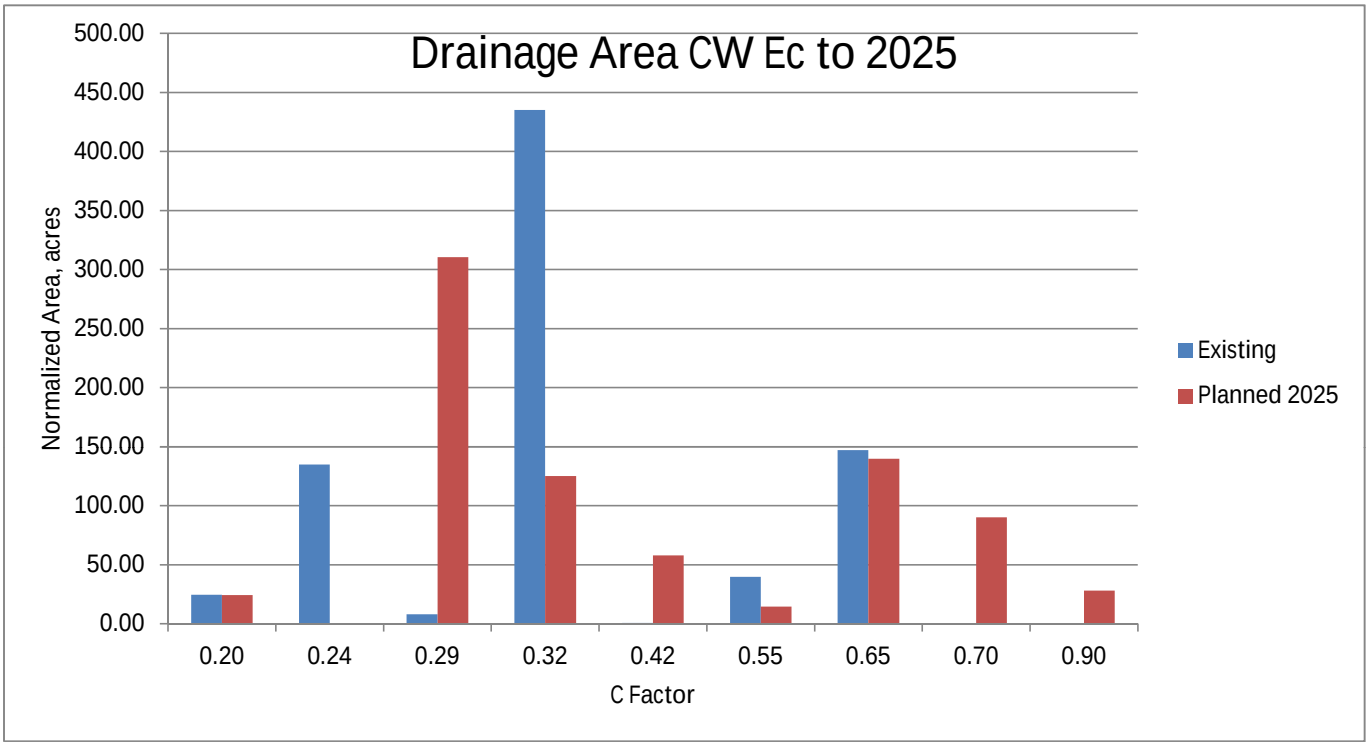

Drainage Area CO2 EC to 2025
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

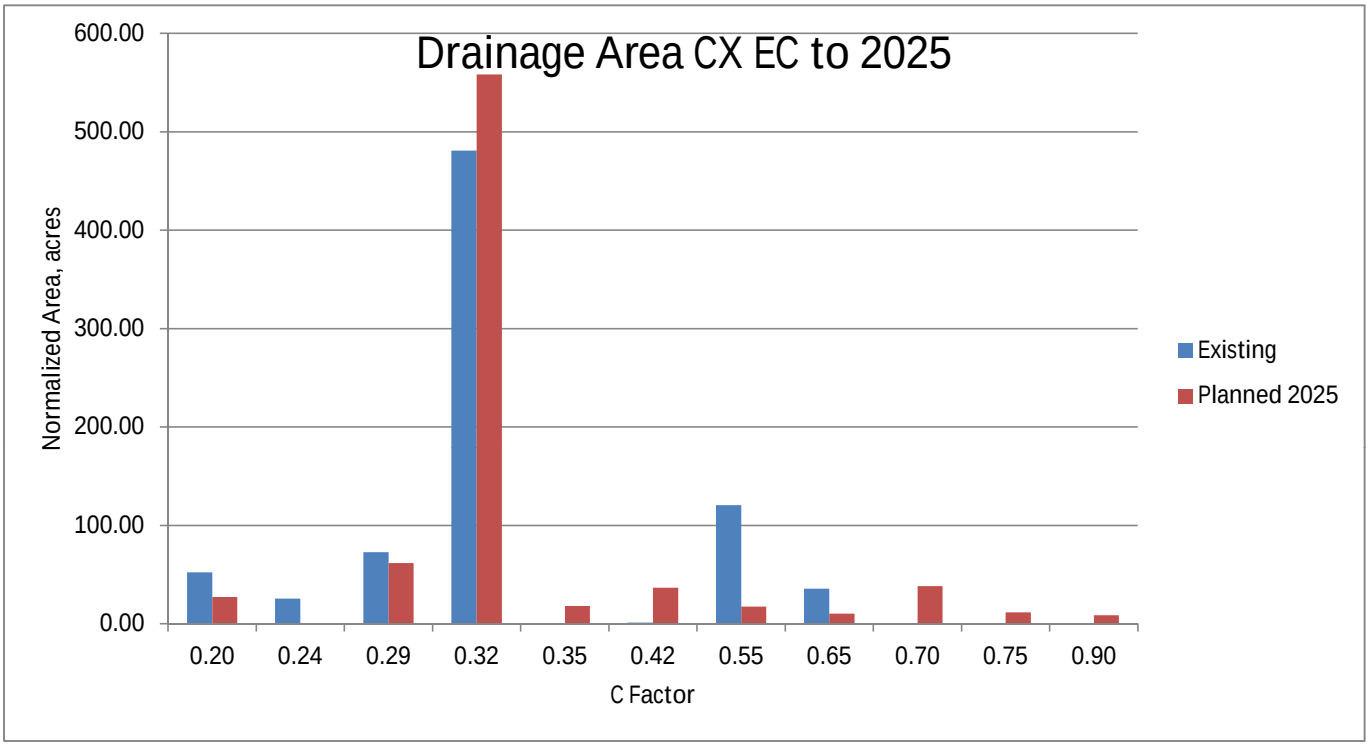

Drainage Area CP EC to 2025
Normalized Area, acres
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.24
0.29
0.32
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

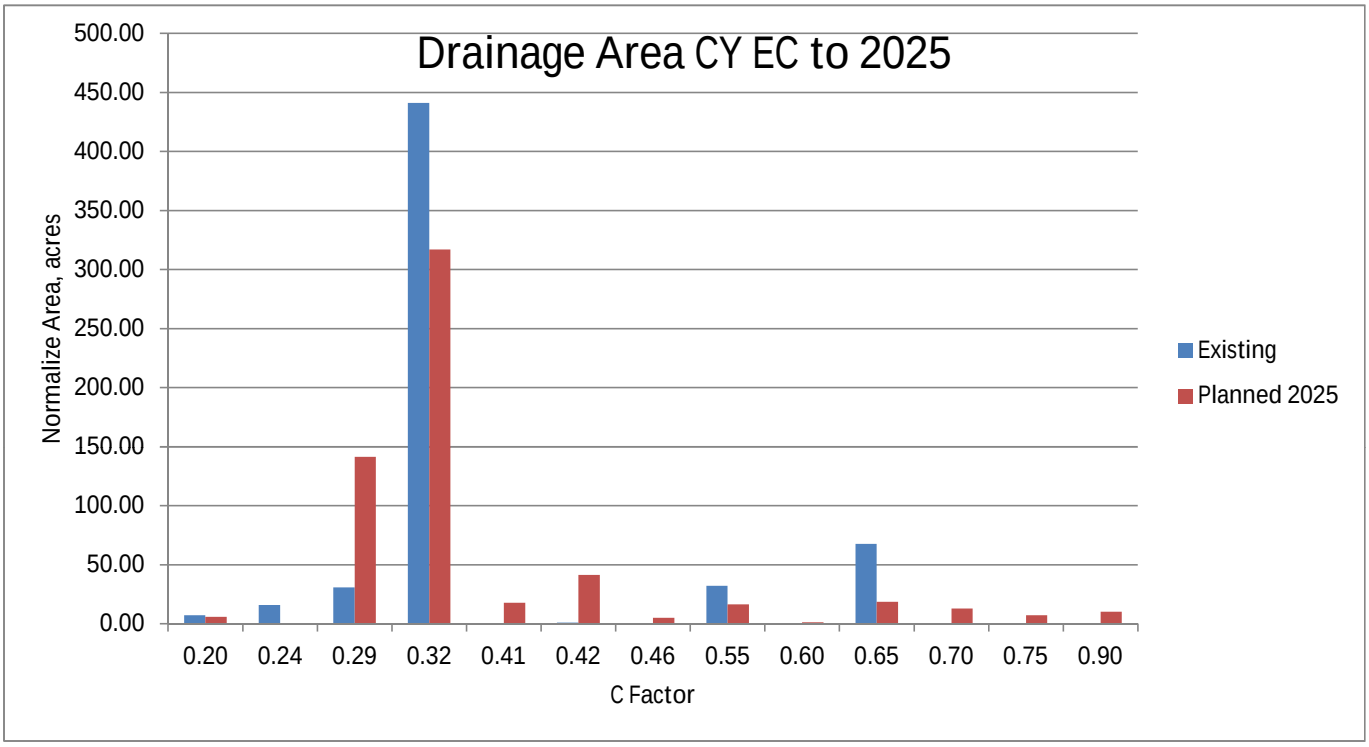

Drainage Area CQ EC to 2025
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

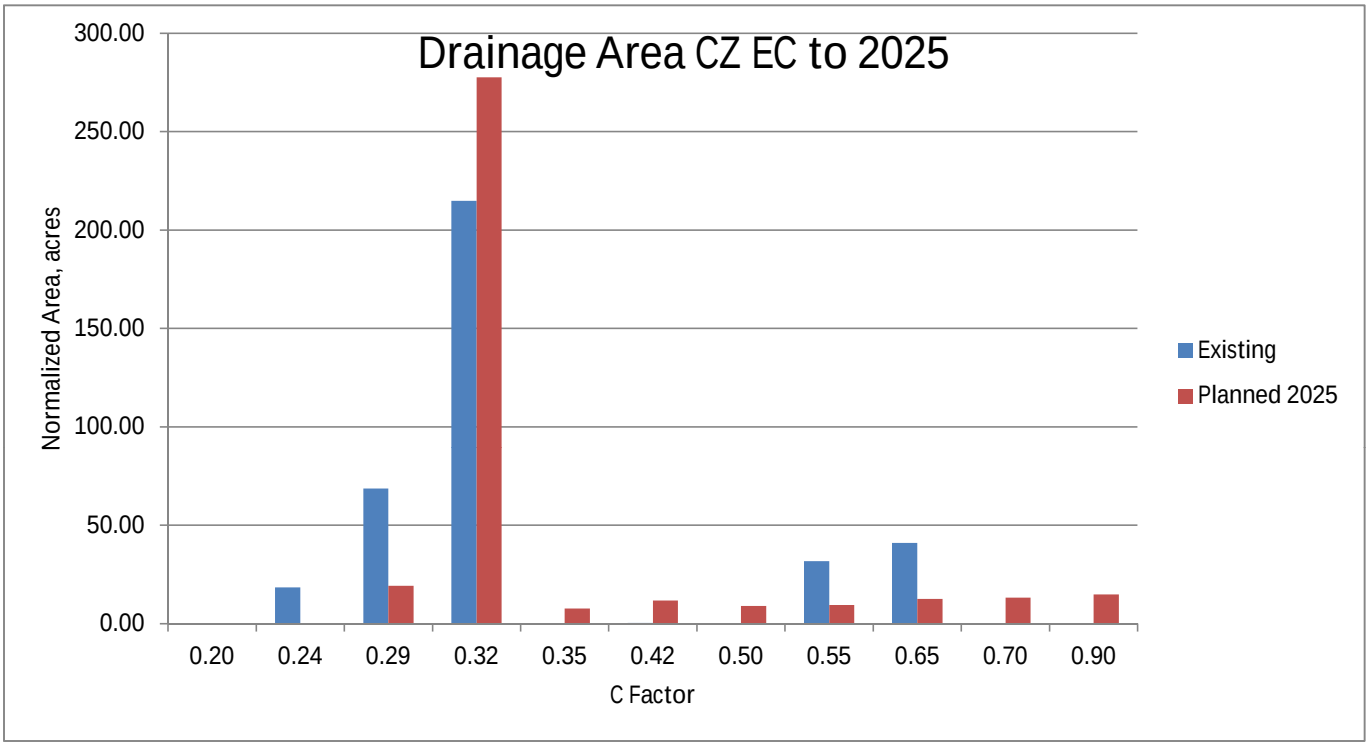

Drainage Area CS EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.65
0.75
C Factor
Existing
Planned 2025

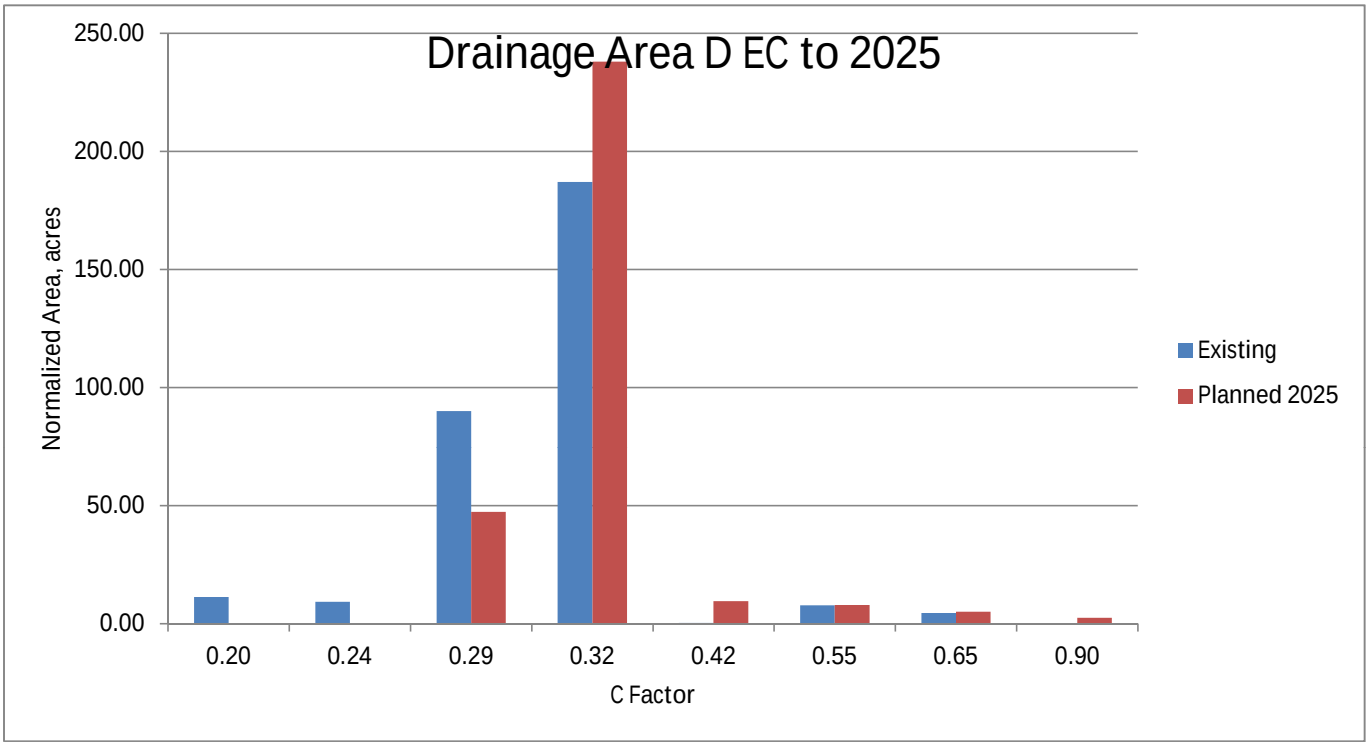

Drainage Area CU EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.65
0.75
C Factor
Existing
Planned 2025

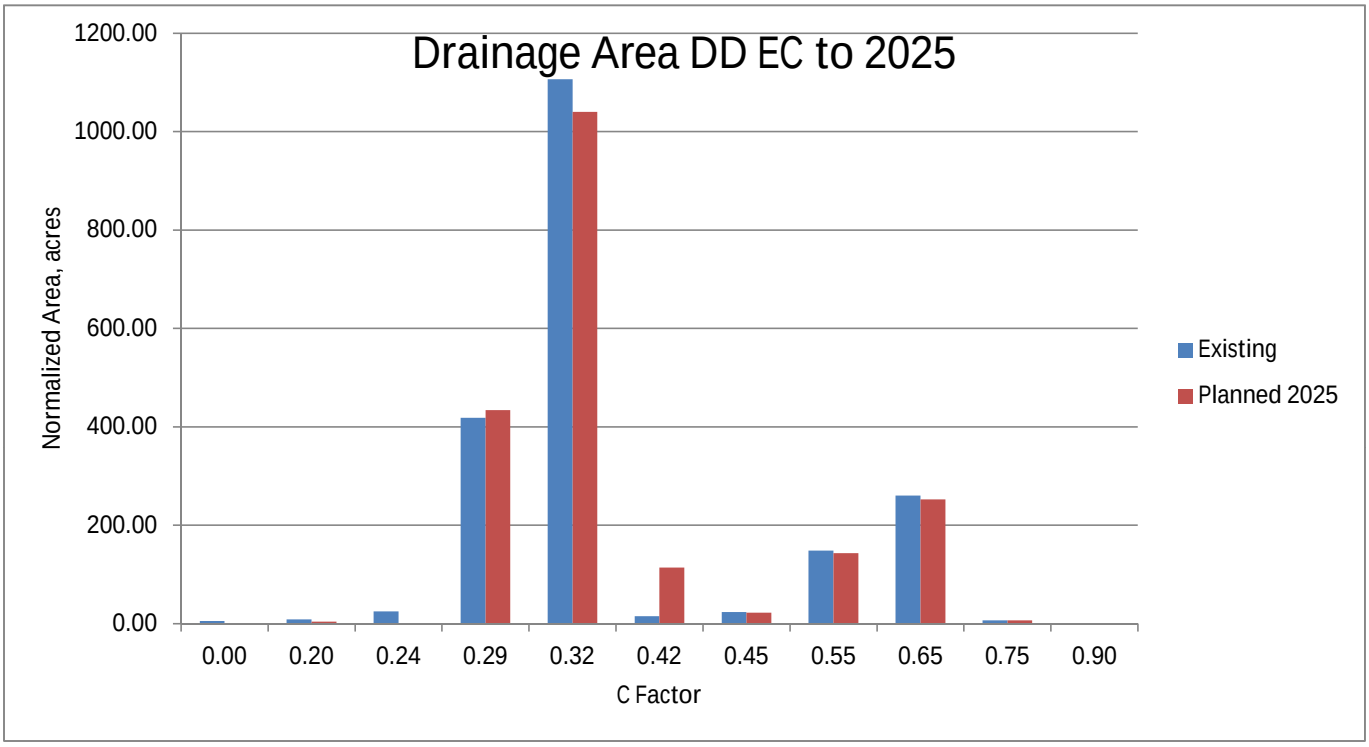

Drainage Area CW Ec to 2025
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

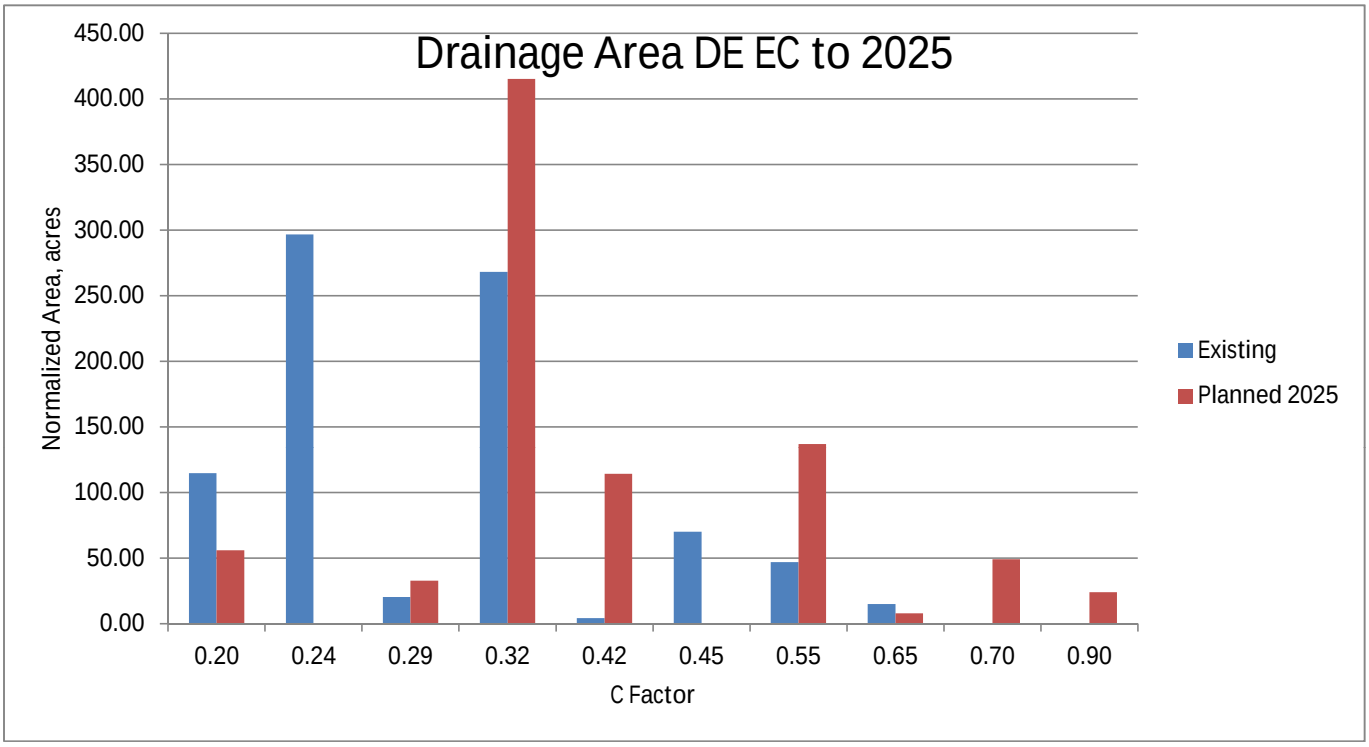

Drainage Area CX EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

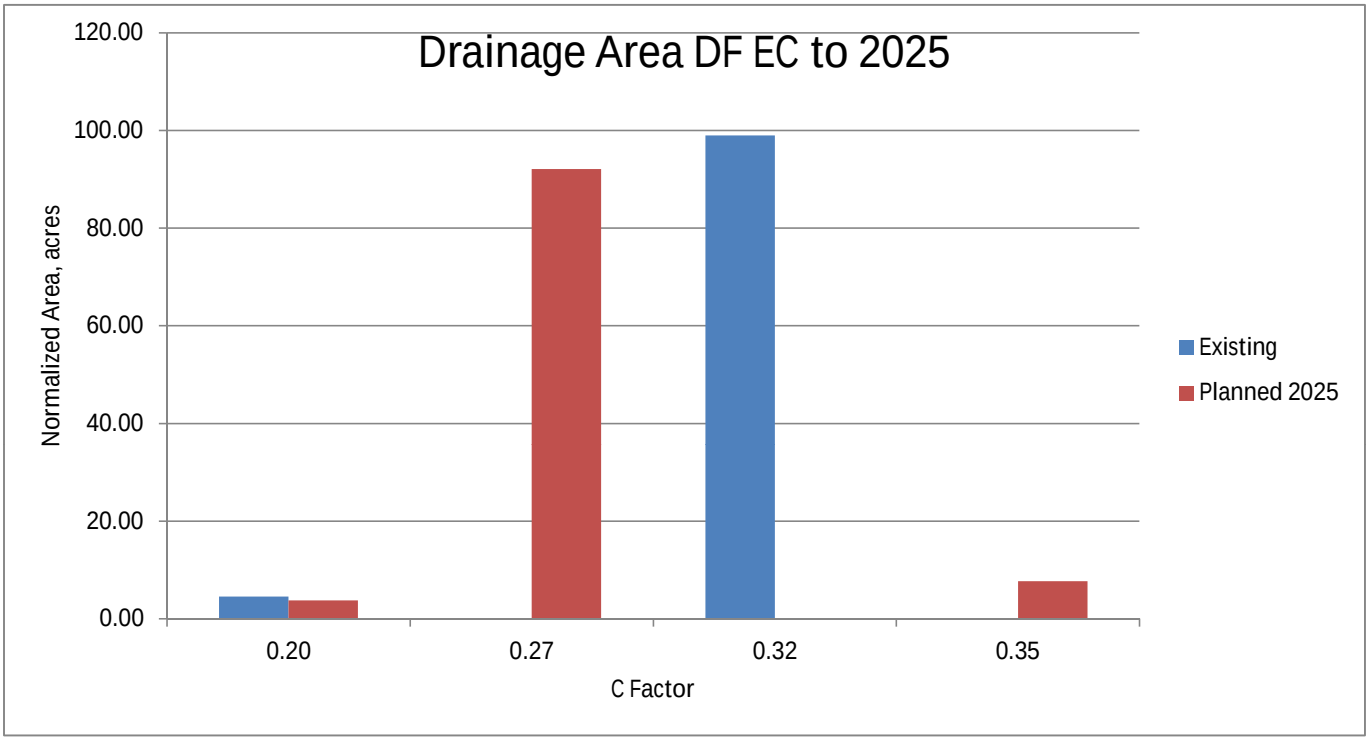

Drainage Area CY EC to 2025
Normalize Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.41
0.42
0.46
0.55
0.60
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

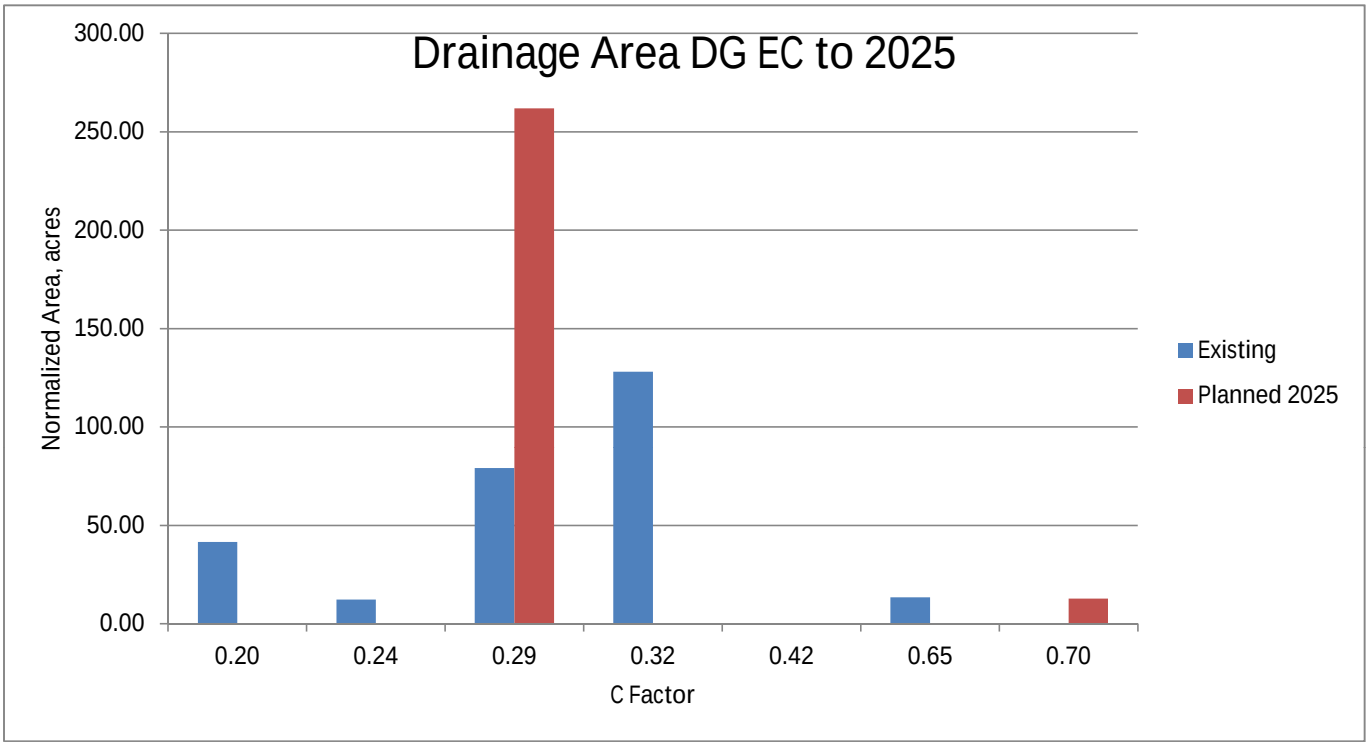

Drainage Area CZ EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

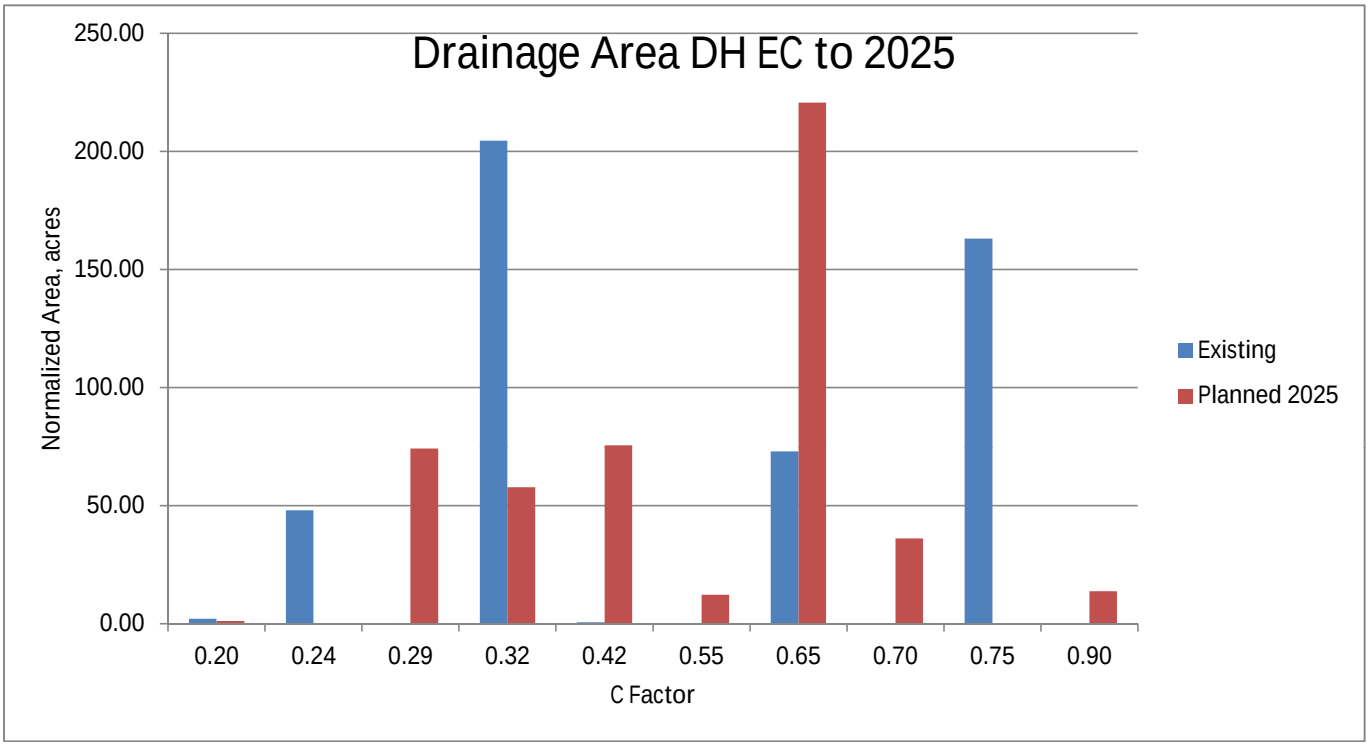

Drainage Area D EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
Existing
Planned 2025

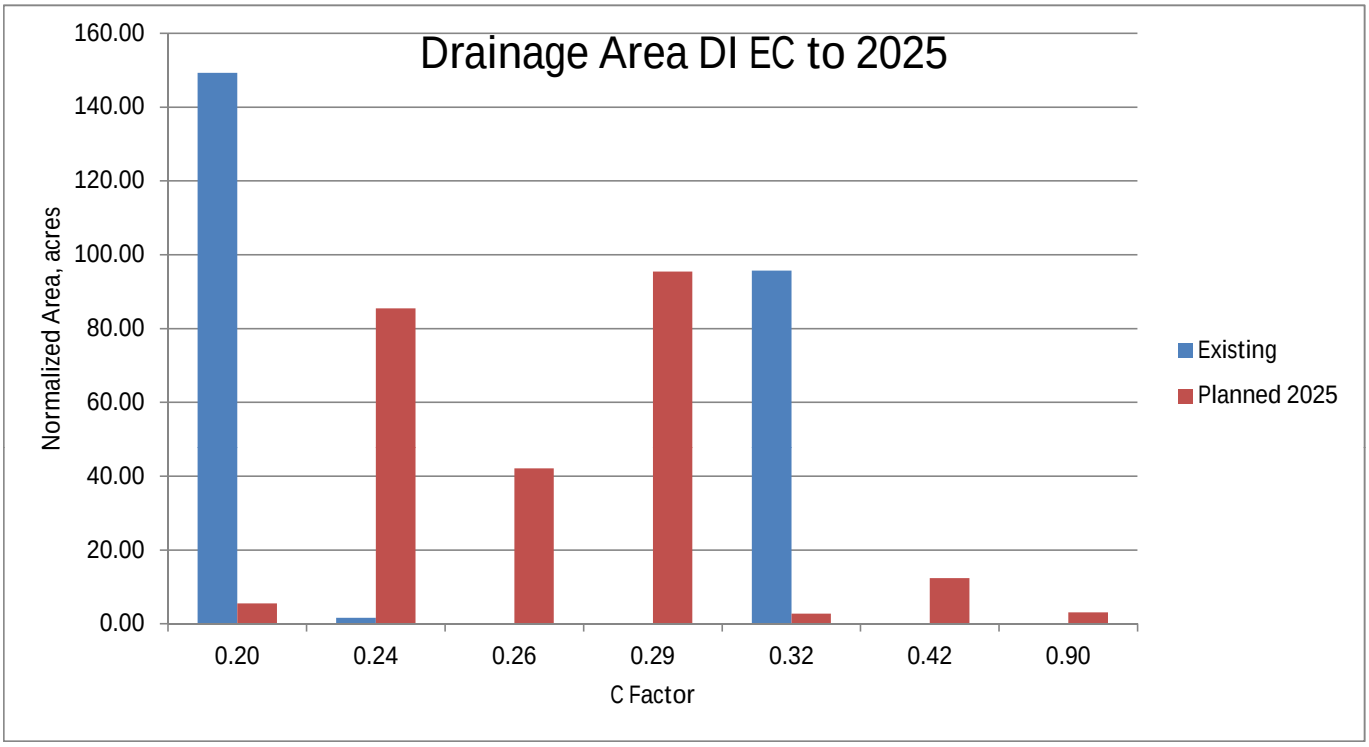

Drainage Area DD EC to 2025
Normalized Area, acres
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.75
0.90
C Factor
Existing
Planned 2025

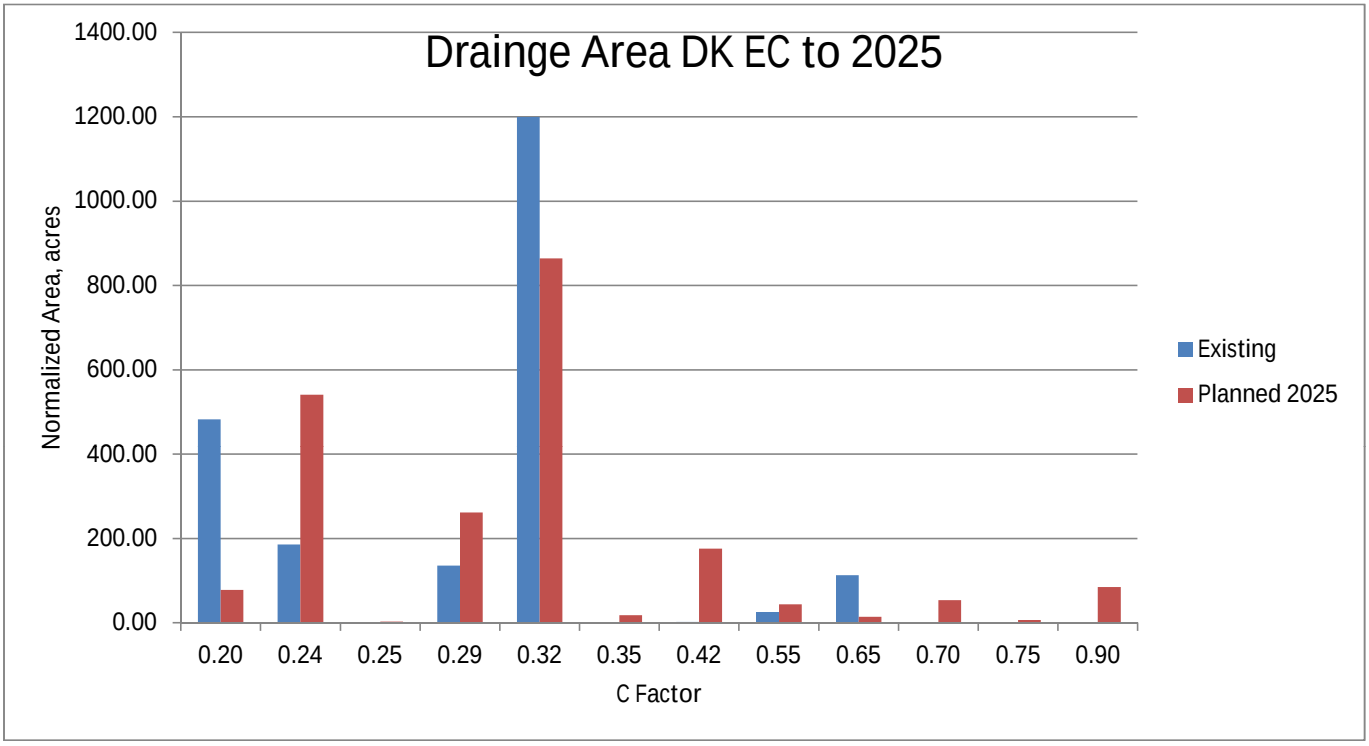

Drainage Area DE EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

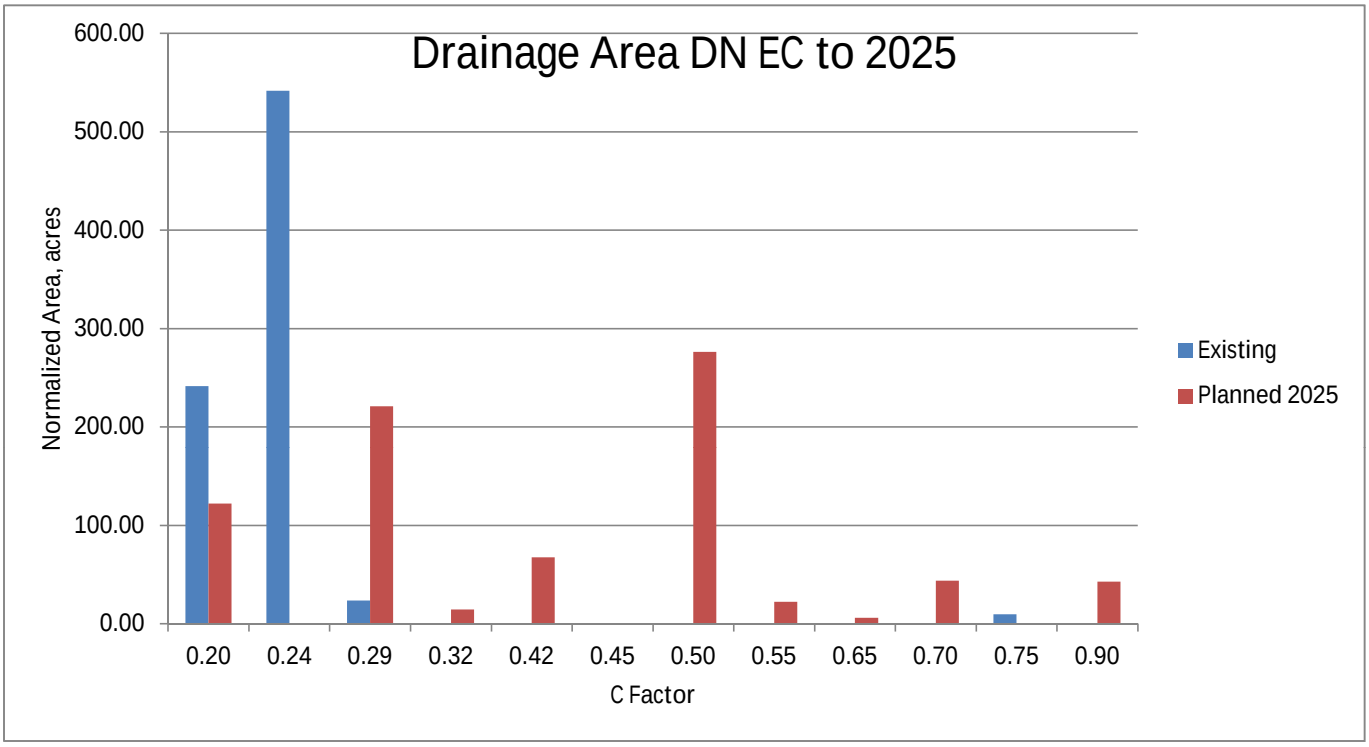

Drainage Area DF EC to 2025
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.27
0.32
0.35
C Factor
Existing
Planned 2025

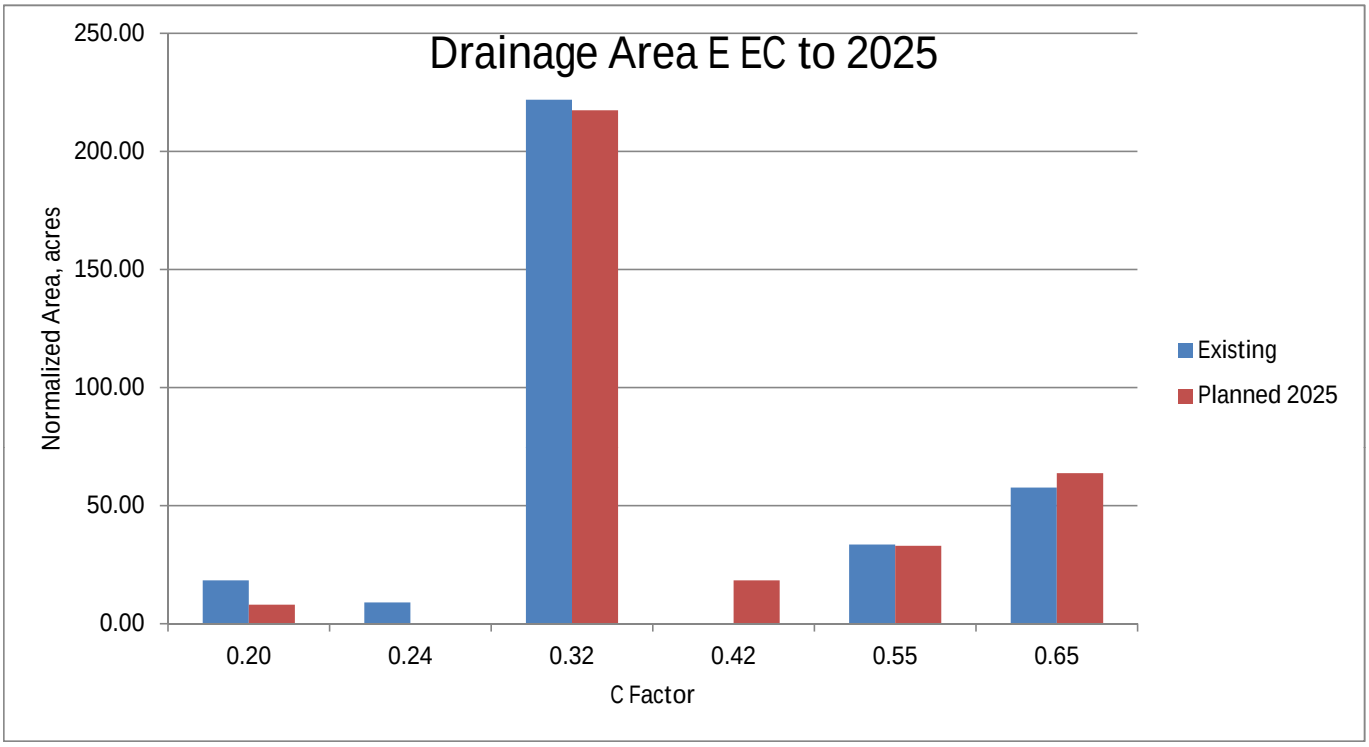

Drainage Area DG EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.65
0.70
C Factor
Existing
Planned 2025

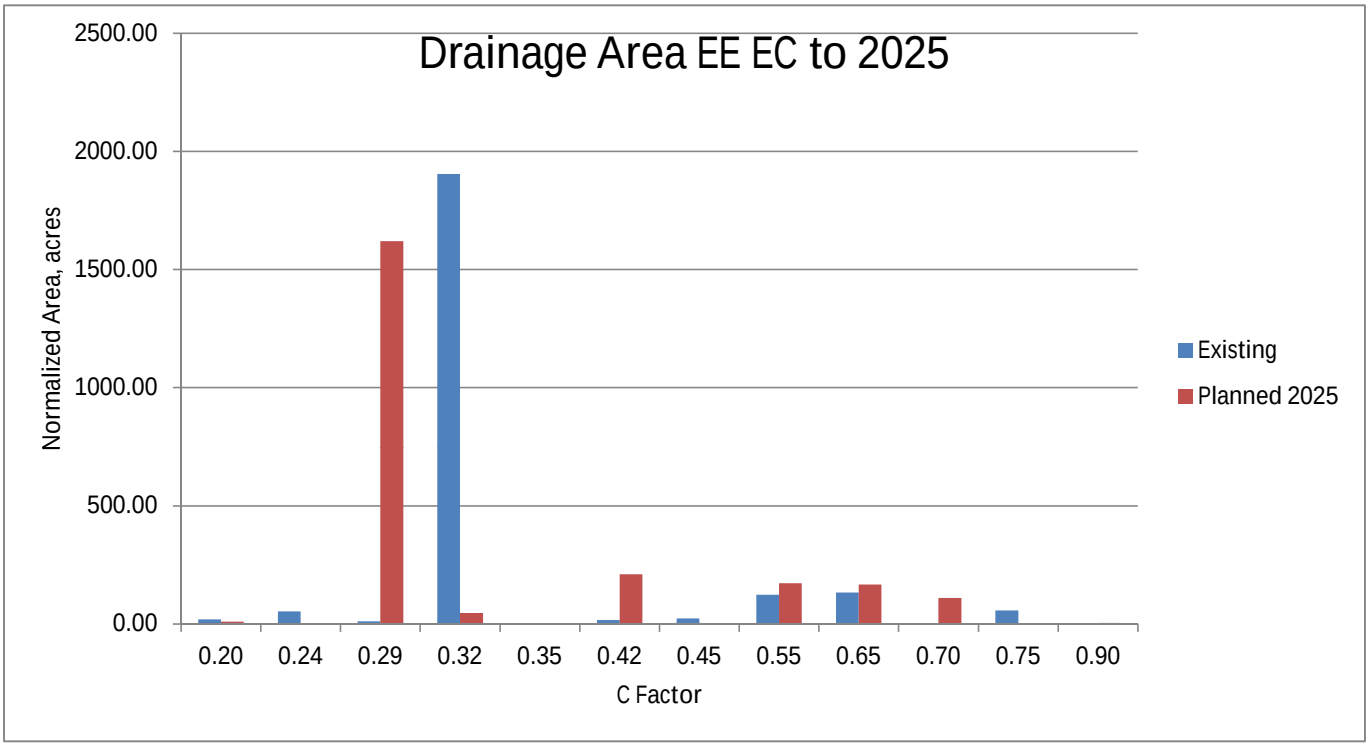

Drainage Area DH EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

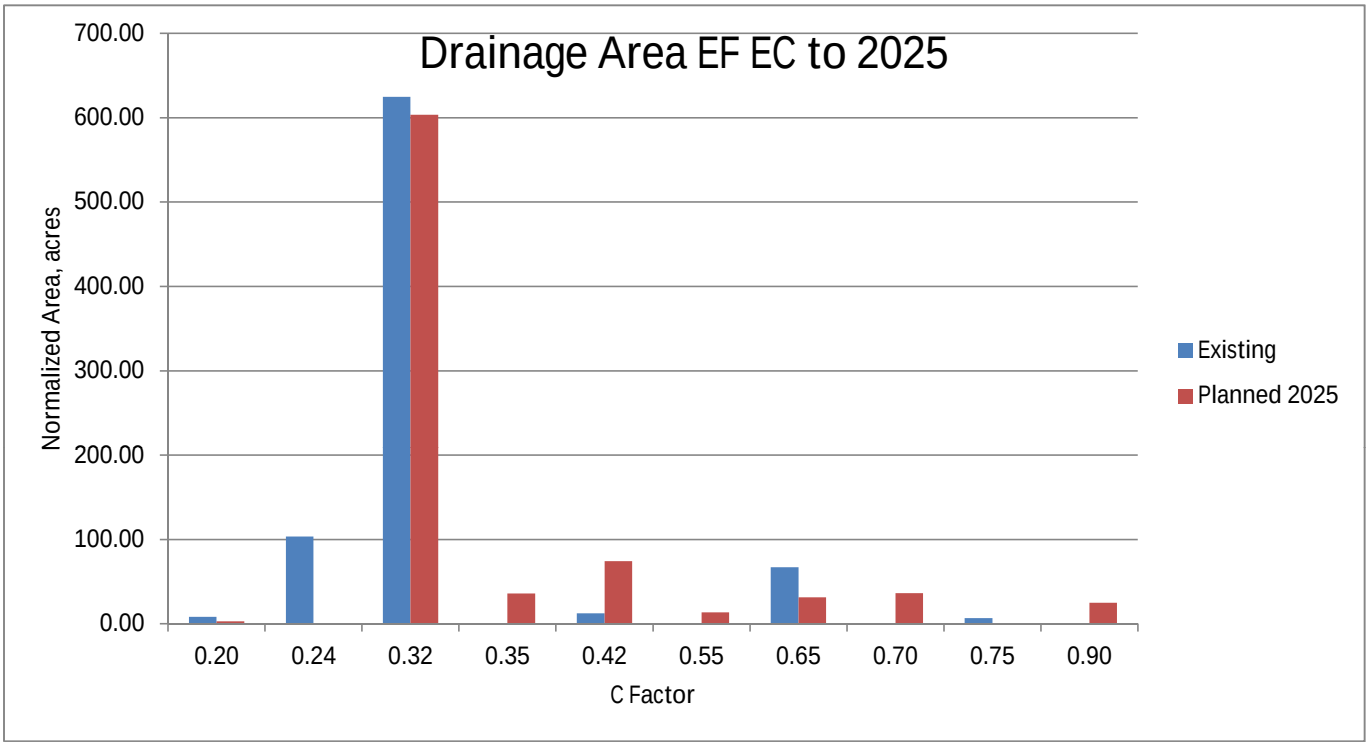

Drainage Area DI EC to 2025
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.26
0.29
0.32
0.42
0.90
C Factor
Existing
Planned 2025

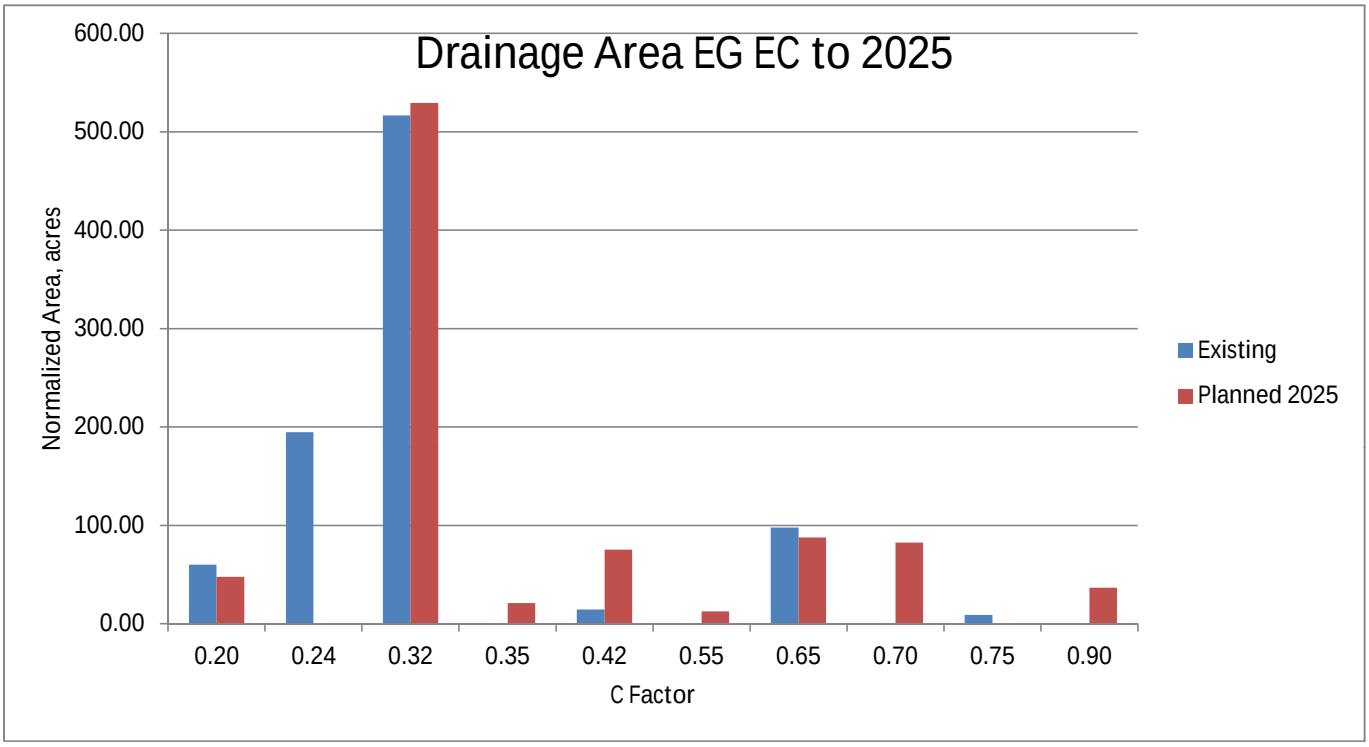

Drainge Area DK EC to 2025
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
Normalized Area, acres
0.20
0.24
0.25
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

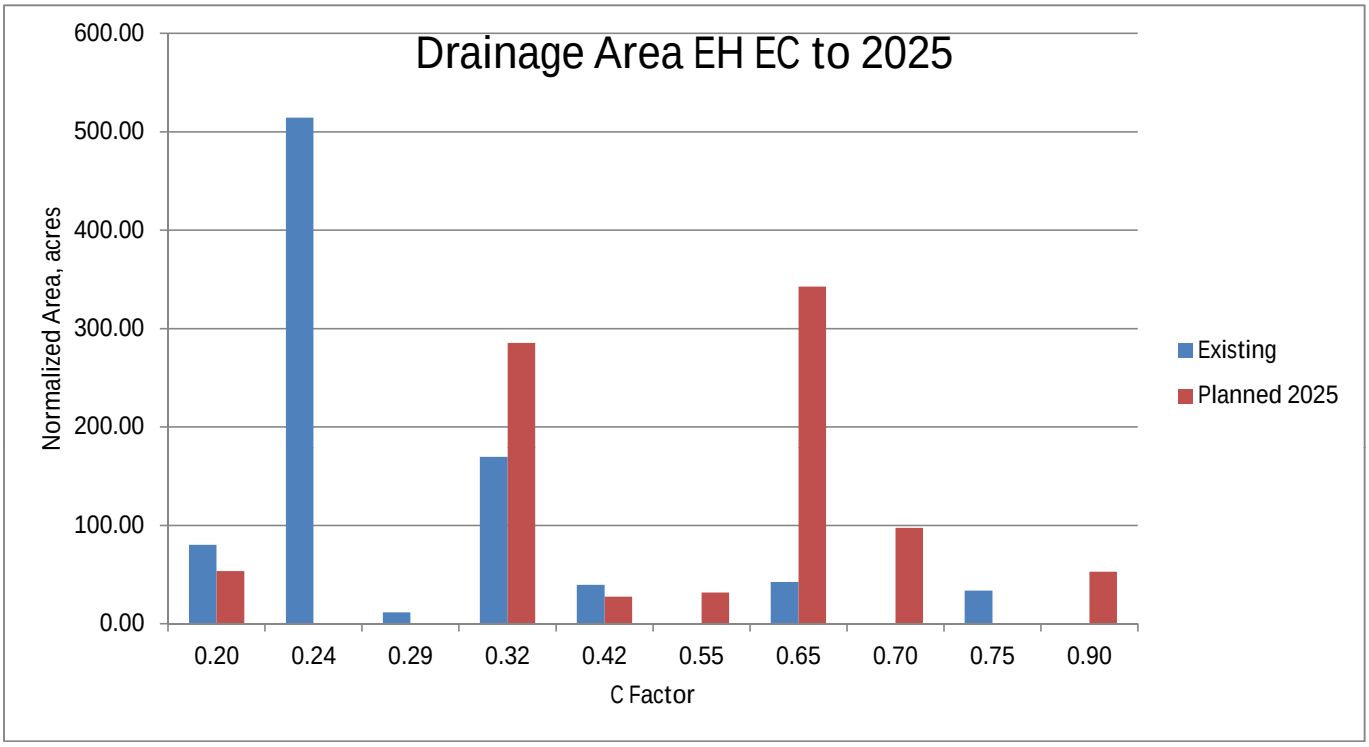

Drainage Area DN EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

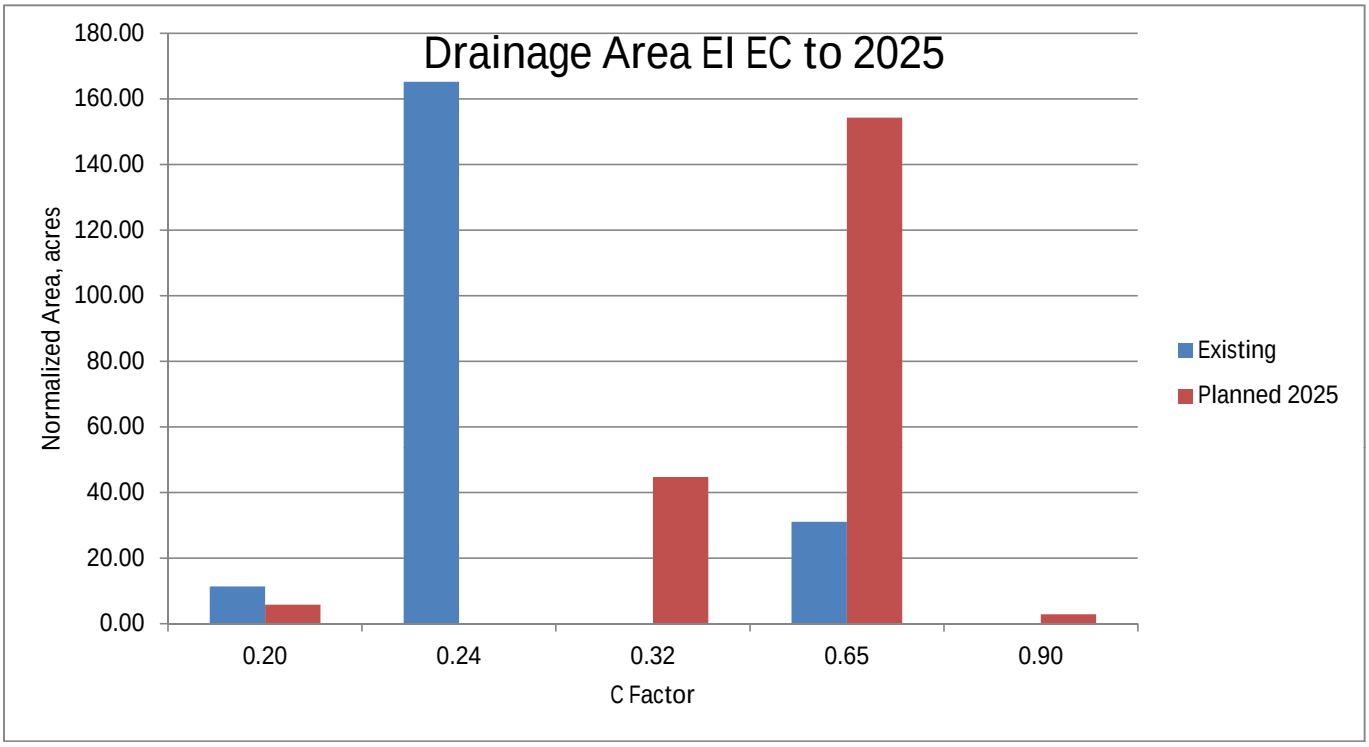

Drainage Area E EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.42
0.55
0.65
C Factor
Existing
Planned 2025

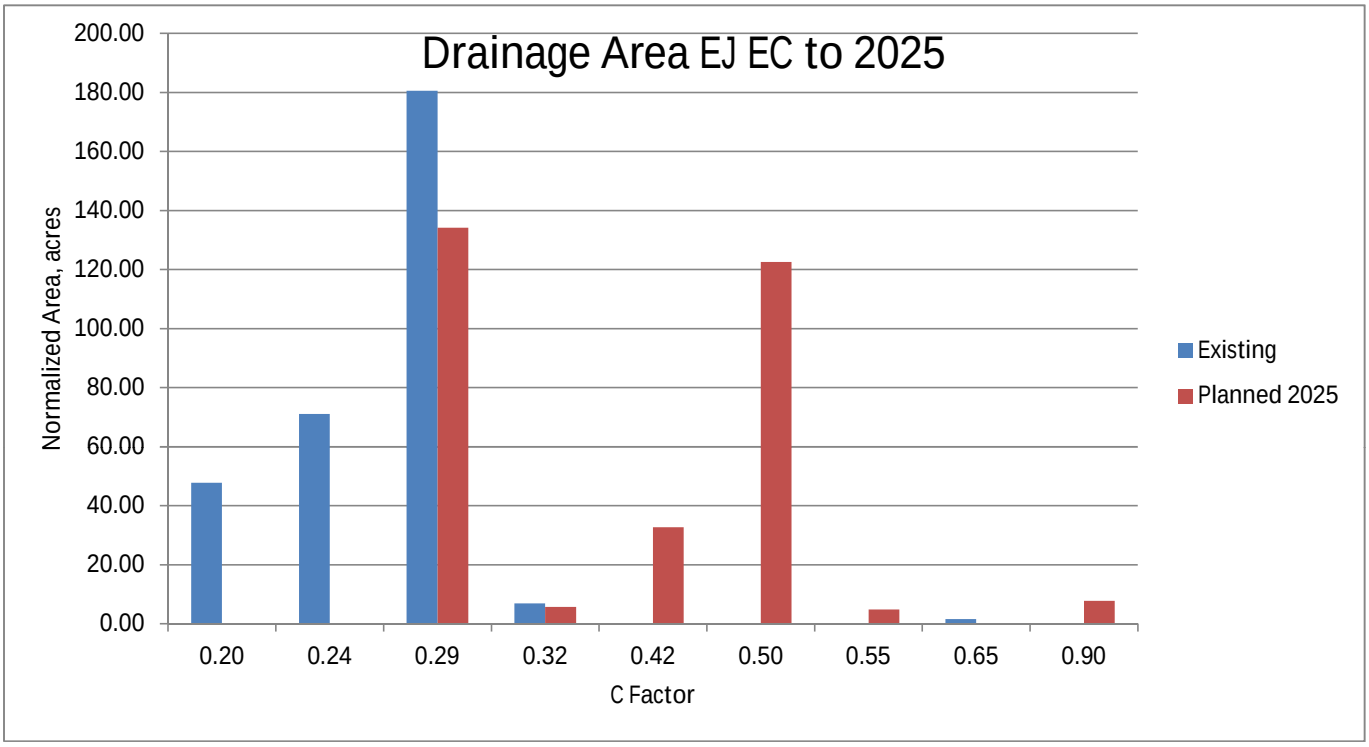

Drainage Area EE EC to 2025
2500.00
2000.00
1500.00
1000.00
500.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

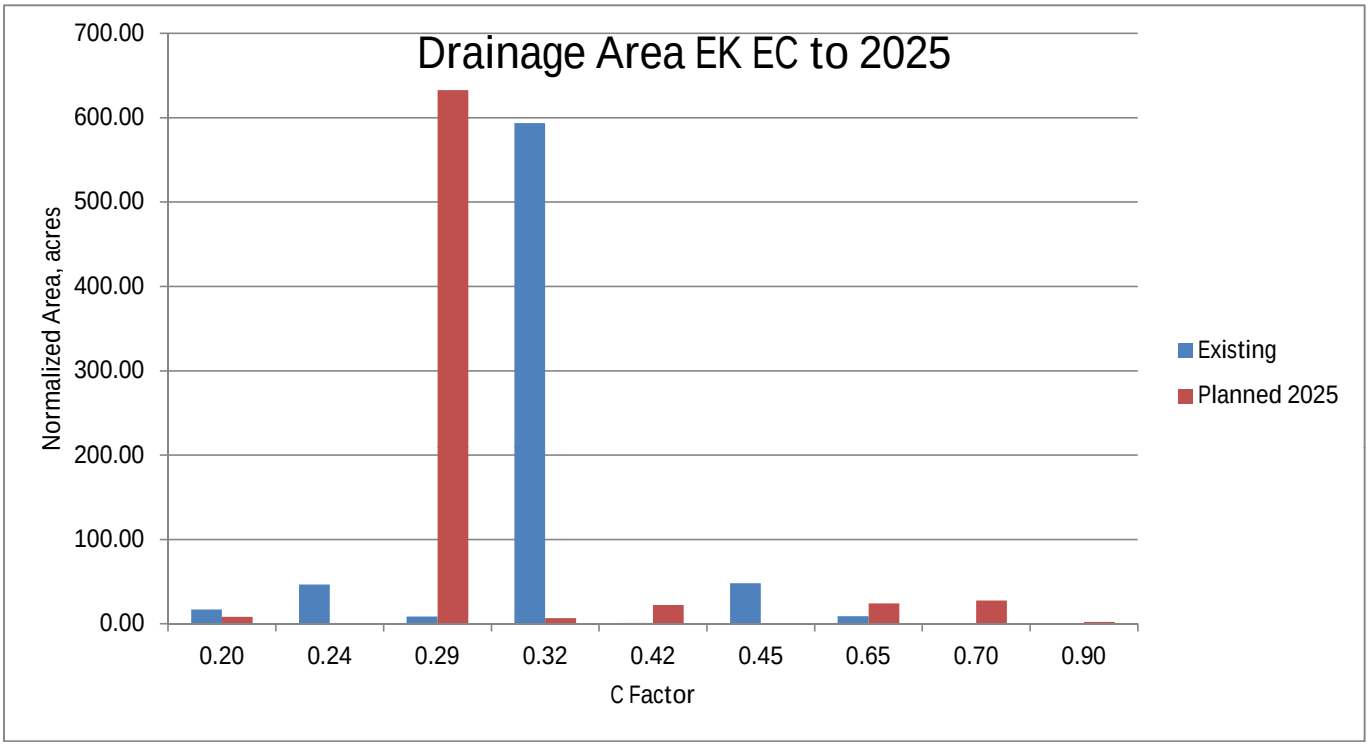

Drainage Area EF EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

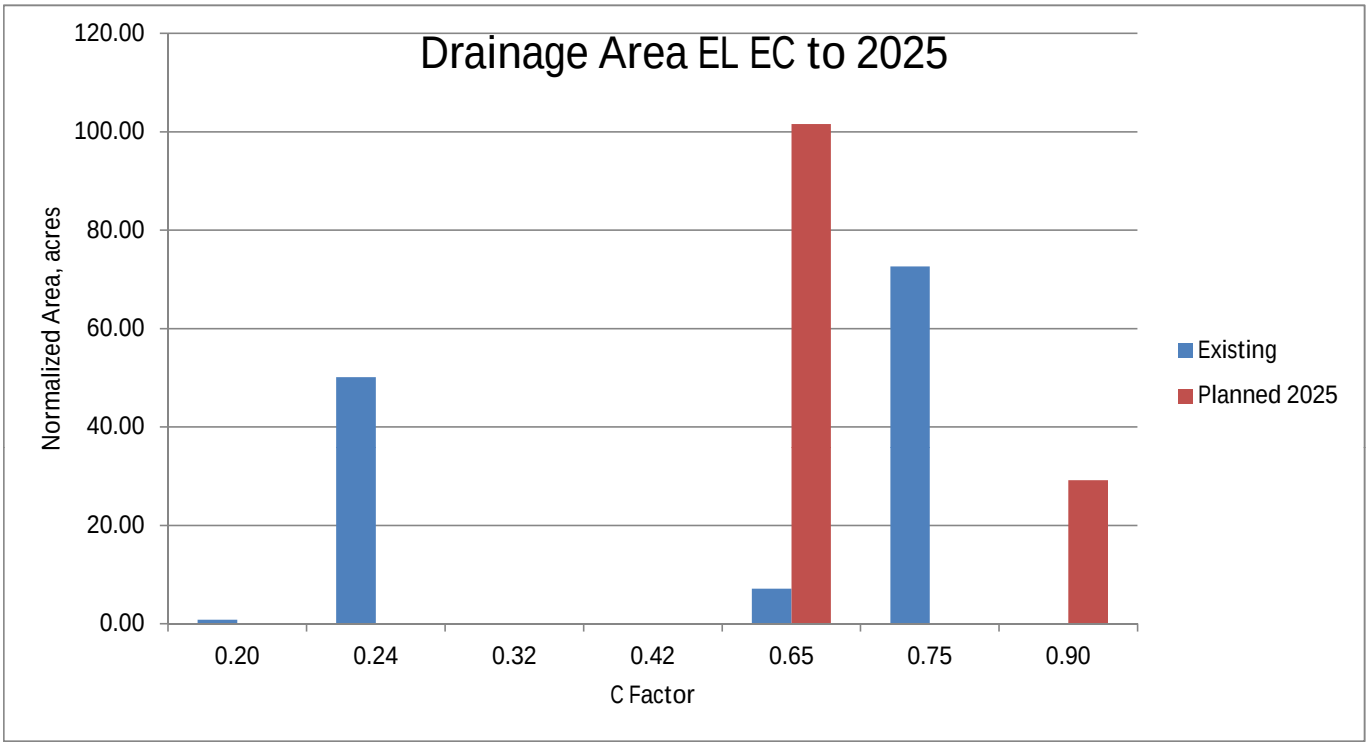

Drainage Area EG EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

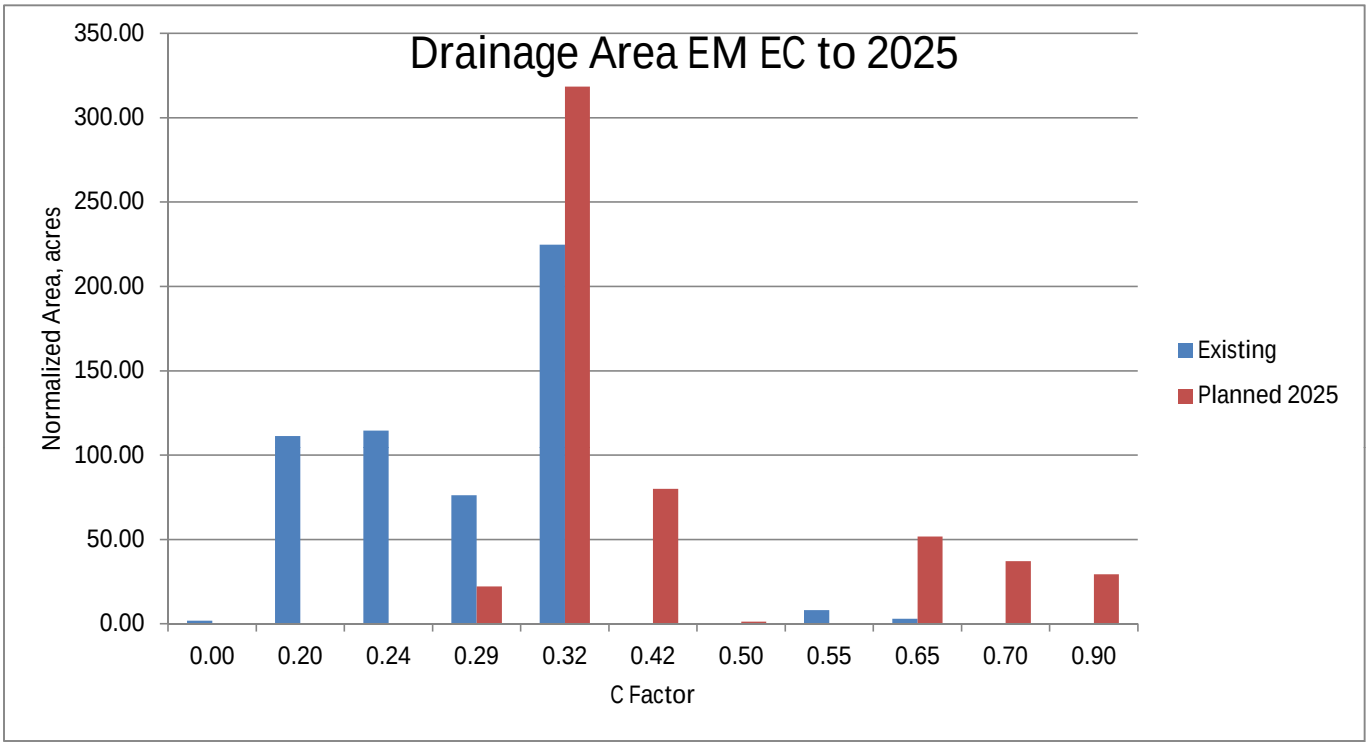

Drainage Area EH EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

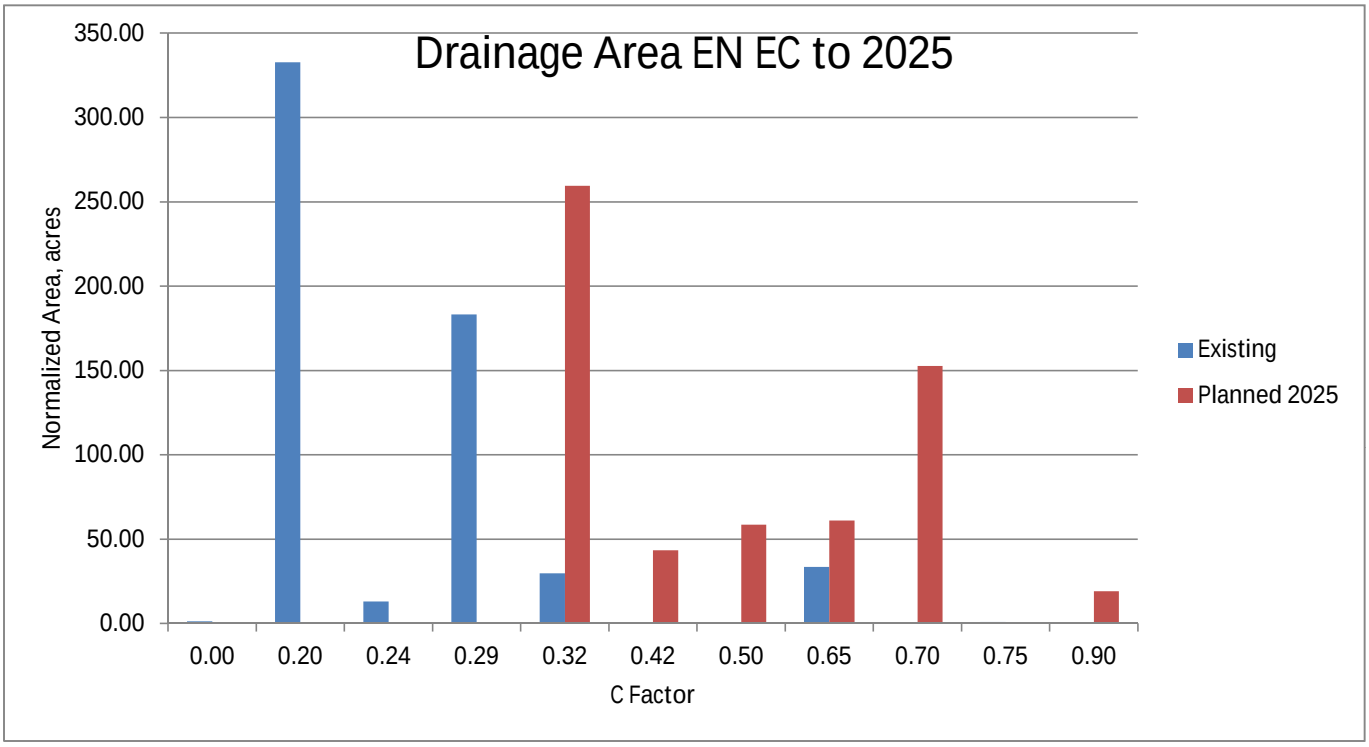

Drainage Area EI EC to 2025
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.65
0.90
C Factor
Existing
Planned 2025

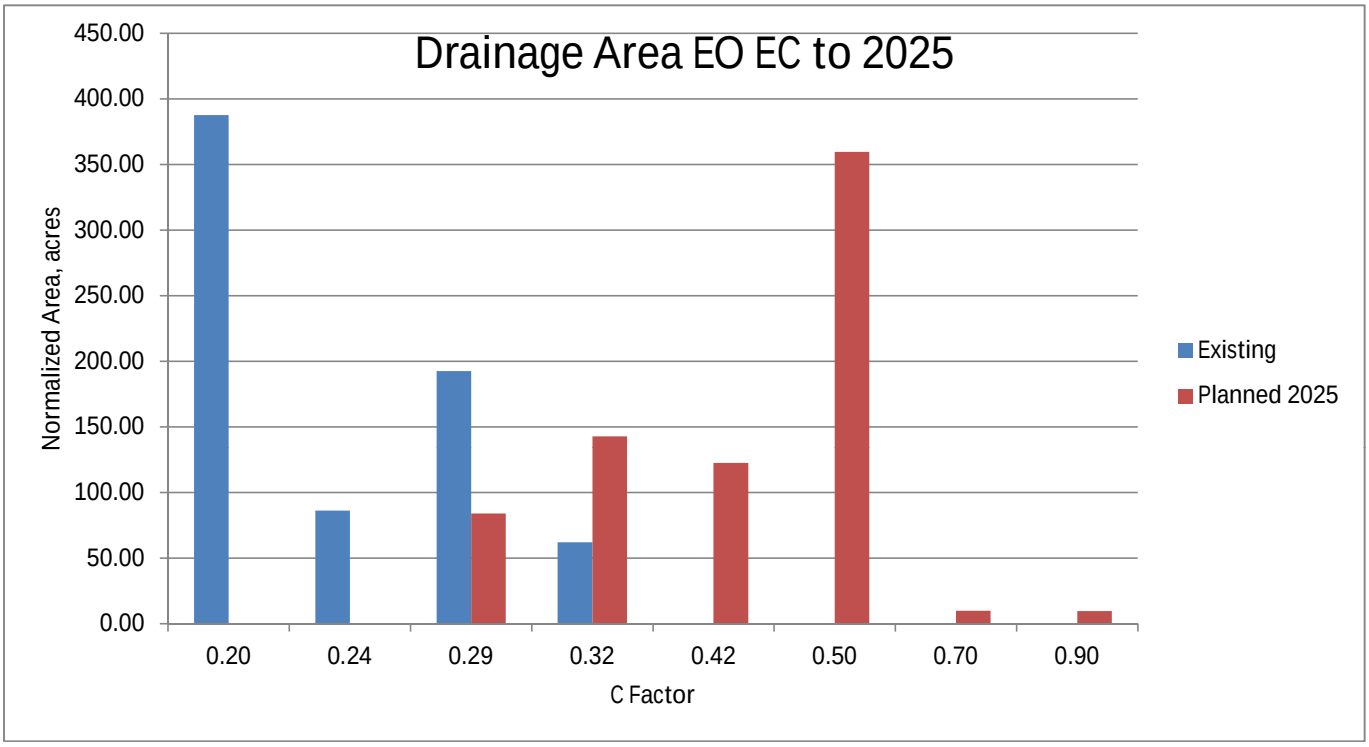

Drainage Area EJ EC to 2025
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.90
C Factor
Existing
Planned 2025

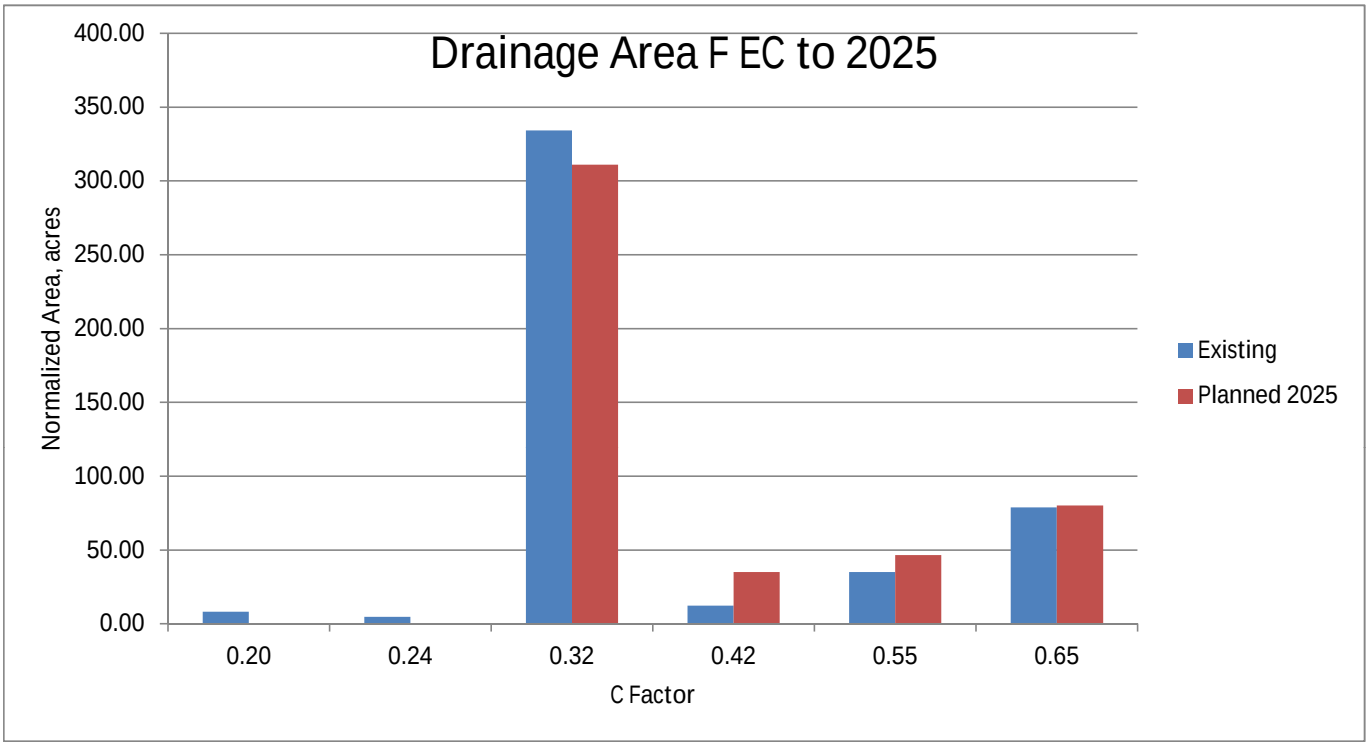

Drainage Area EK EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.65
0.70
0.90
C Factor
Existing
Planned 2025

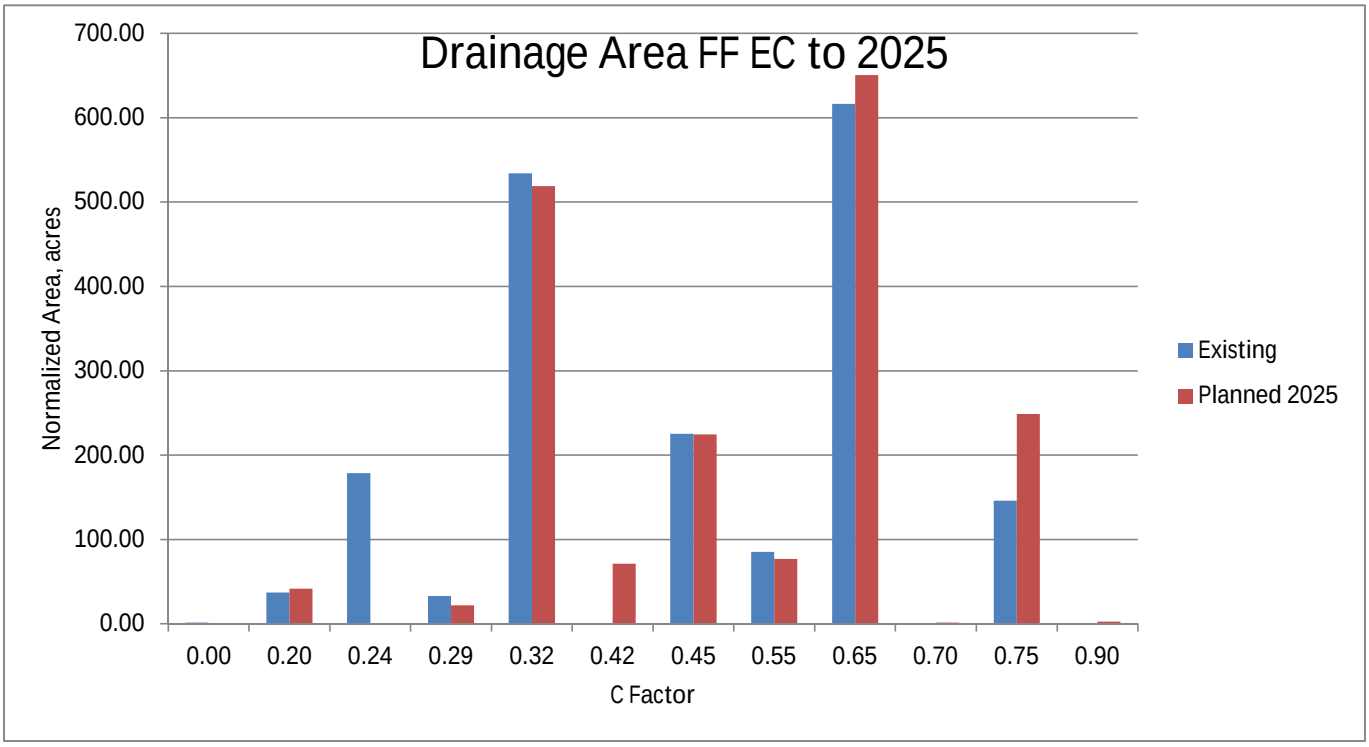

Drainage Area EL EC to 2025
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.42
0.65
0.75
0.90
C Factor
Existing
Planned 2025

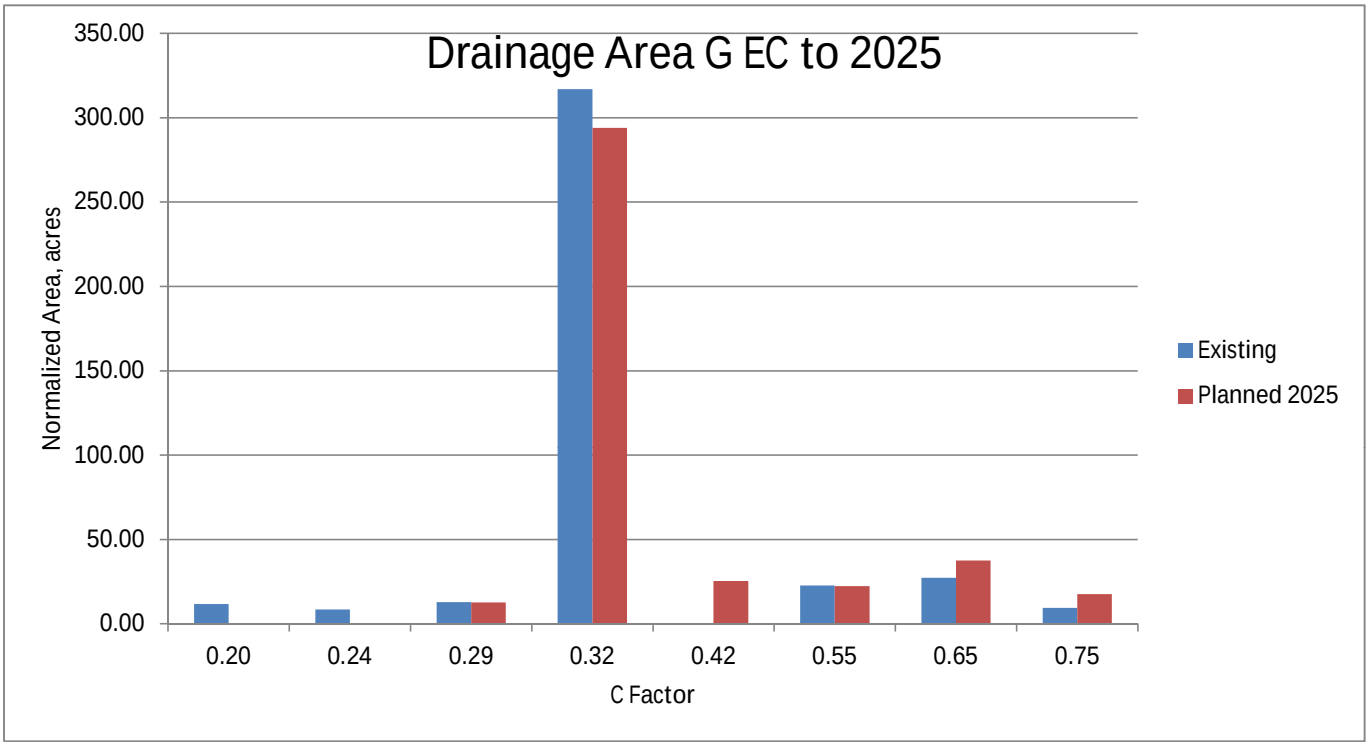

Drainage Area EM EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

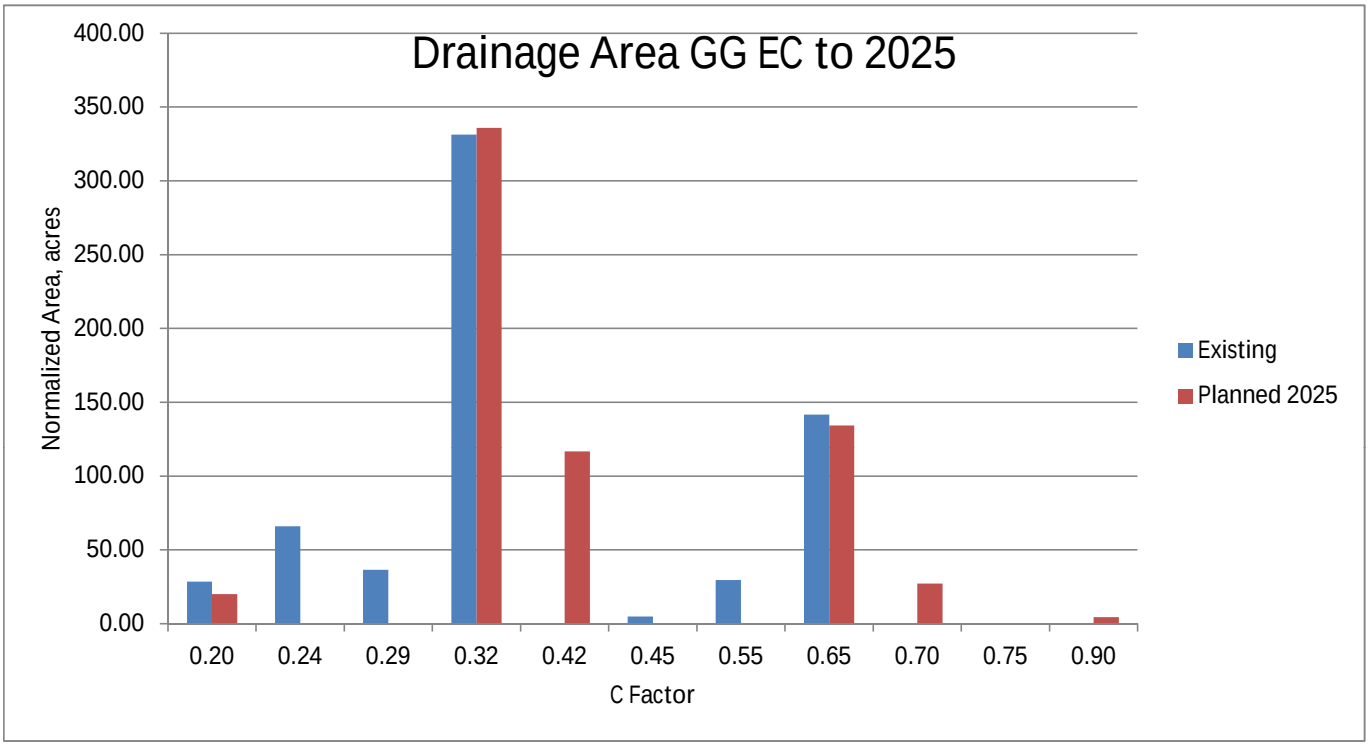

Drainage Area EN EC to 2025
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

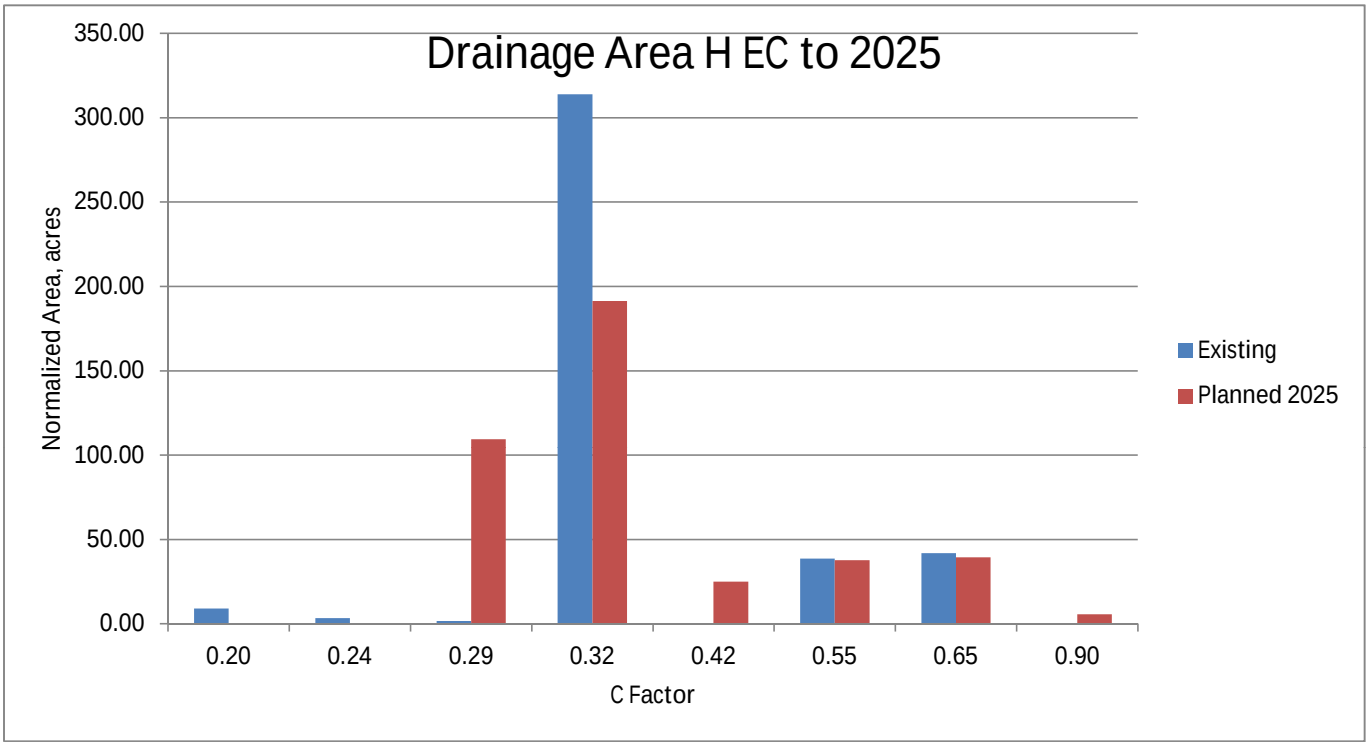

Drainage Area EO EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.70
0.90
C Factor
Existing
Planned 2025

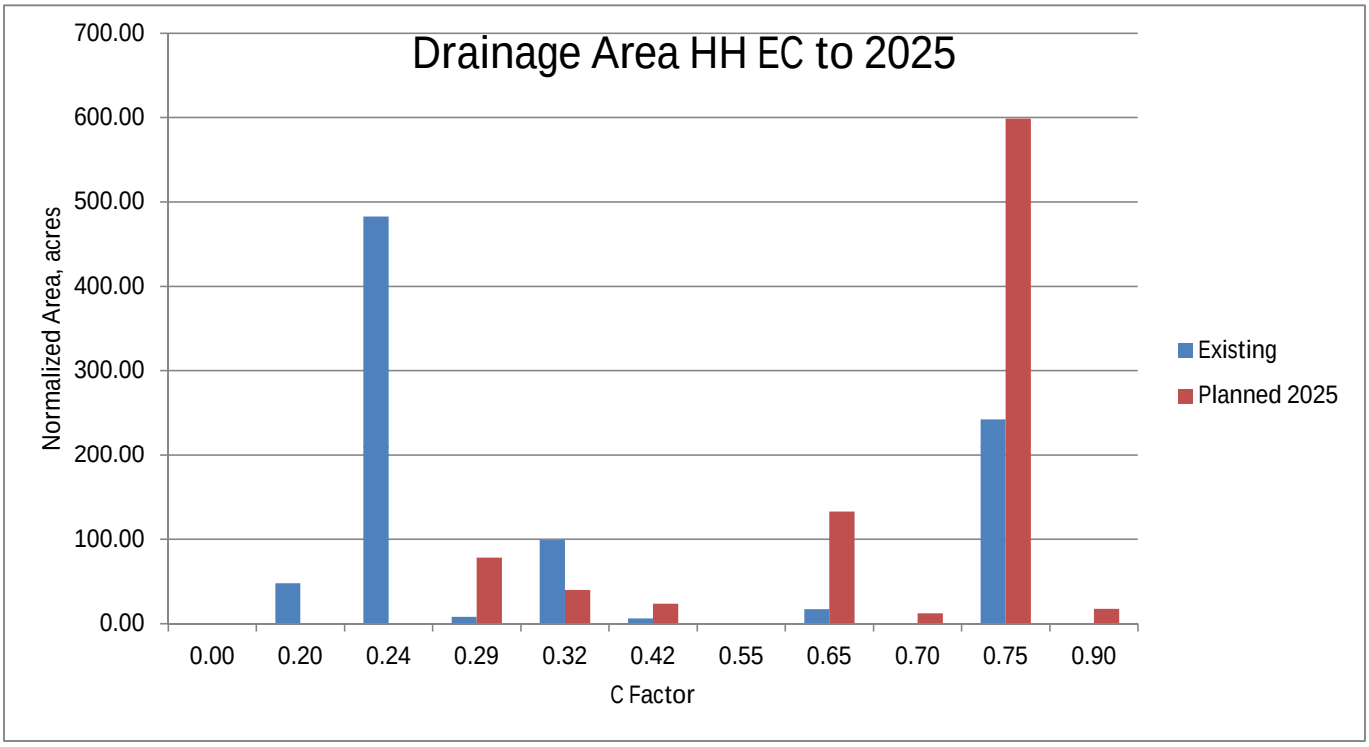

Drainage Area F EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.42
0.55
0.65
C Factor
Existing
Planned 2025

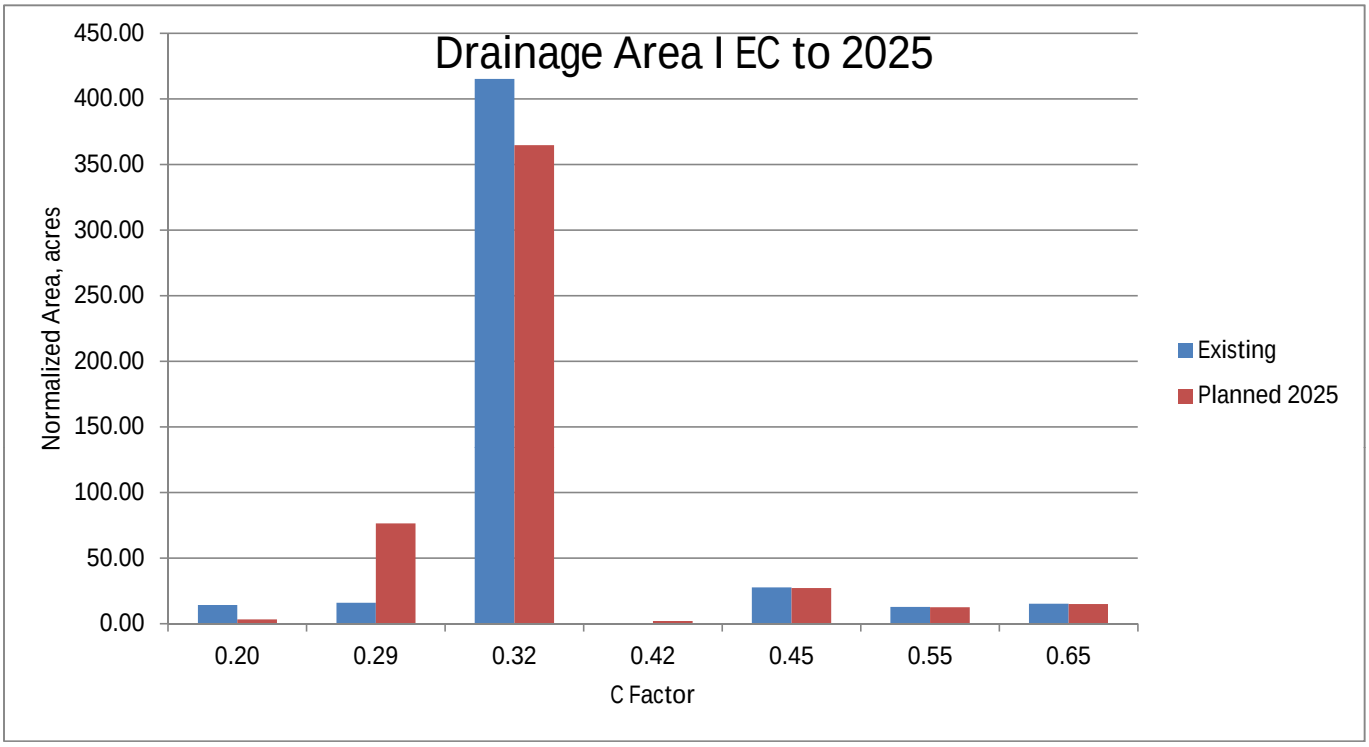

Drainage Area FF EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

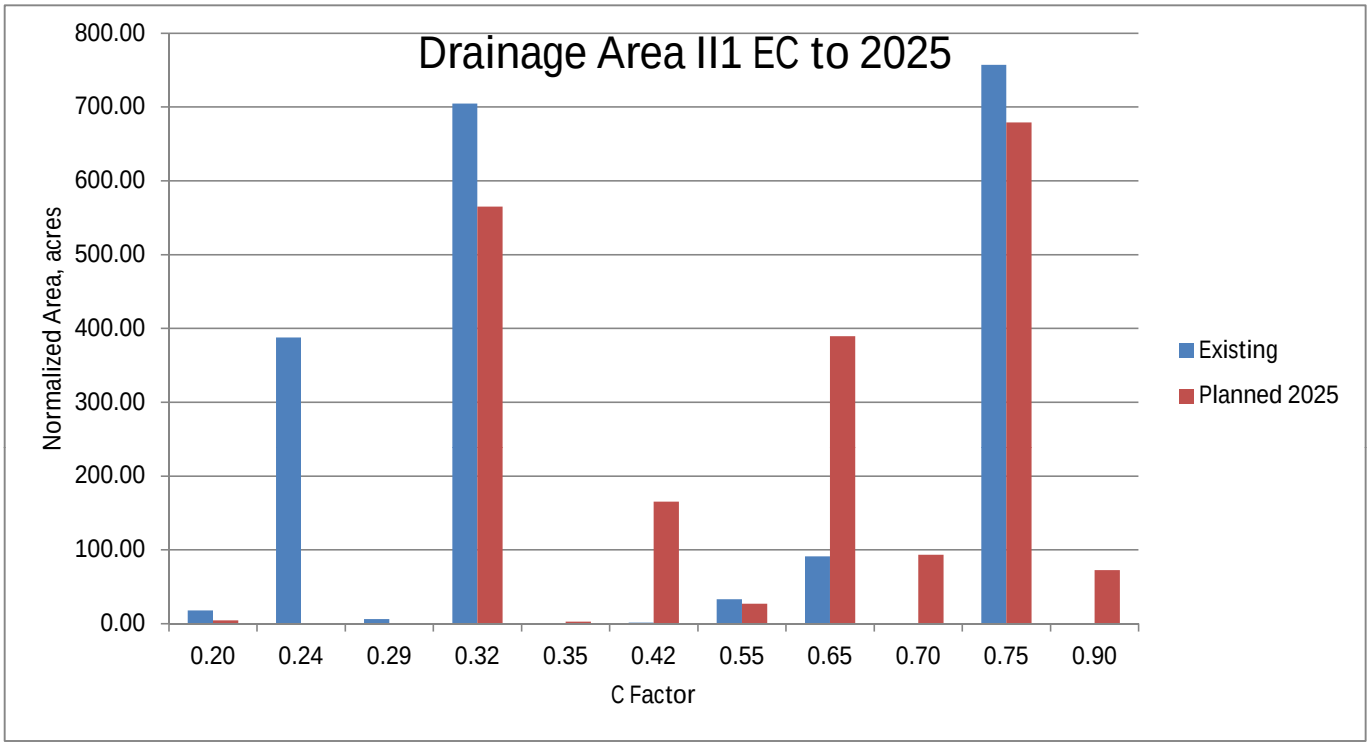

Drainage Area G EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
C Factor
Existing
Planned 2025

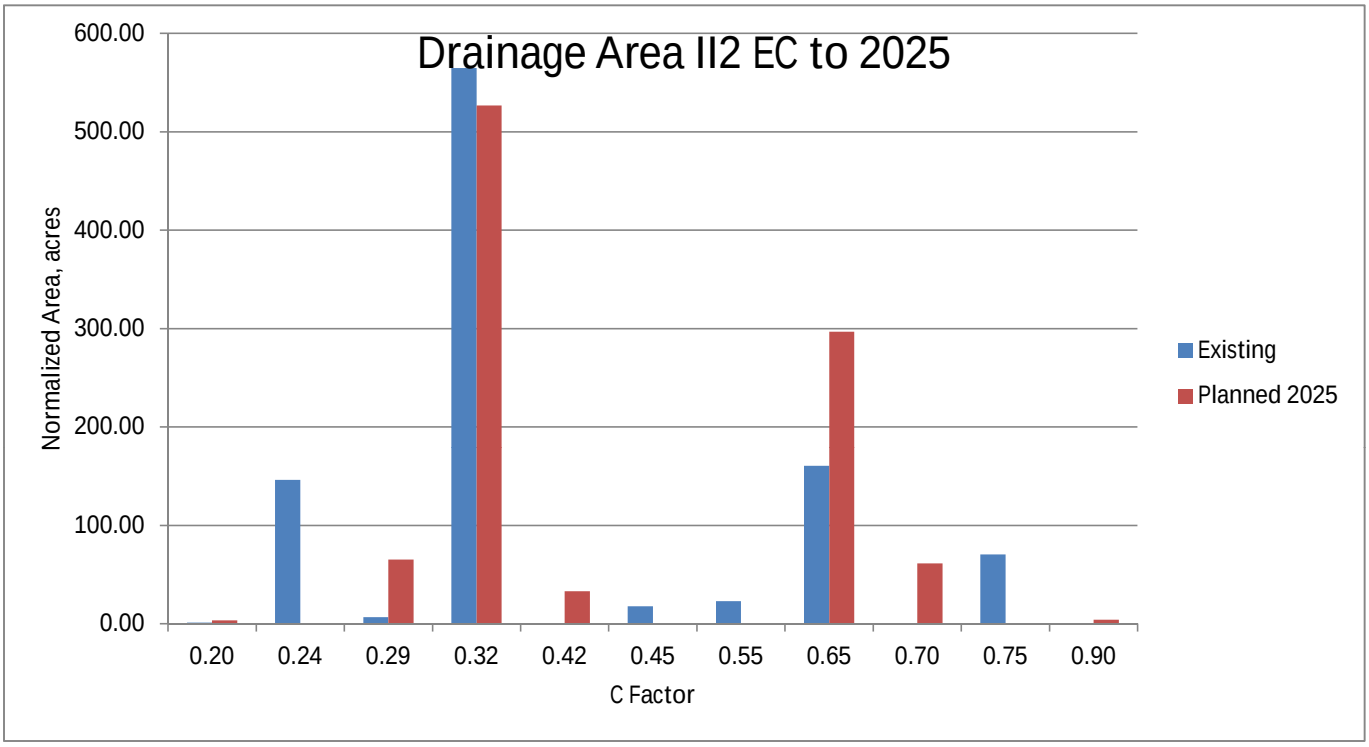

Drainage Area GG EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

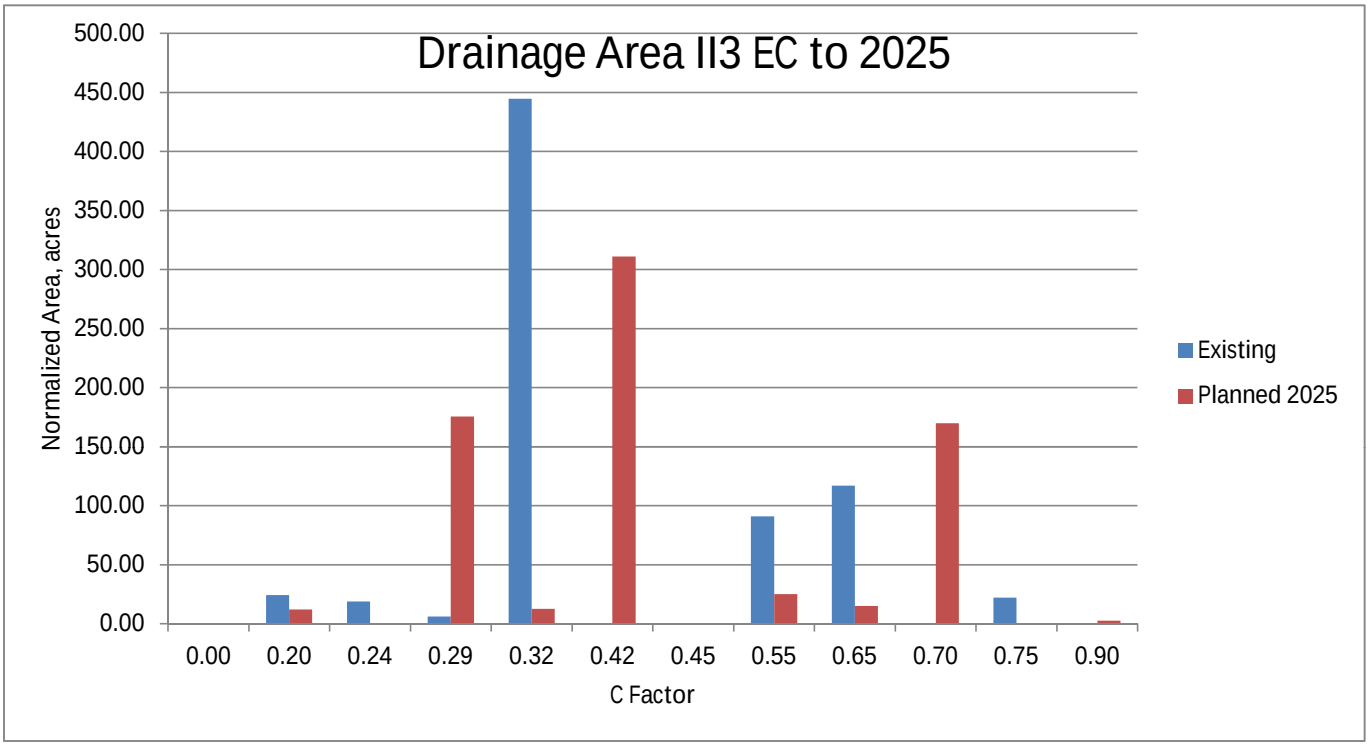

Drainage Area H EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
Existing
Planned 2025

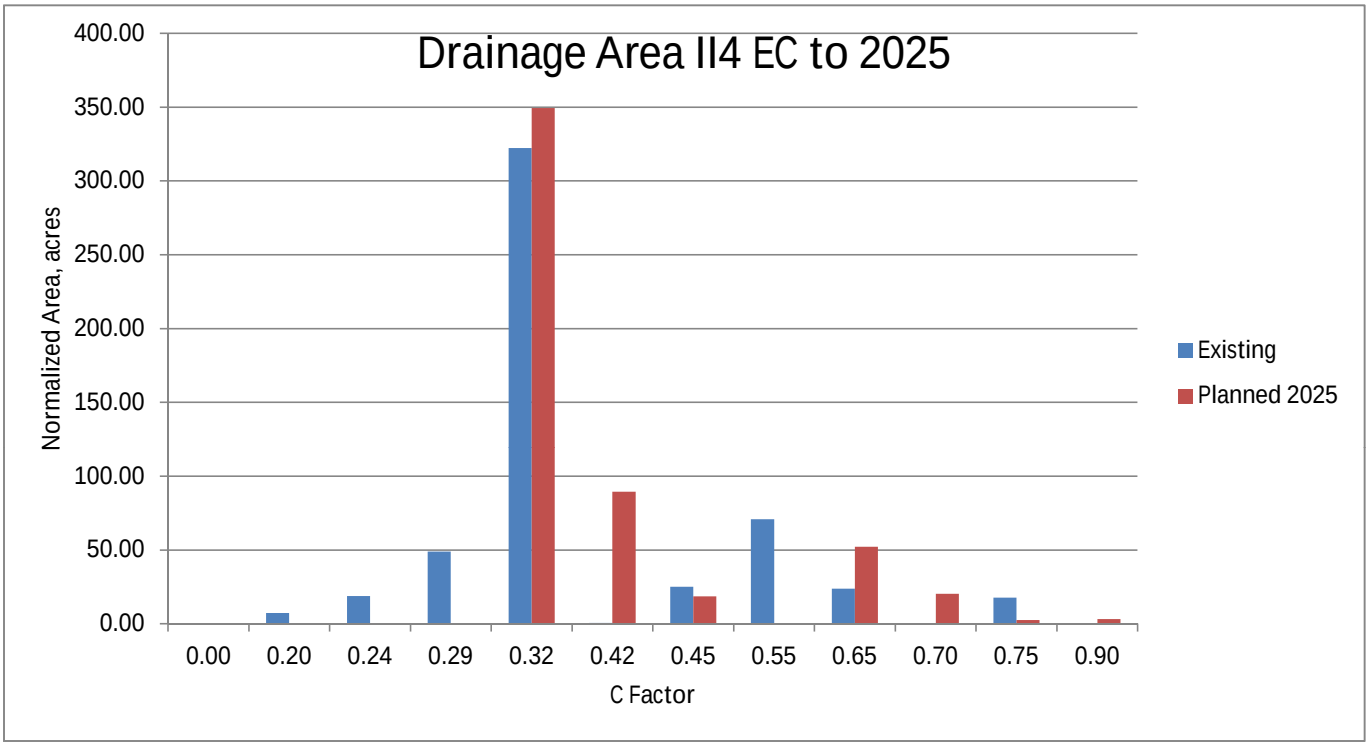

Drainage Area HH EC to 2025
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

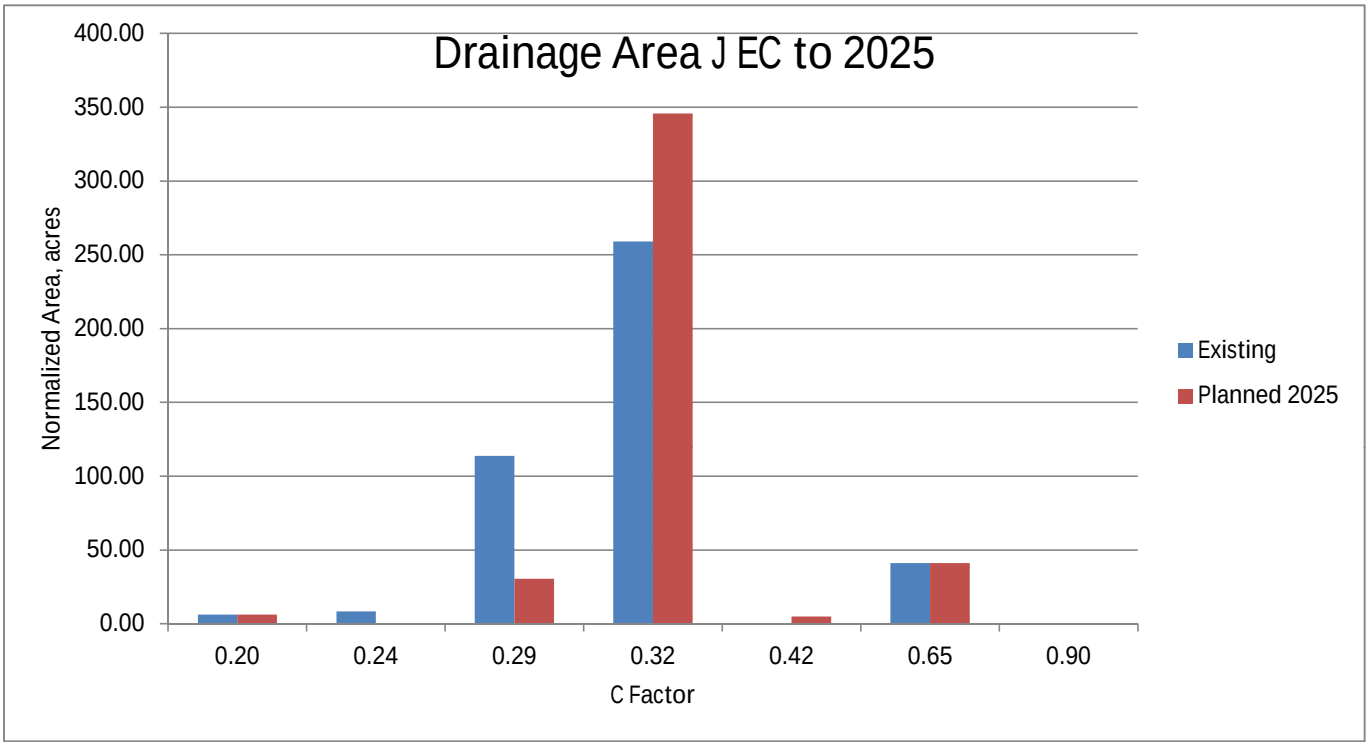

Drainage Area I EC to 2025
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.55
0.65
C Factor
Existing
Planned 2025

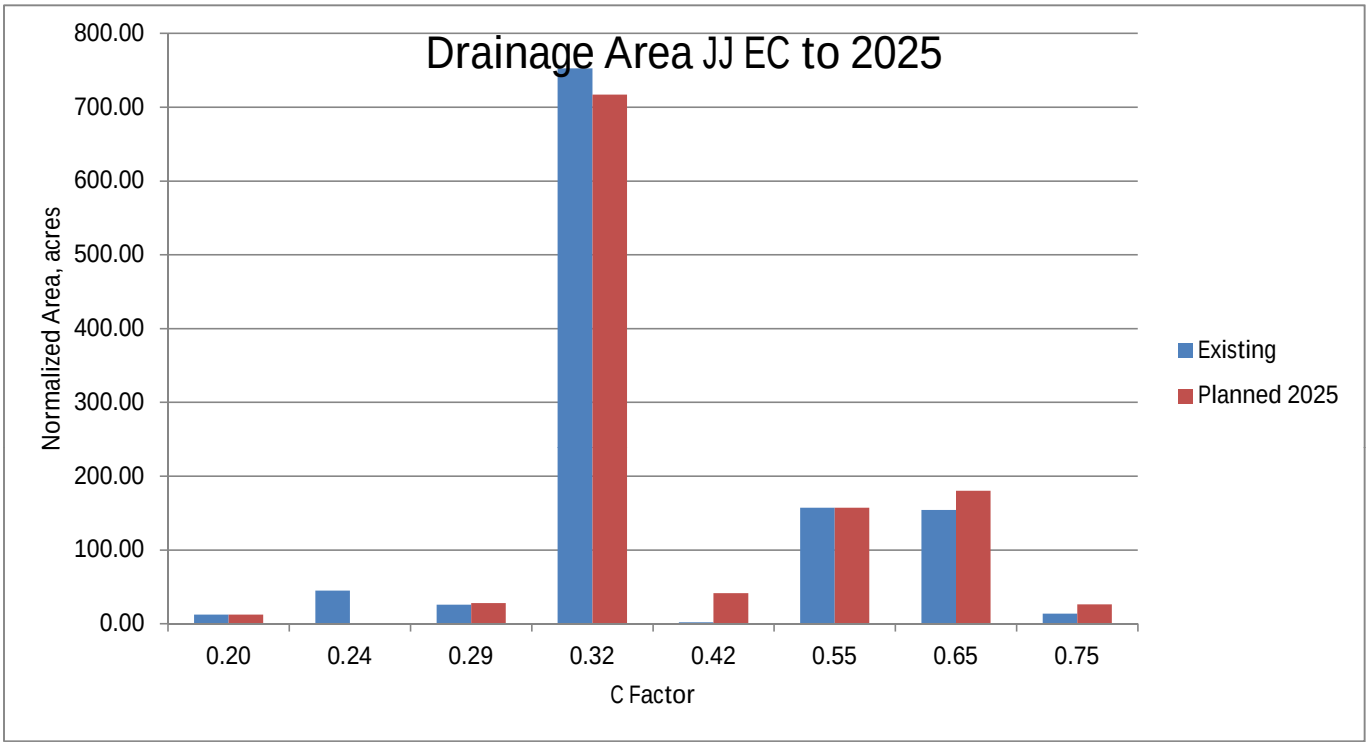

Drainage Area II1 EC to 2025
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

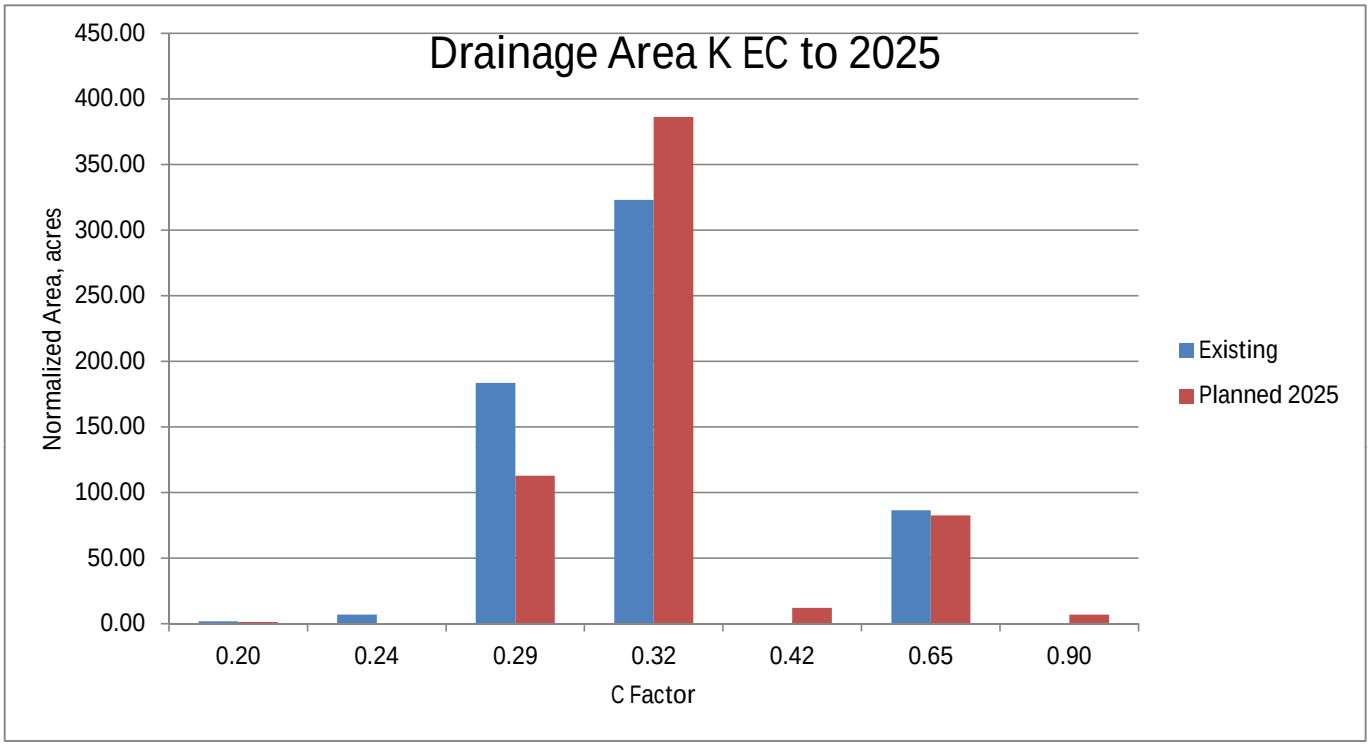

Drainage Area II2 EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

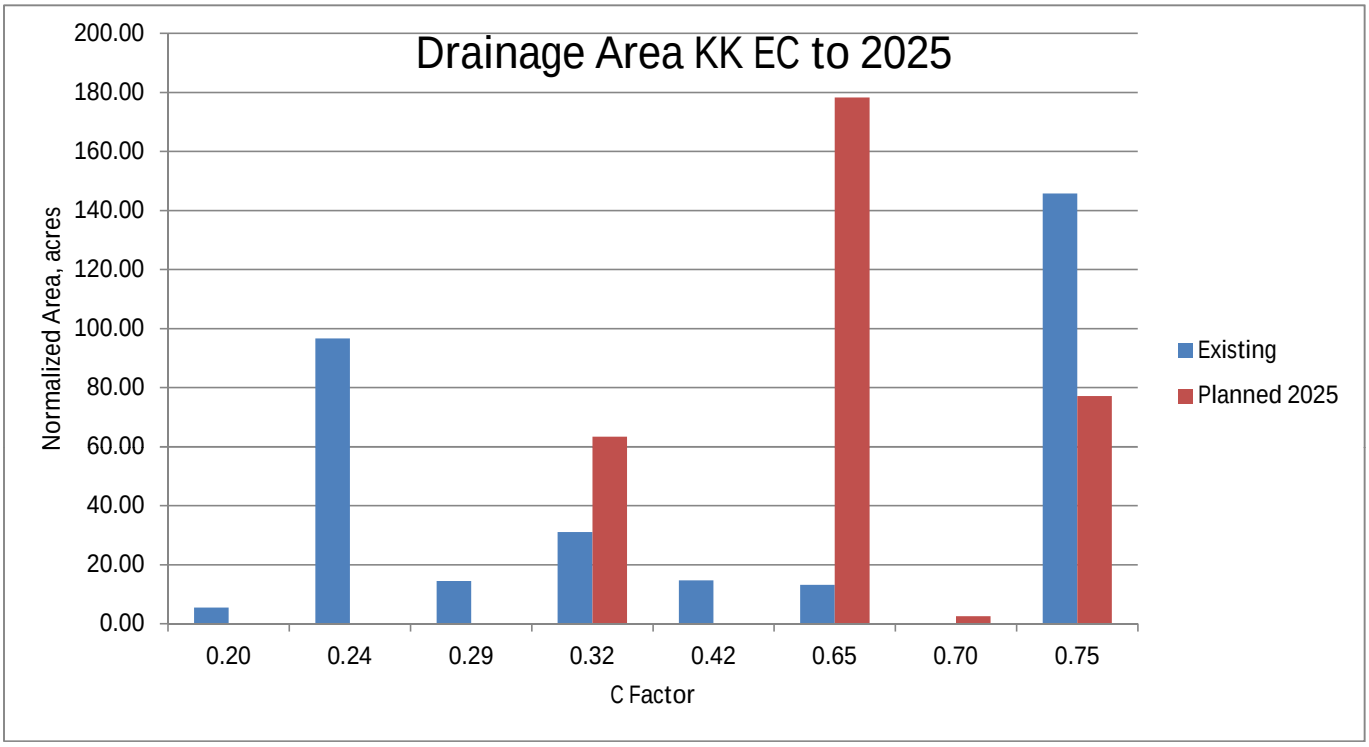

Drainage Area II3 EC to 2025
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

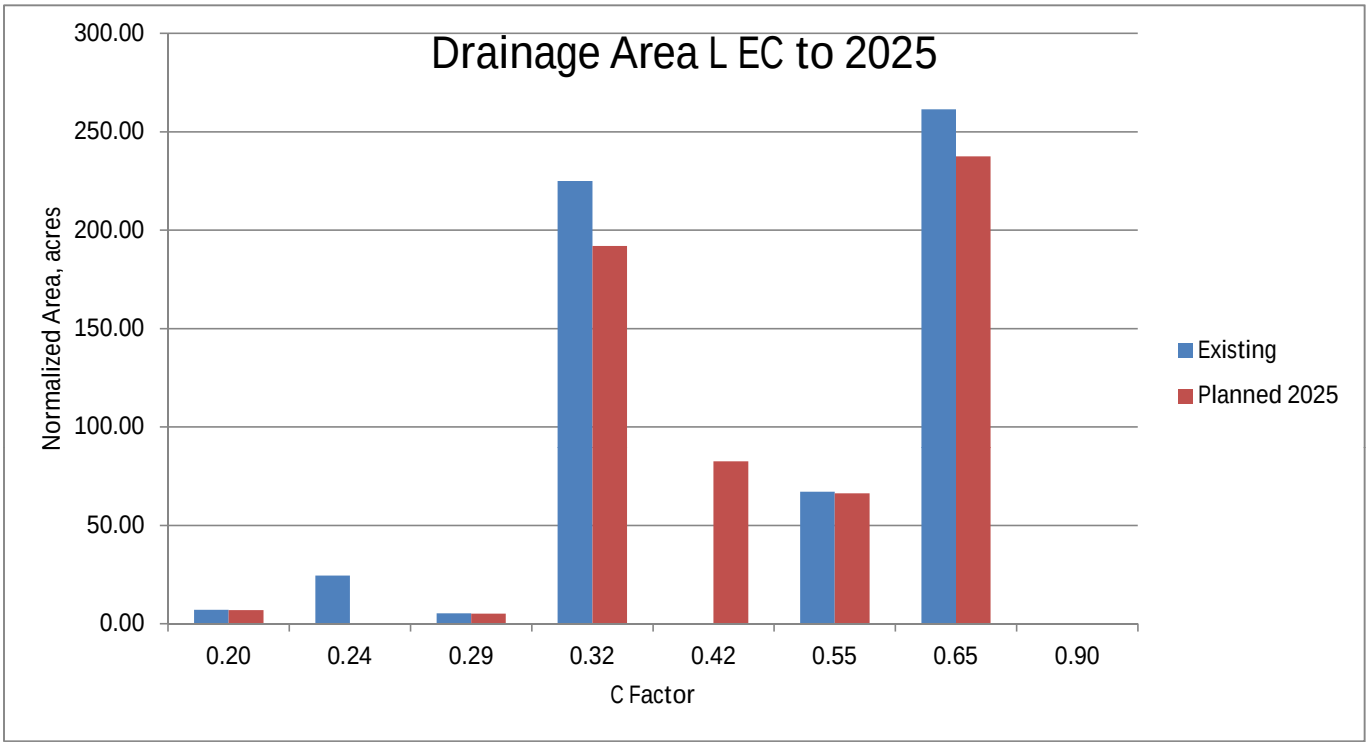

Drainage Area II4 EC to 2025
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

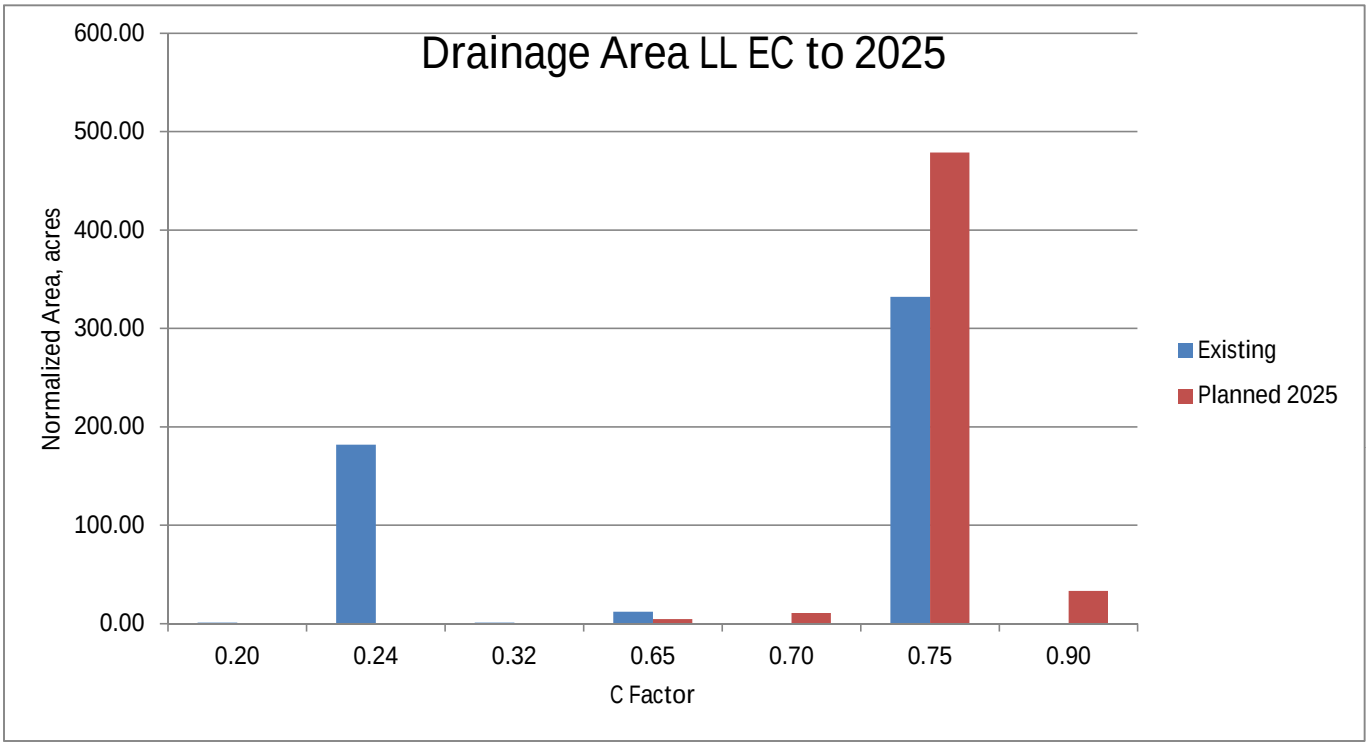

Drainage Area J EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.65
0.90
C Factor
Existing
Planned 2025

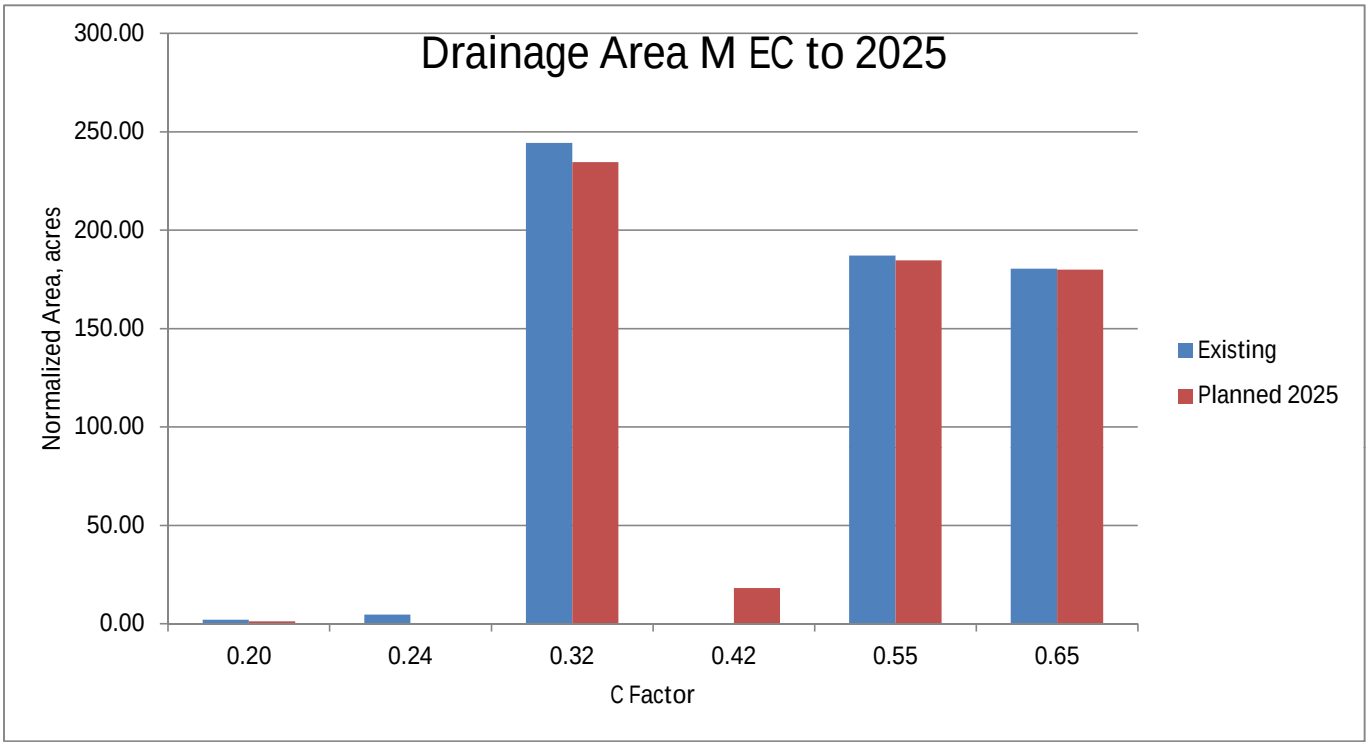

Drainage Area JJ EC to 2025
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
C Factor
Existing
Planned 2025

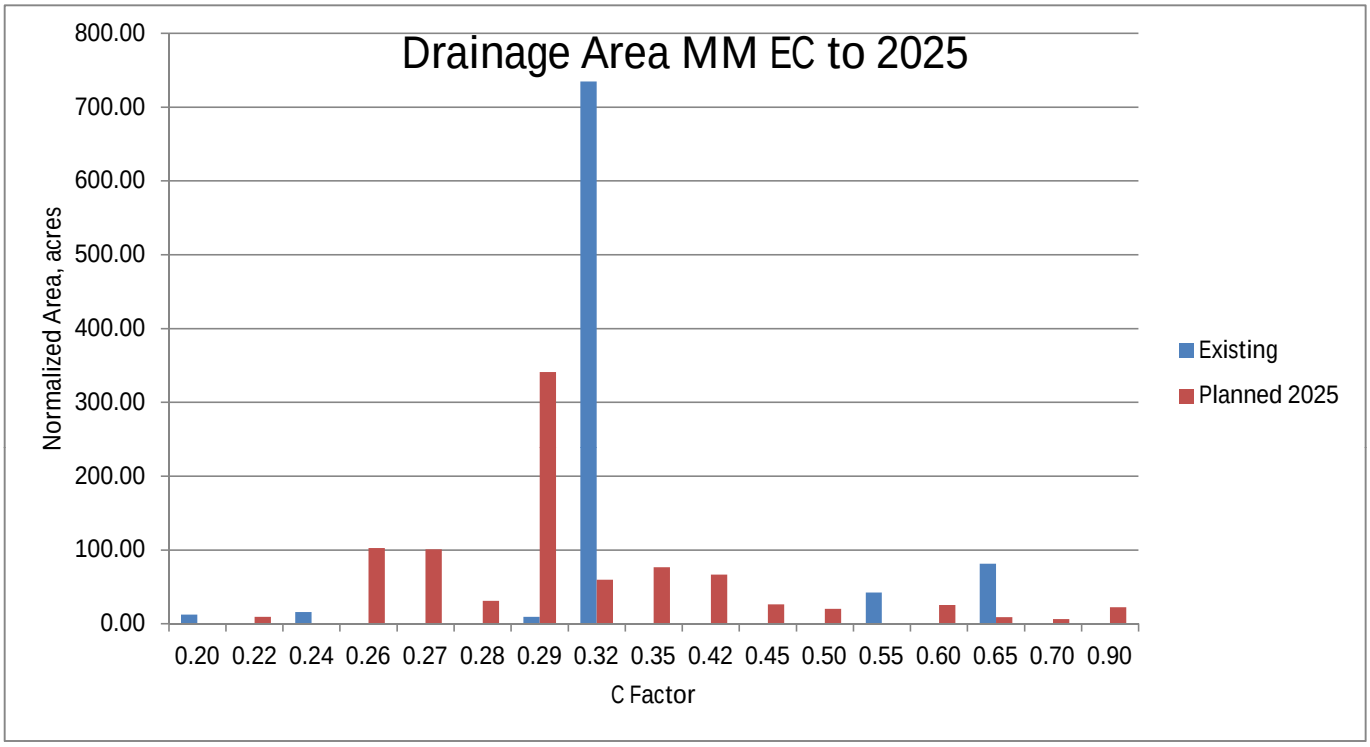

Drainage Area K EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.65
0.90
C Factor
Existing
Planned 2025

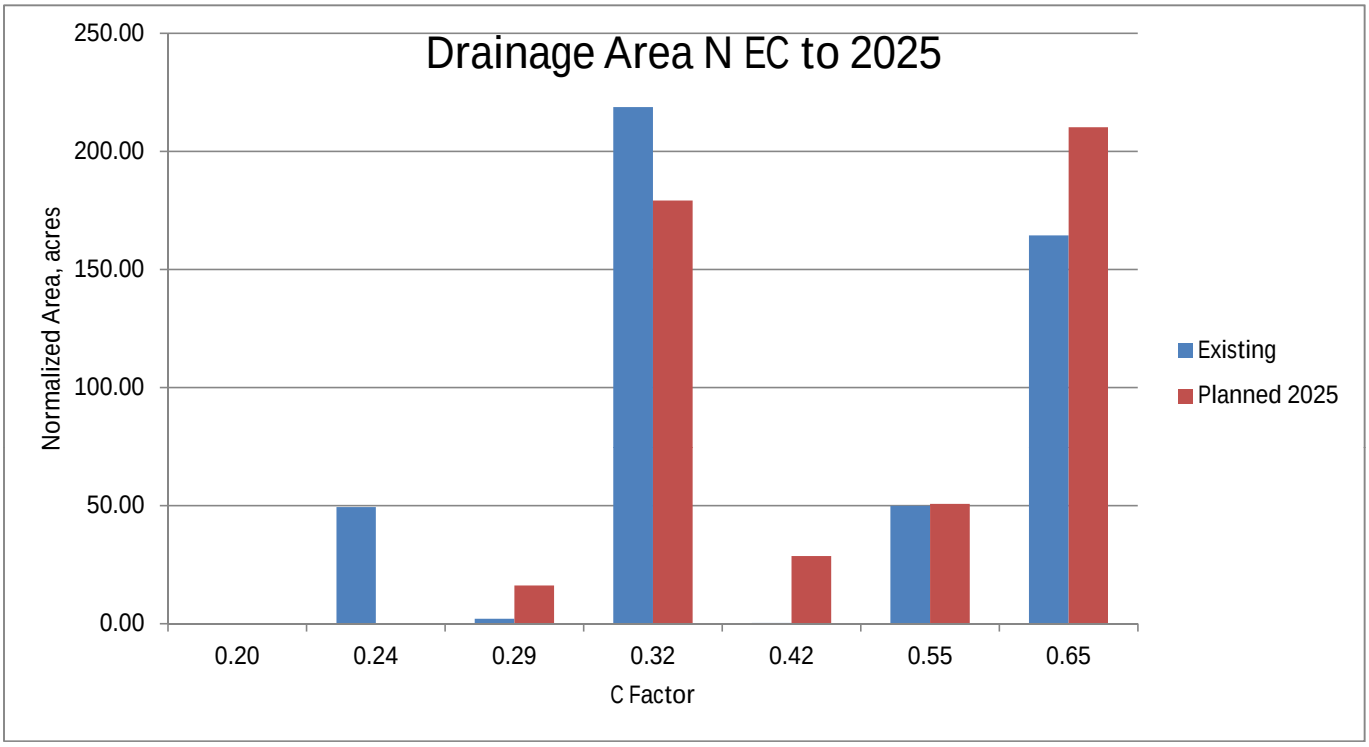

Drainage Area KK EC to 2025
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.65
0.70
0.75
C Factor
Existing
Planned 2025

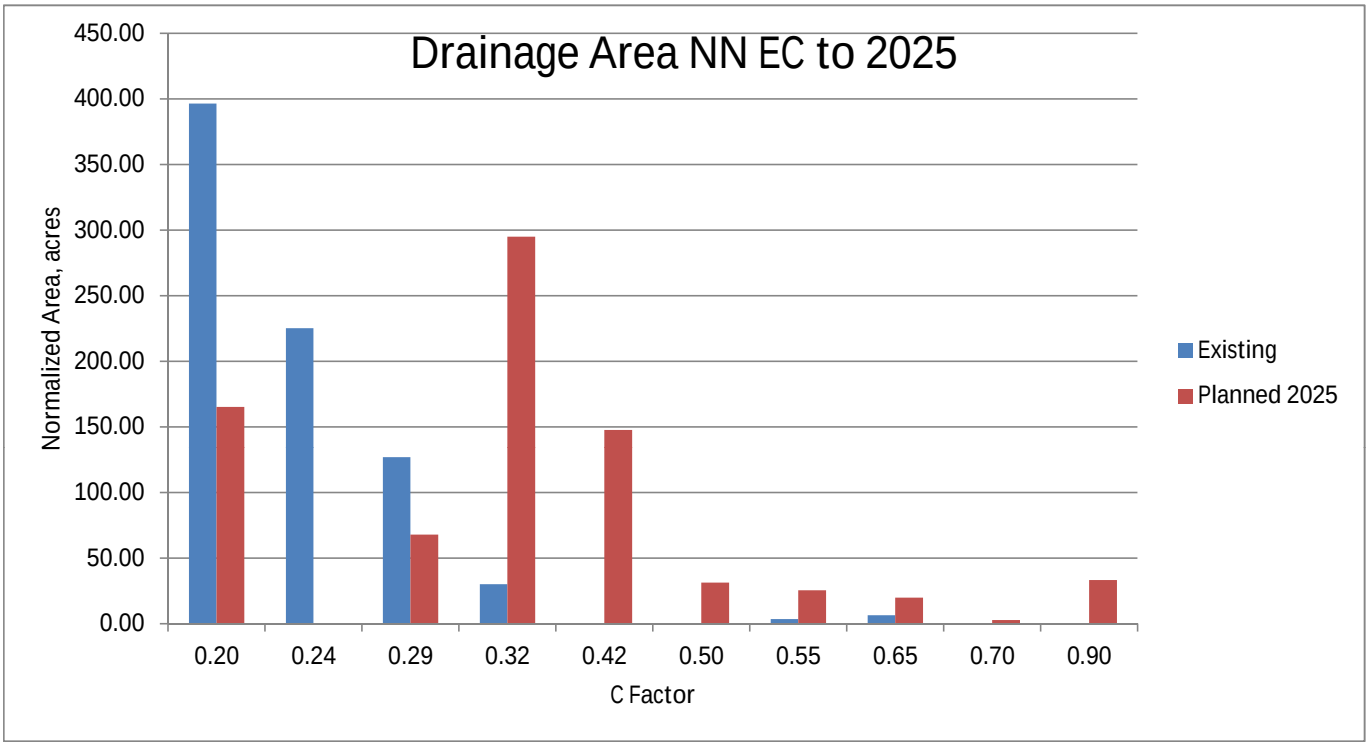

Drainage Area L EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
Existing
Planned 2025

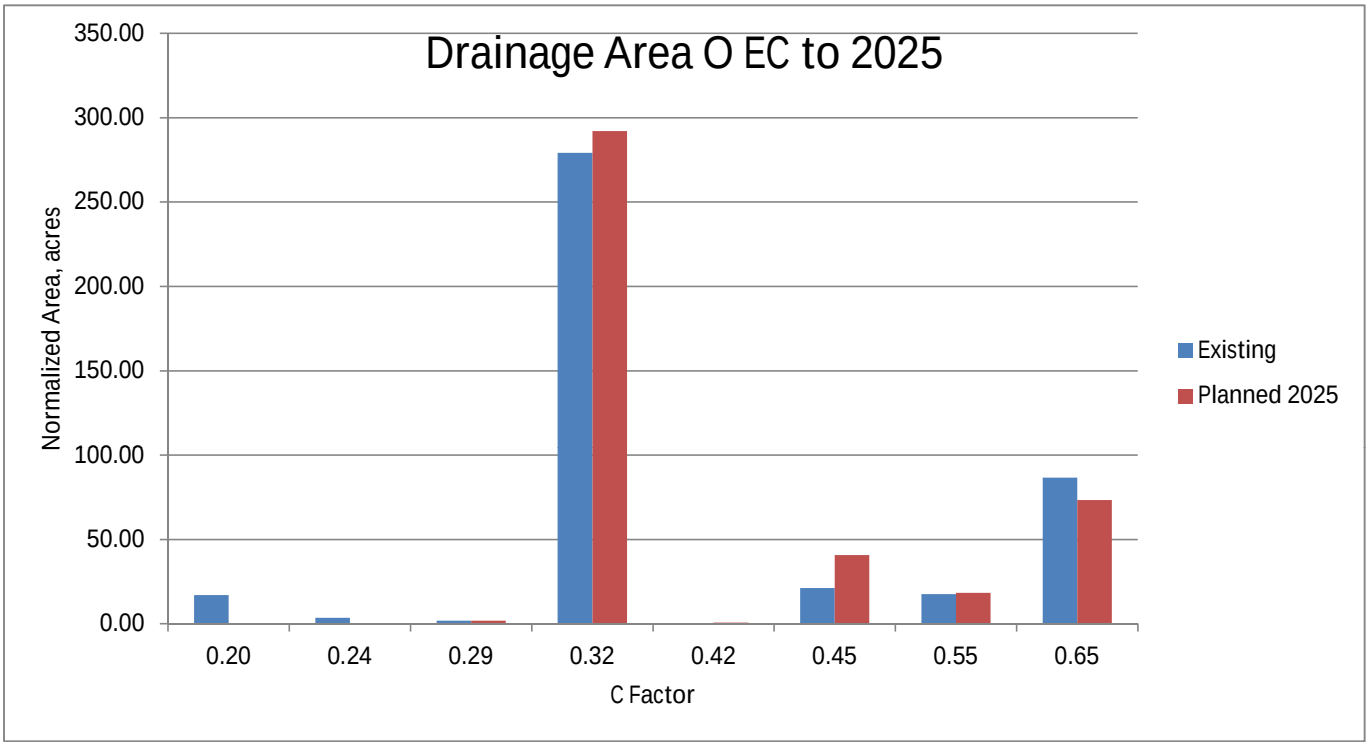

Drainage Area LL EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

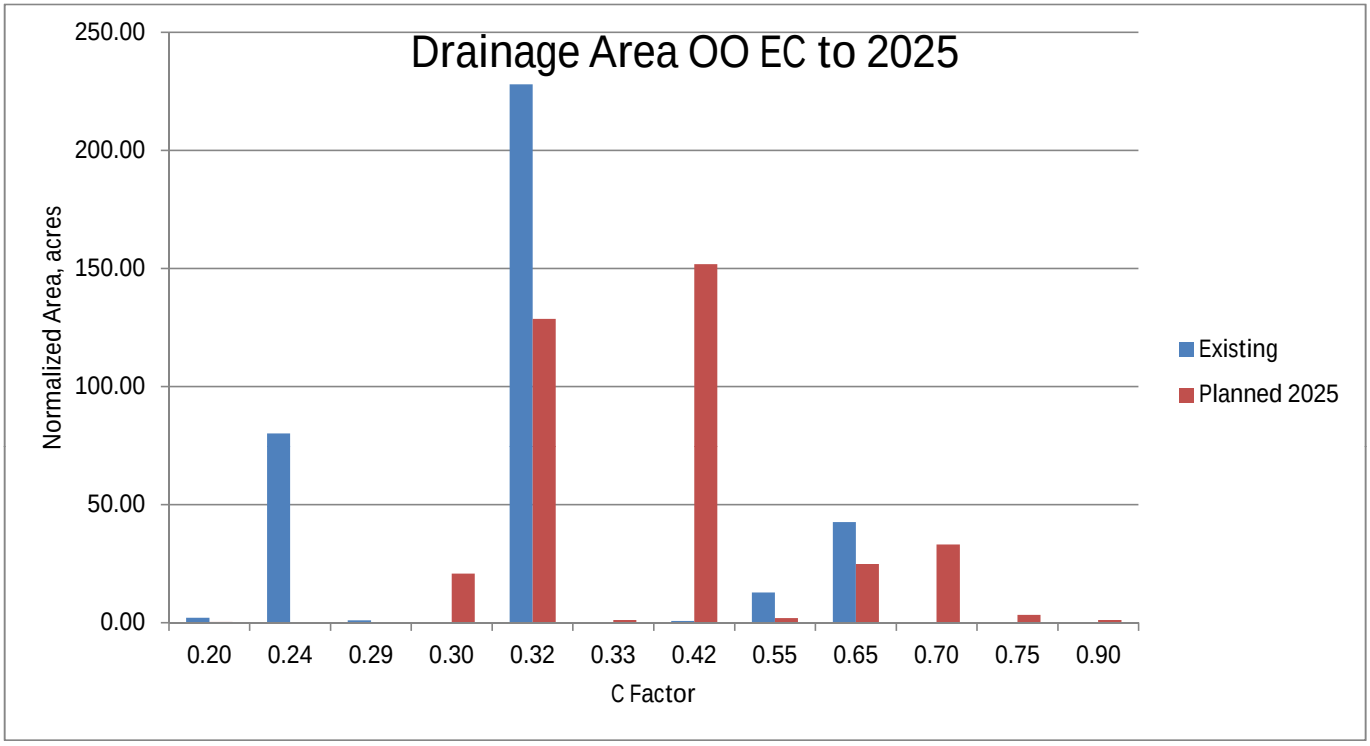

Drainage Area M EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.32
0.42
0.55
0.65
C Factor
Existing
Planned 2025

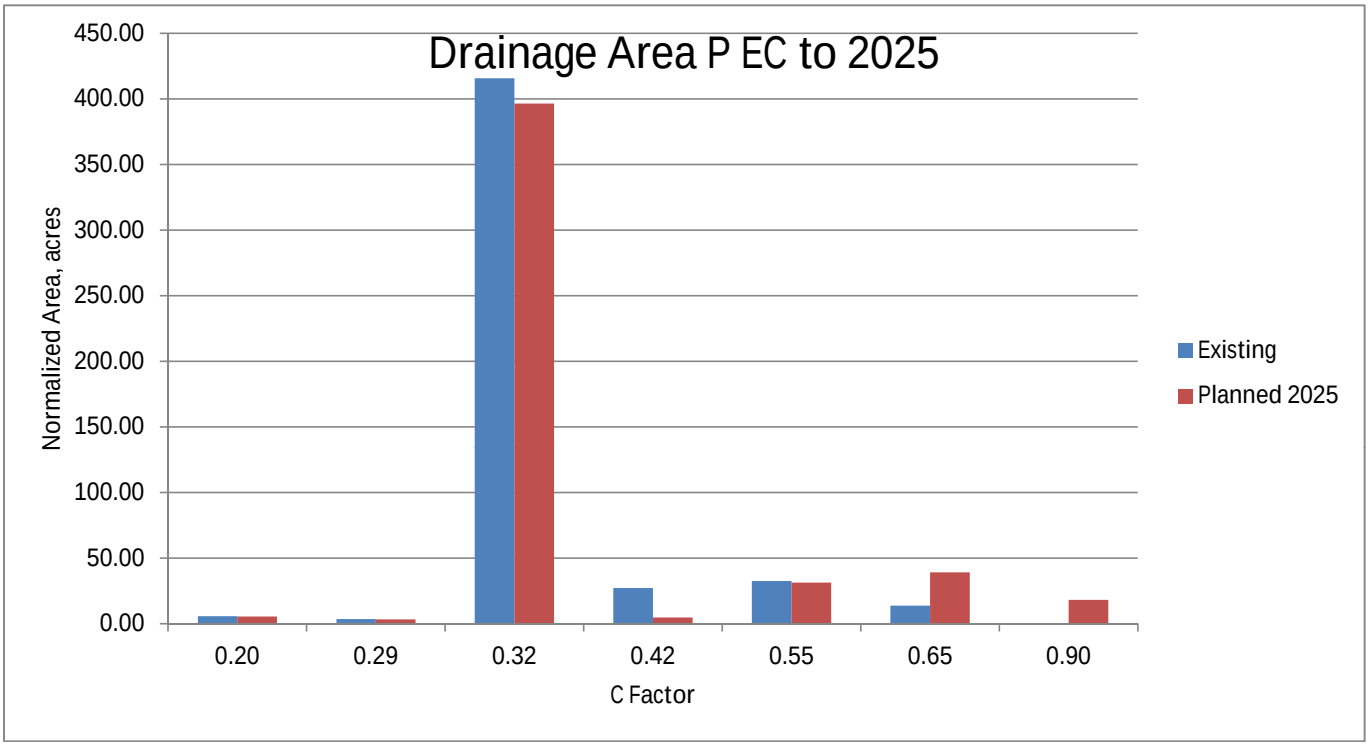

Drainage Area MM EC to 2025
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20 0.22 0.24 0.26 0.27 0.28 0.29 0.32 0.35 0.42 0.45 0.50 0.55 0.60 0.65 0.70 0.90
C Factor
Existing
Planned 2025

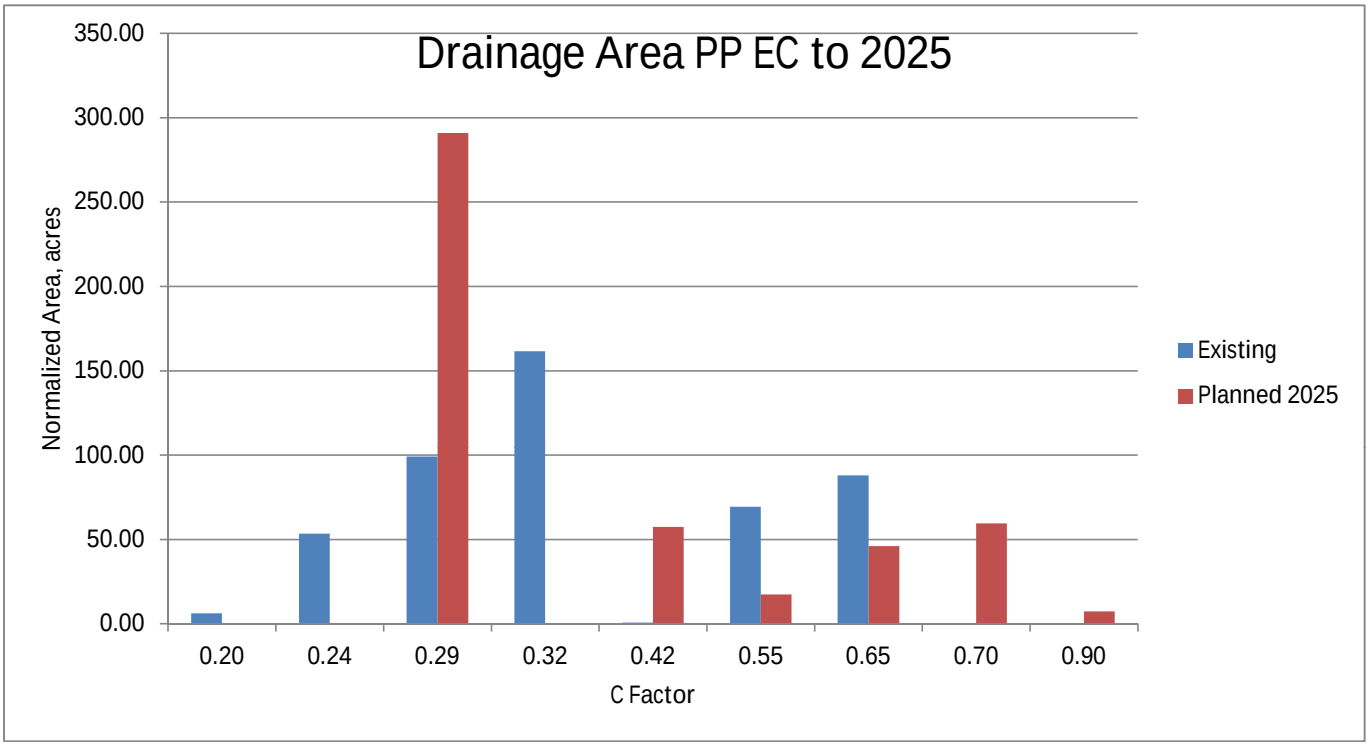

Drainage Area N EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
C Factor
Existing
Planned 2025

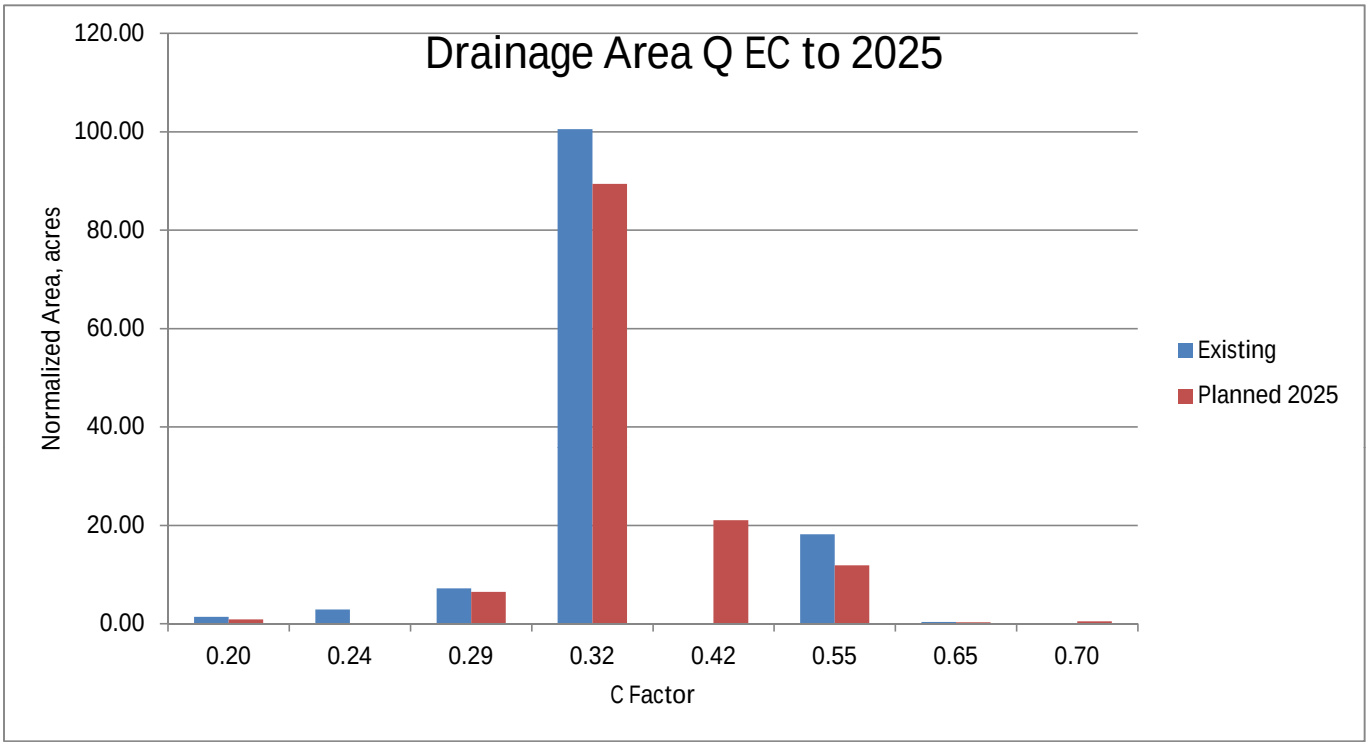

Drainage Area NN EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

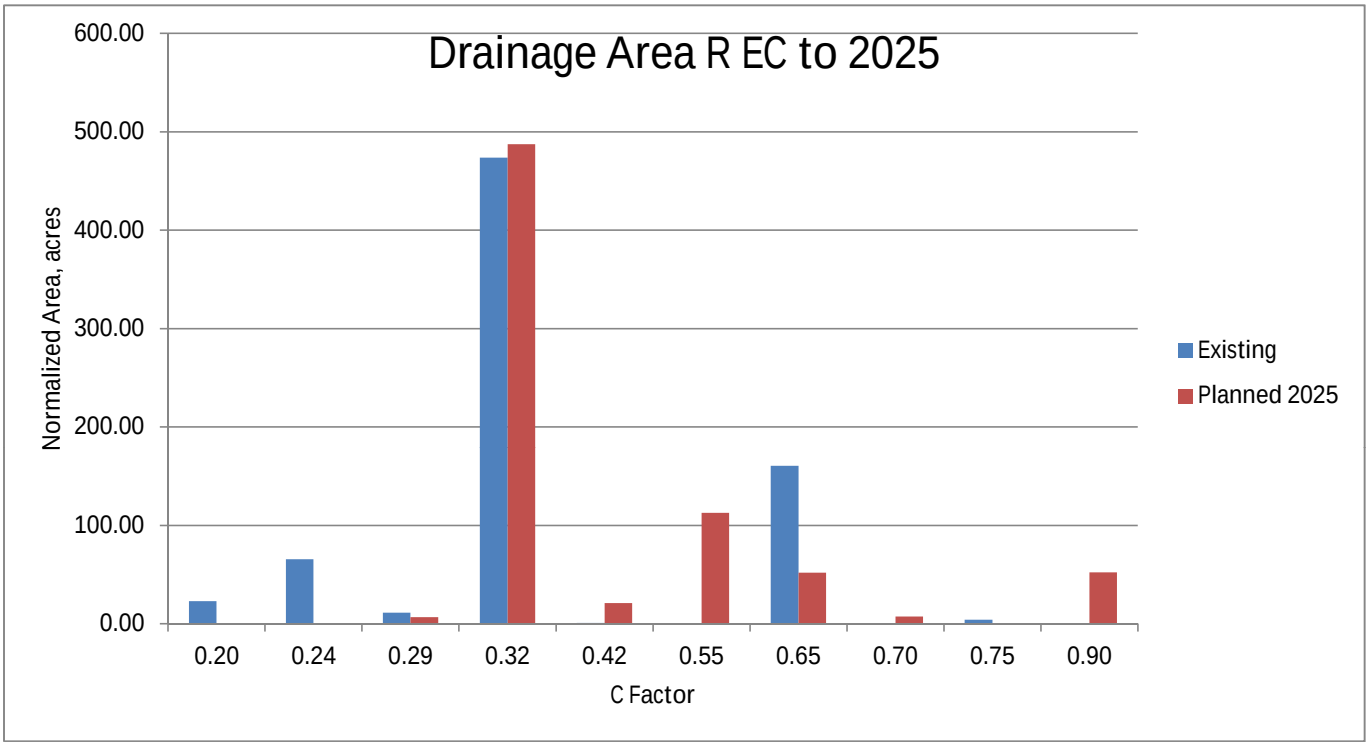

Drainage Area O EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
C Factor
Existing
Planned 2025

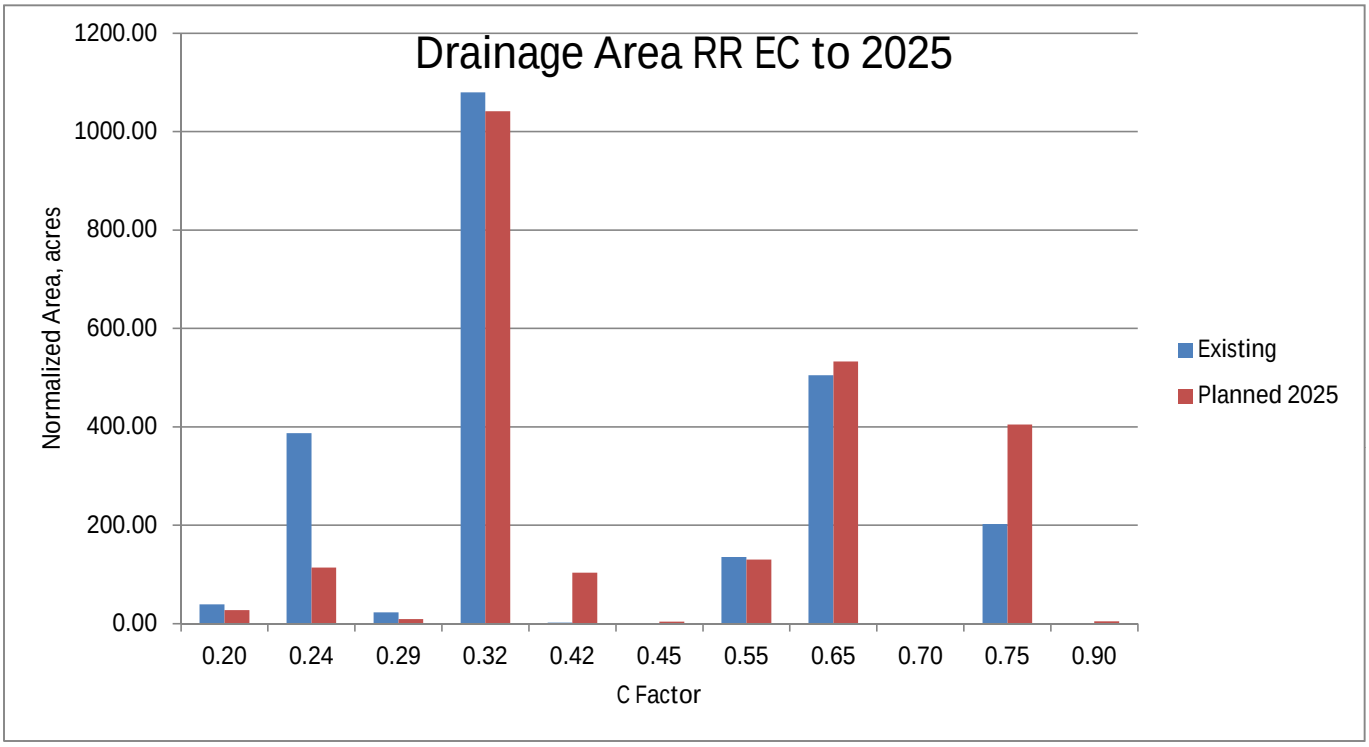

Drainage Area OO EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.30
0.32
0.33
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

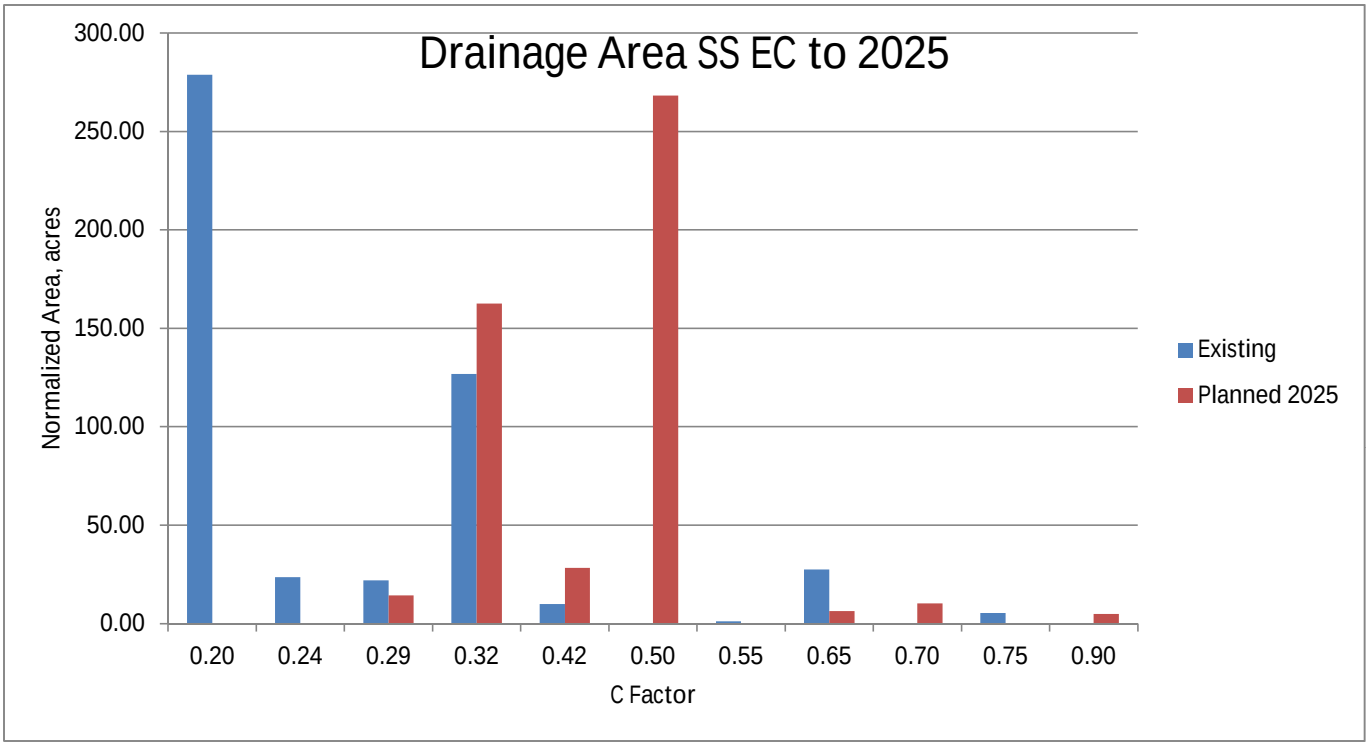

Drainage Area P EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
Existing
Planned 2025

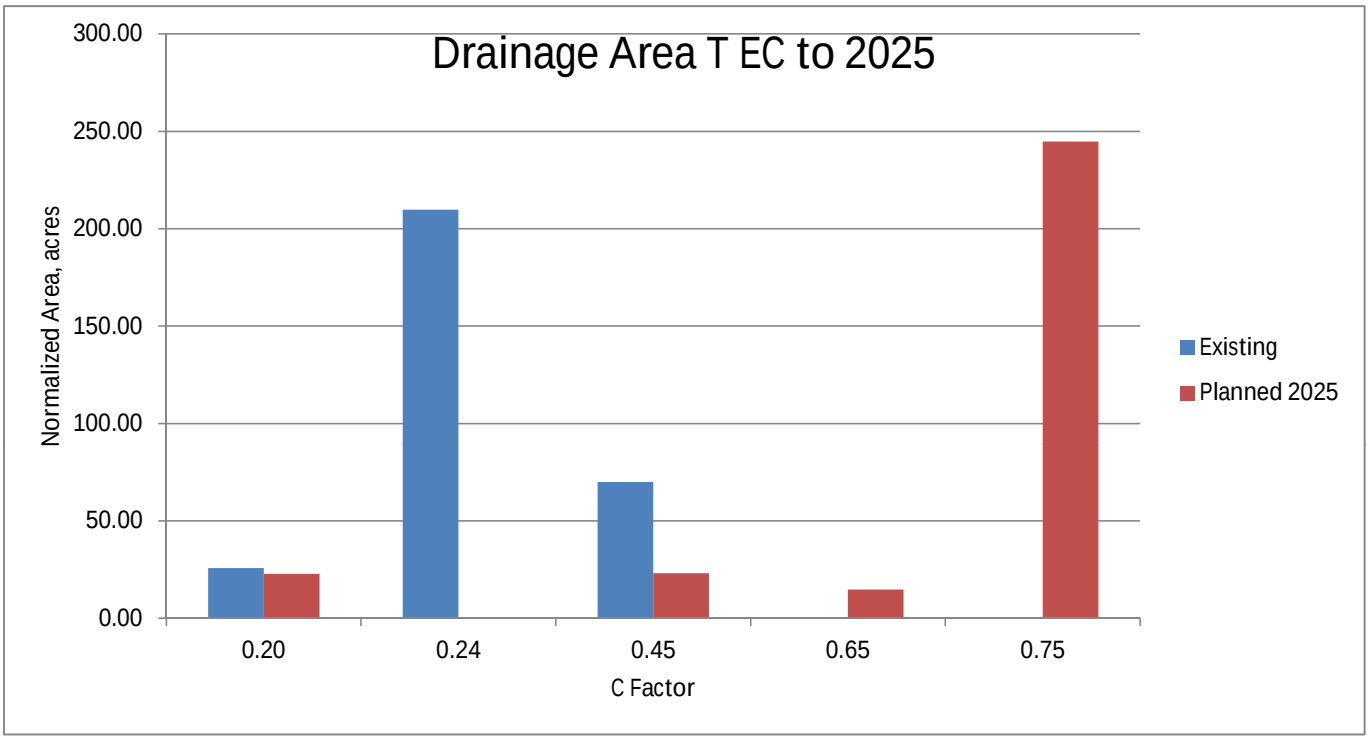

Drainage Area PP EC to 2025
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

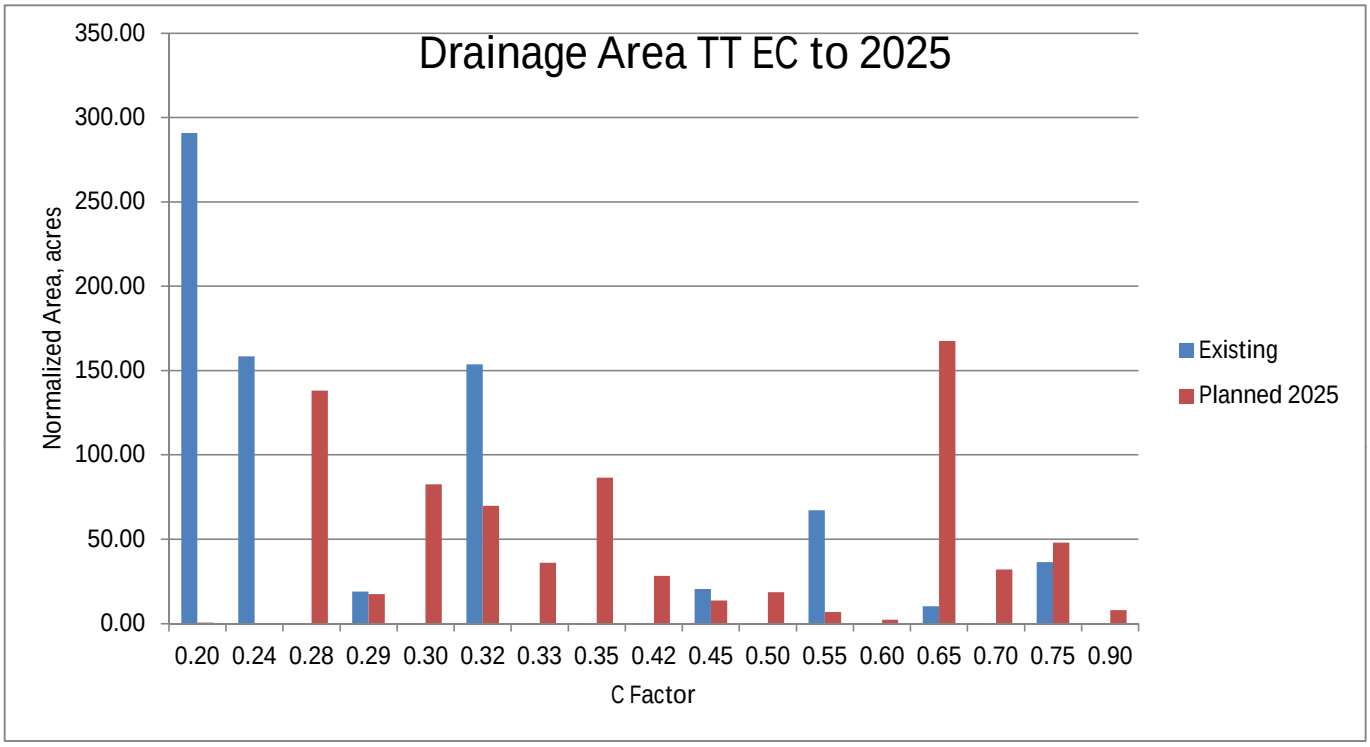

Drainage Area Q EC to 2025
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
C Factor
Existing
Planned 2025

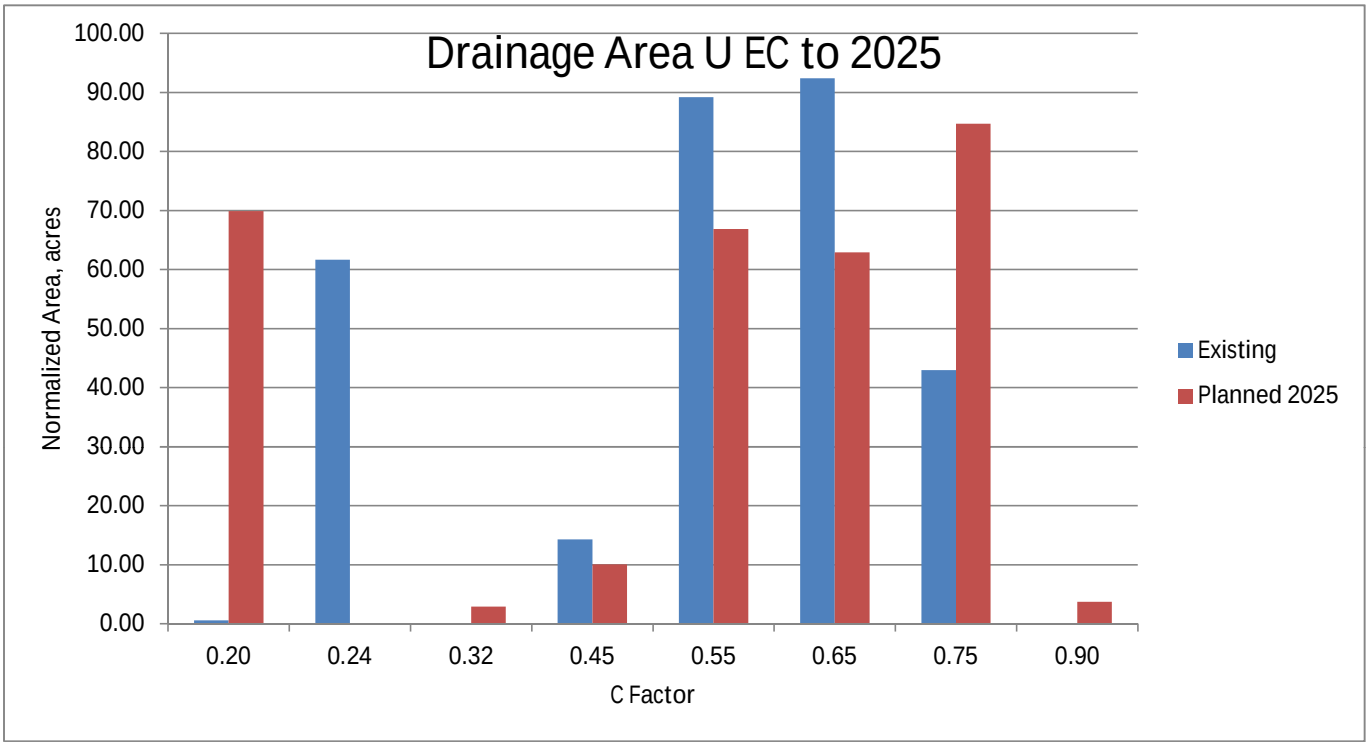

Drainage Area R EC to 2025
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

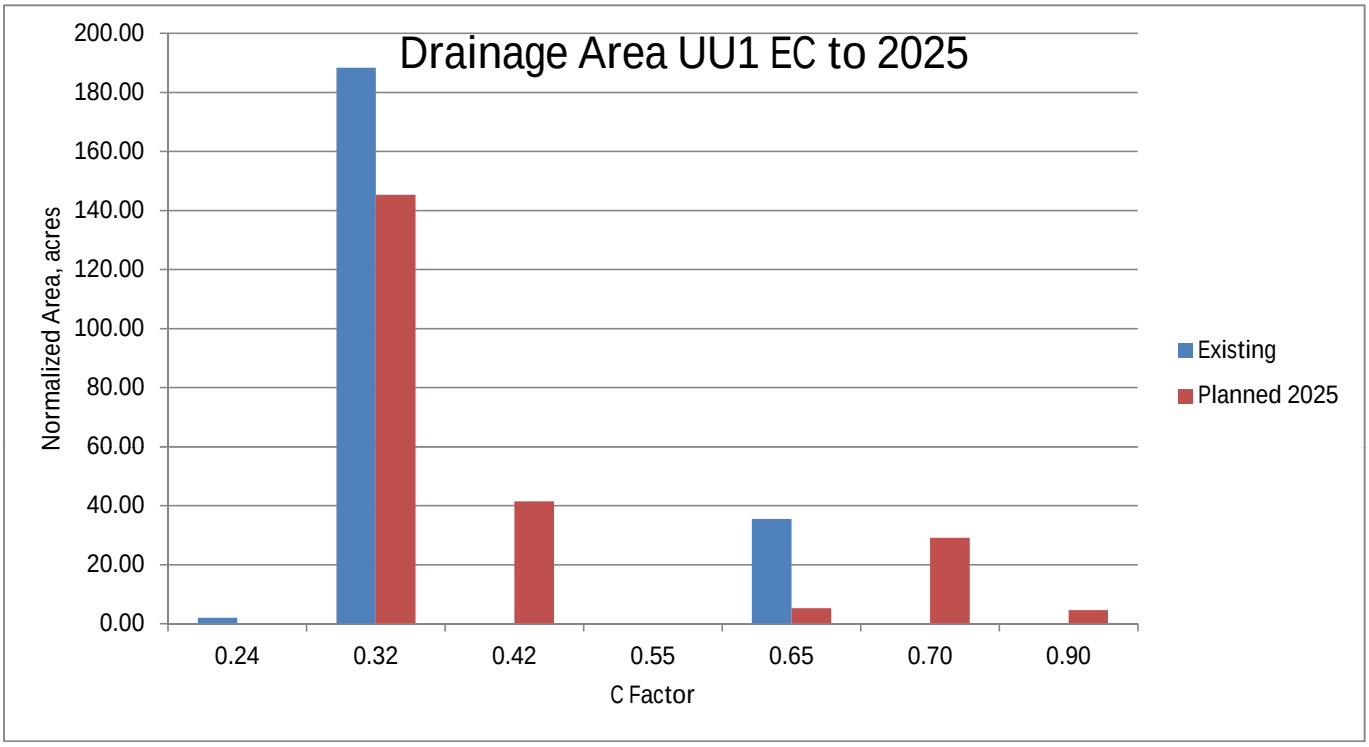

Drainage Area RR EC to 2025
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

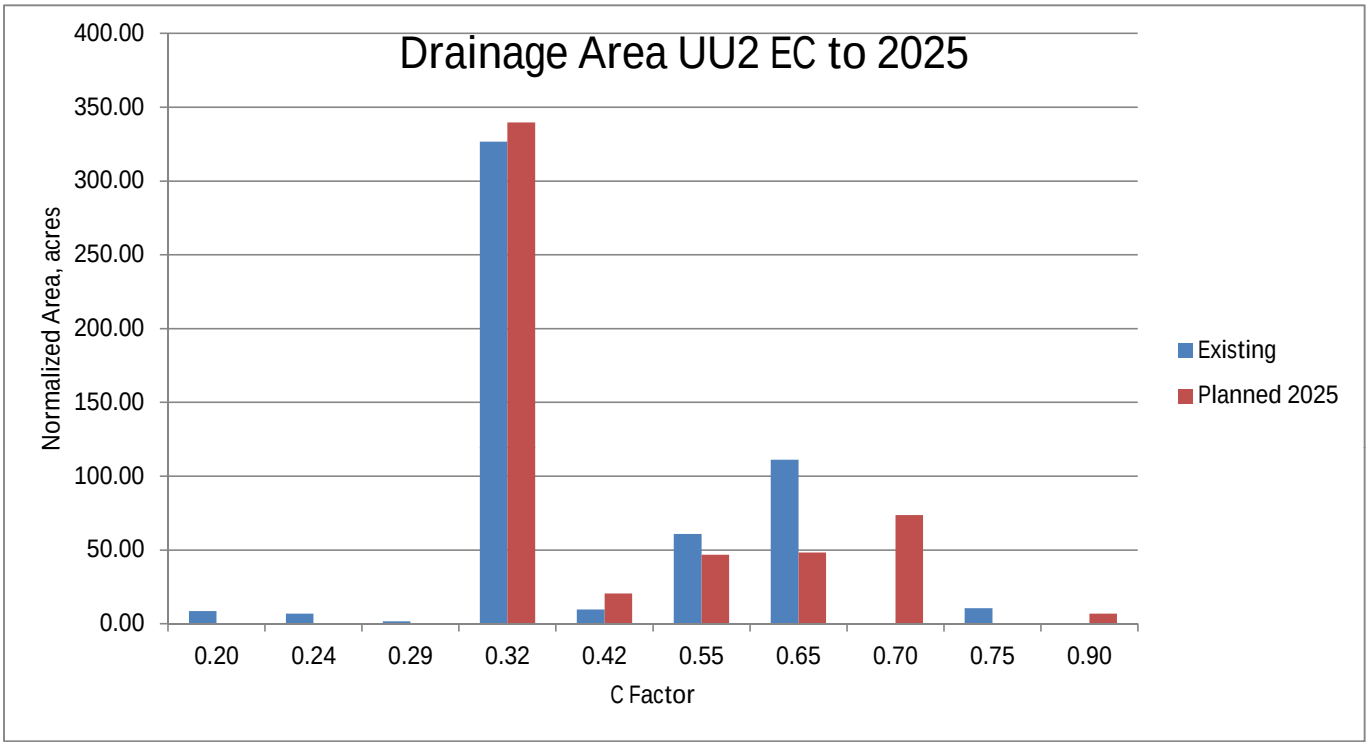

Drainage Area SS EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

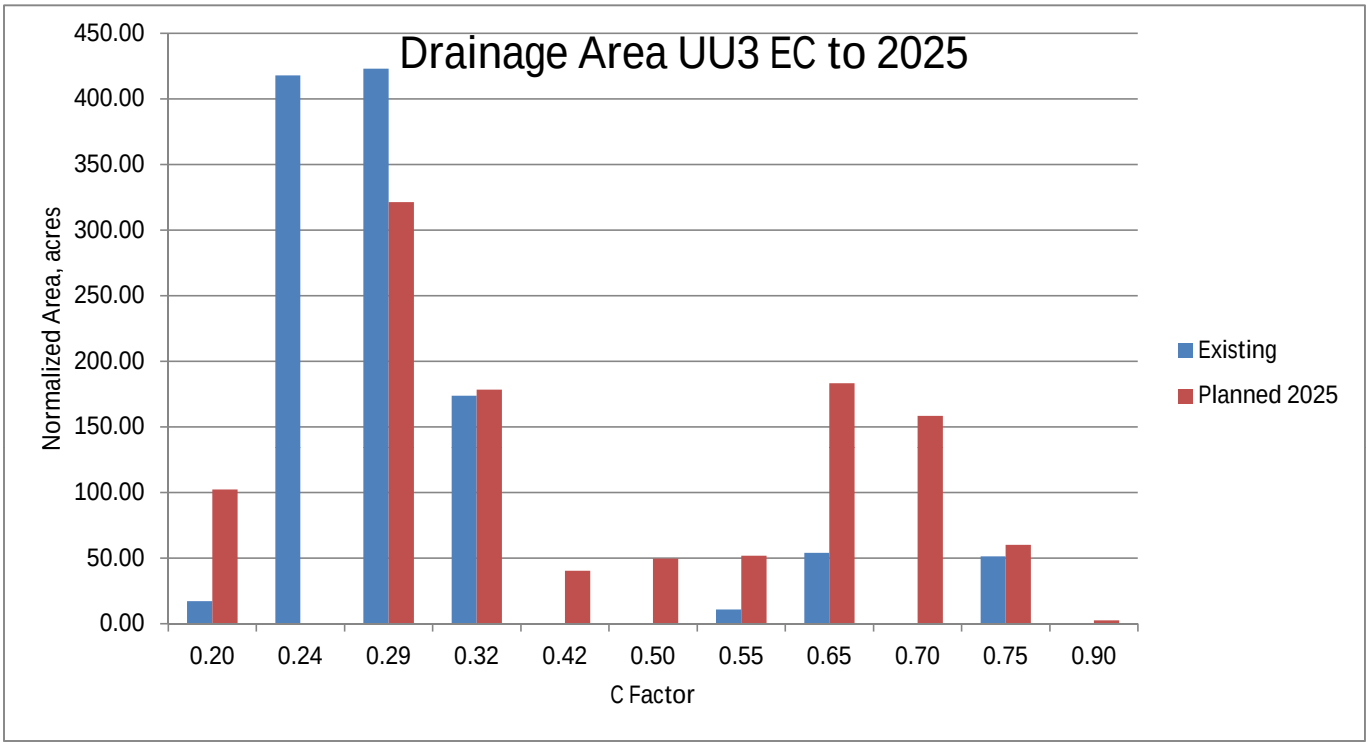

Drainage Area T EC to 2025
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.45
0.65
0.75
C Factor
Existing
Planned 2025

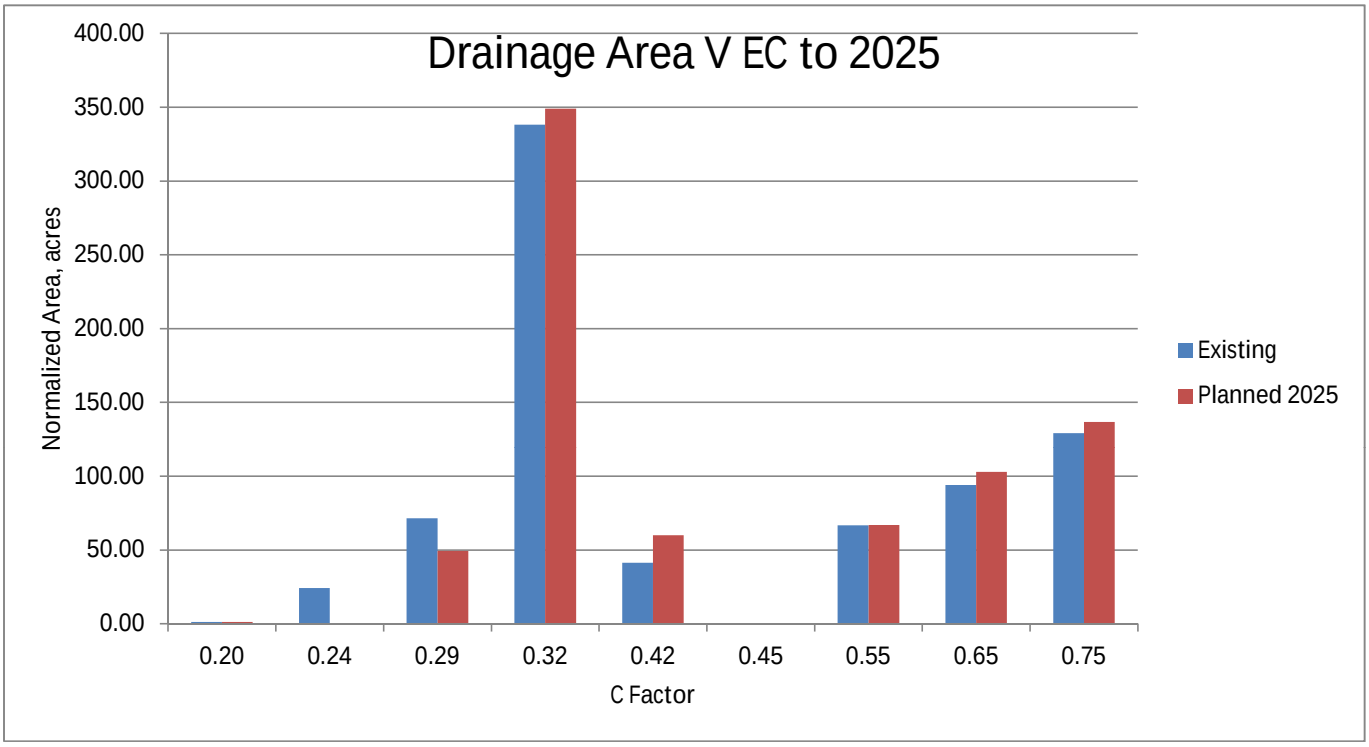

Drainage Area TT EC to 2025
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20 0.24 0.28 0.29 0.30 0.32 0.33 0.35 0.42 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.90
C Factor
Existing
Planned 2025

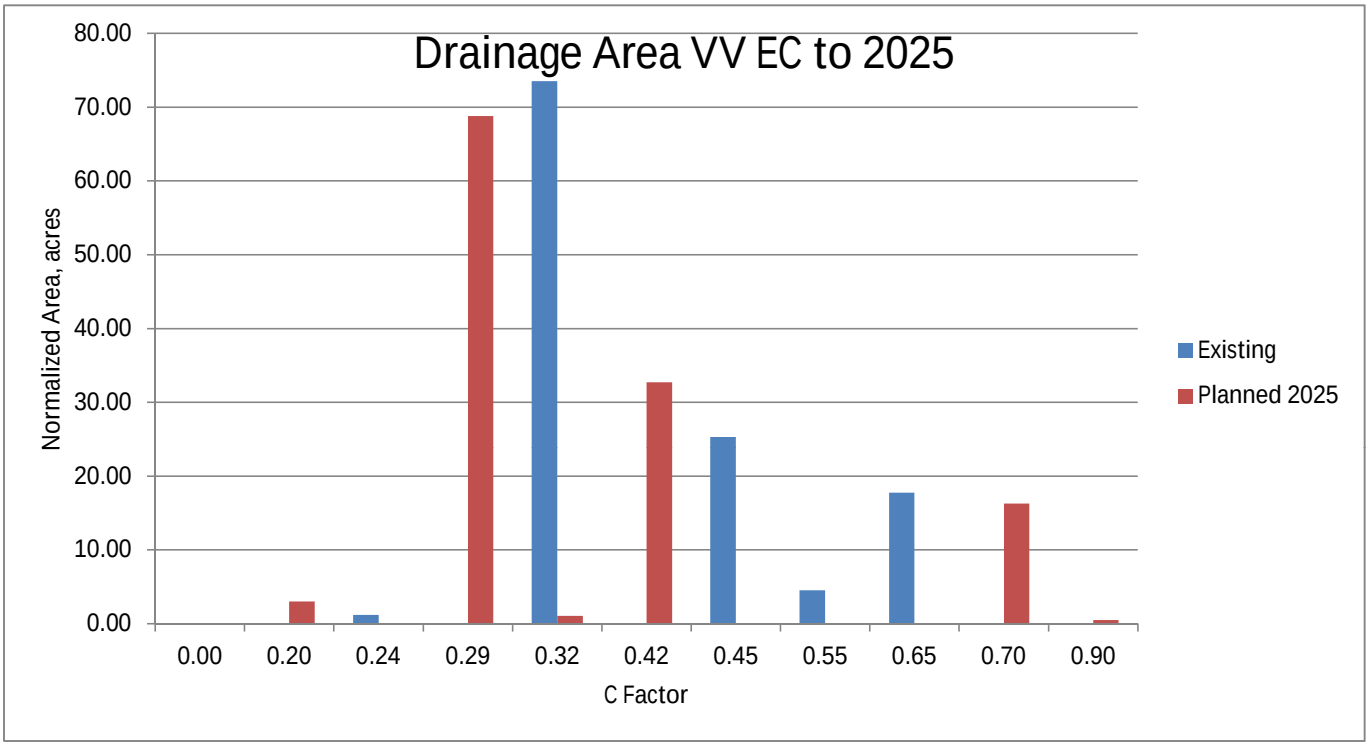

Drainage Area U EC to 2025
Normalized Area, acres
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.20
0.24
0.32
0.45
0.55
0.65
0.75
0.90
C Factor
Existing
Planned 2025

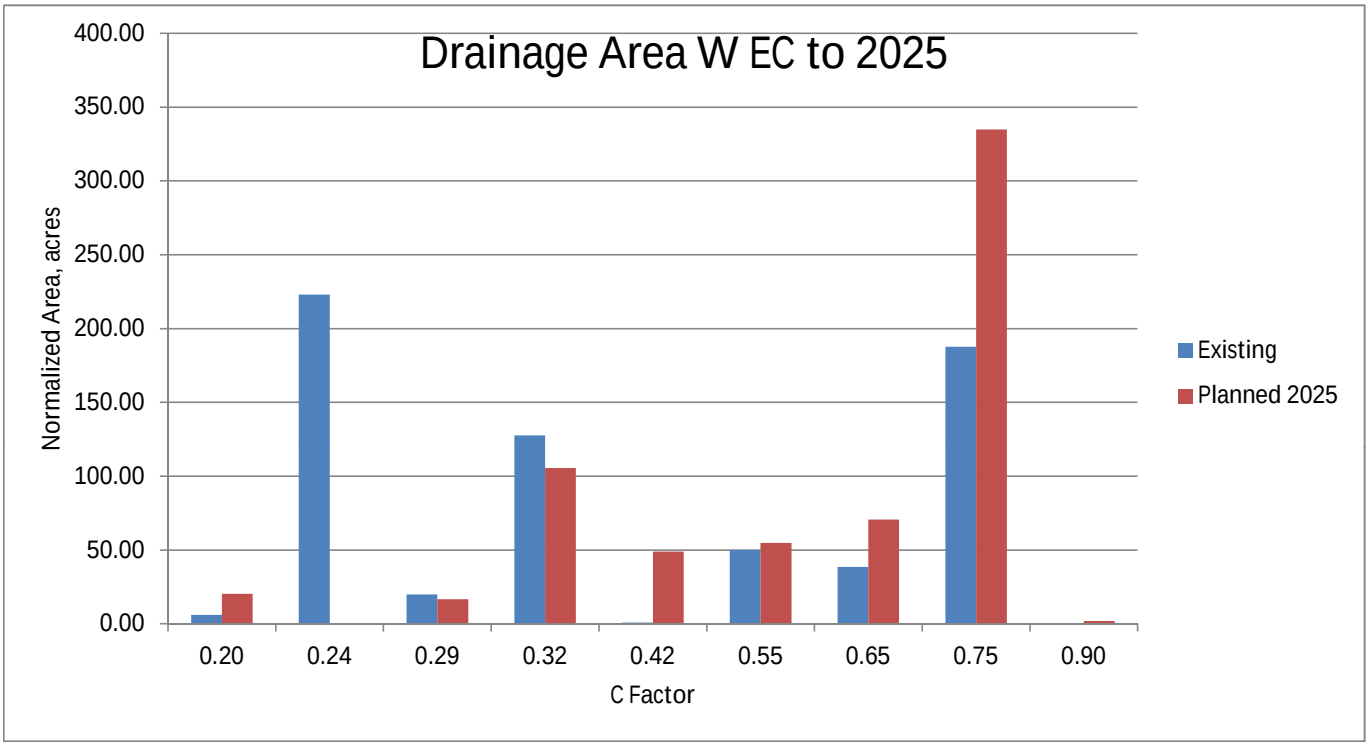

Drainage Area UU1 EC to 2025
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.24
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

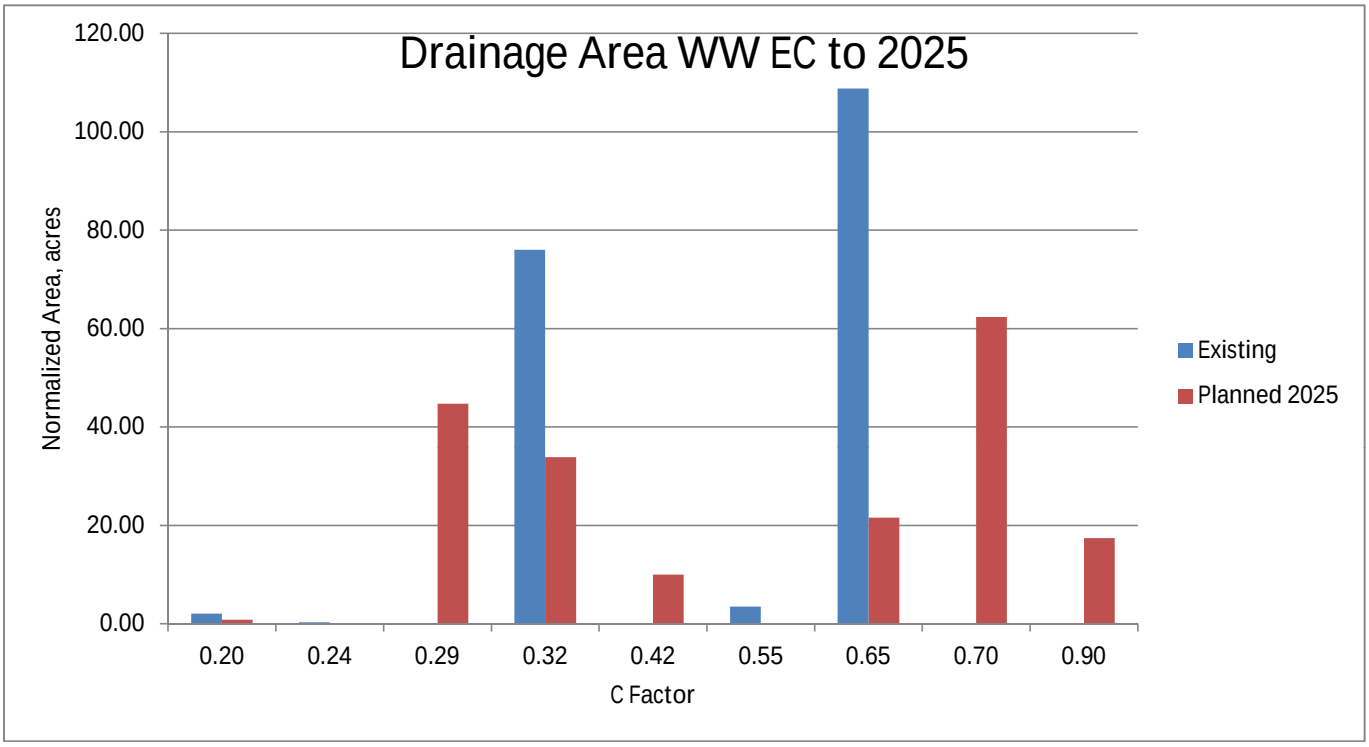

Drainage Area UU2 EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

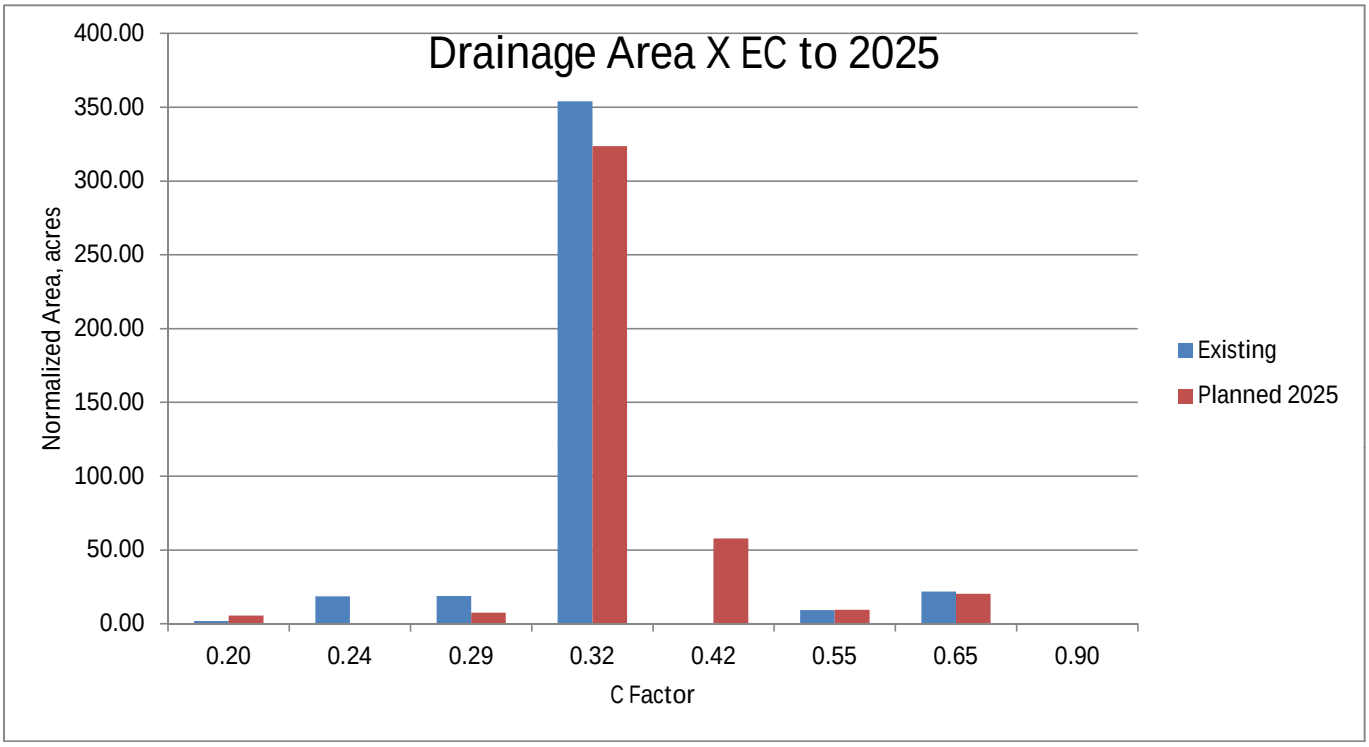

Drainage Area UU3 EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

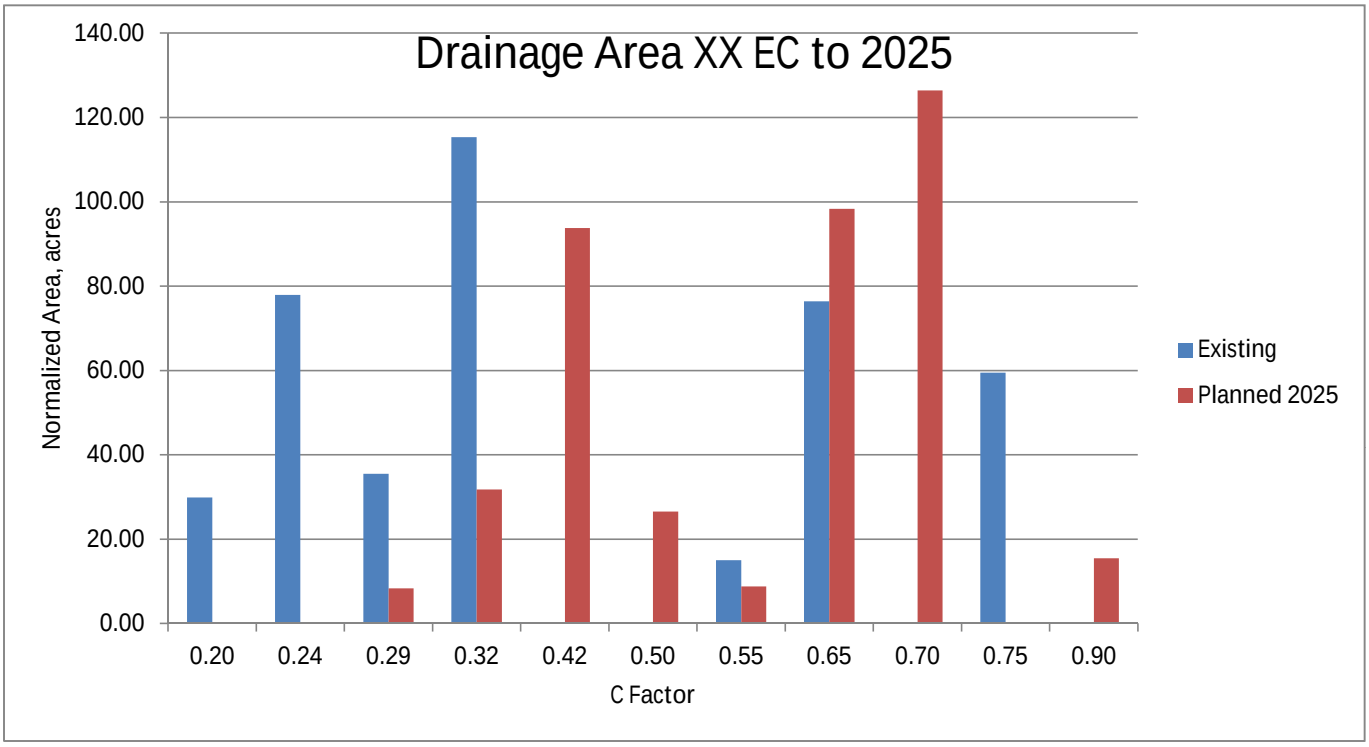

Drainage Area V EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.75
C Factor
Existing
Planned 2025

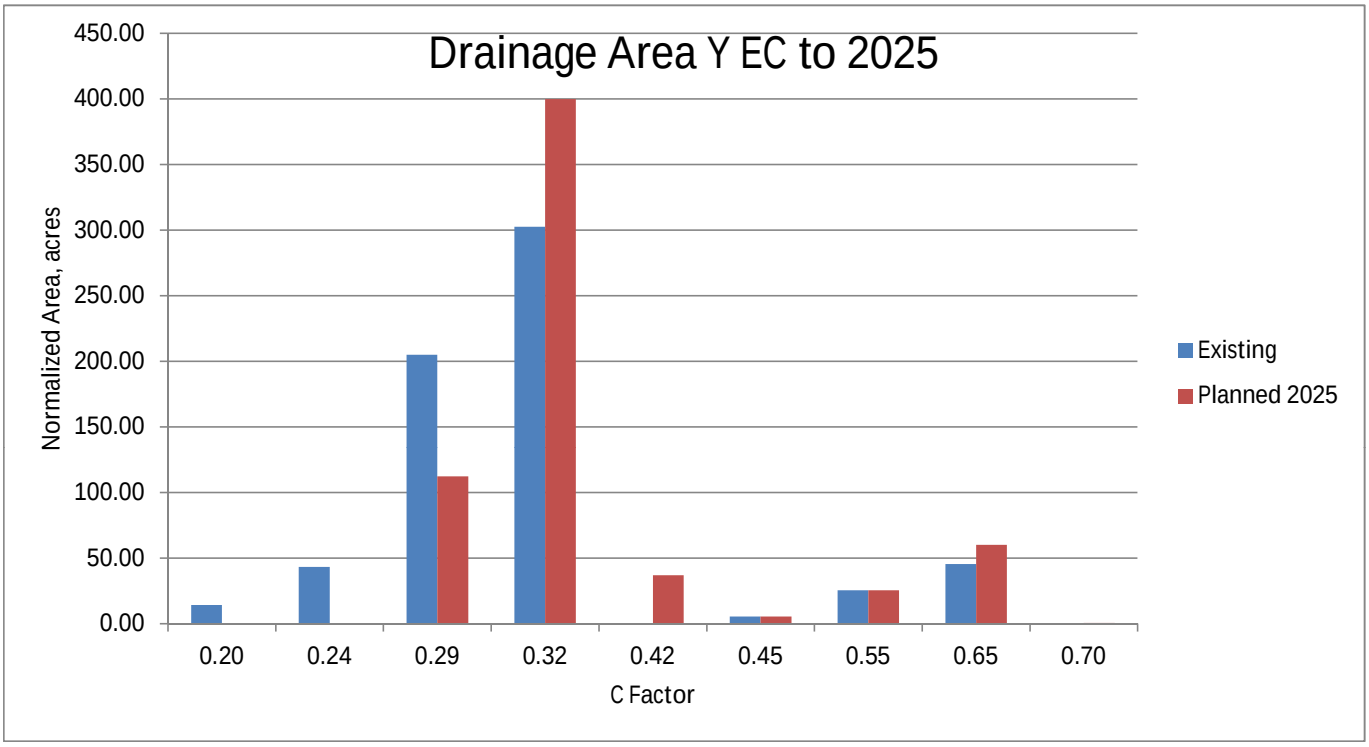

Drainage Area VV EC to 2025
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Normalized Area, acres
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025

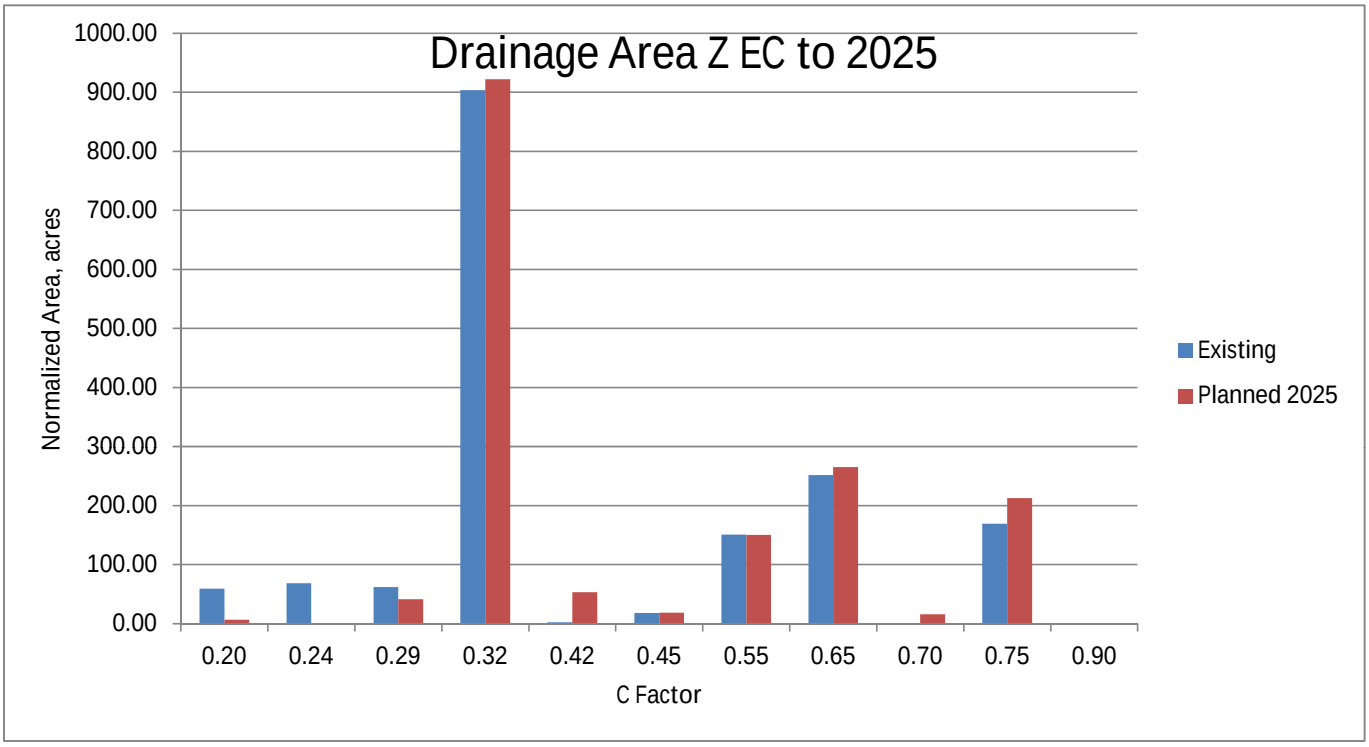

Drainage Area W EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
Existing
Planned 2025

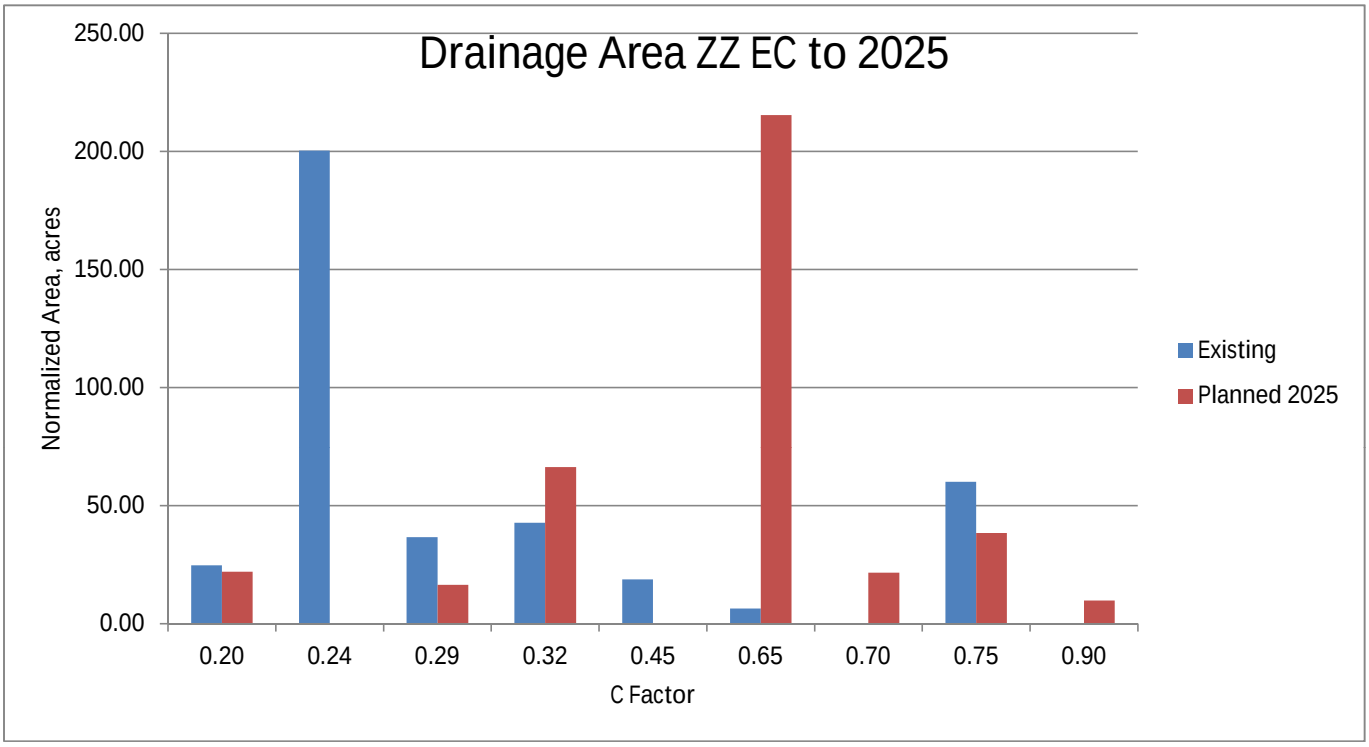

Drainage Area WW EC to 2025
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
Existing
Planned 2025


Drainage Area X EC to 2025
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
Existing
Planned 2025


Drainage Area XX EC to 2025
Normalized Area, acres
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

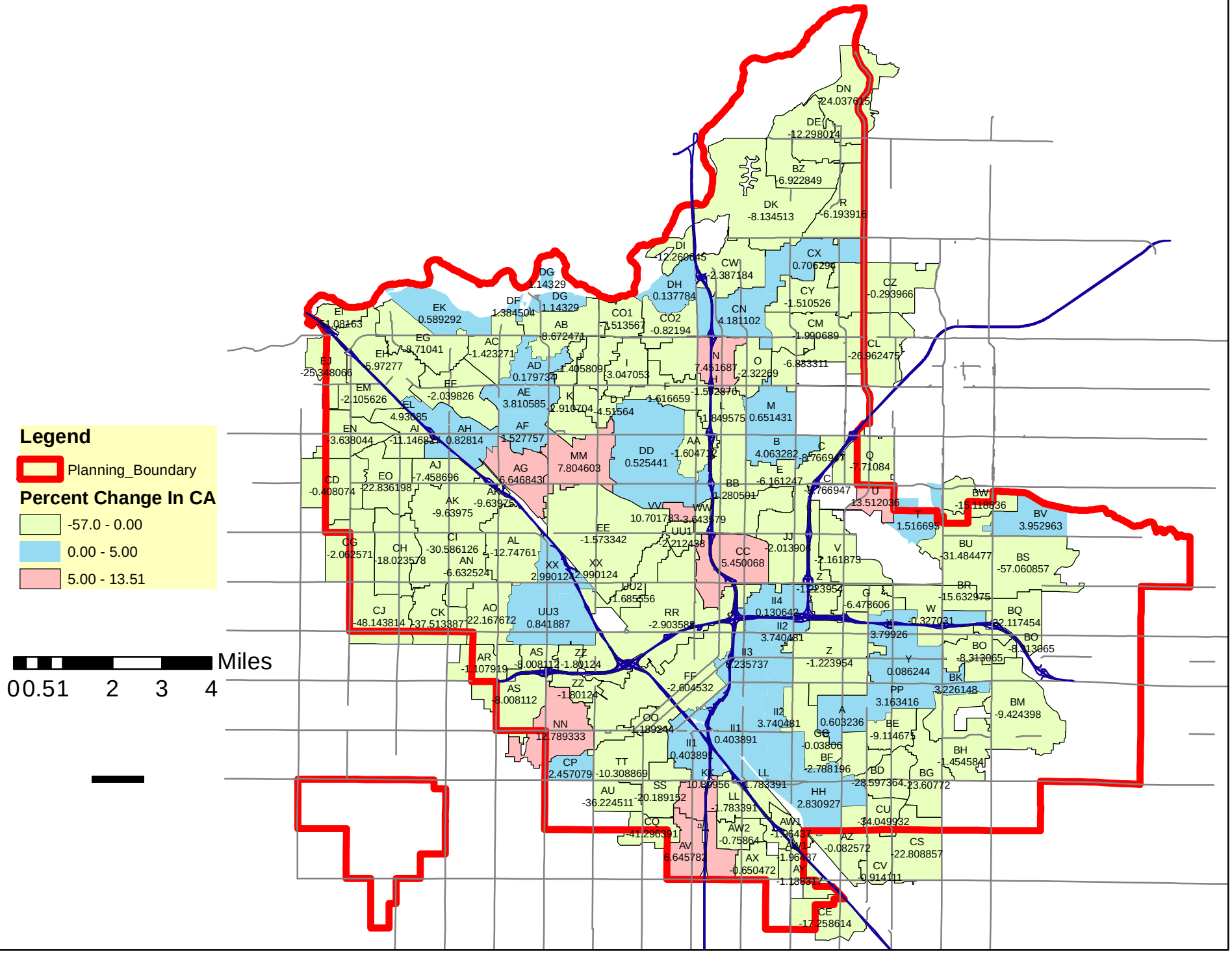

Drainage Area Y EC to 2025
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
C Factor
Existing
Planned 2025

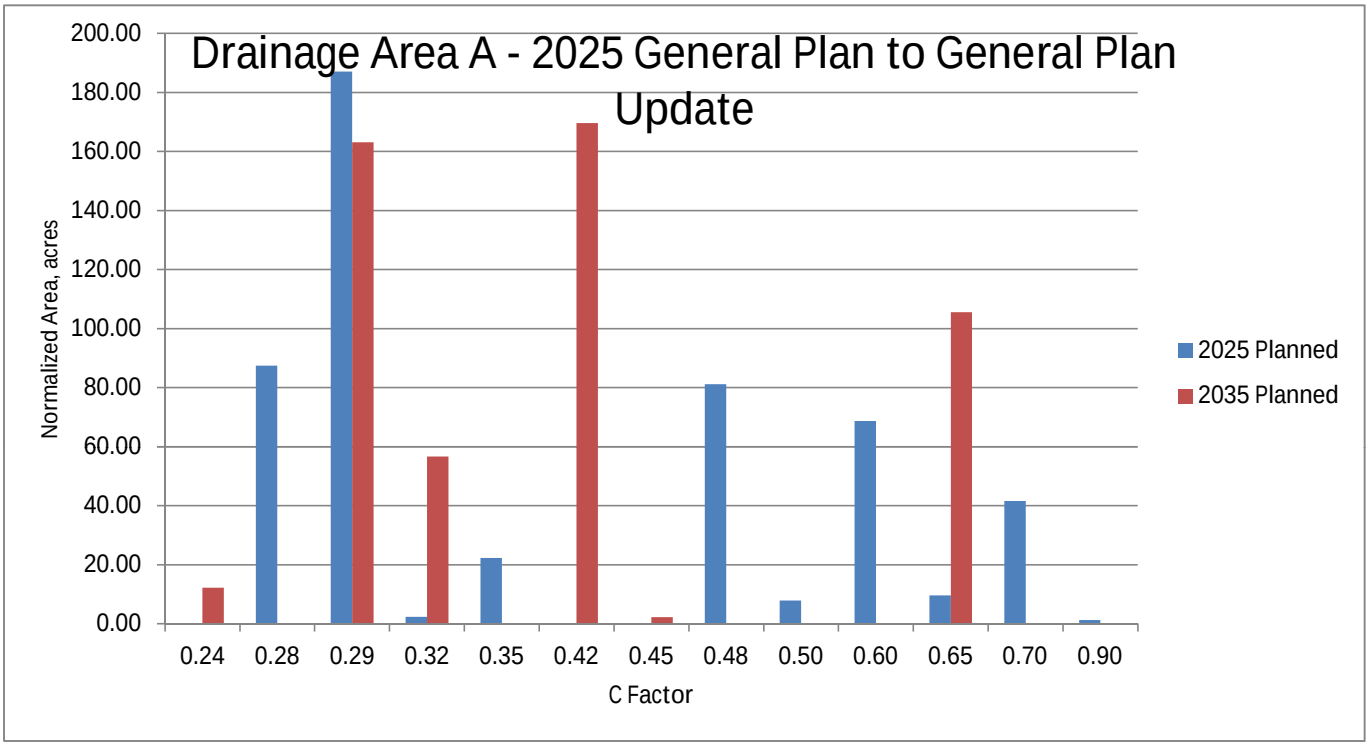

Drainage Area Z EC to 2025
Normalized Area, acres
1000.00
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

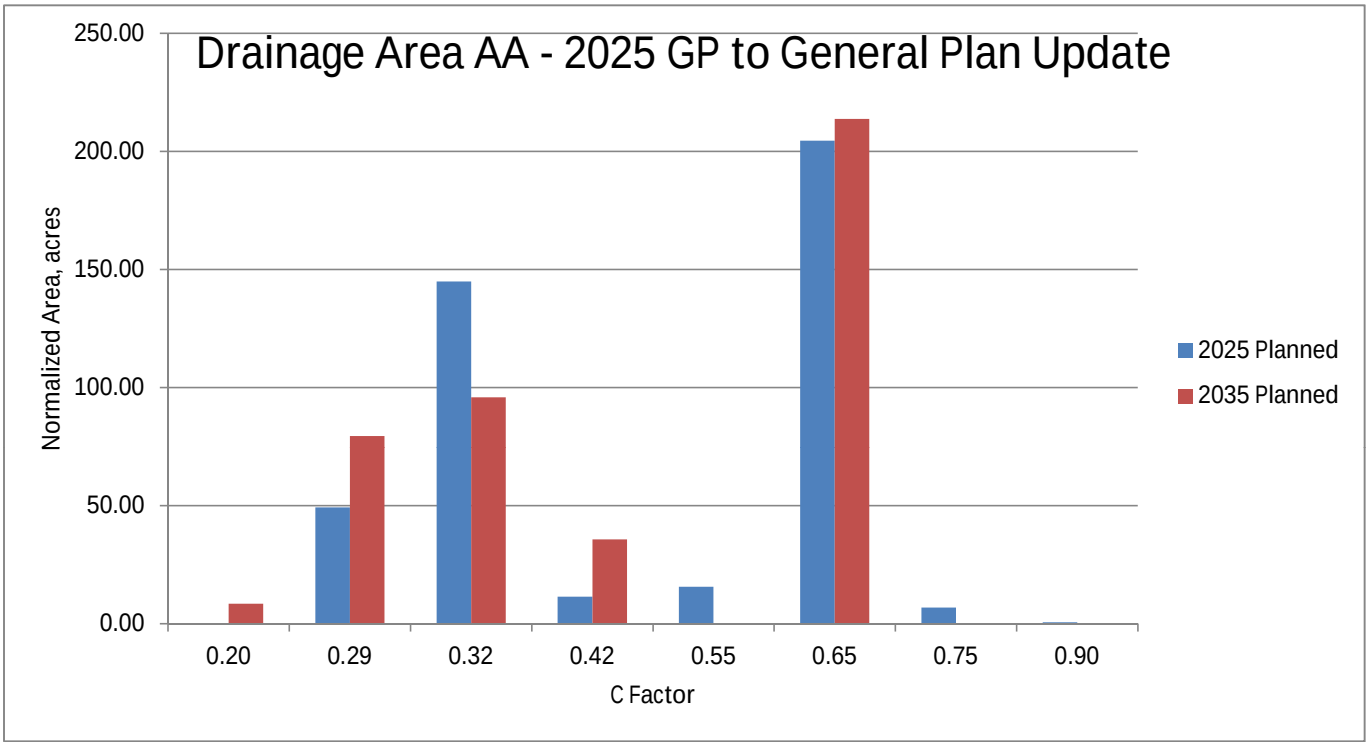

Drainage Area ZZ EC to 2025
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.45
0.65
0.70
0.75
0.90
C Factor
Existing
Planned 2025

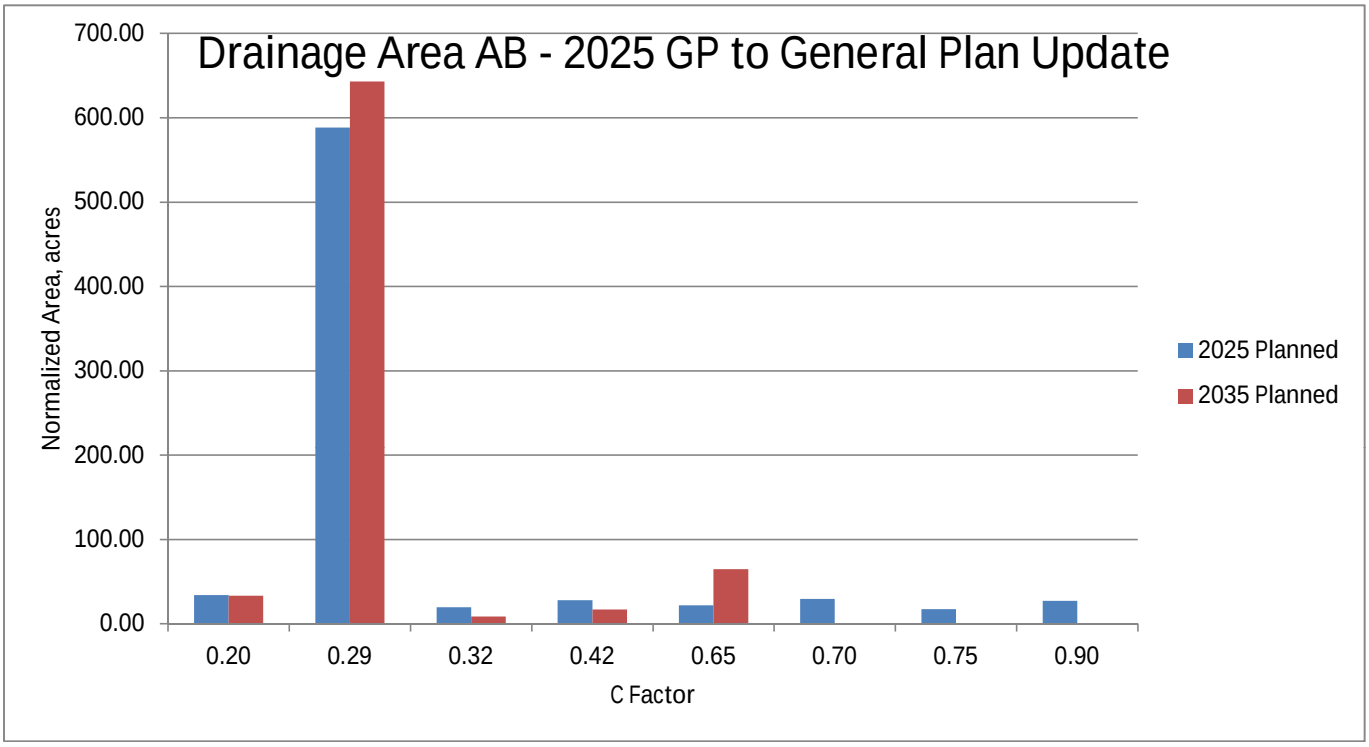
Appendix C

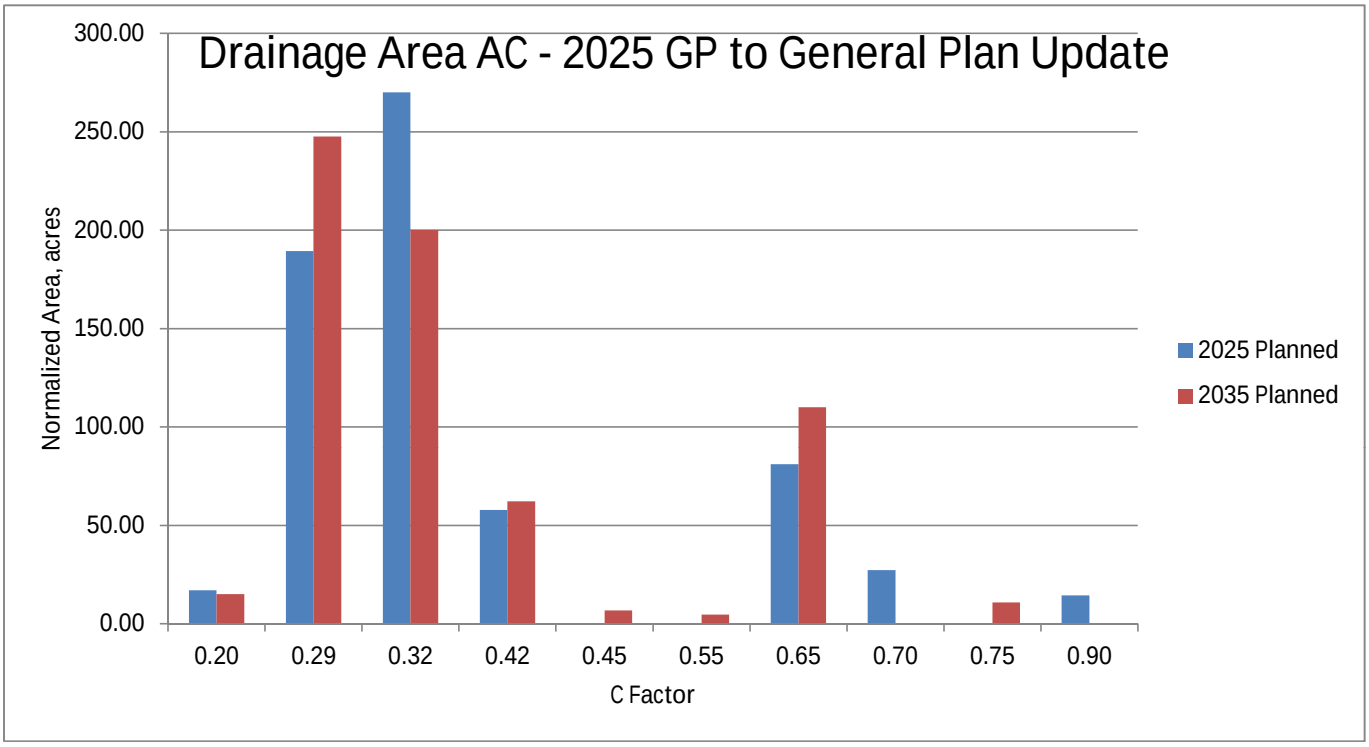
Percent Change in CA from2025 General Plan Land Use to General Plan Update Land Use

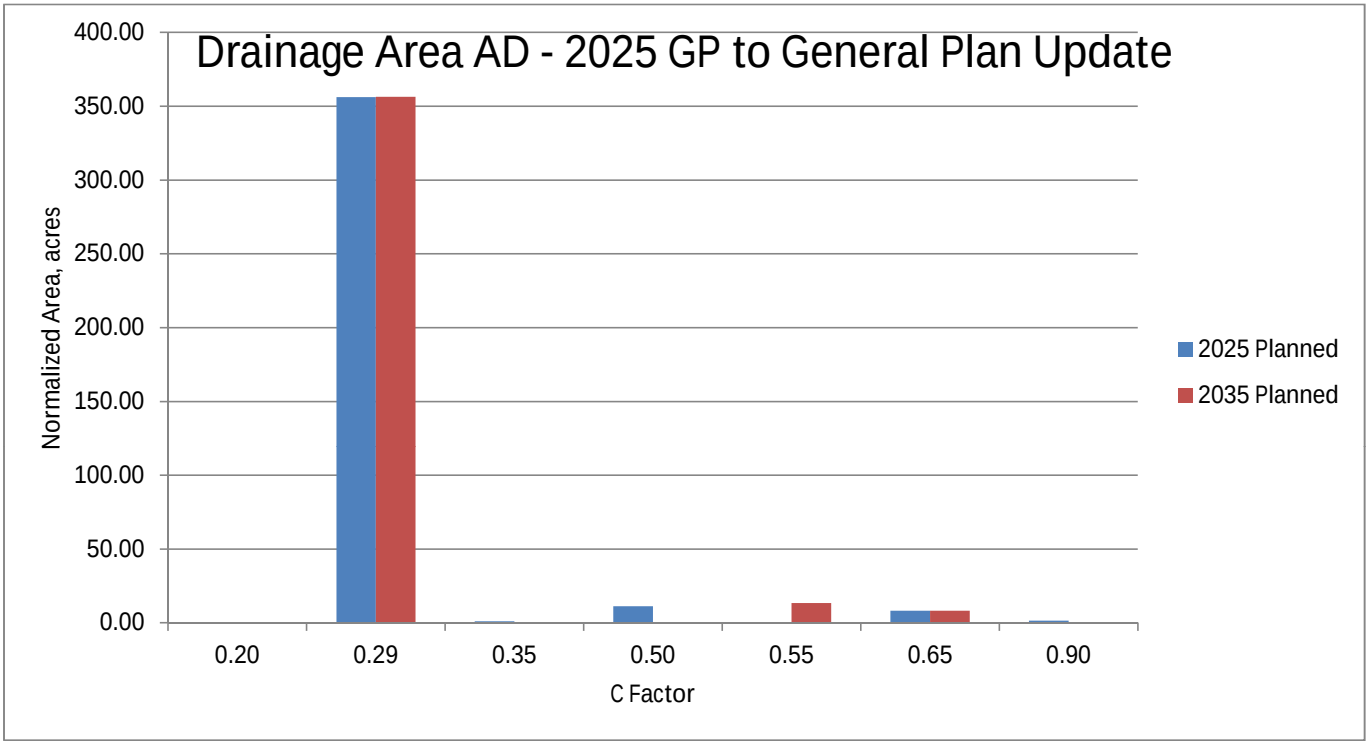


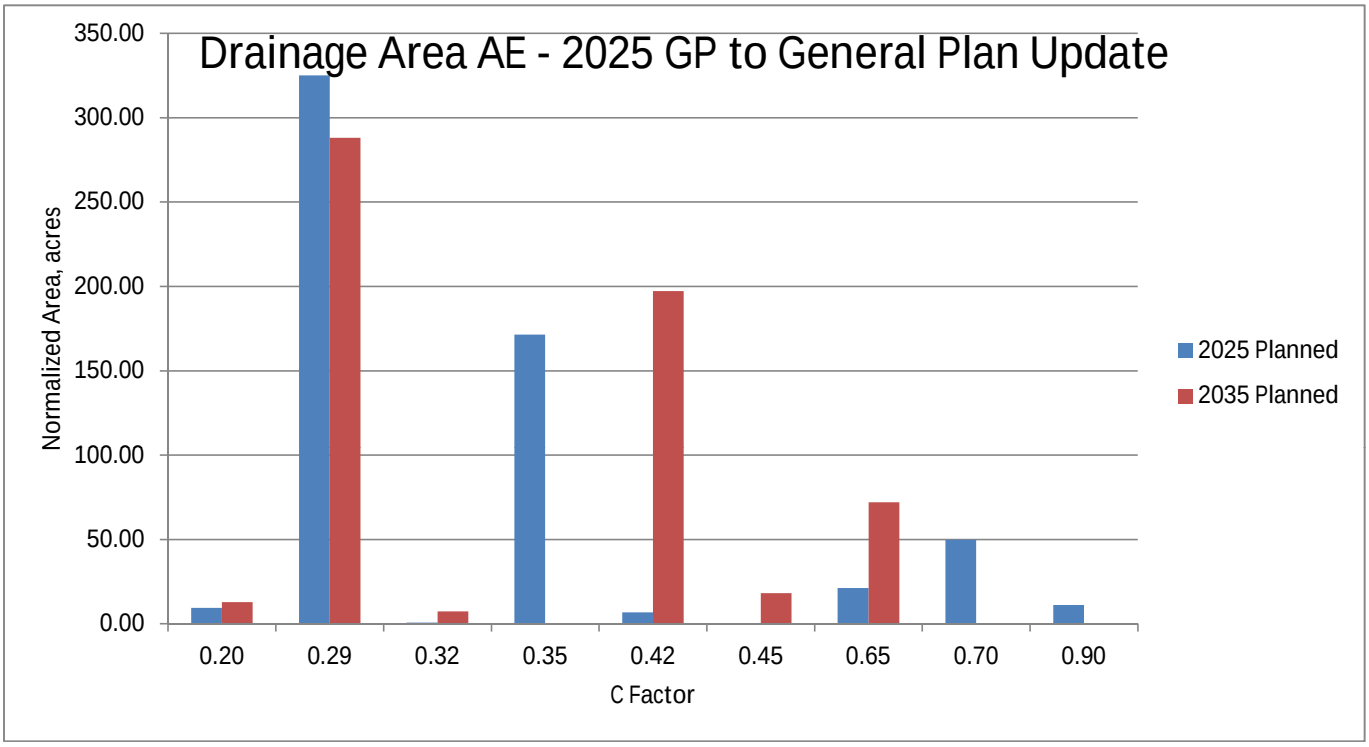

Drainage Area A - 2025 General Plan to General Plan Update
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.24
0.28
0.29
0.32
0.35
0.42
0.45
0.48
0.50
0.60
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

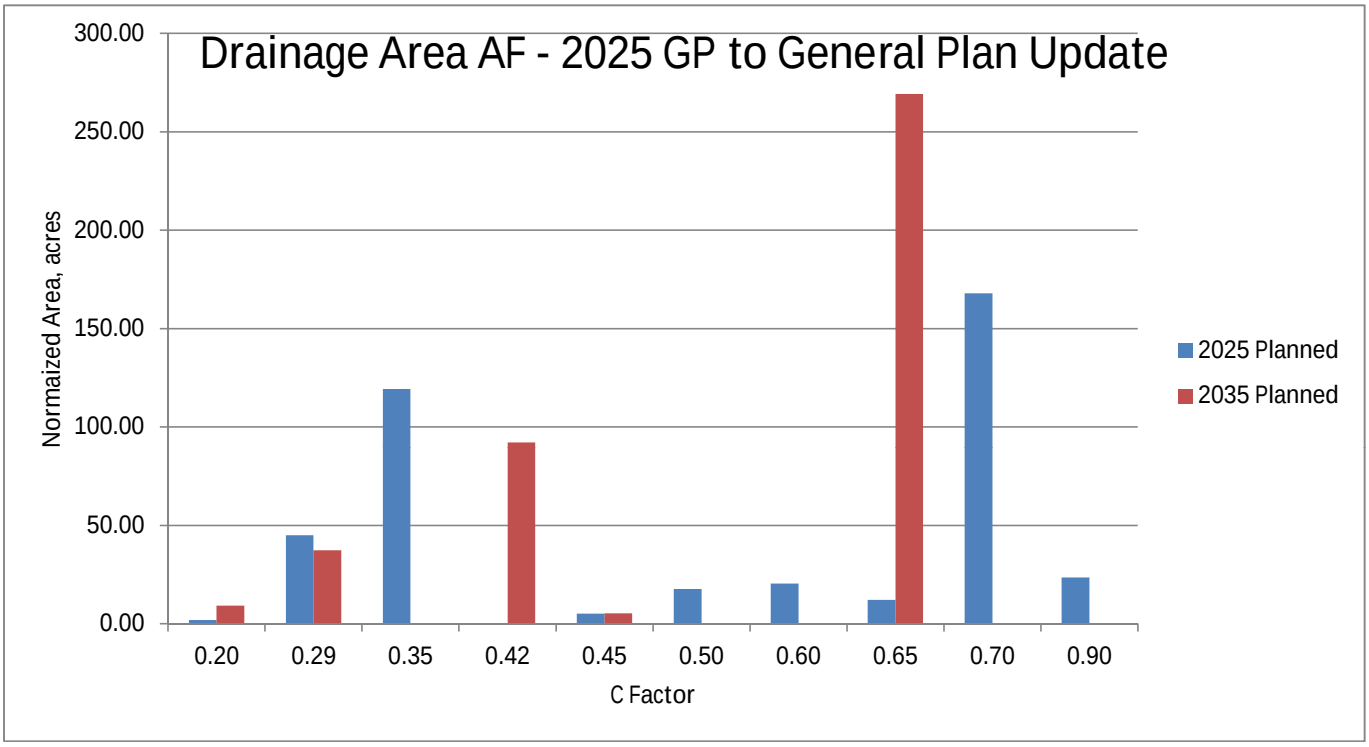

Drainage Area AA - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

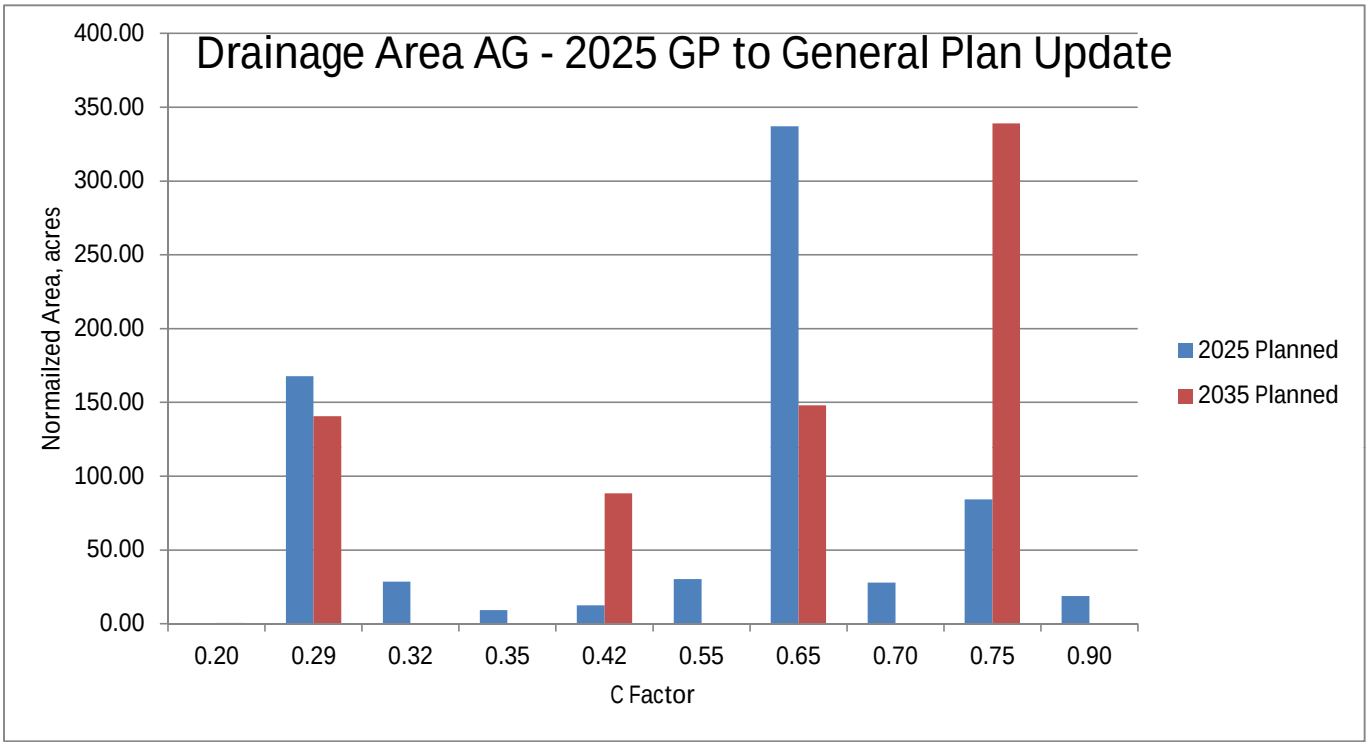

Drainage Area AB - 2025 GP to General Plan Update
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

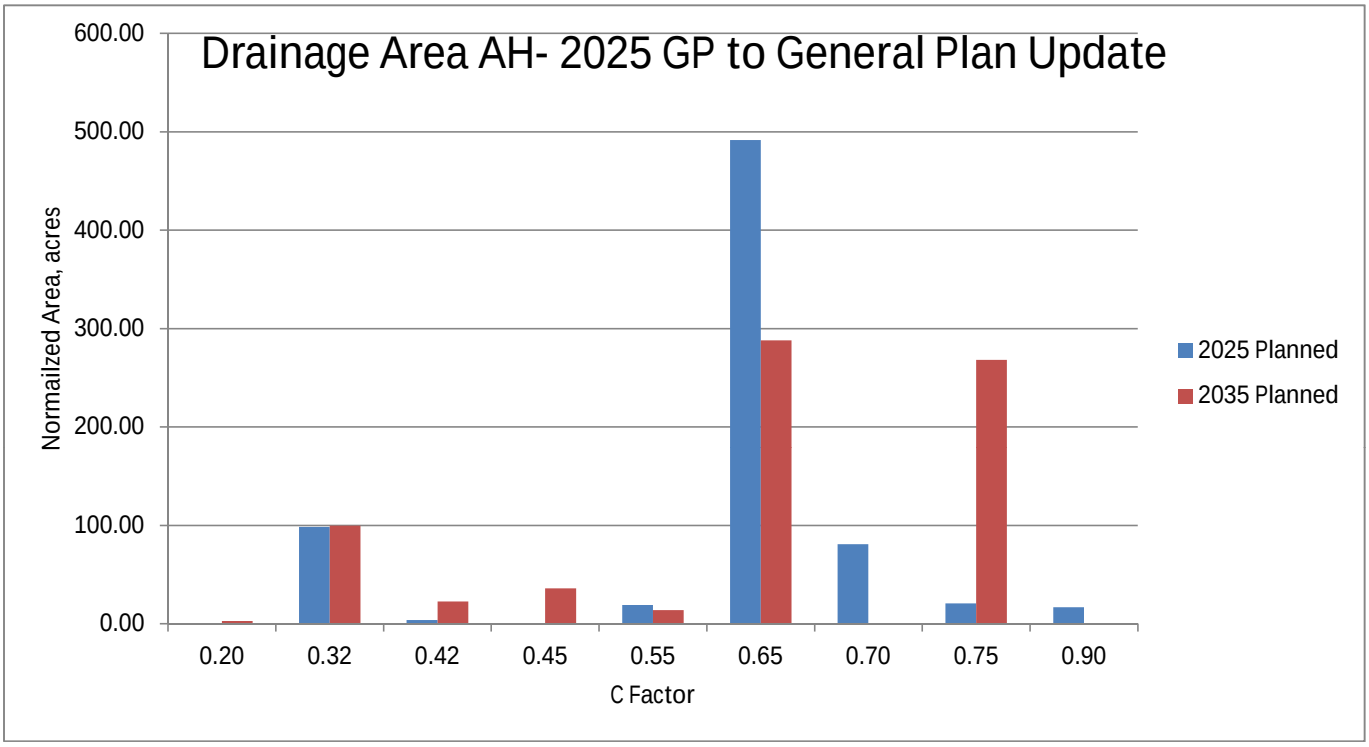

Drainage Area AC - 2025 GP to General Plan Update
Normalized Area, acres
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

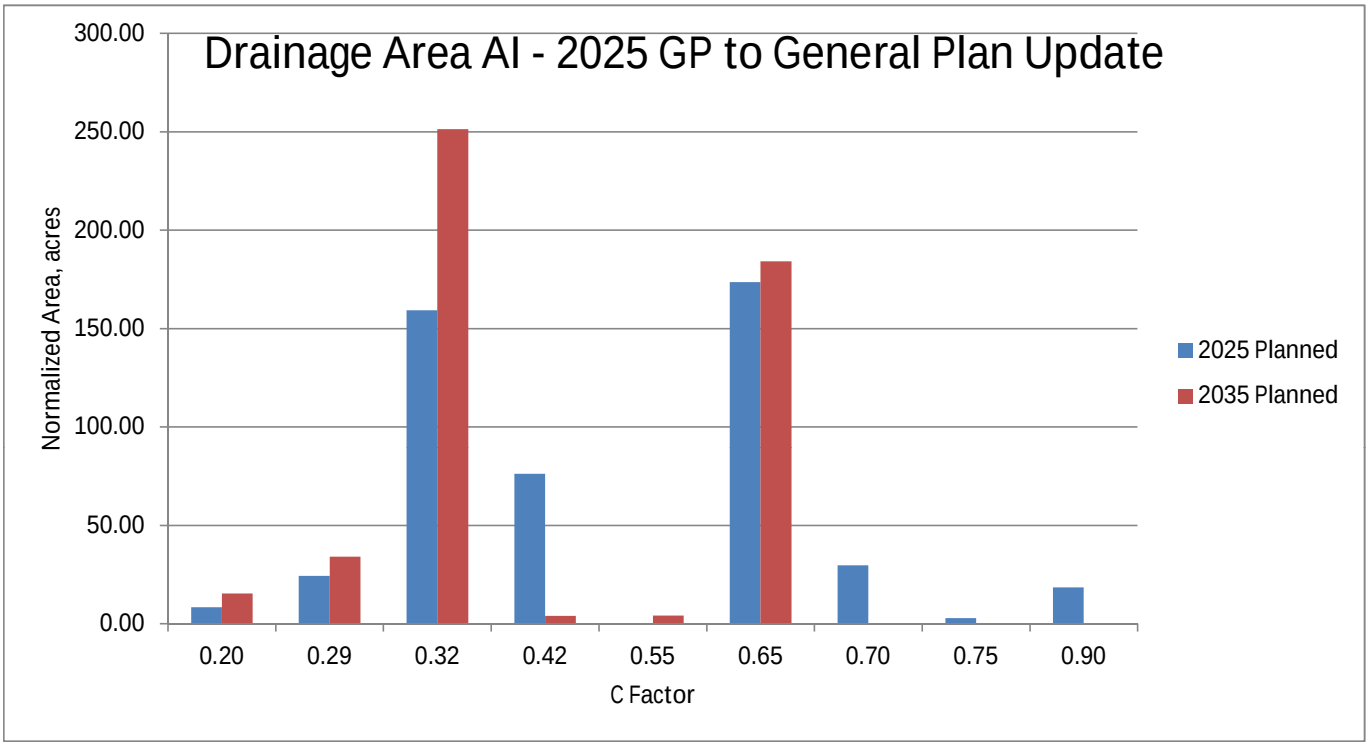

Drainage Area AD - 2025 GP to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.35
0.50
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

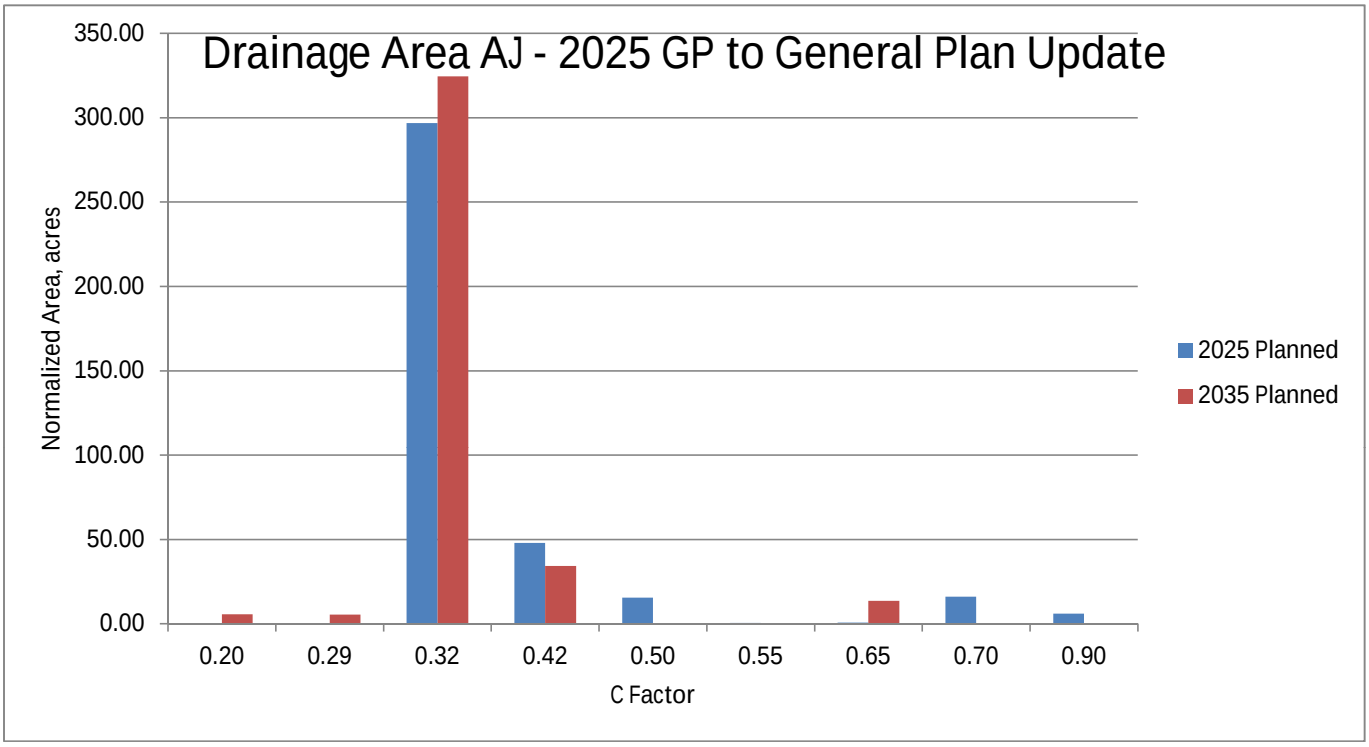

Drainage Area AE - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.35
0.42
0.45
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

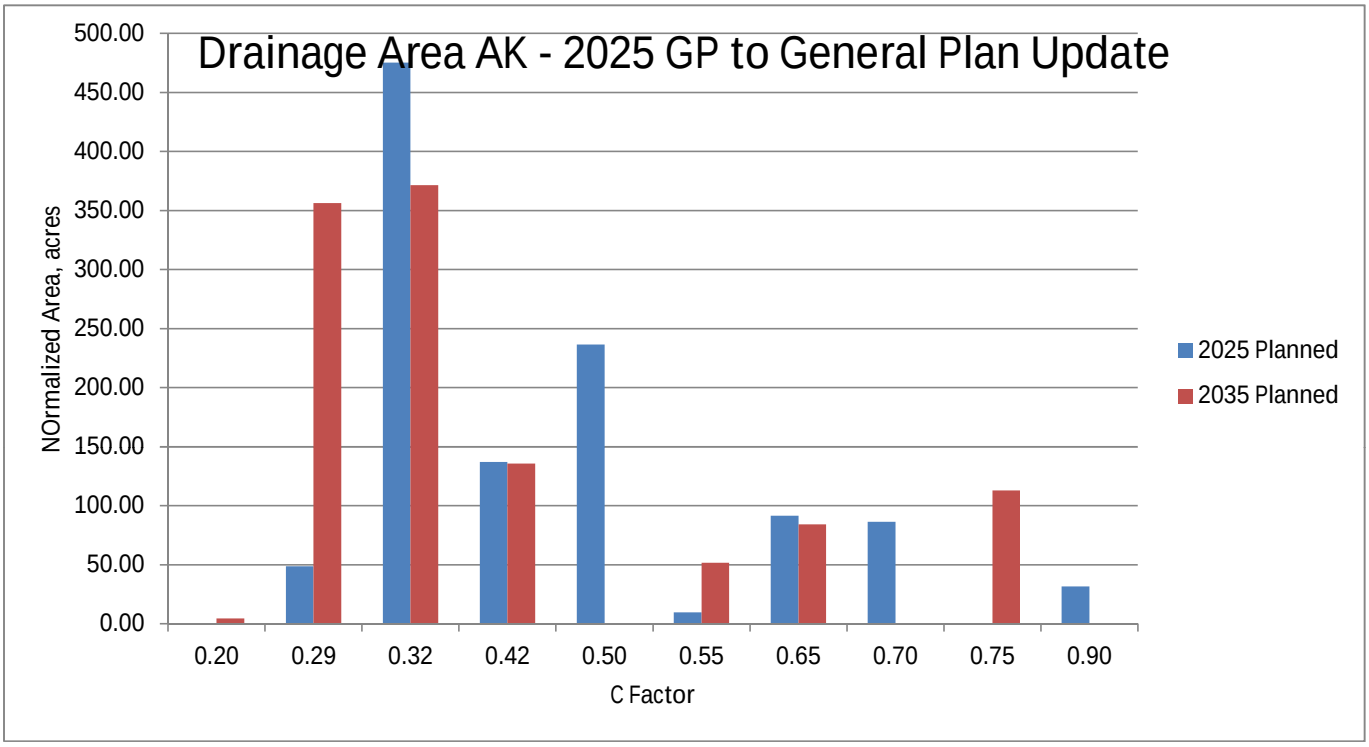

Drainage Area AF - 2025 GP to General Plan Update
Normaized Area, acres
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.35
0.42
0.45
0.50
0.60
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

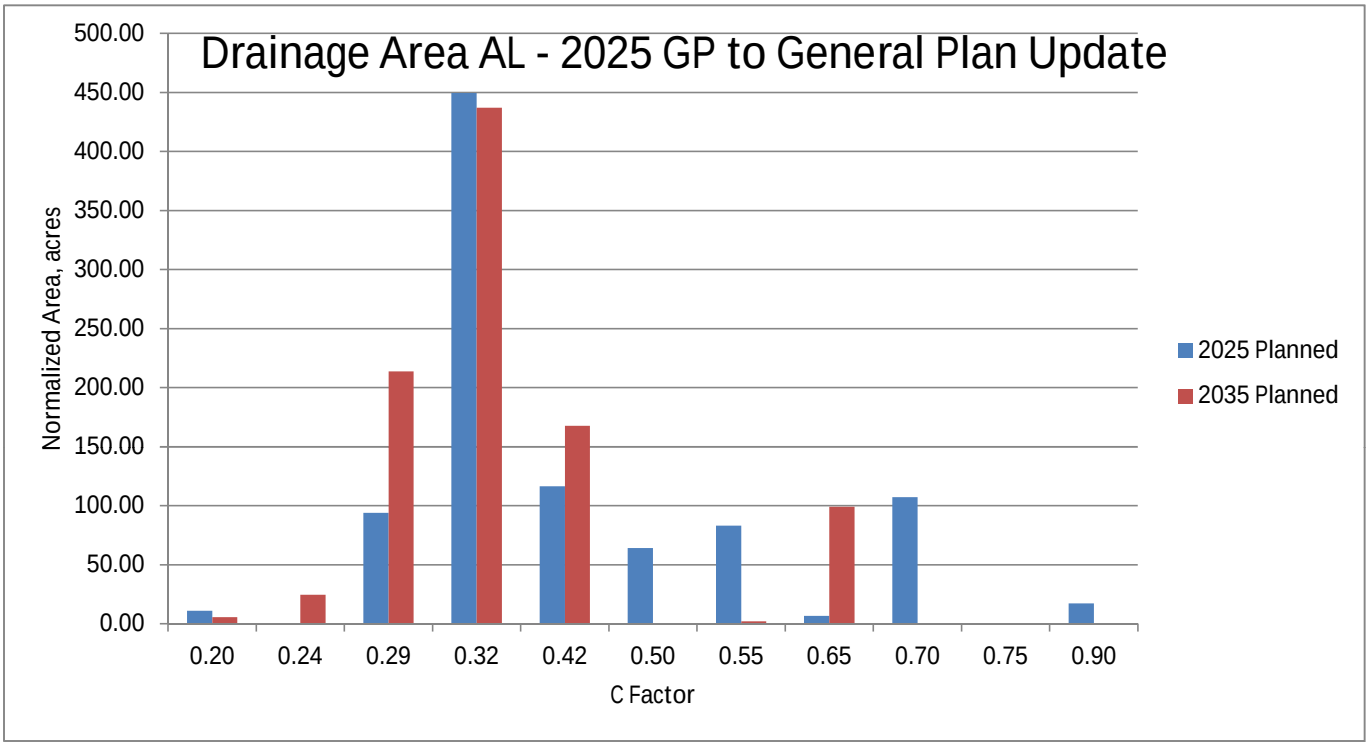

Drainage Area AG - 2025 GP to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

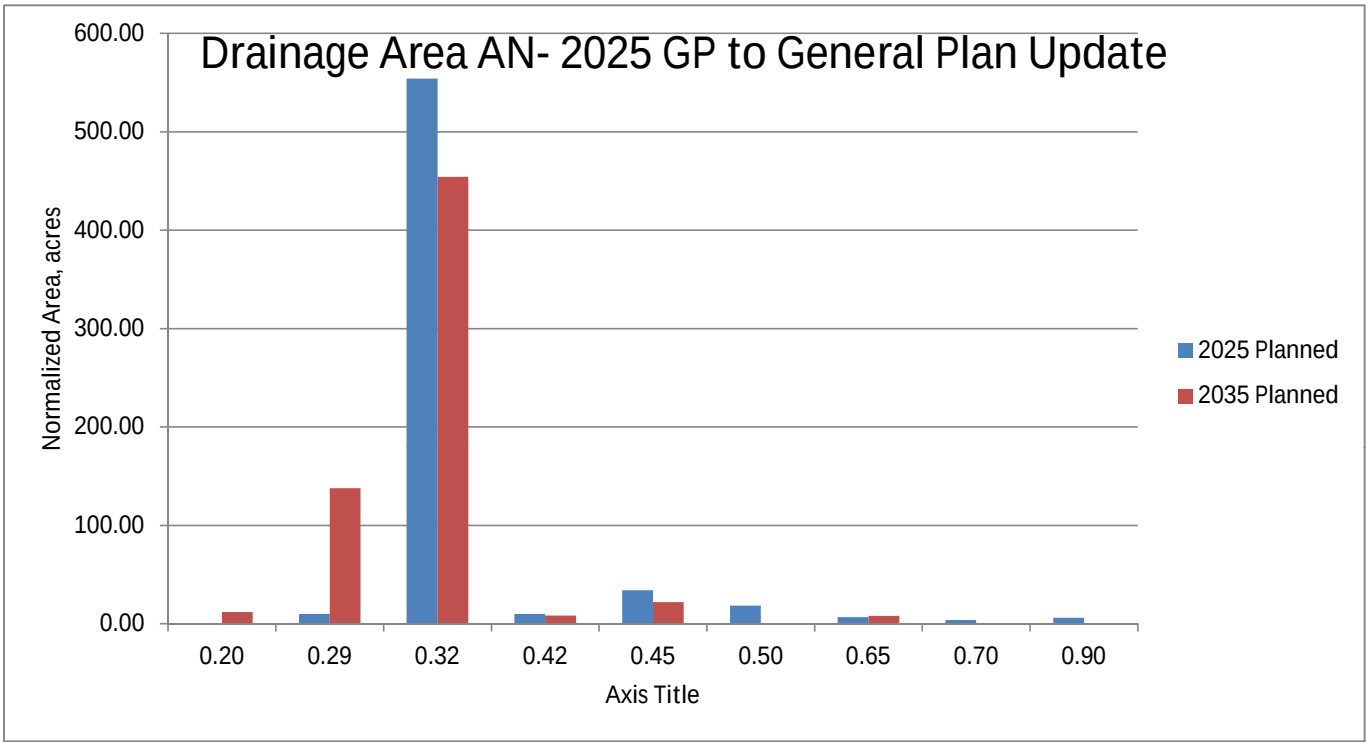

Drainage Area AH- 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normailzed Area, acres
0.20
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

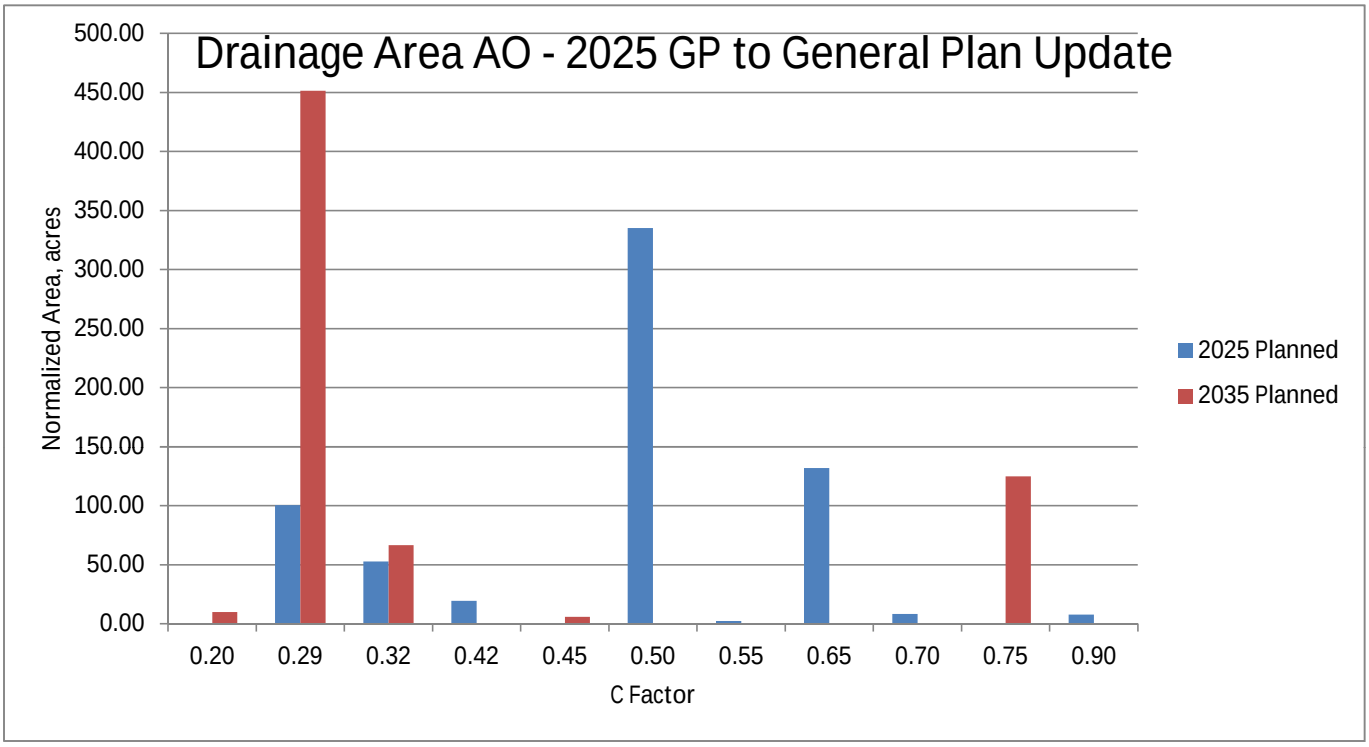

Drainage Area AI - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

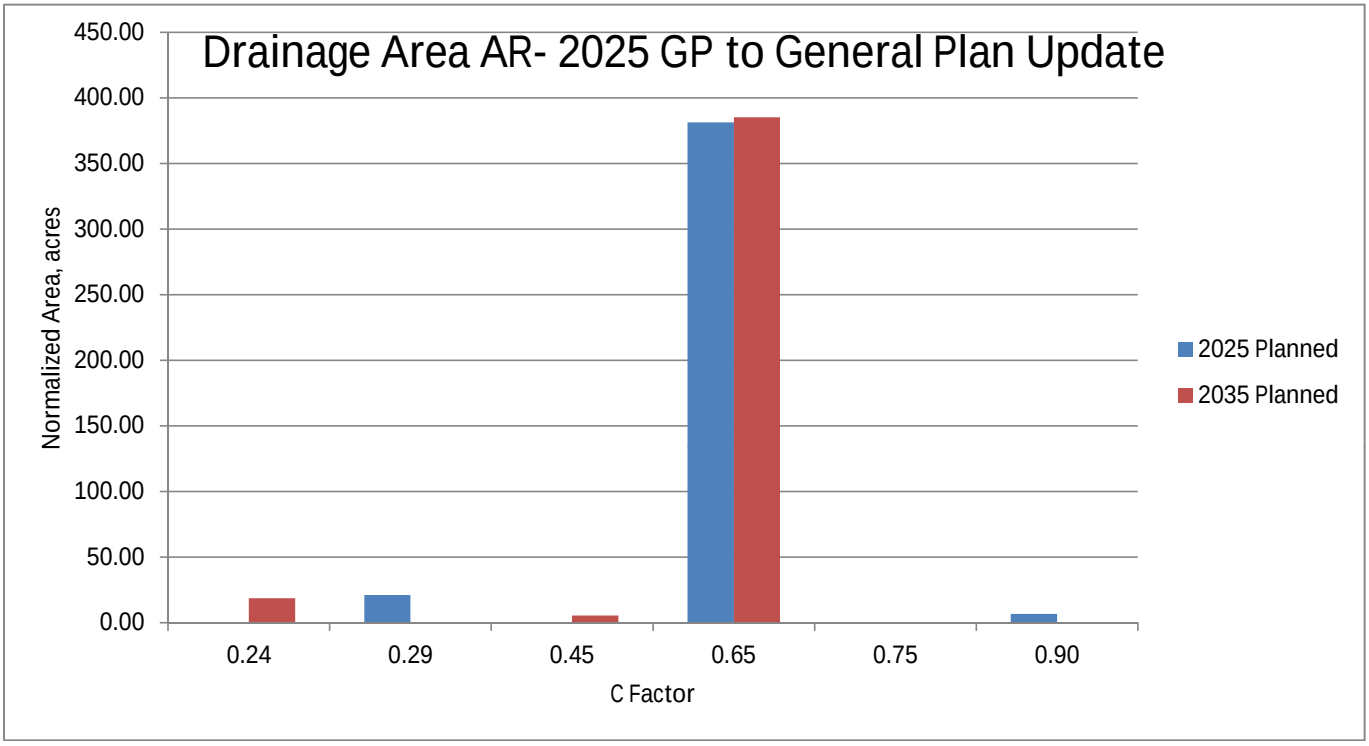

Drainage Area AJ - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

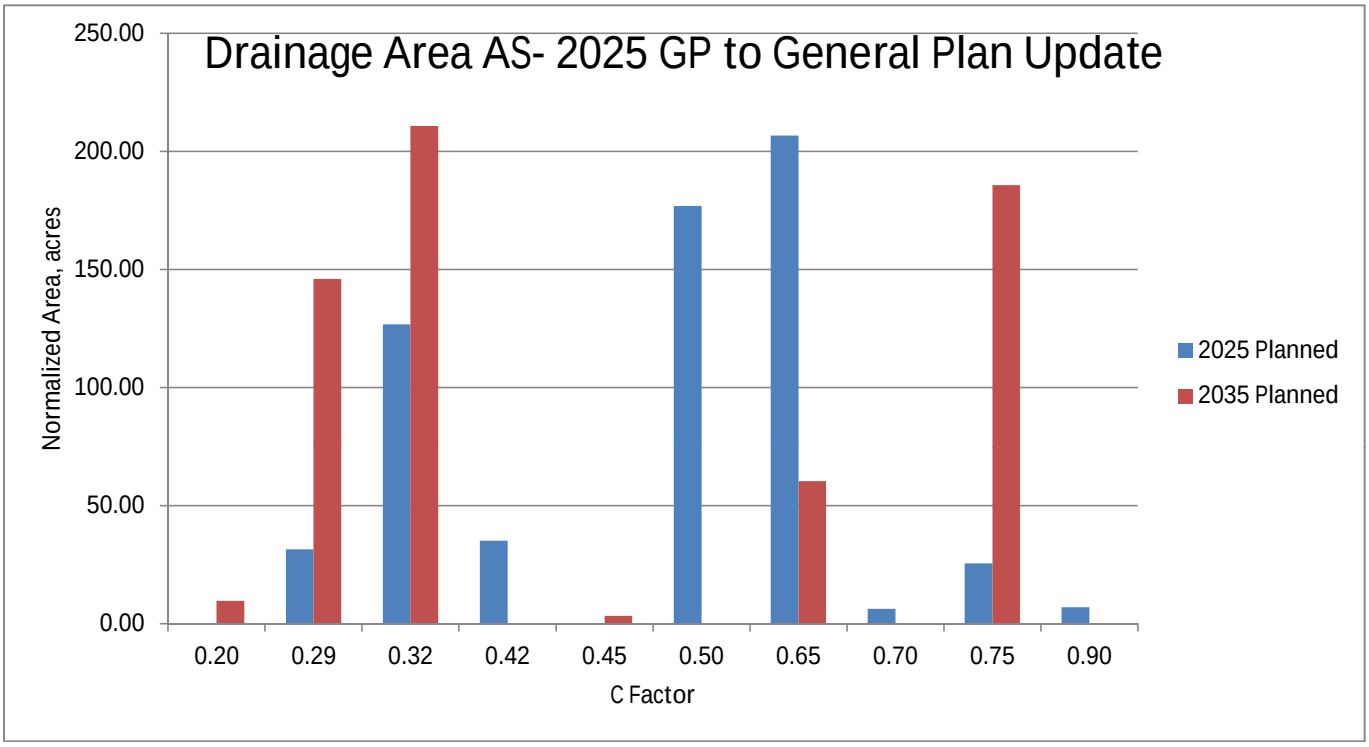

Drainage Area AK - 2025 GP to General Plan Update
NOrmalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

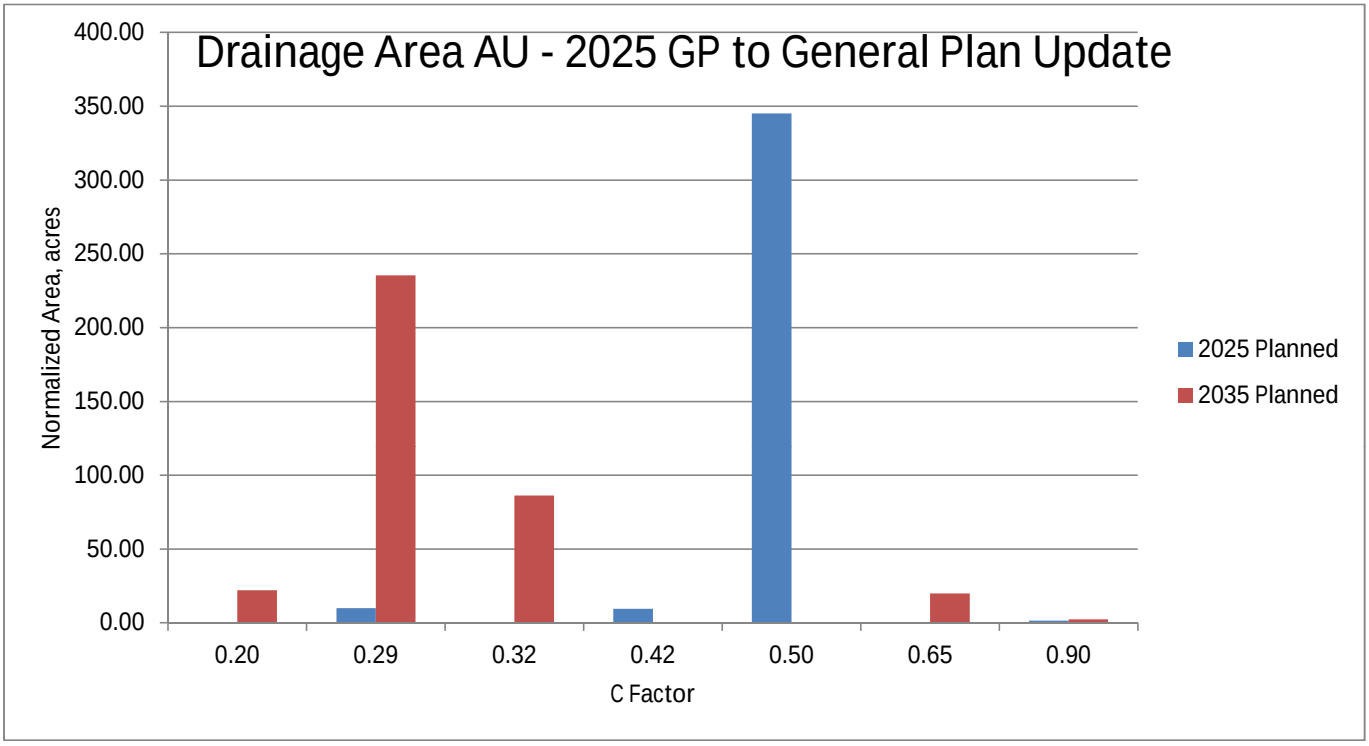

Drainage Area AL - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

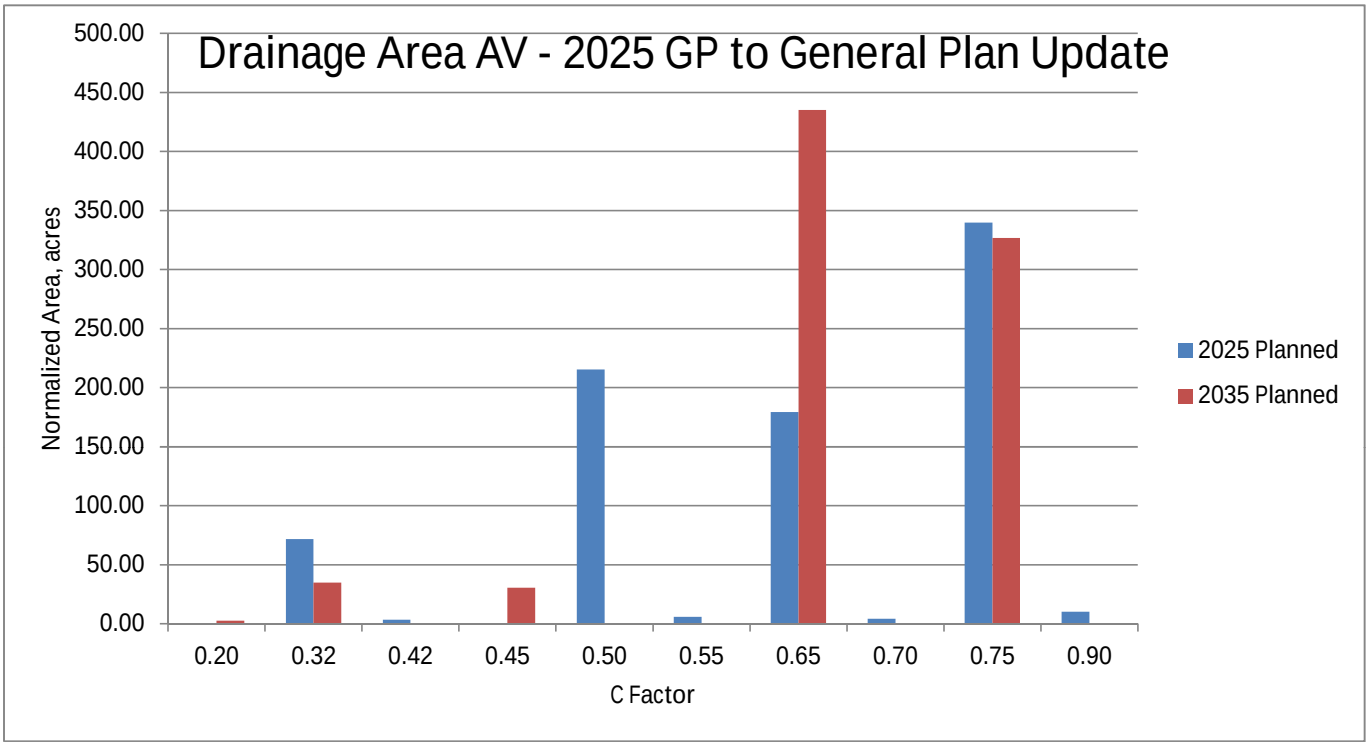

Drainage Area AN- 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.50
0.65
0.70
0.90
Axis Title
2025 Planned
2035 Planned

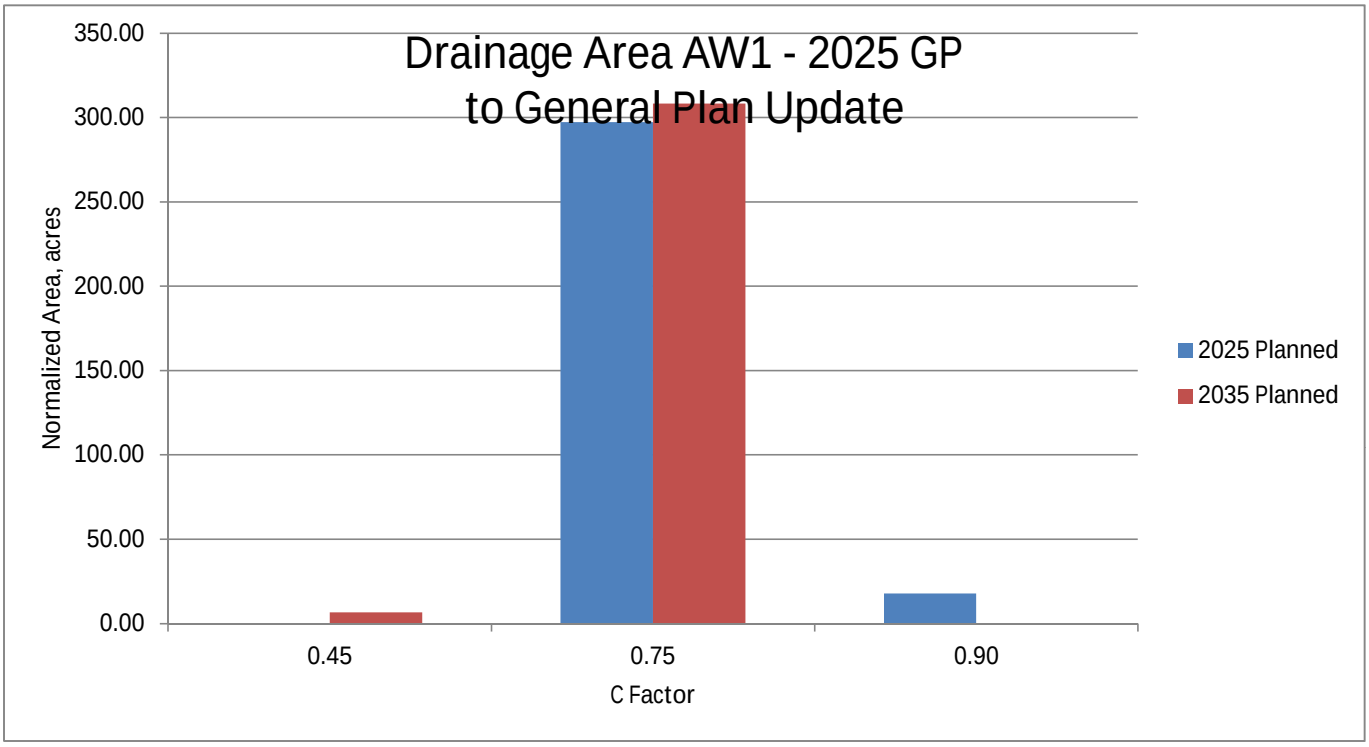

Drainage Area AO - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

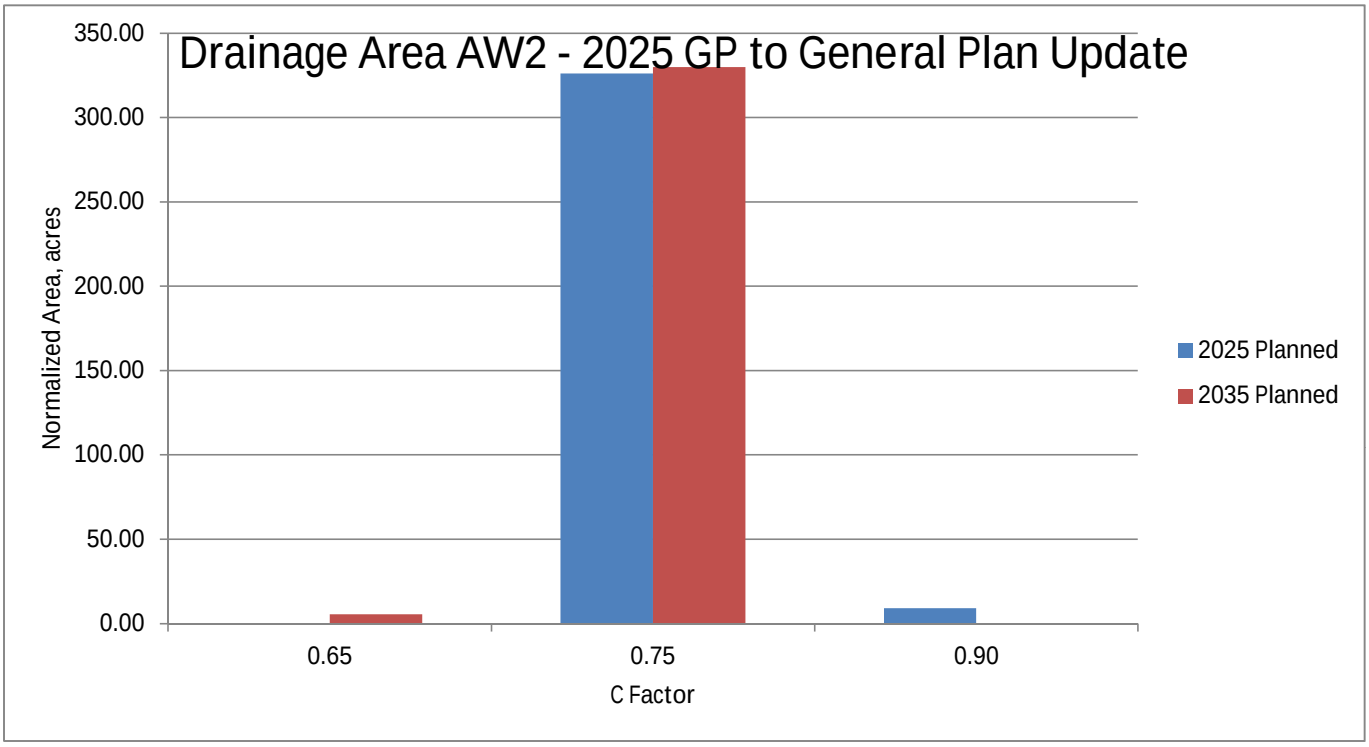

Drainage Area AR- 2025 GP to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.24
0.29
0.45
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

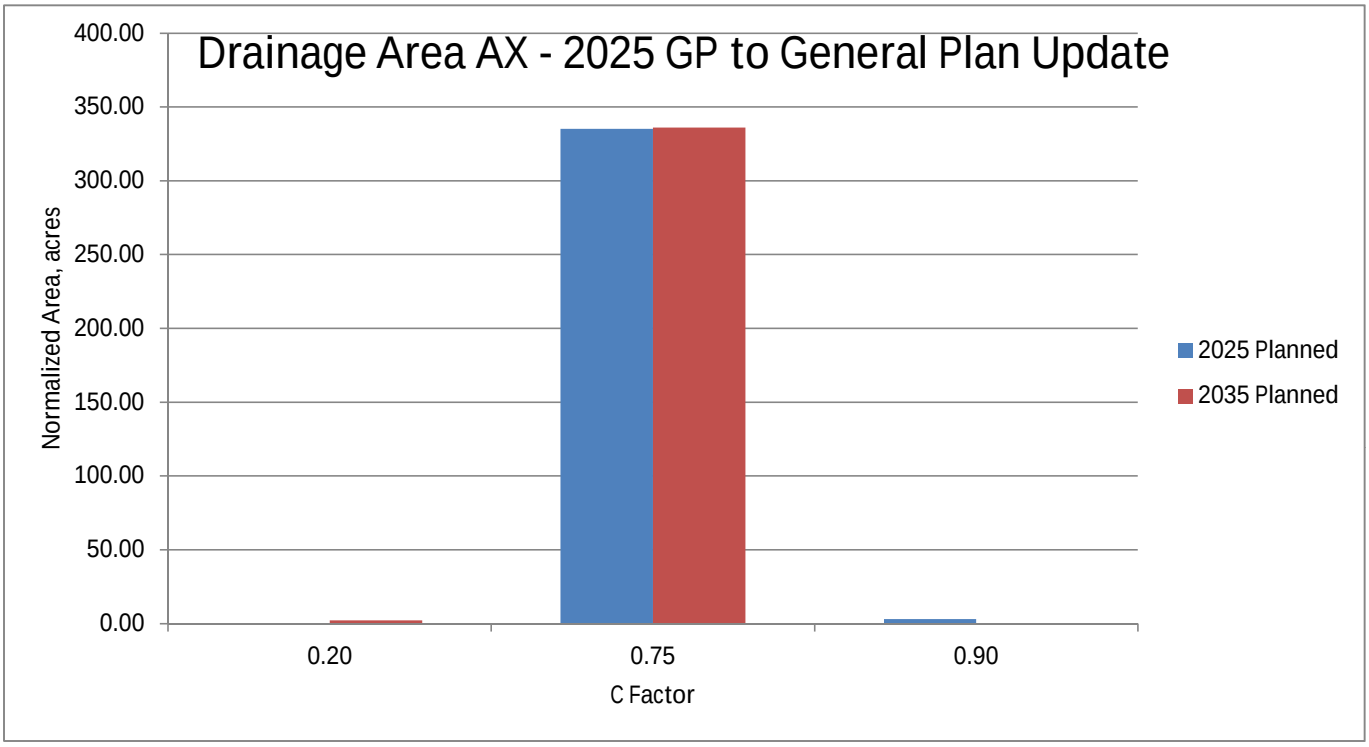

Drainage Area AS- 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.50
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

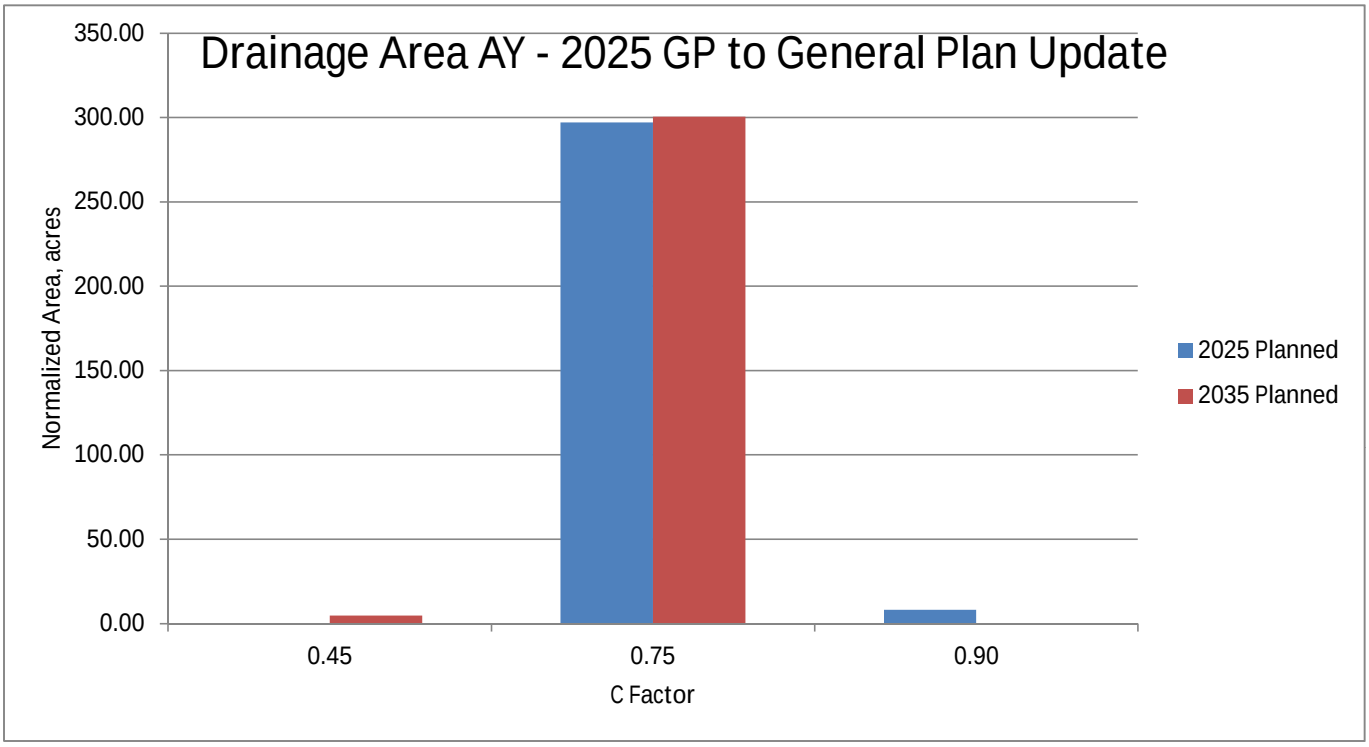

Drainage Area AU - 2025 GP to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.65
0.90
C Factor
2025 Planned
2035 Planned

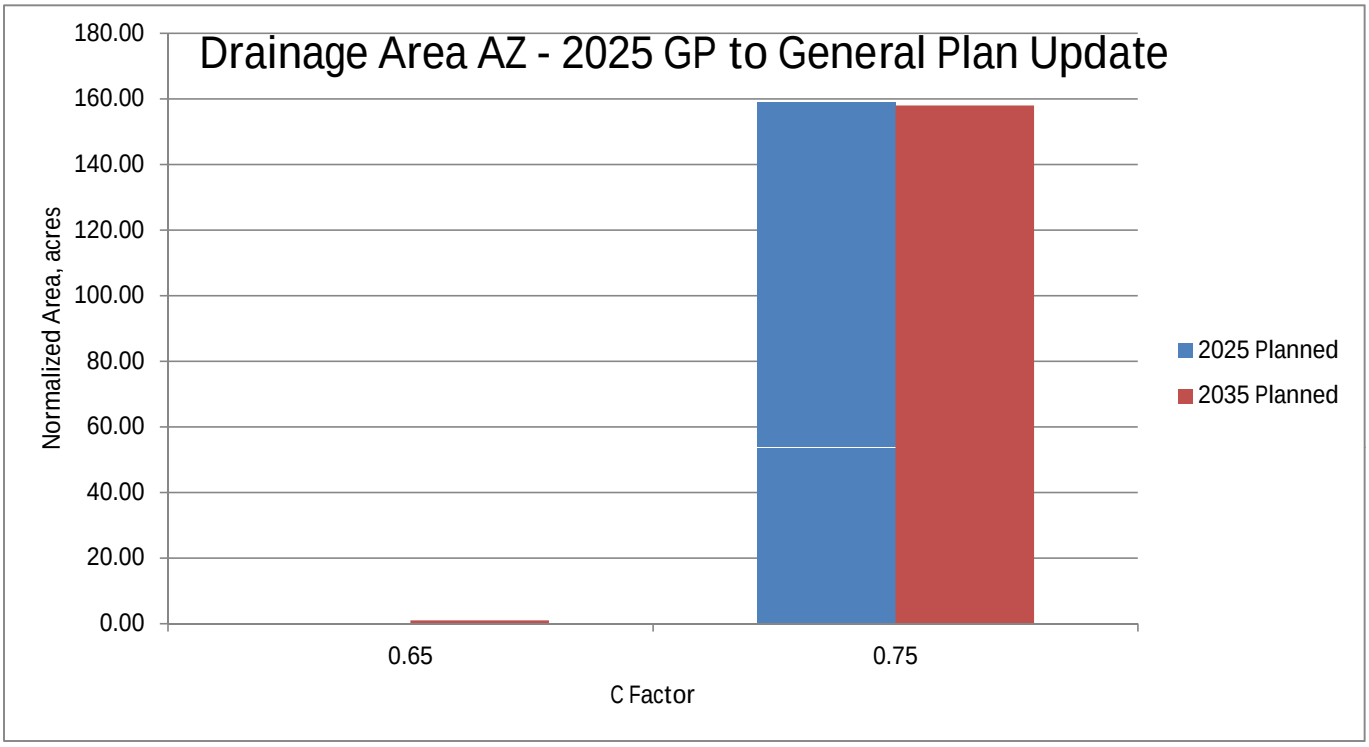

Drainage Area AV - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

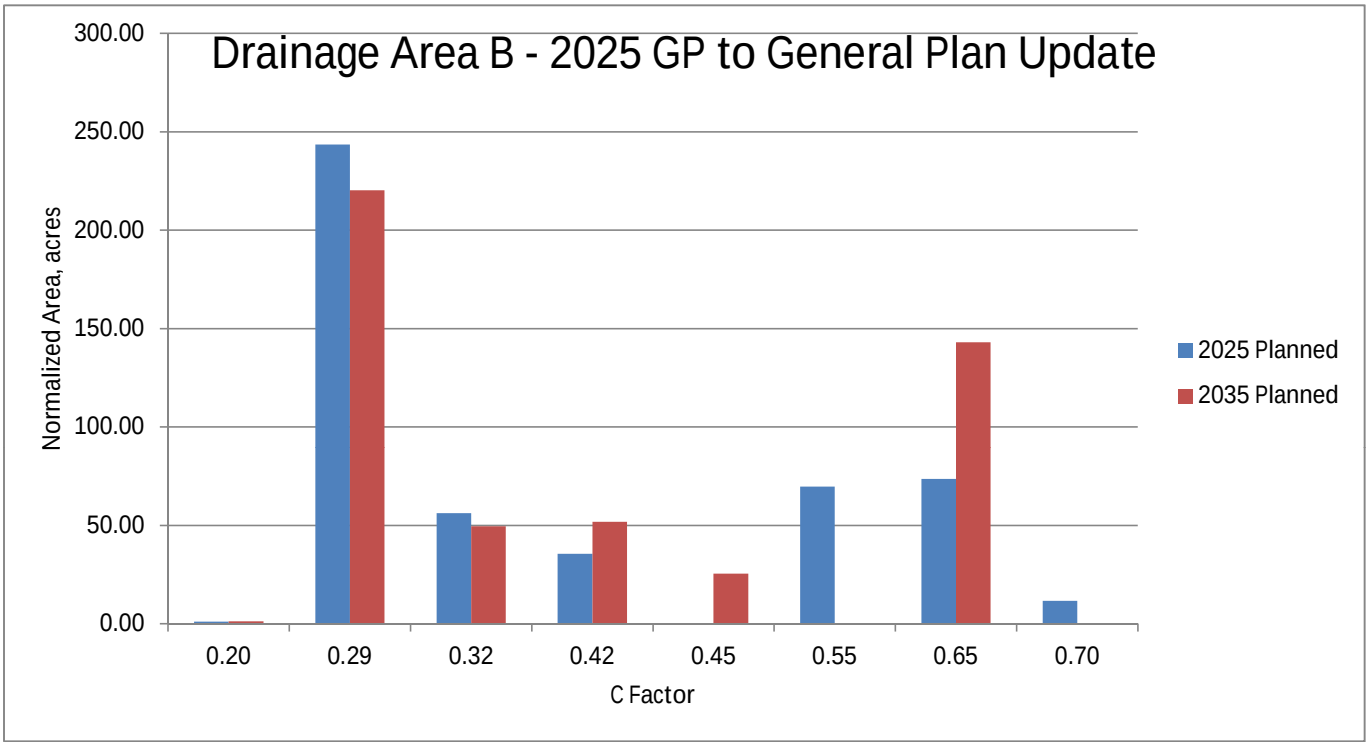

Drainage Area AW1 - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.45
0.75
0.90
C Factor
2025 Planned
2035 Planned

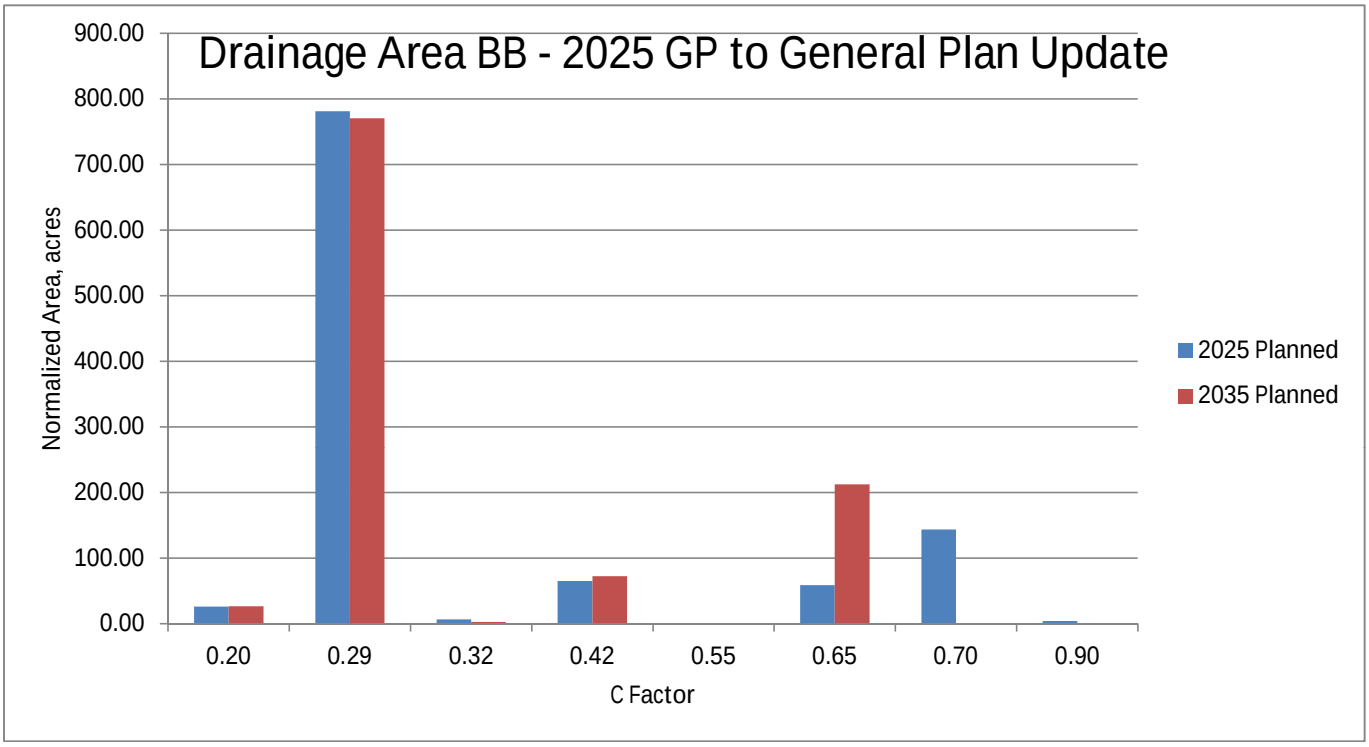

Drainage Area AW2 - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

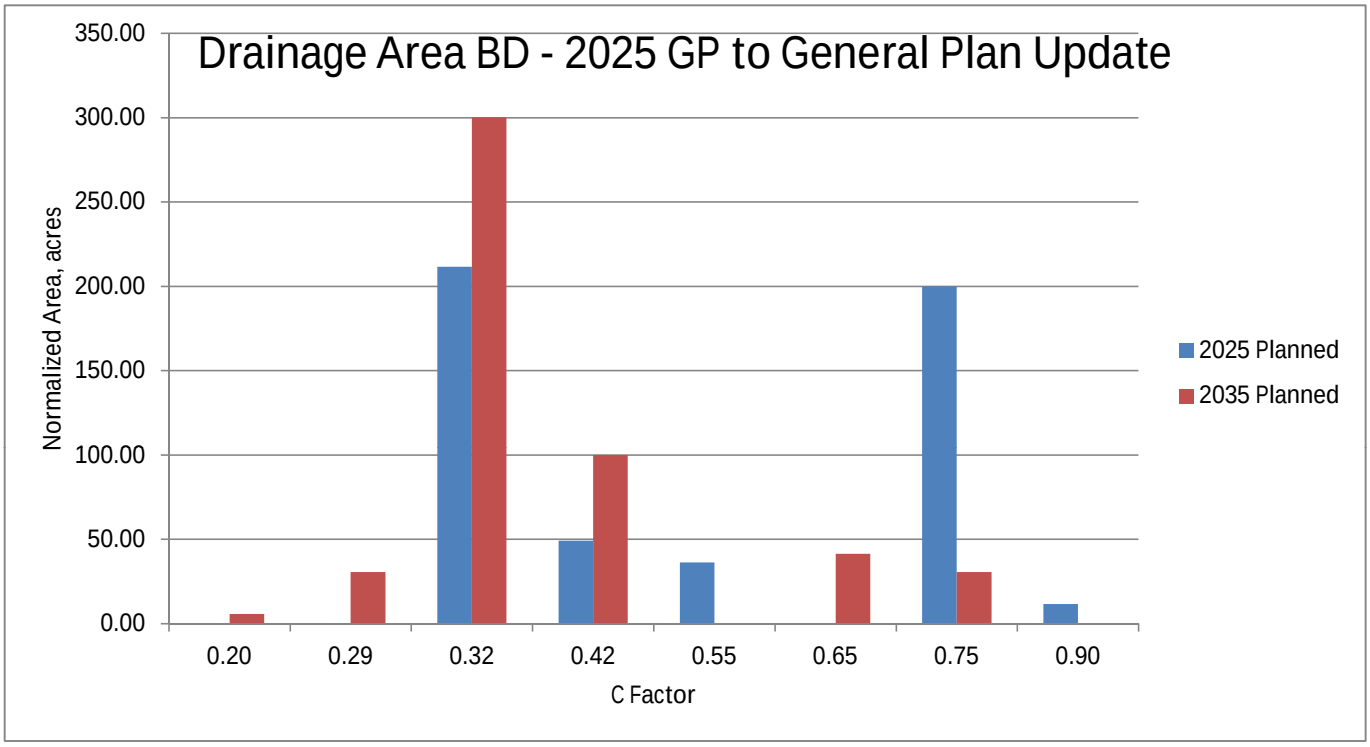

Drainage Area AX - 2025 GP to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.75
0.90
C Factor
2025 Planned
2035 Planned

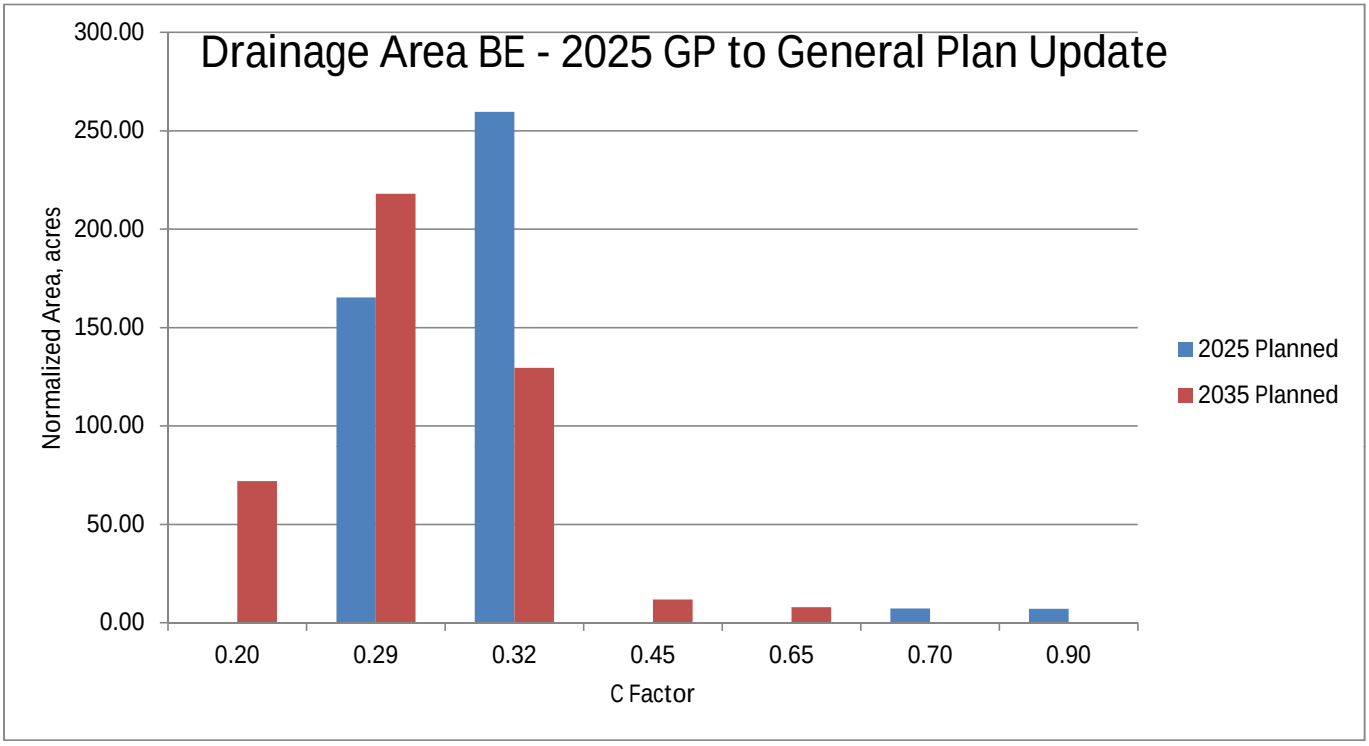

Drainage Area AY - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.45
0.75
0.90
C Factor
2025 Planned
2035 Planned

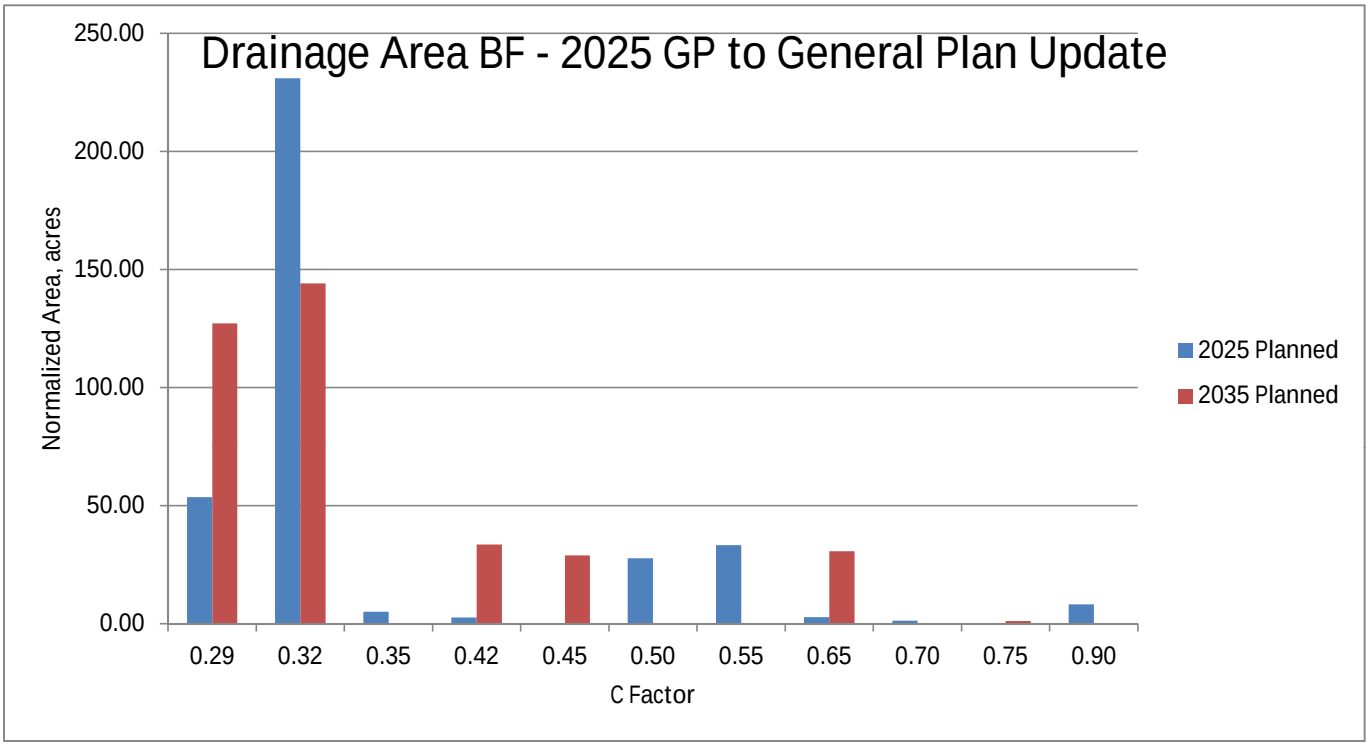

Drainage Area AZ - 2025 GP to General Plan Update
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.65
0.75
C Factor
2025 Planned
2035 Planned

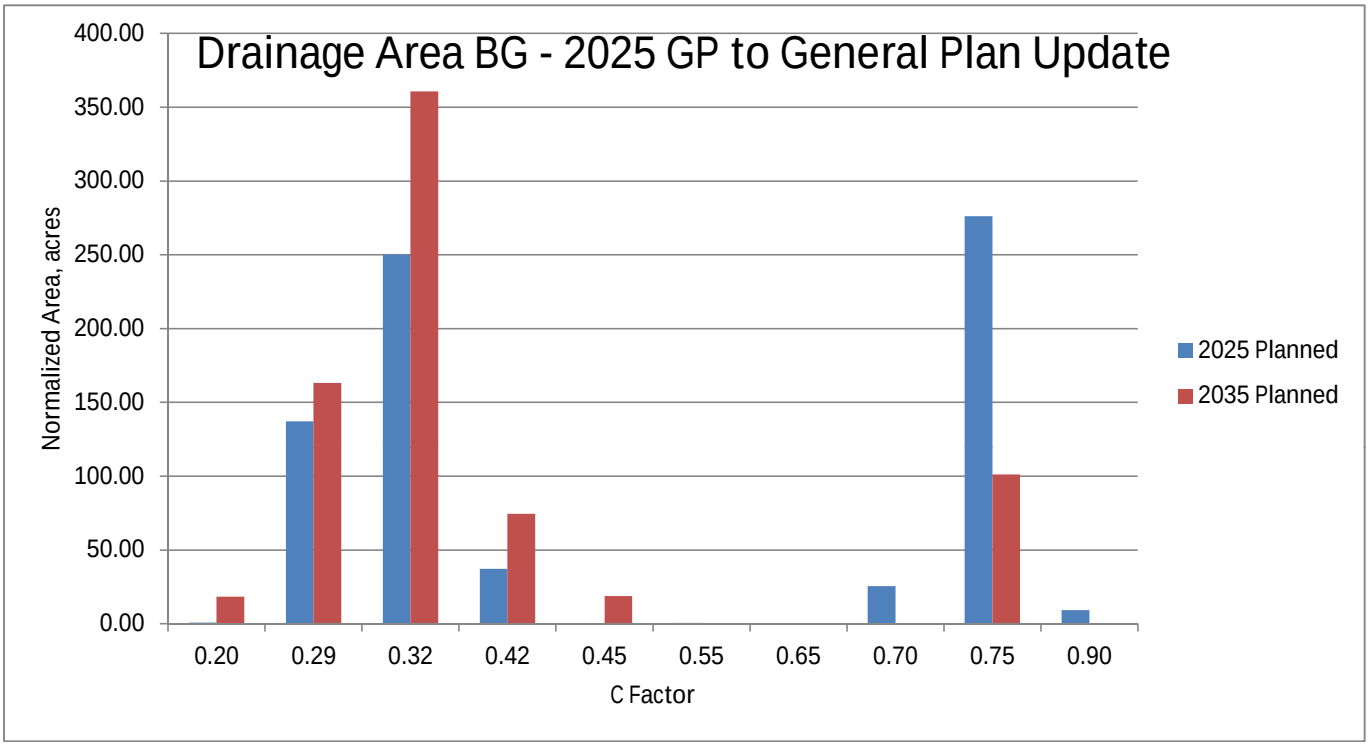

Drainage Area B - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
C Factor
2025 Planned
2035 Planned

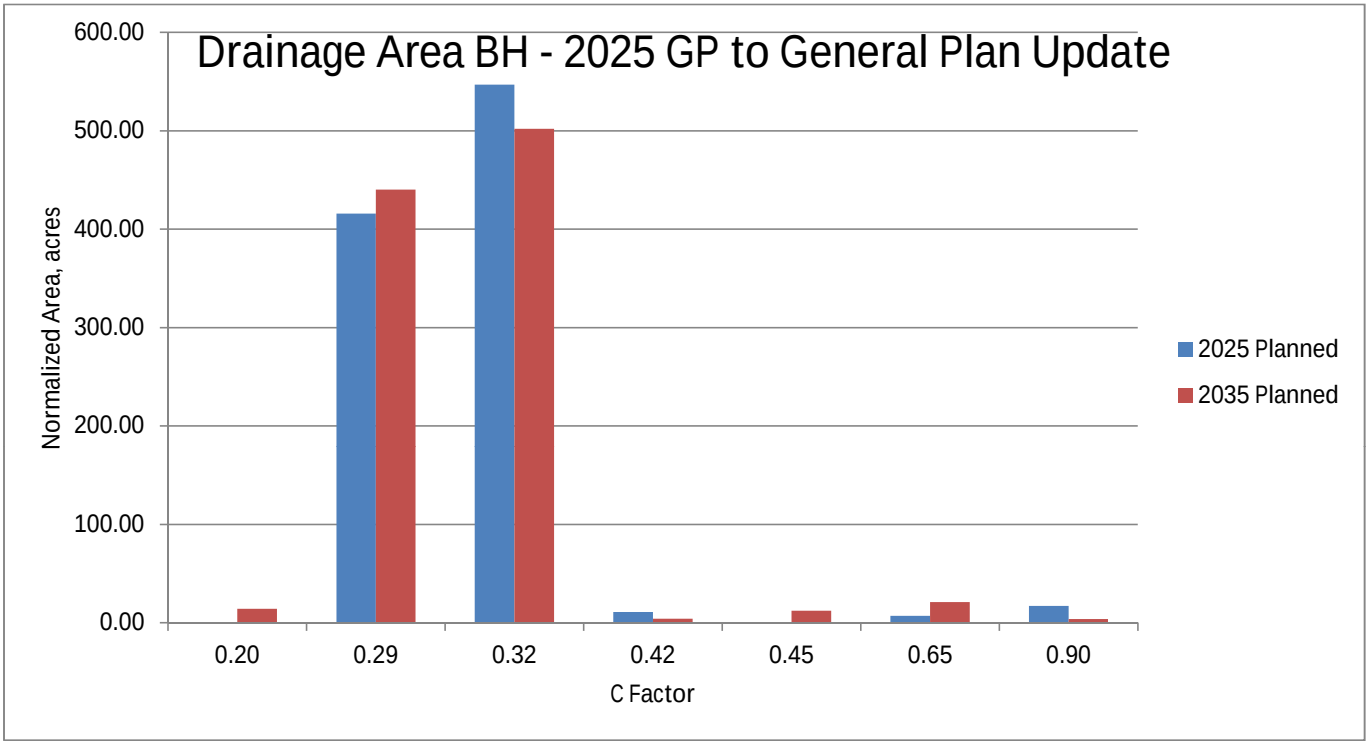

Drainage Area BB - 2025 GP to General Plan Update
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

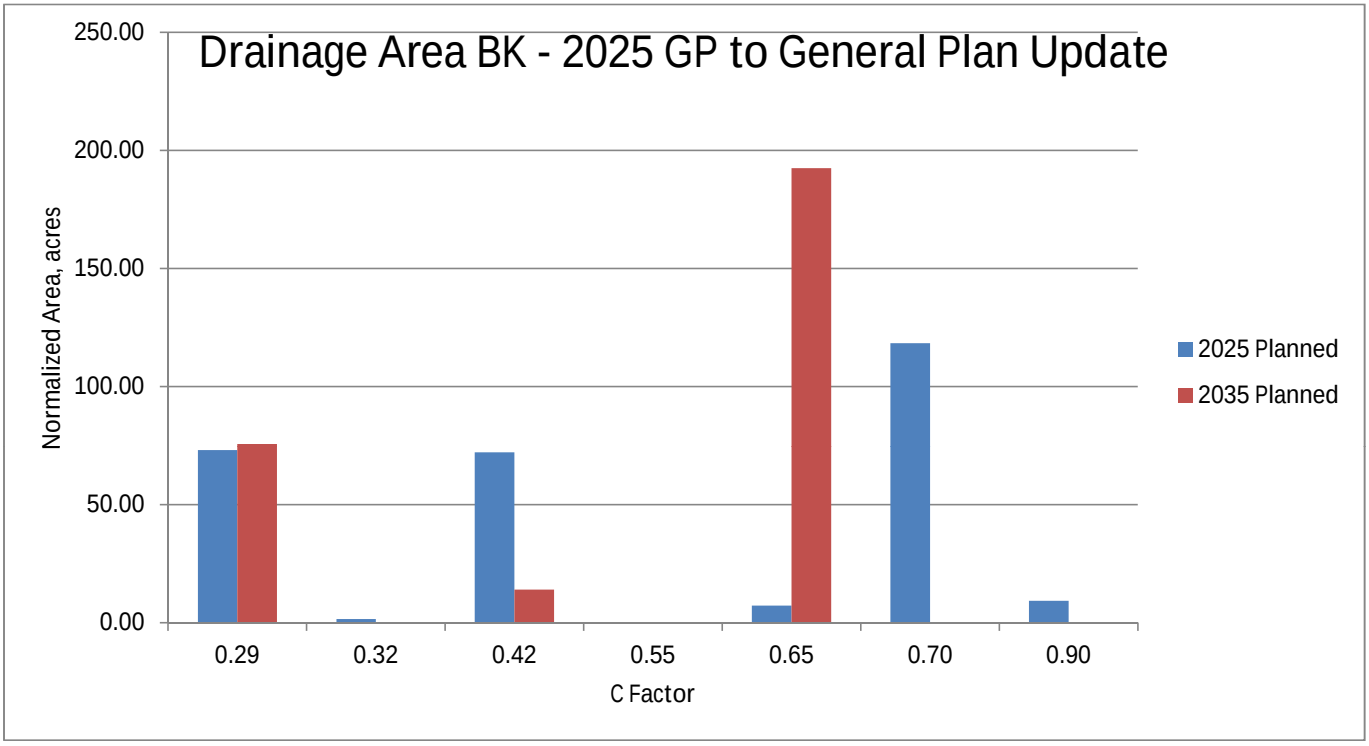

Drainage Area BD - 2025 GP to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

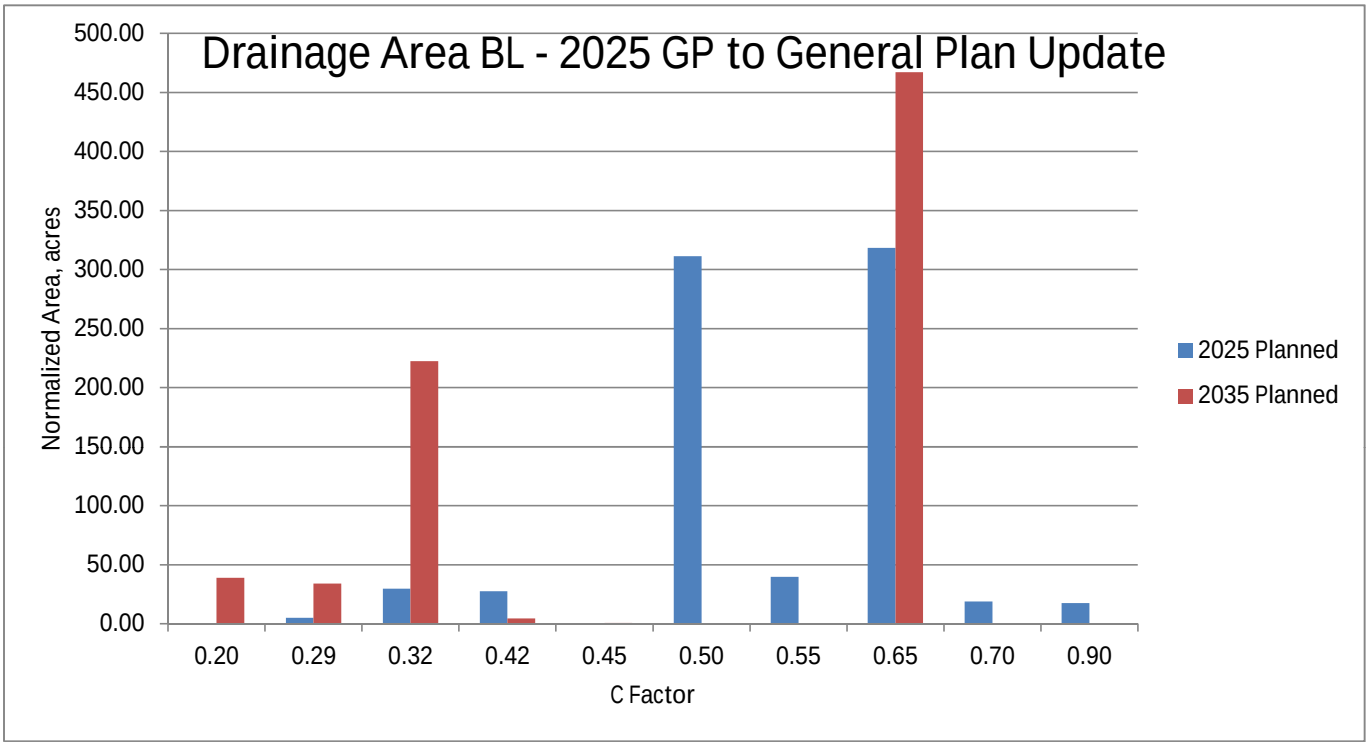

Drainage Area BE - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.45
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

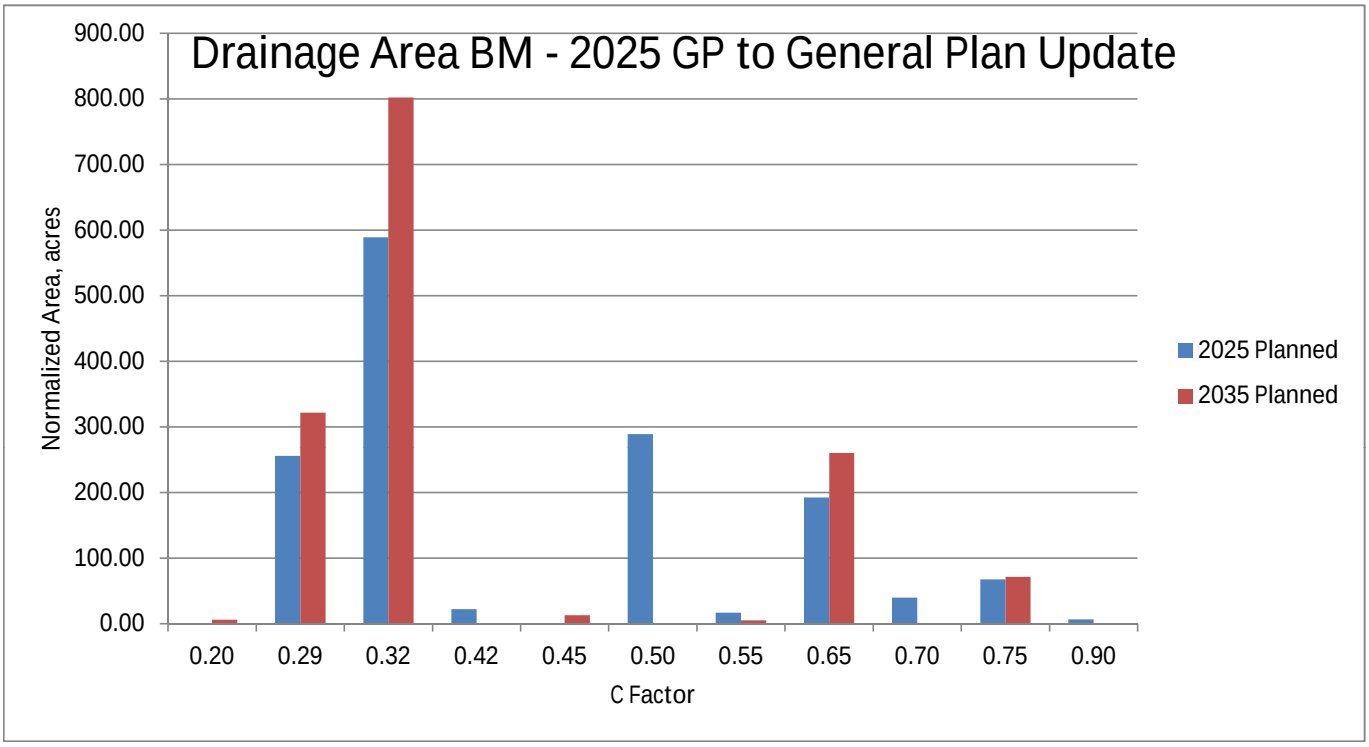

Drainage Area BF - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.29
0.32
0.35
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

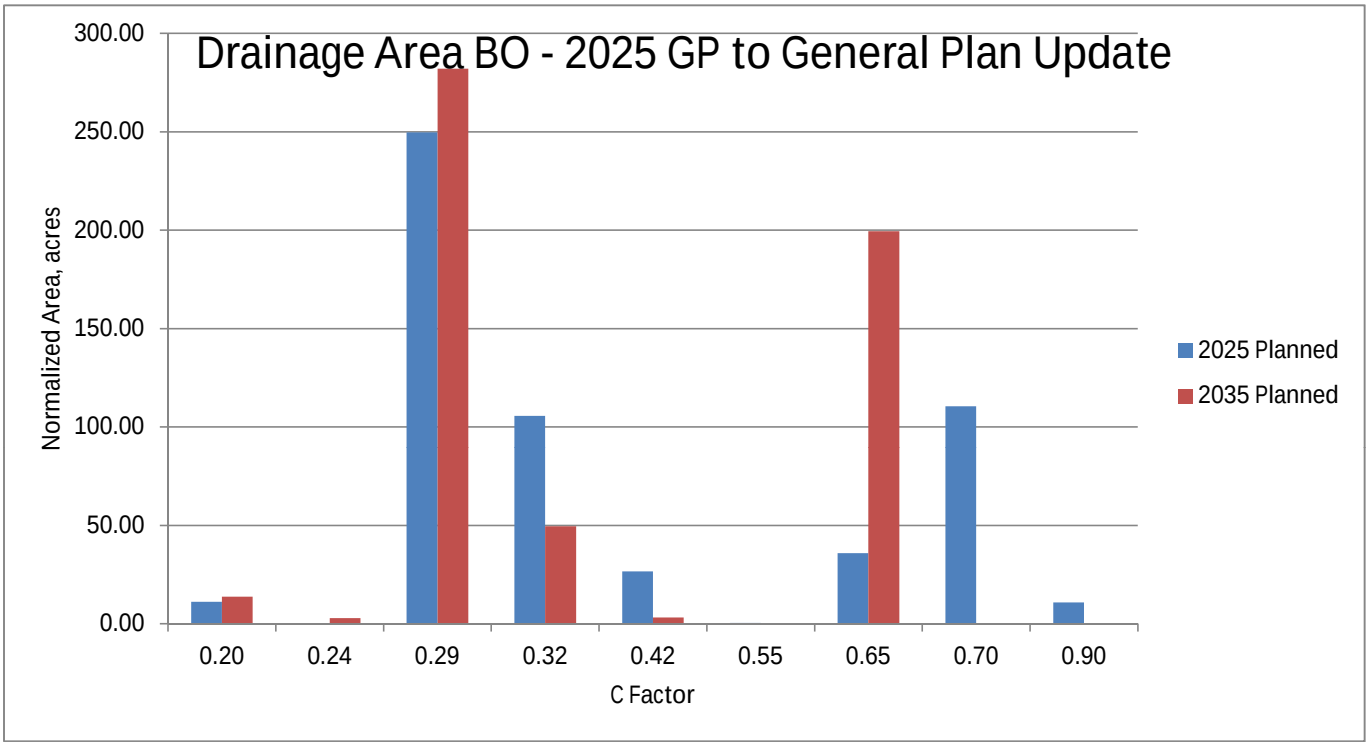

Drainage Area BG - 2025 GP to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

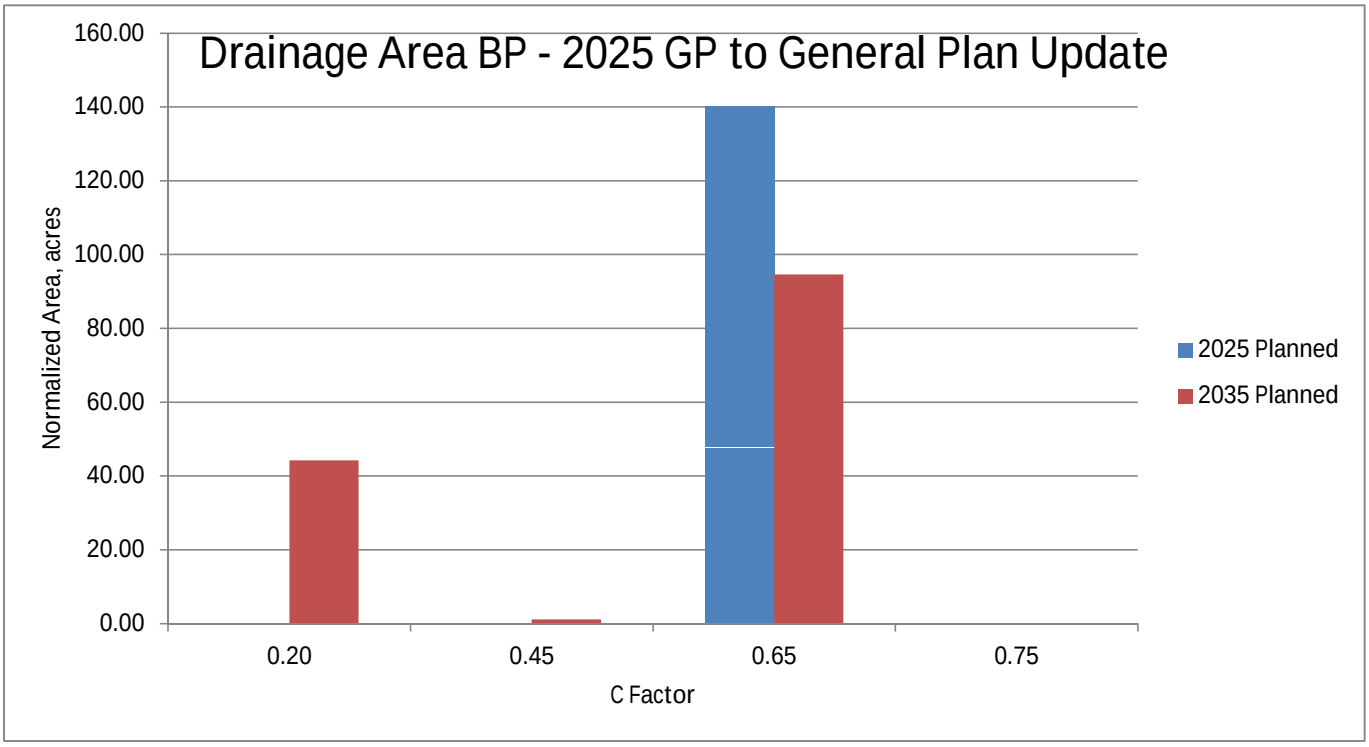

Drainage Area BH - 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.65
0.90
C Factor
2025 Planned
2035 Planned

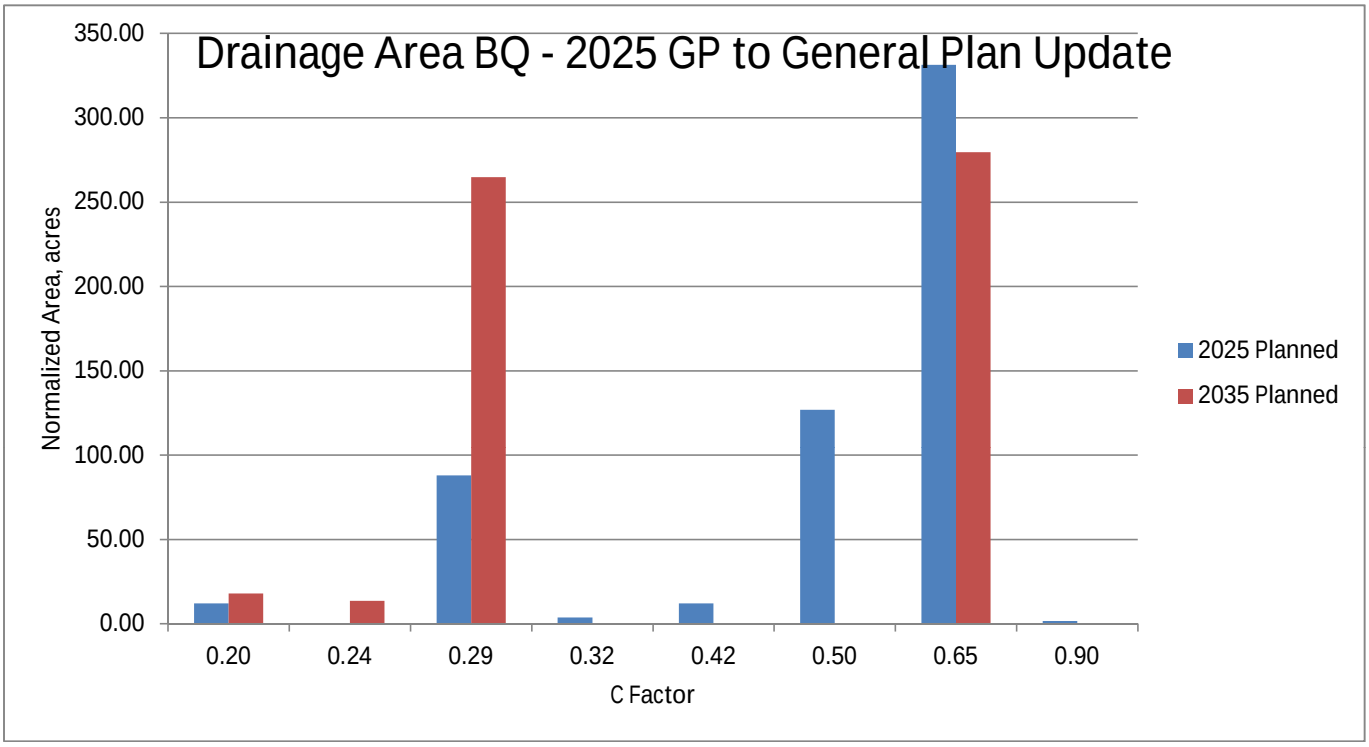

Drainage Area BK - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

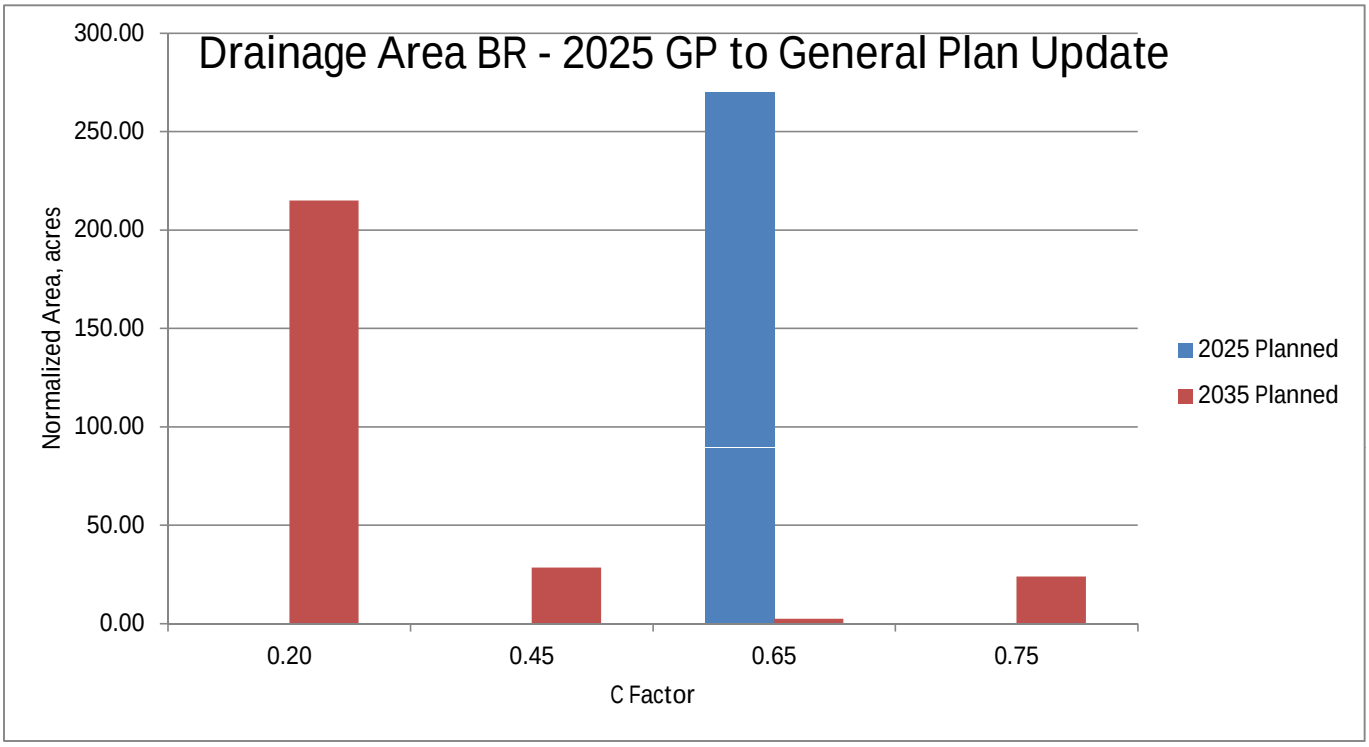

Drainage Area BL - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

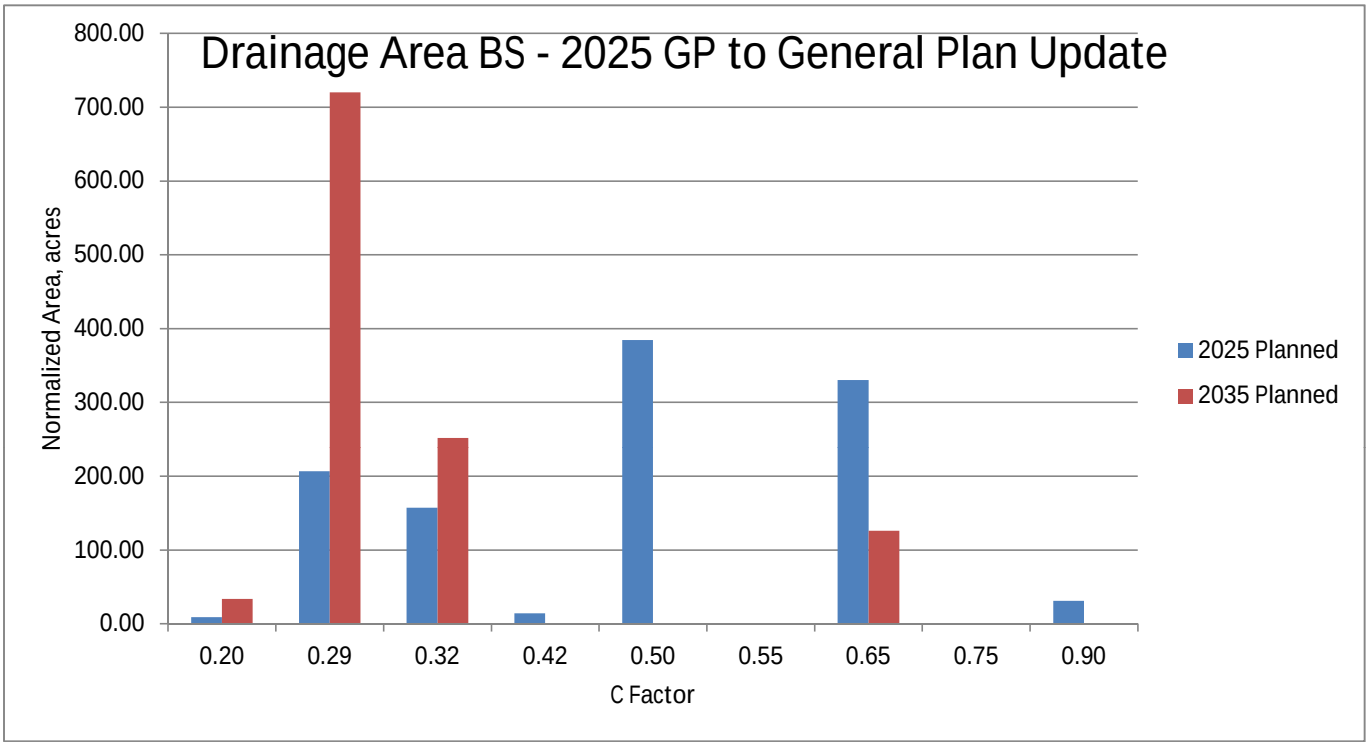

Drainage Area BM - 2025 GP to General Plan Update
Normalized Area, acres
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

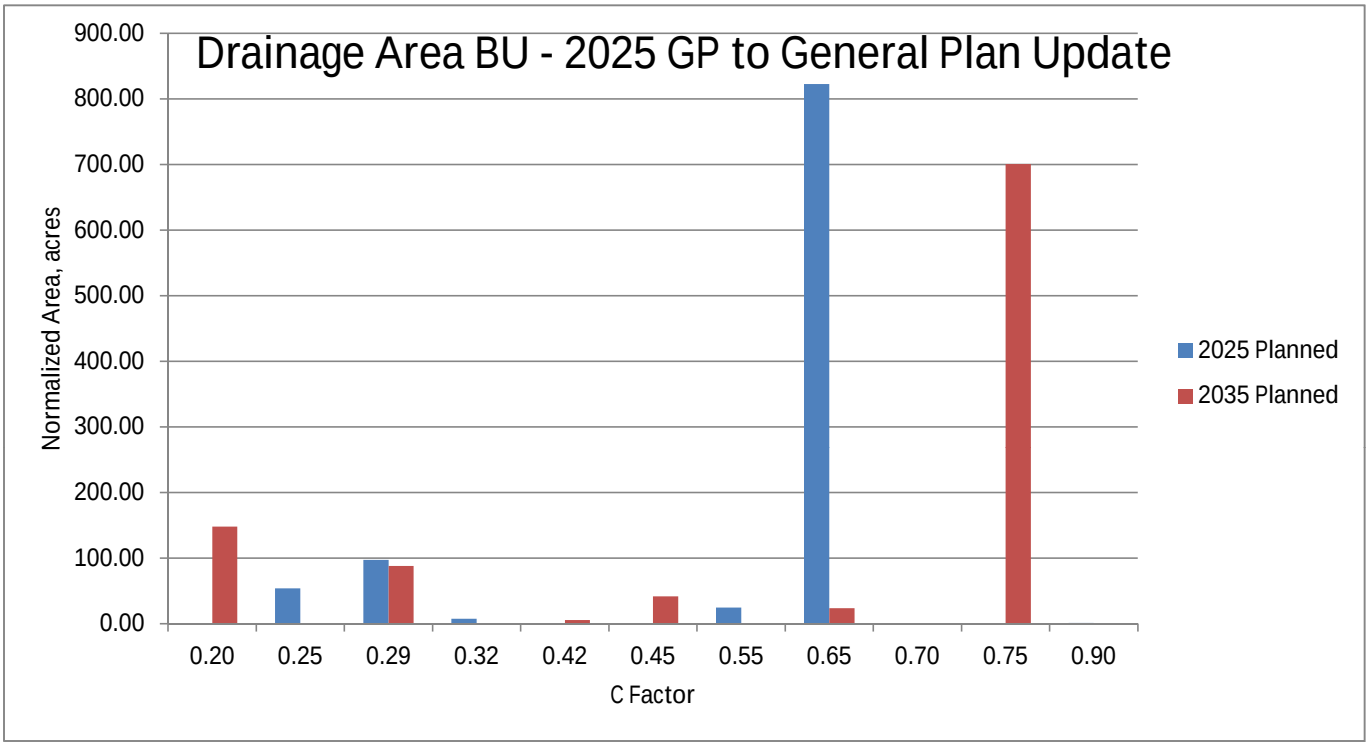

Drainage Area BO - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

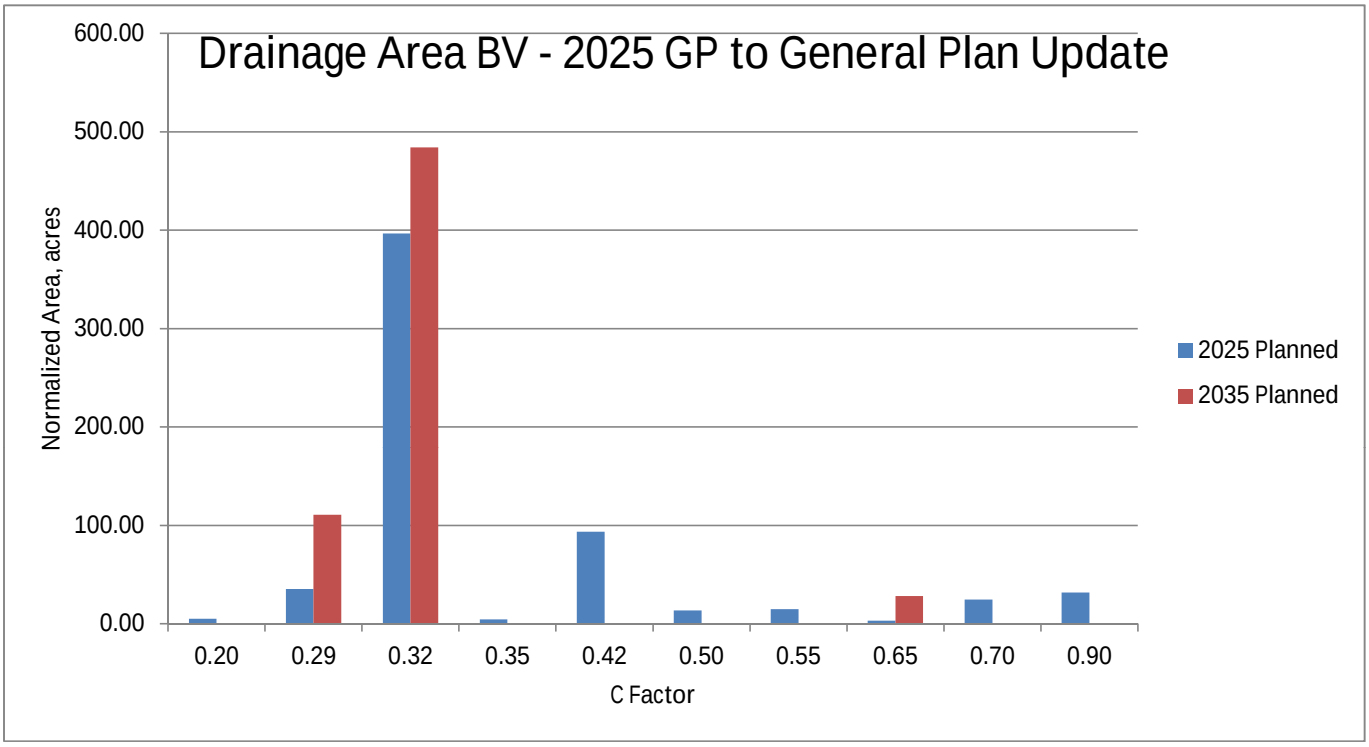

Drainage Area BP - 2025 GP to General Plan Update
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.45
0.65
0.75
C Factor
2025 Planned
2035 Planned

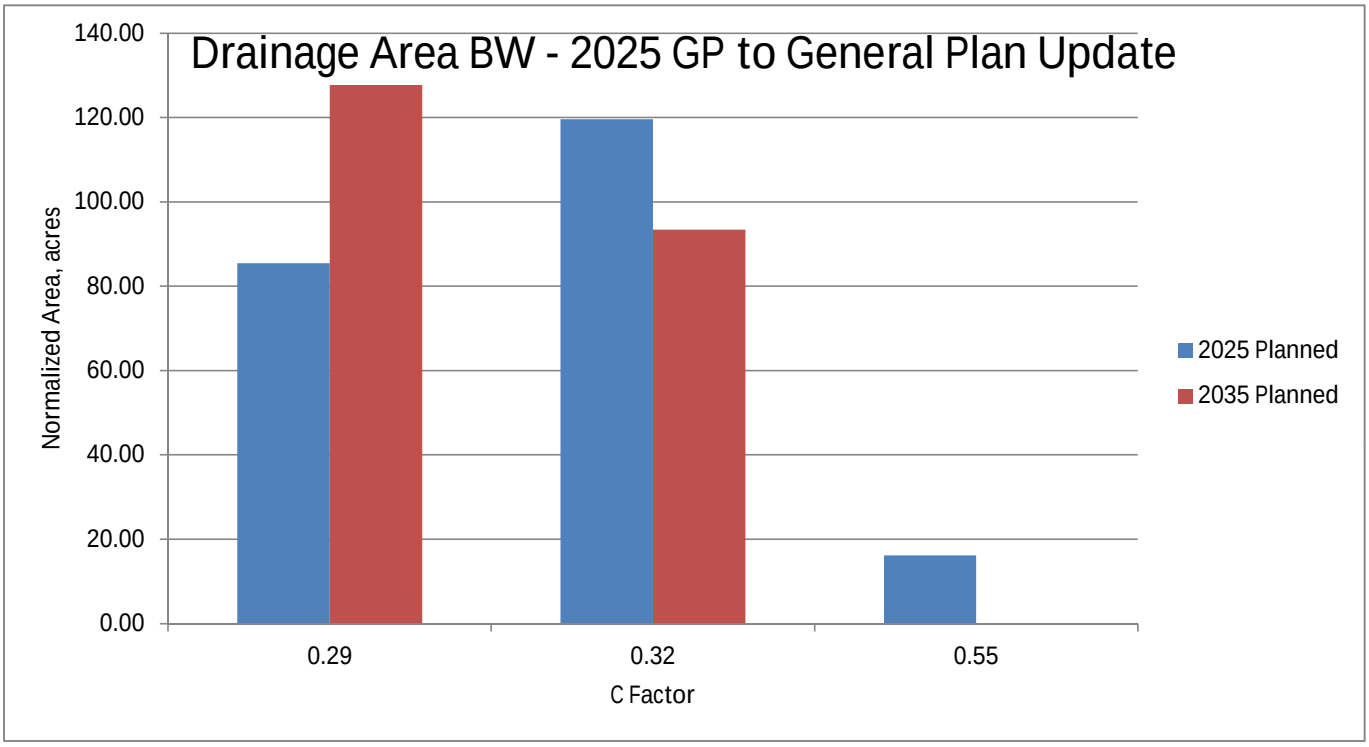

Drainage Area BQ - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.50
0.65
0.90
C Factor
2025 Planned
2035 Planned

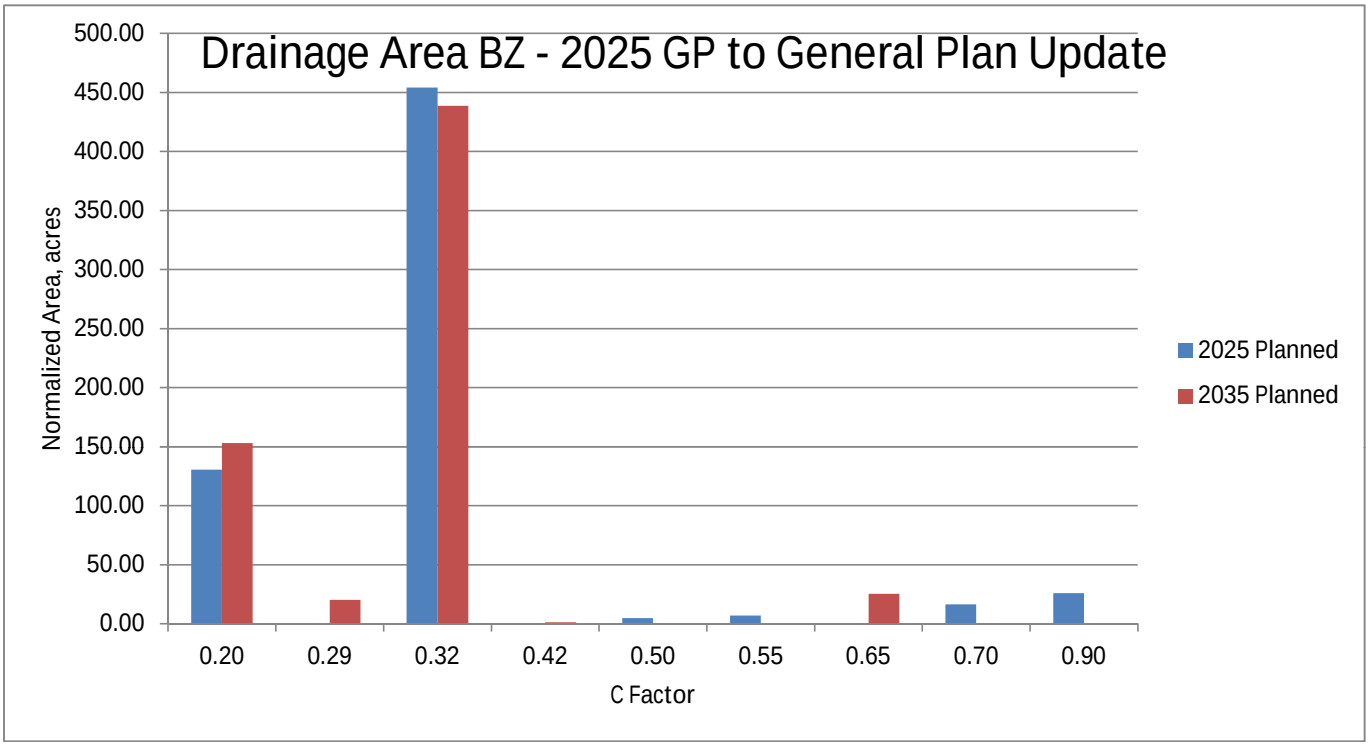

Drainage Area BR - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.45
0.65
0.75
C Factor
2025 Planned
2035 Planned

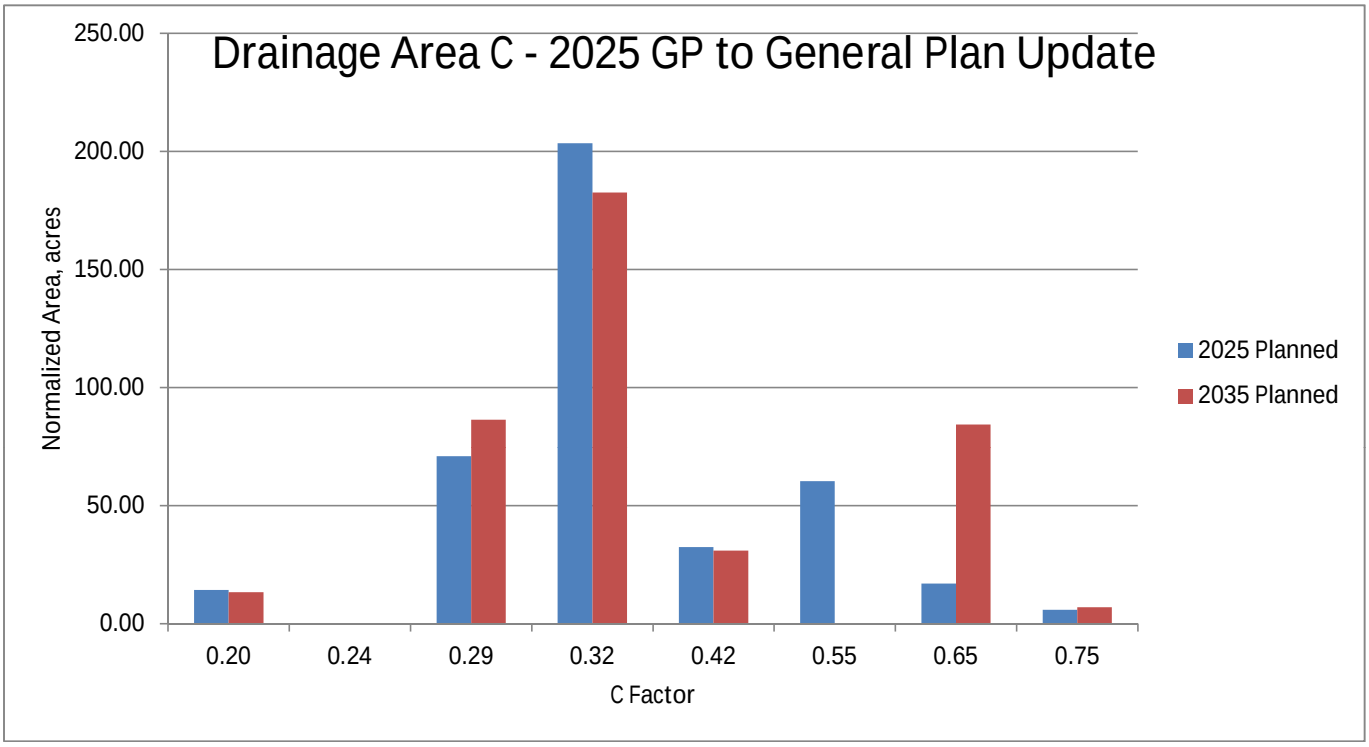

Drainage Area BS - 2025 GP to General Plan Update
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

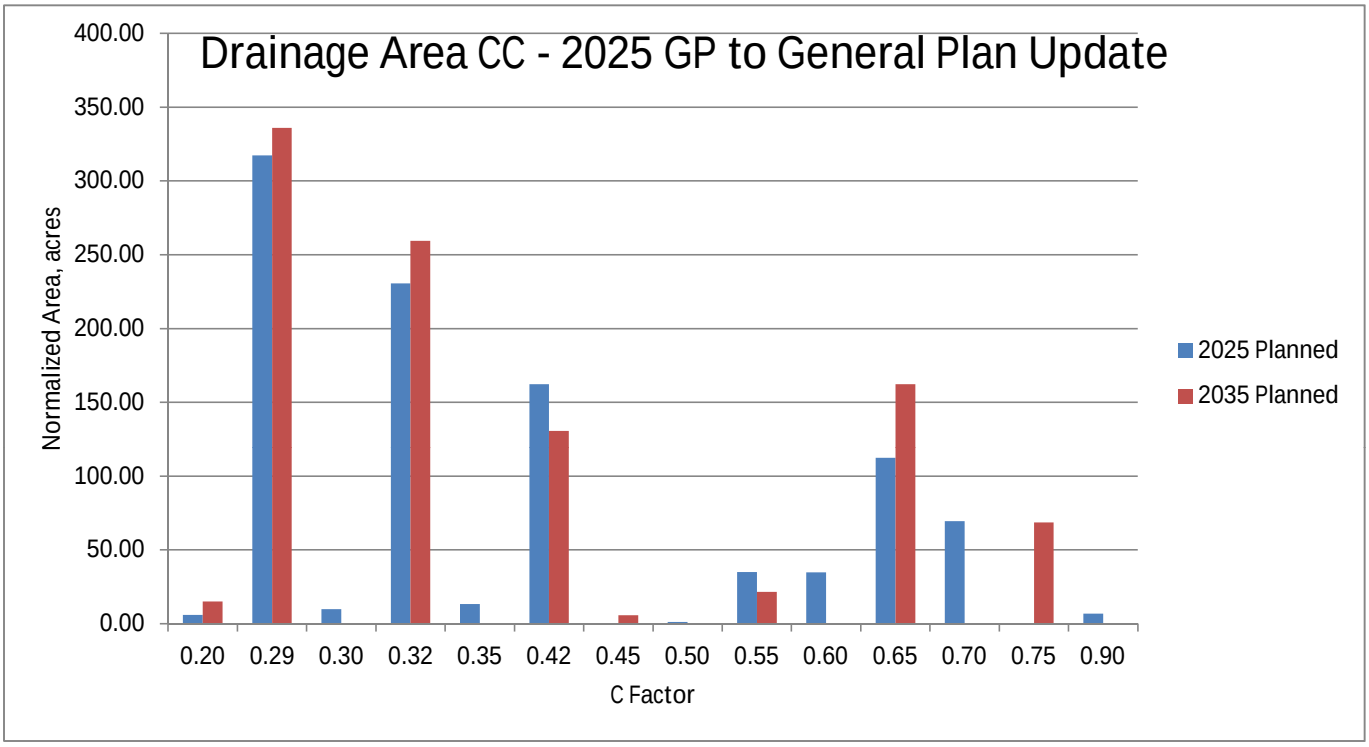

Drainage Area BU - 2025 GP to General Plan Update
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.25
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

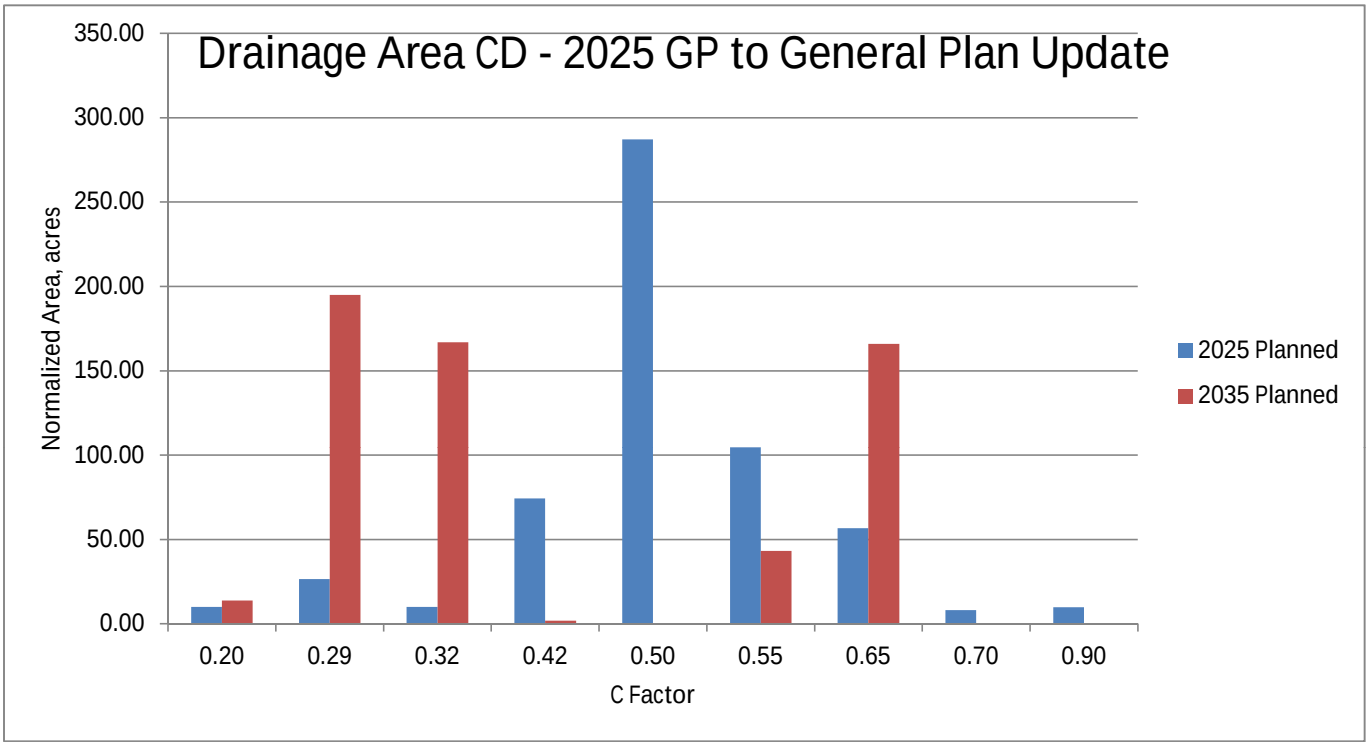

Drainage Area BV - 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.35
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

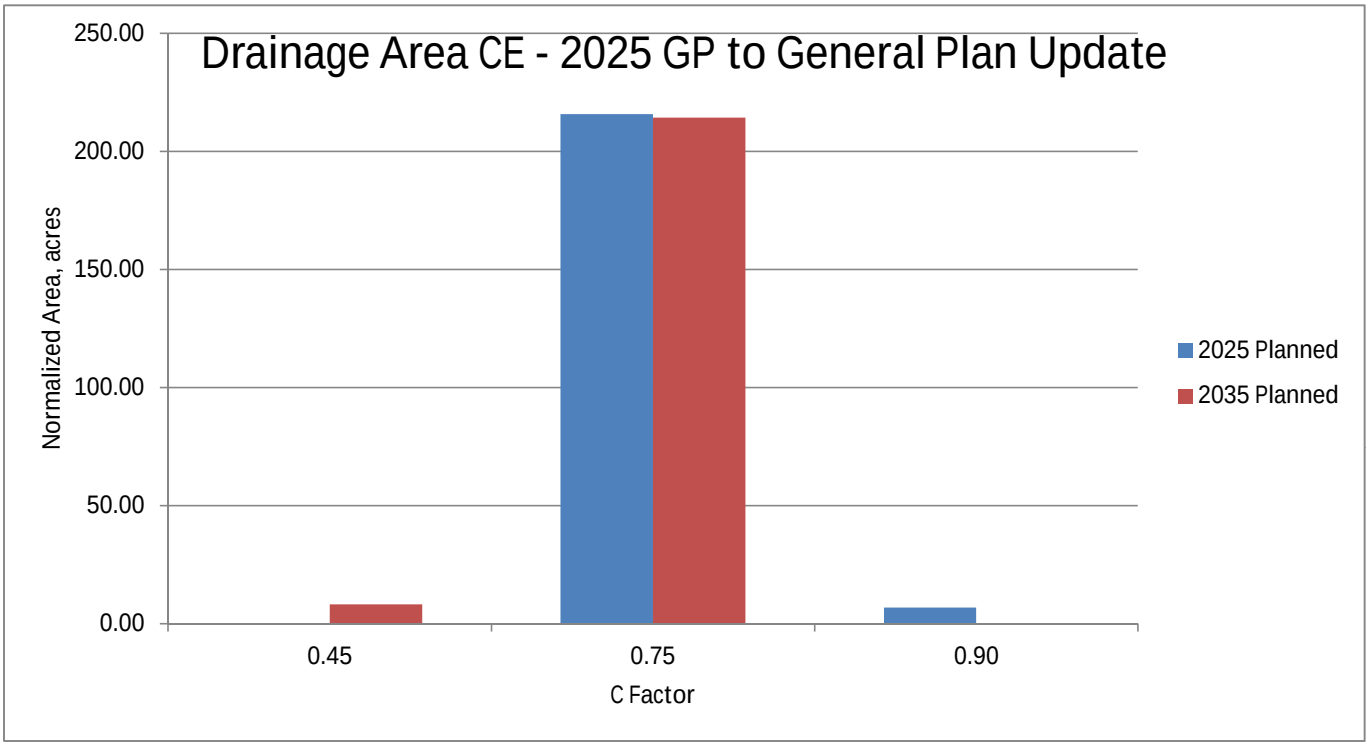

Drainage Area BW - 2025 GP to General Plan Update
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.29
0.32
0.55
C Factor
2025 Planned
2035 Planned

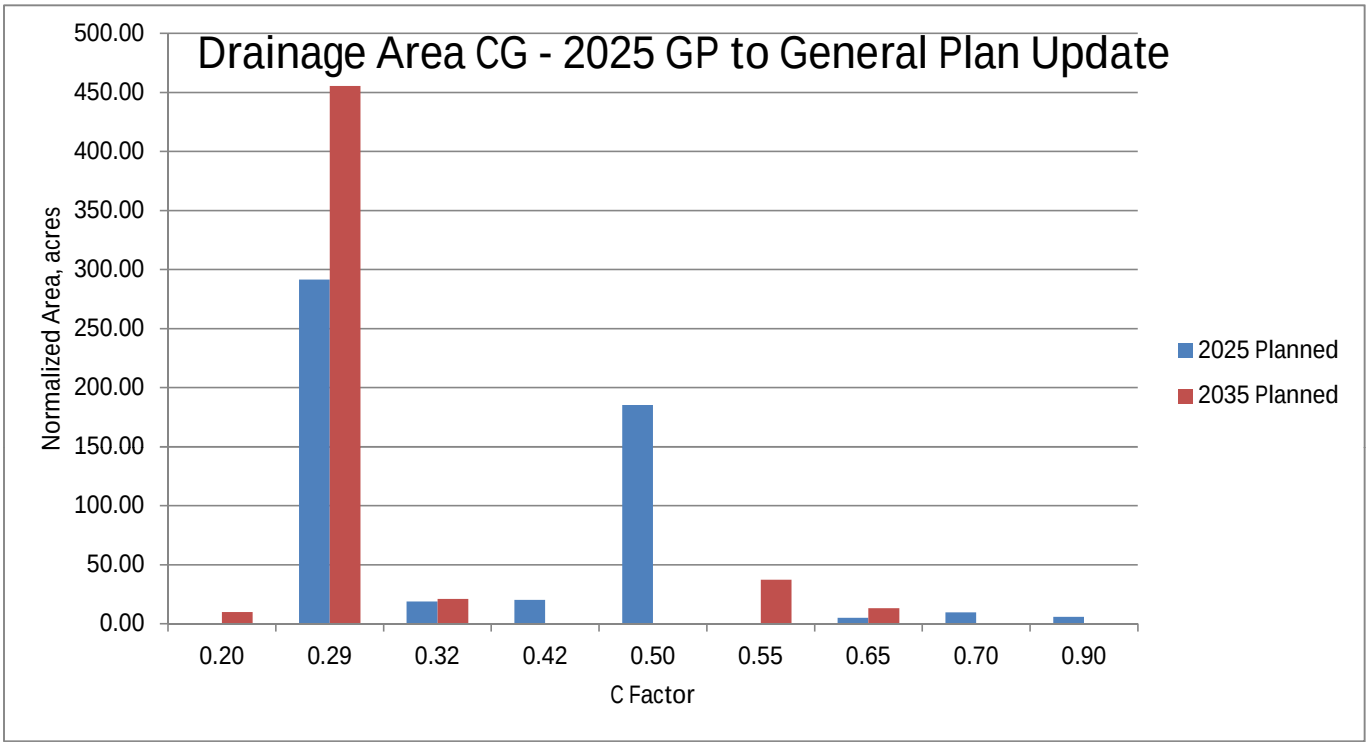

Drainage Area BZ - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

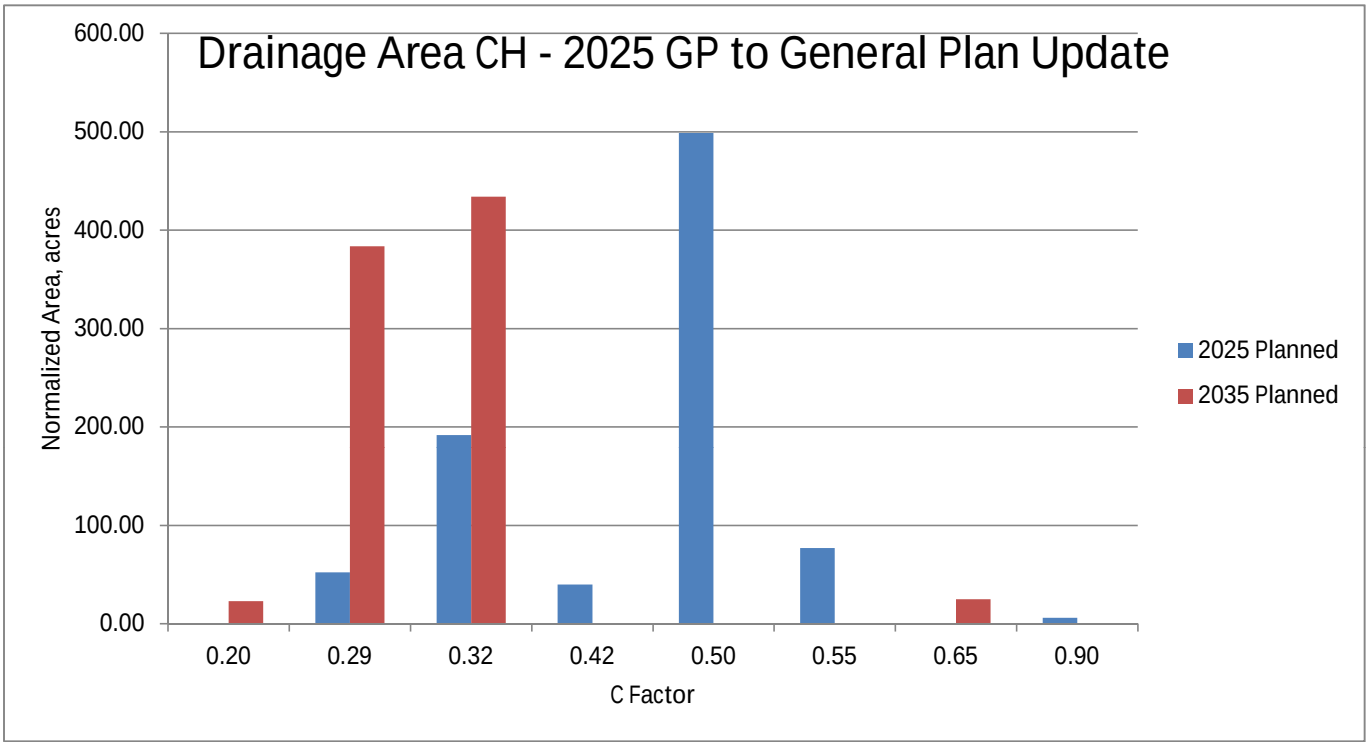

Drainage Area C - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
C Factor
2025 Planned
2035 Planned

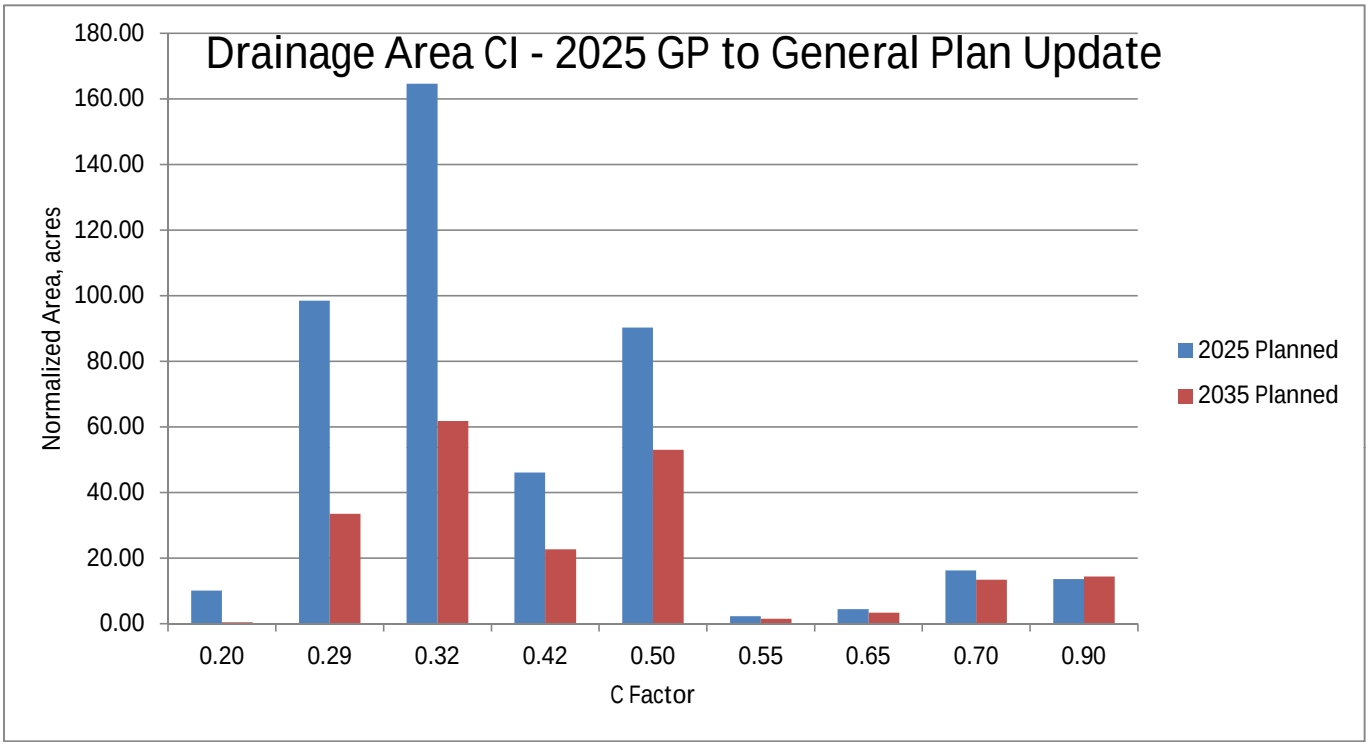

Drainage Area CC - 2025 GP to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.30
0.32
0.35
0.42
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

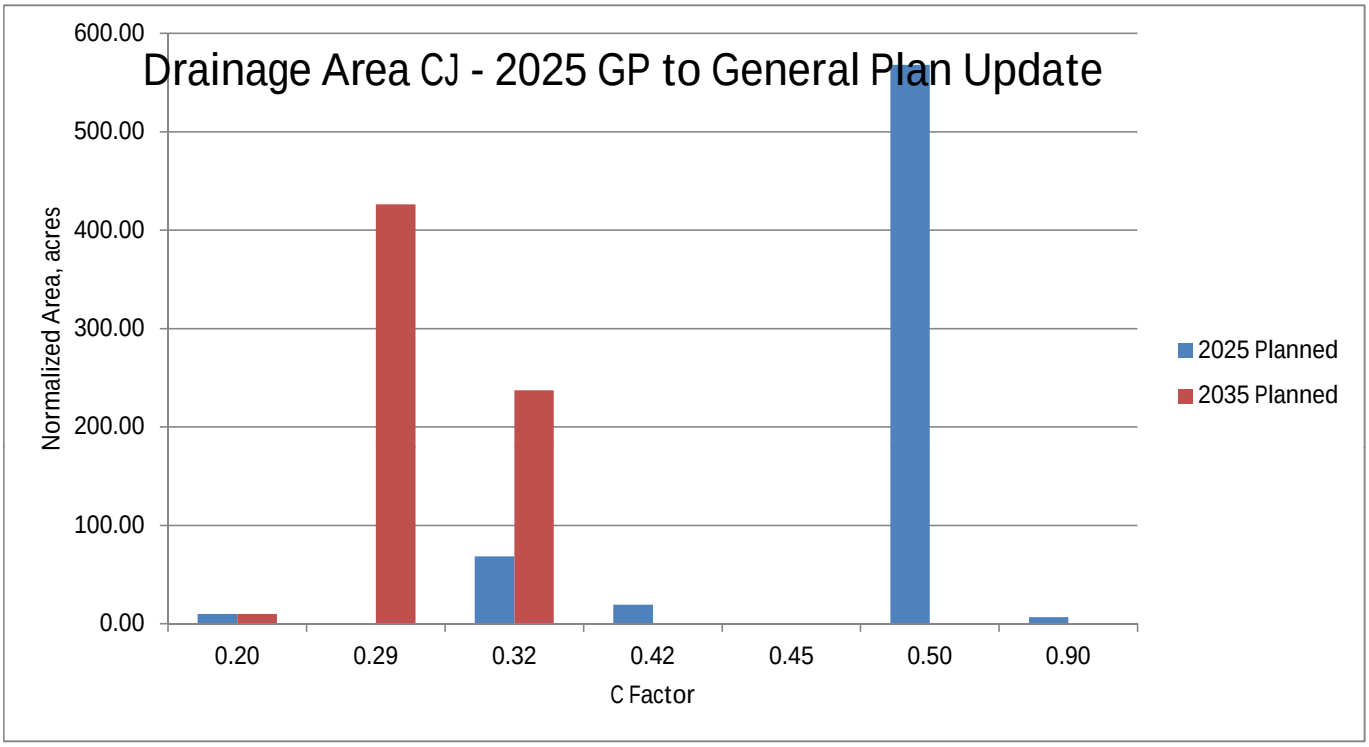

Drainage Area CD - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

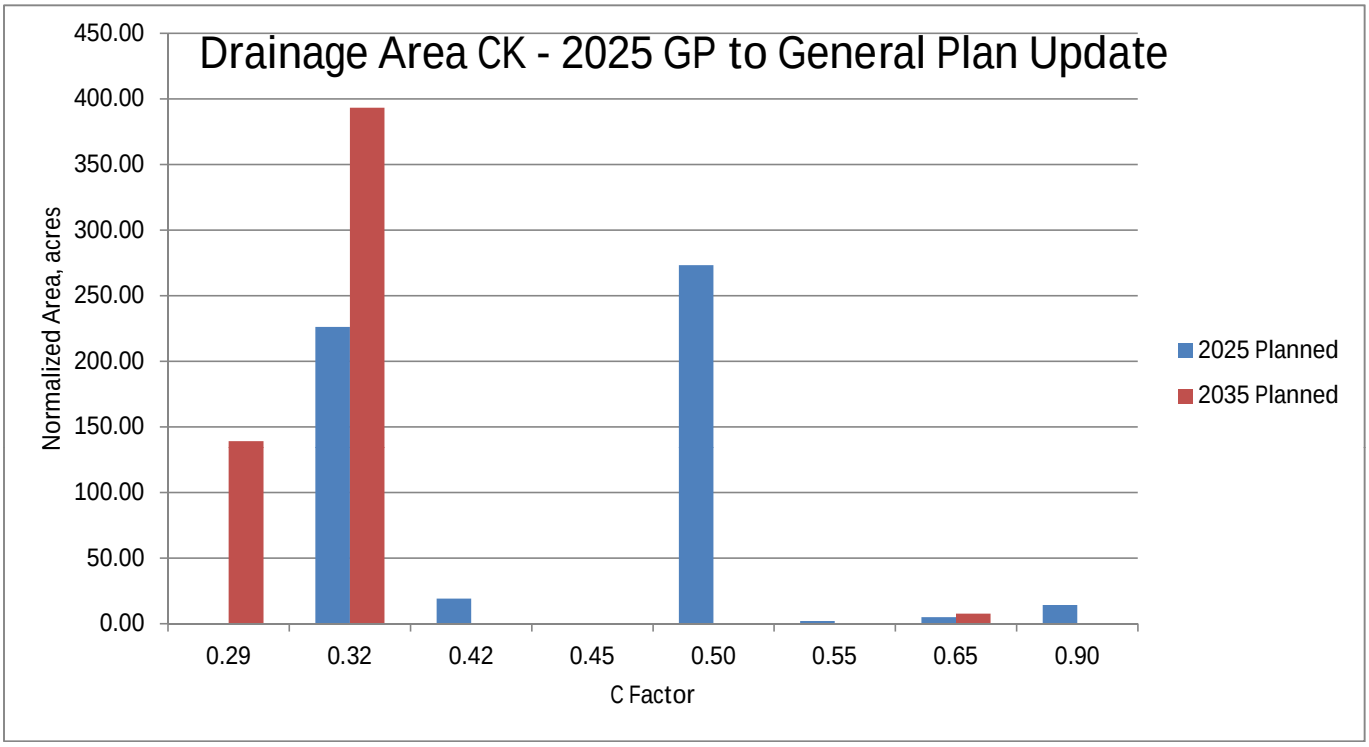

Drainage Area CE - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.45
0.75
0.90
C Factor
2025 Planned
2035 Planned

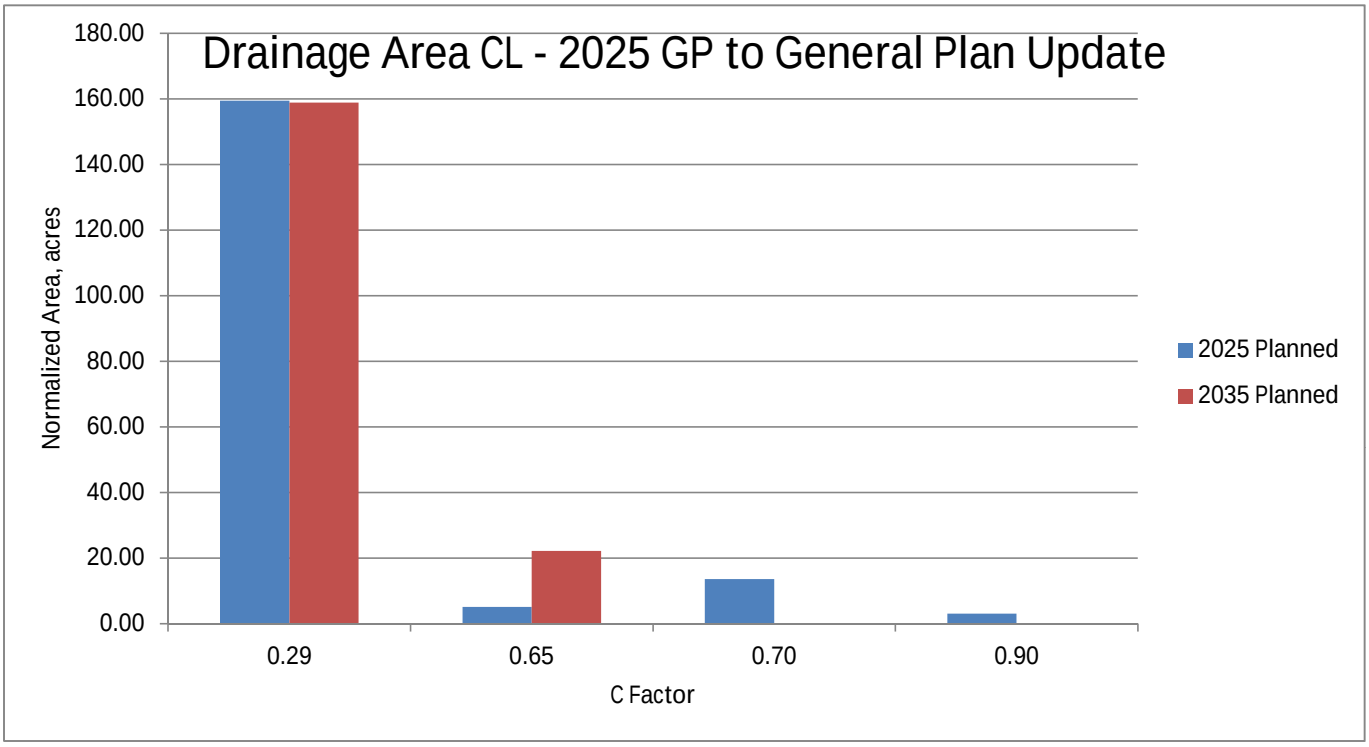

Drainage Area CG - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

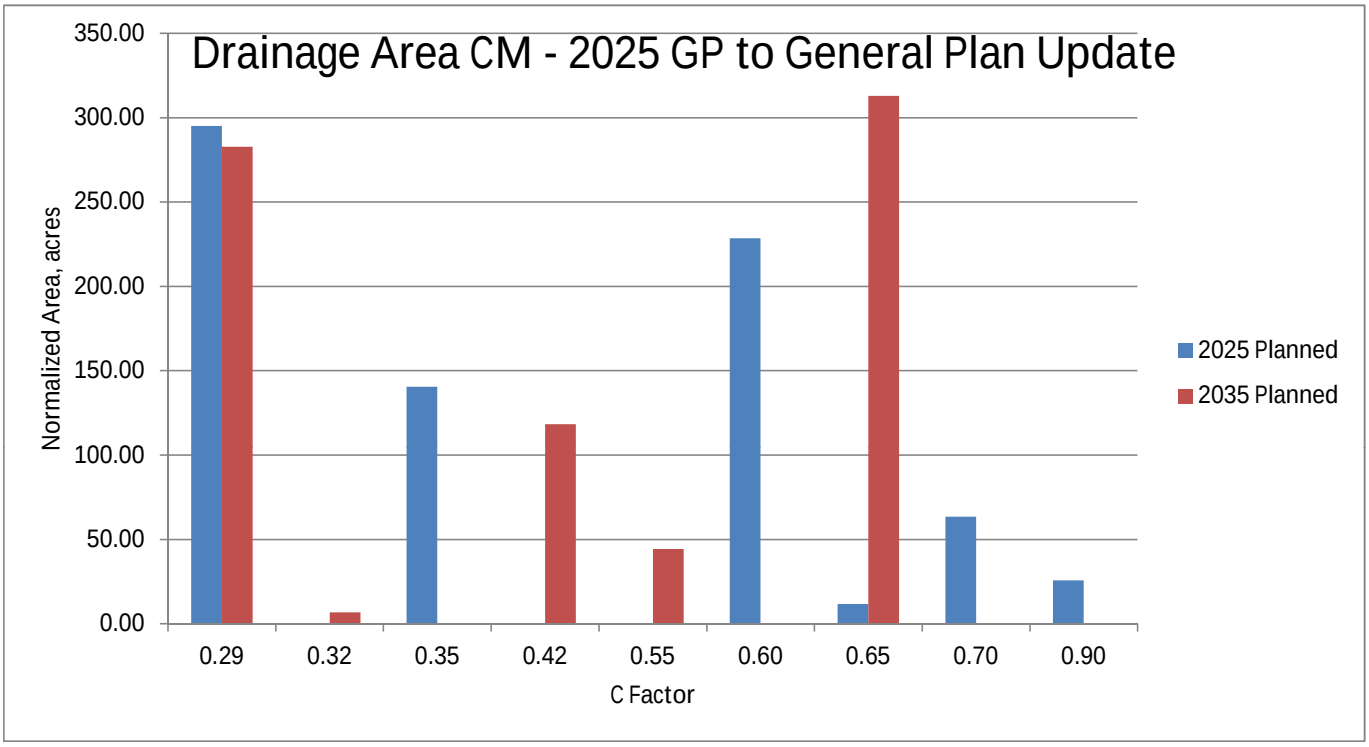

Drainage Area CH - 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

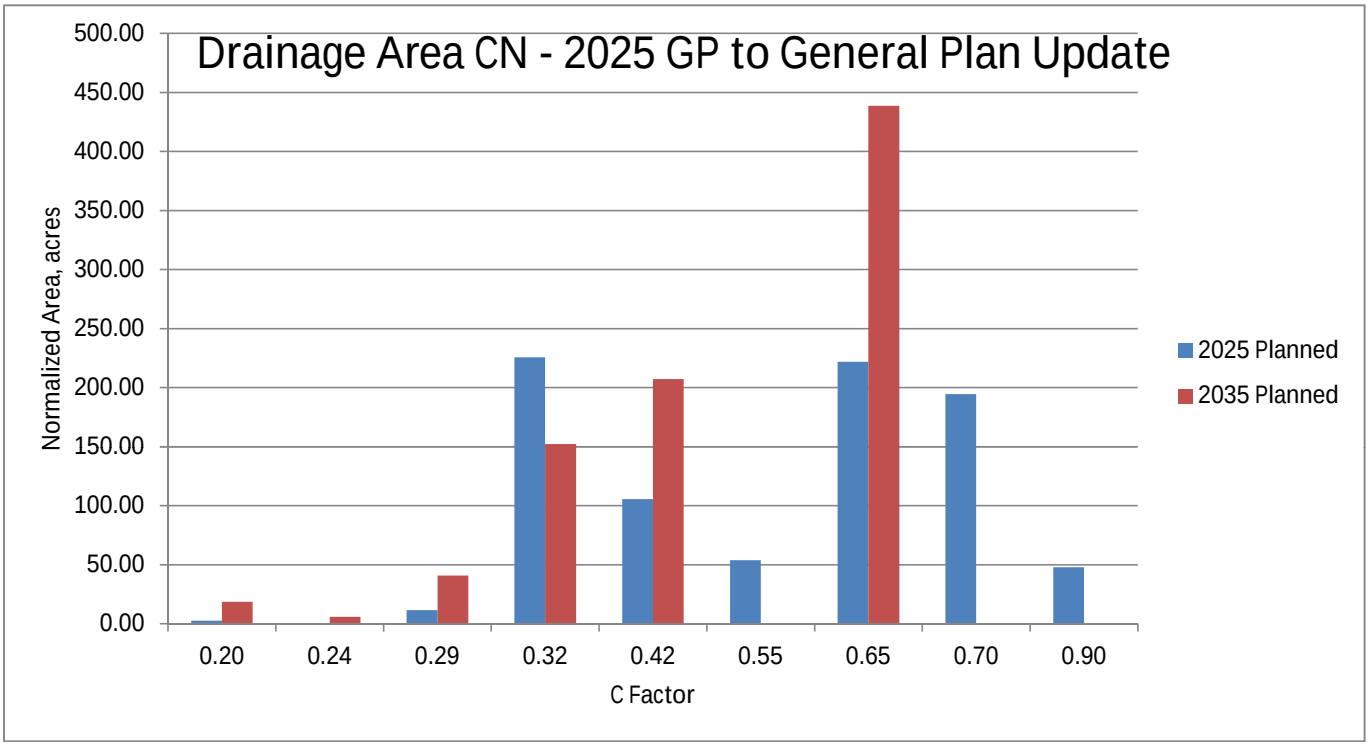

Drainage Area CI - 2025 GP to General Plan Update
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

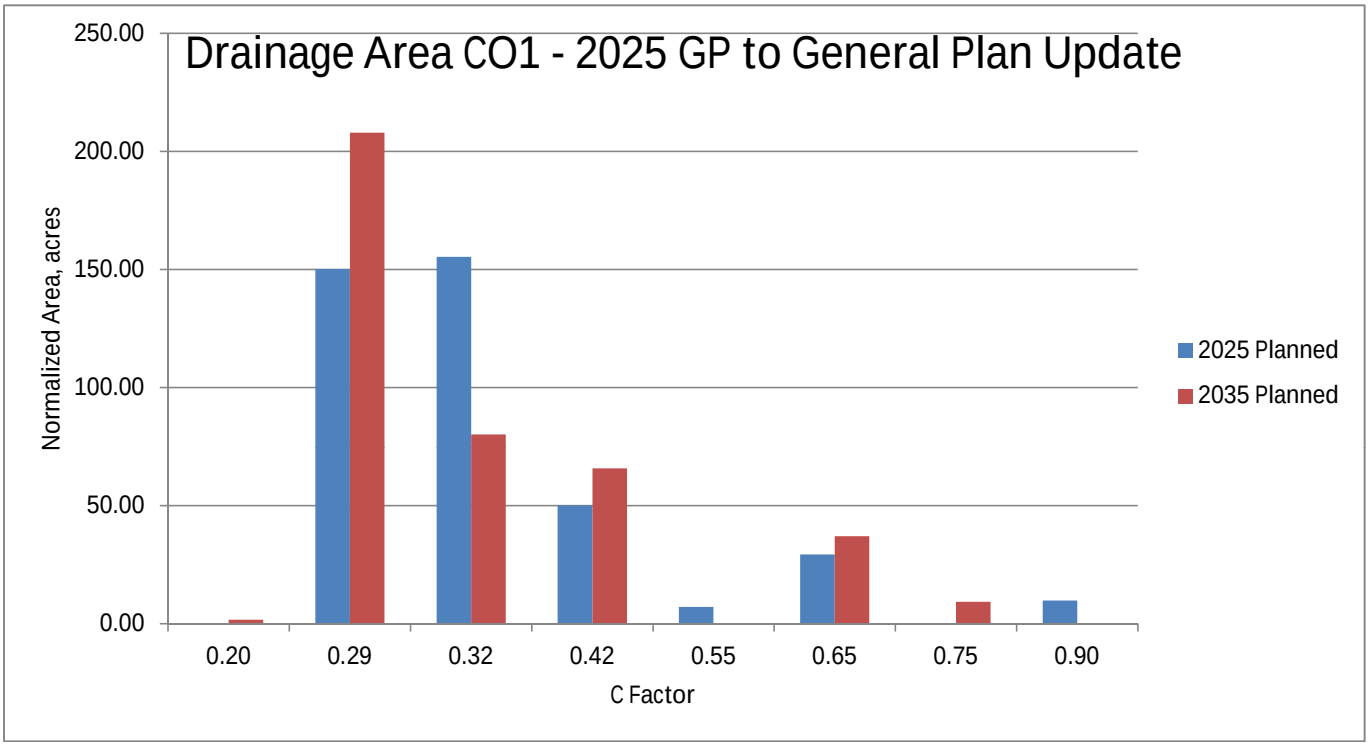

Drainage Area CJ - 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.50
0.90
C Factor
2025 Planned
2035 Planned

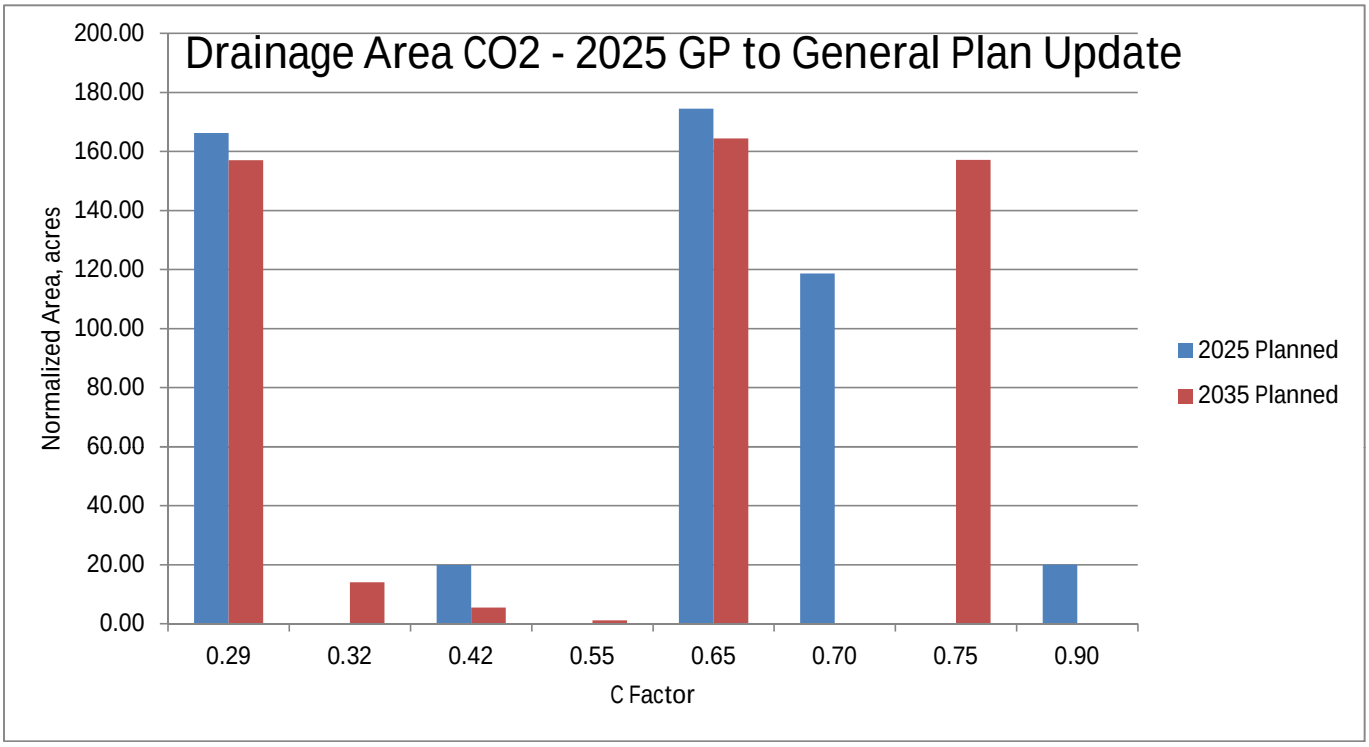

Drainage Area CK - 2025 GP to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

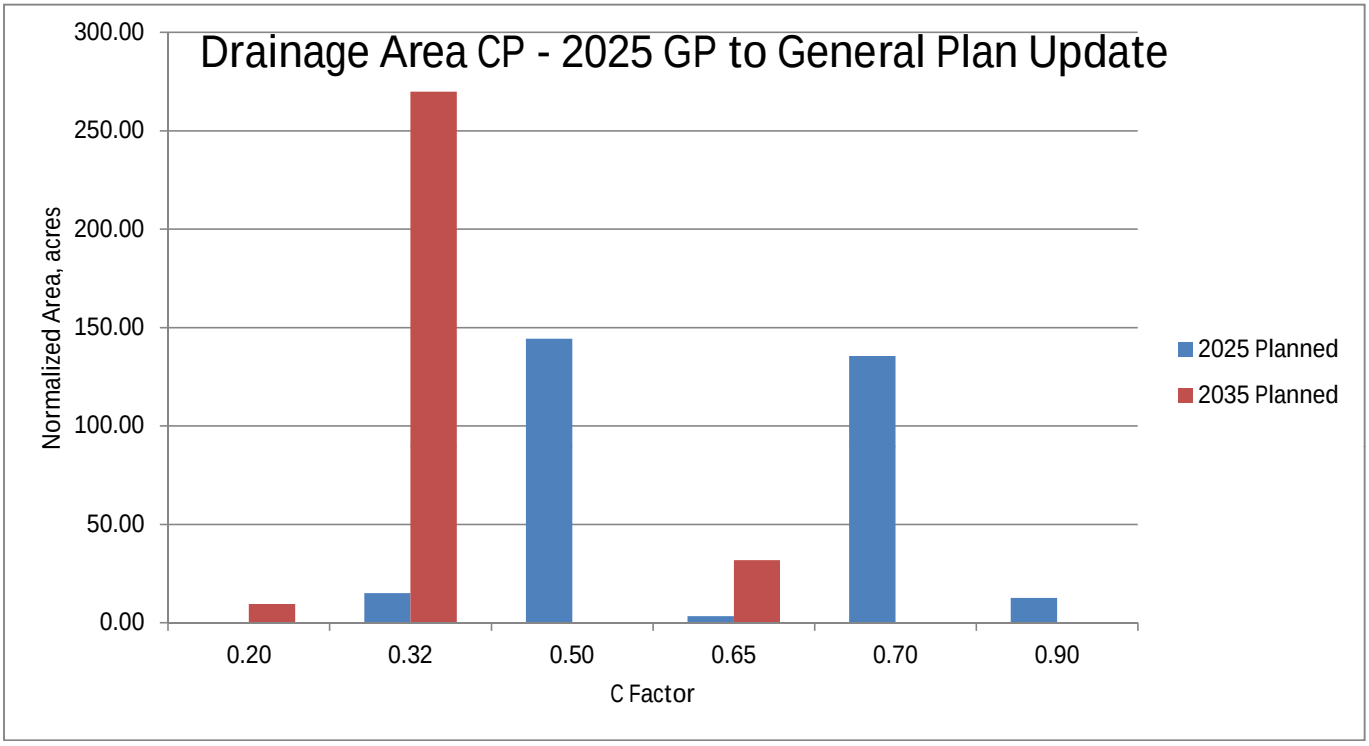

Drainage Area CL - 2025 GP to General Plan Update
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.29
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

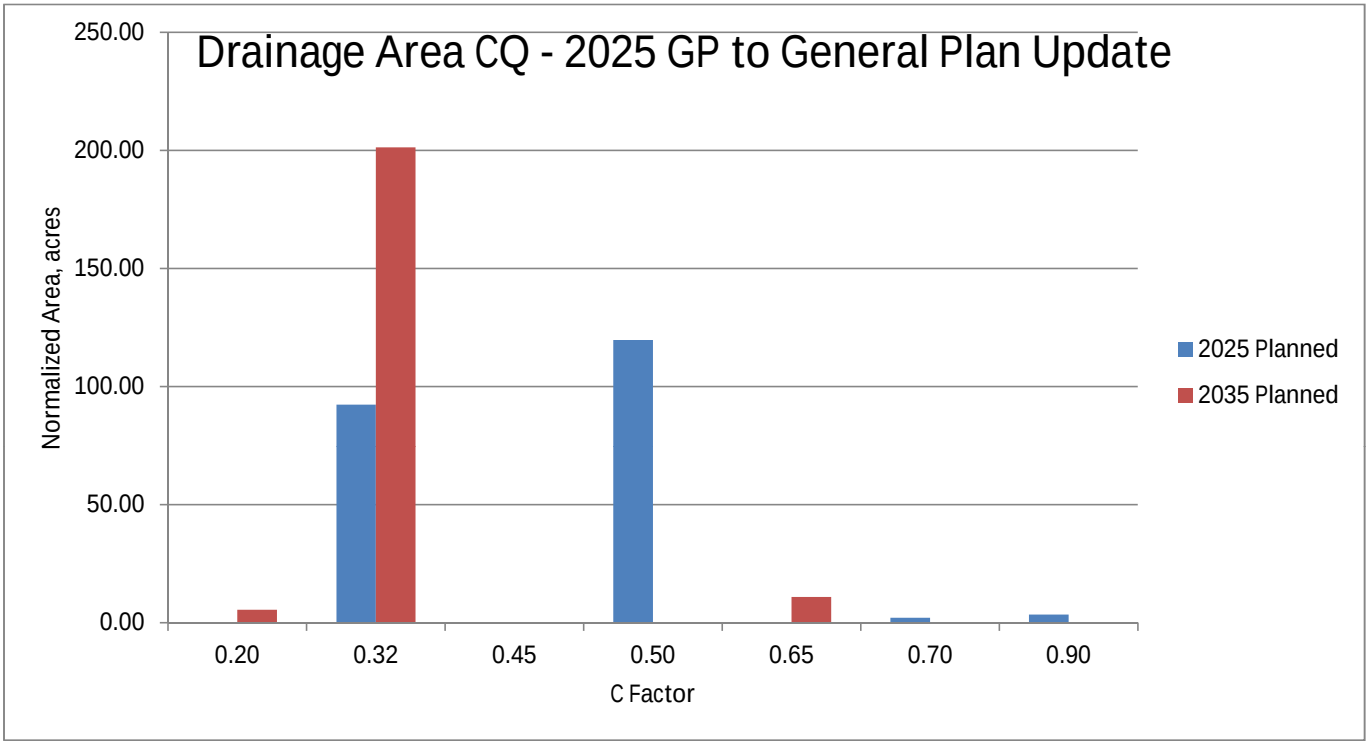

Drainage Area CM - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.29
0.32
0.35
0.42
0.55
0.60
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

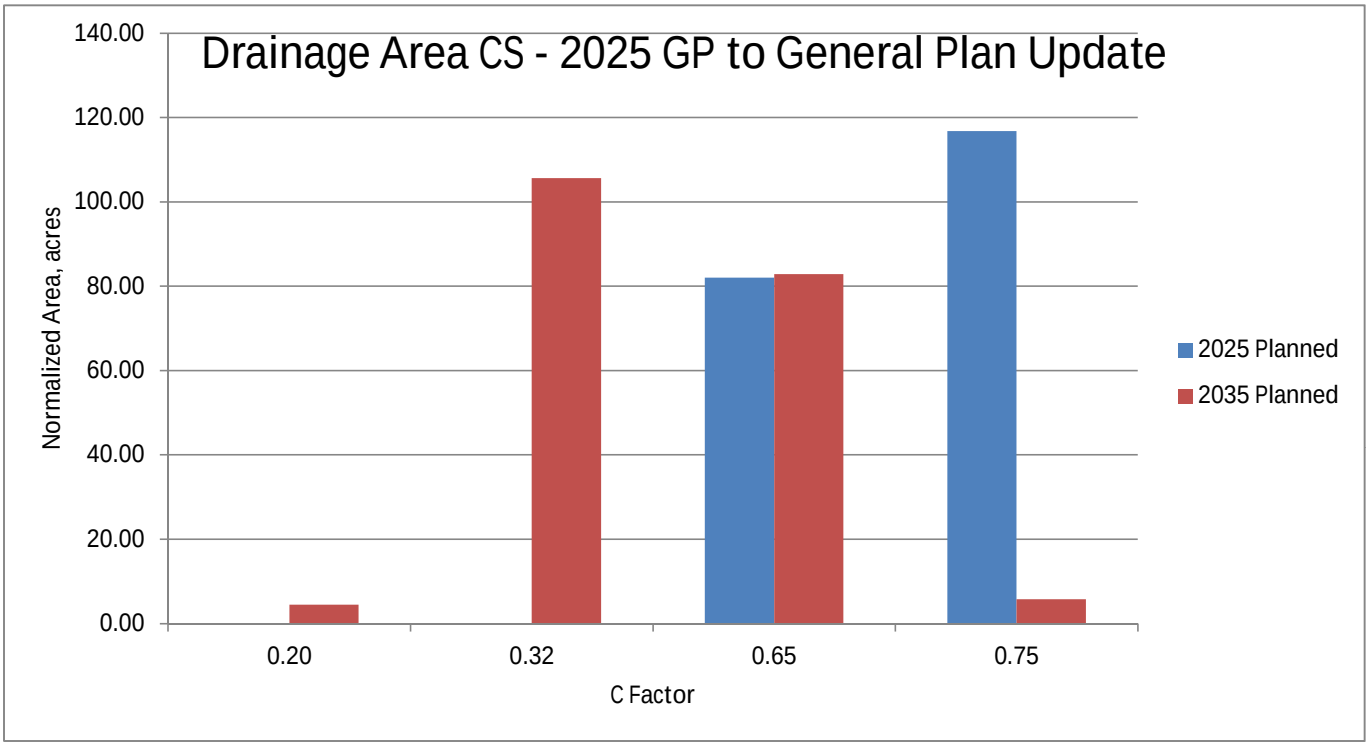

Drainage Area CN - 2025 GP to General Plan Update
Normalized Area, acres
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

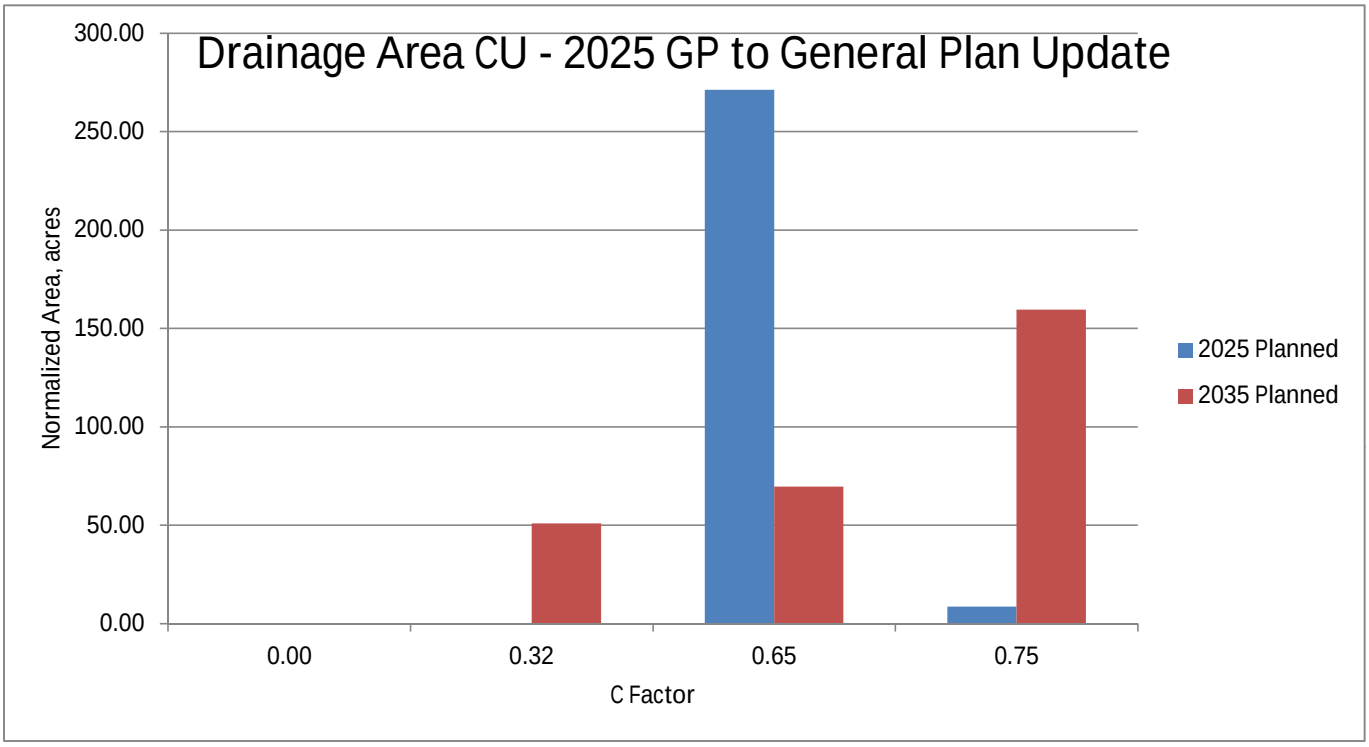

Drainage Area CO1 - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

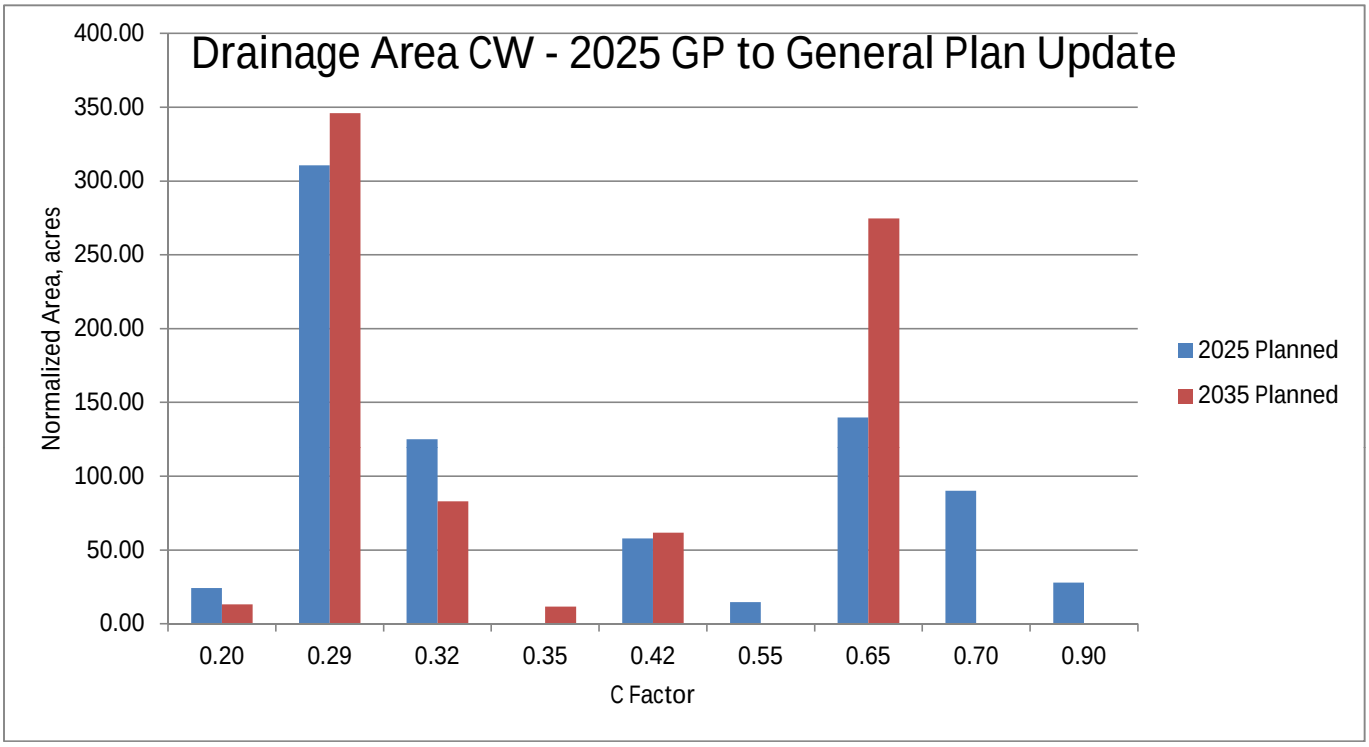

Drainage Area CO2 - 2025 GP to General Plan Update
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

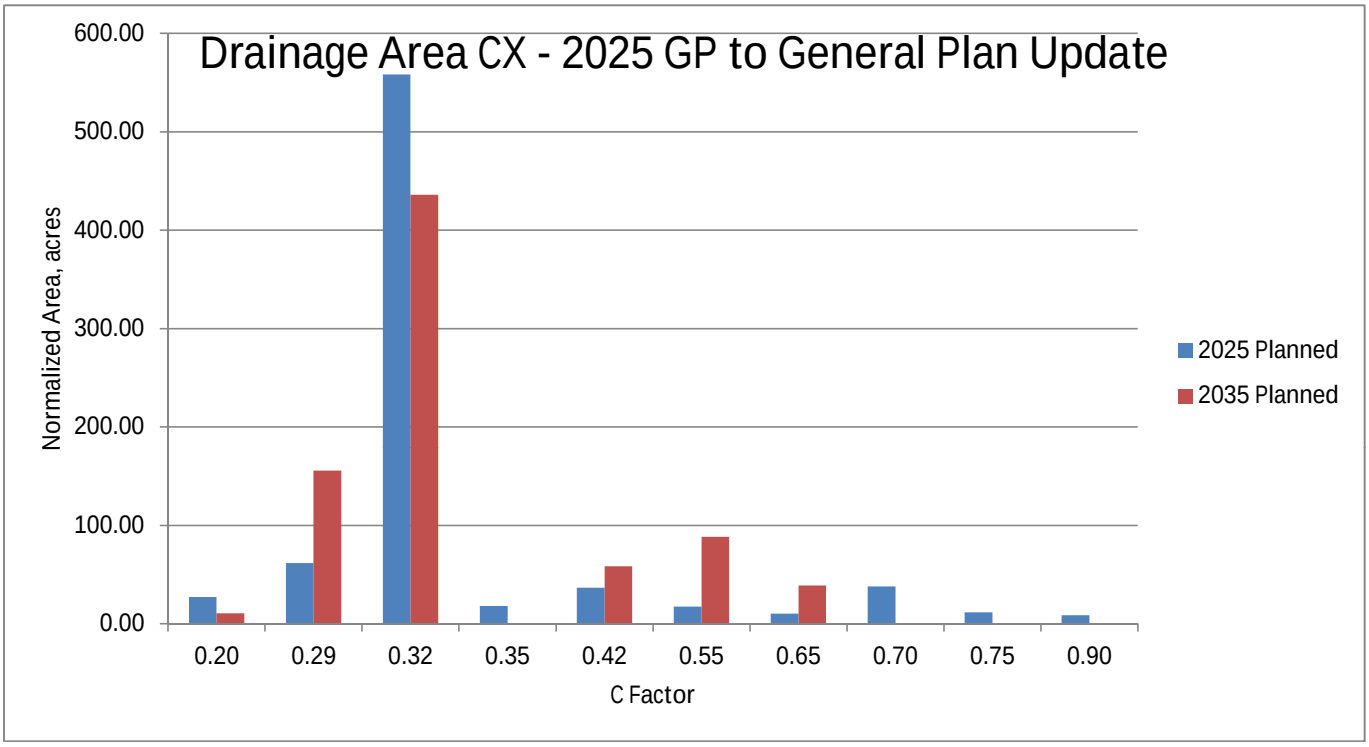

Drainage Area CP - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.32
0.50
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

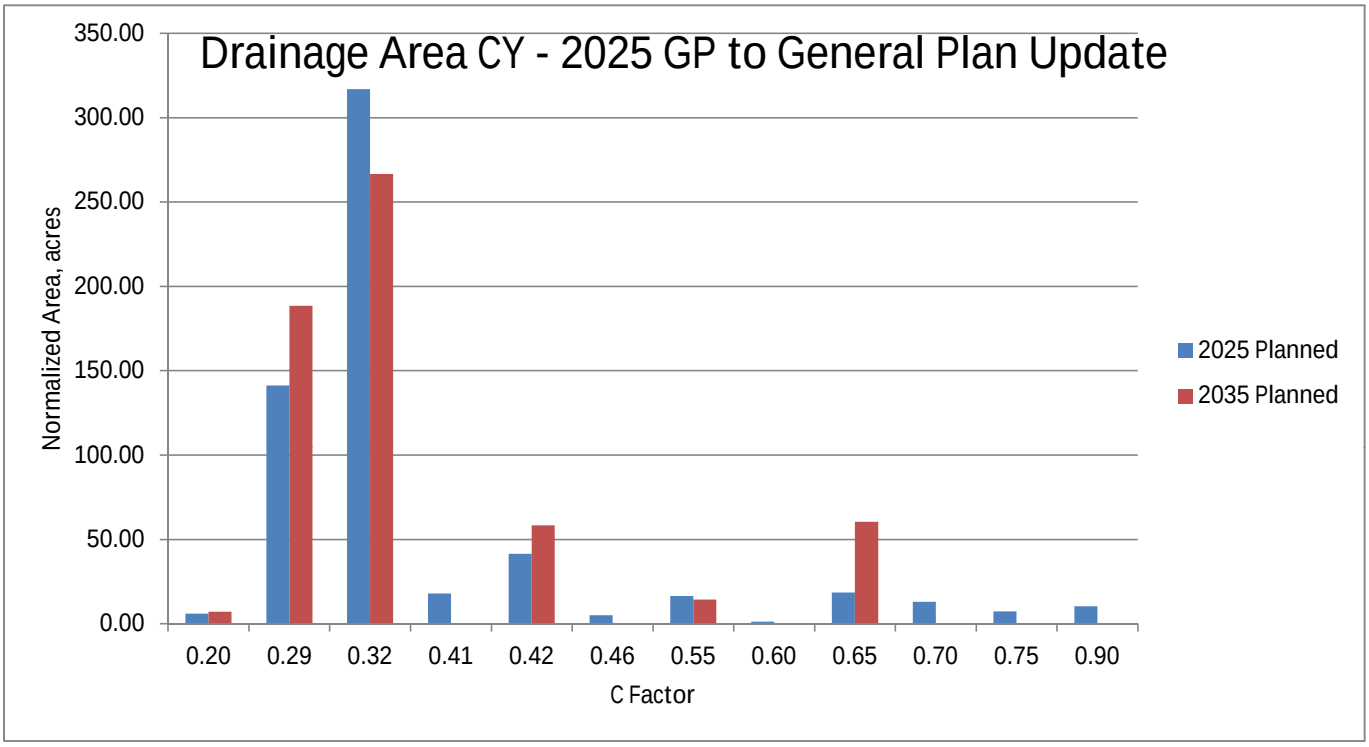

Drainage Area CQ - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.32
0.45
0.50
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

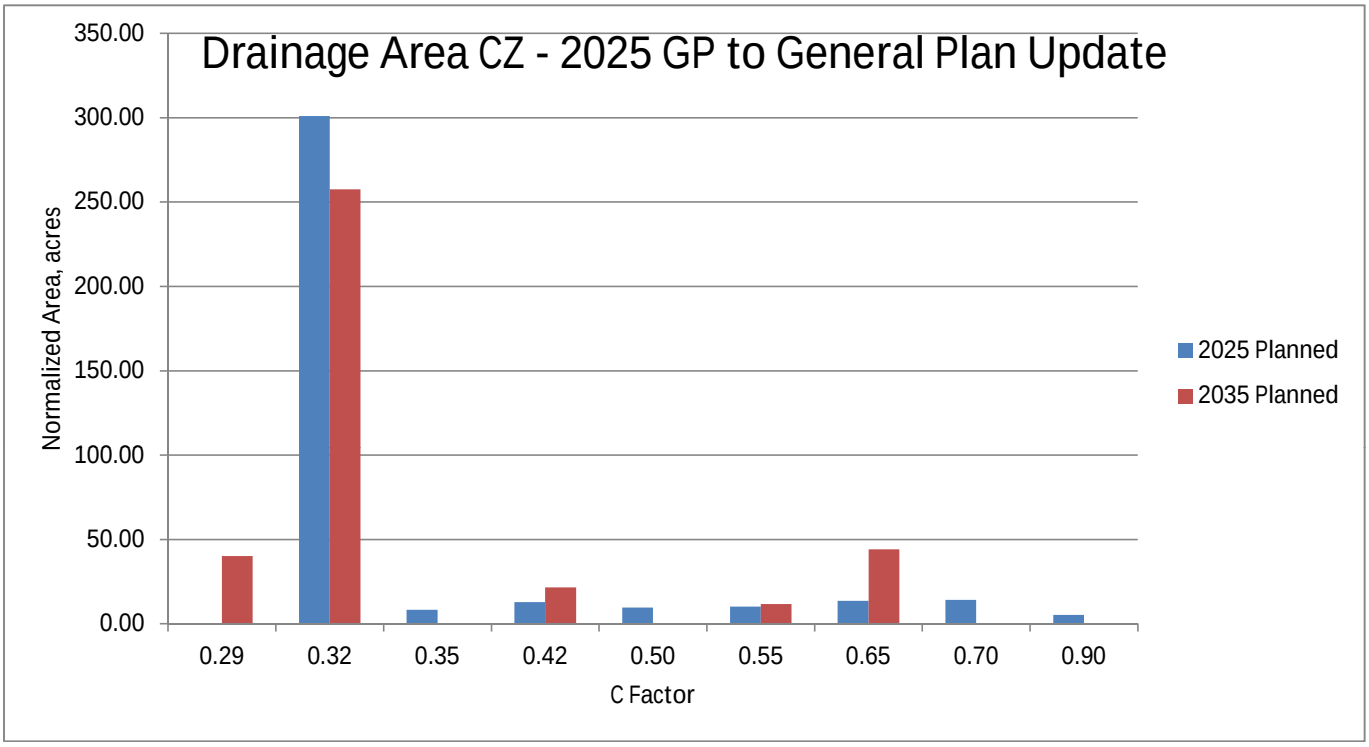

Drainage Area CS - 2025 GP to General Plan Update
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.32
0.65
0.75
C Factor
2025 Planned
2035 Planned

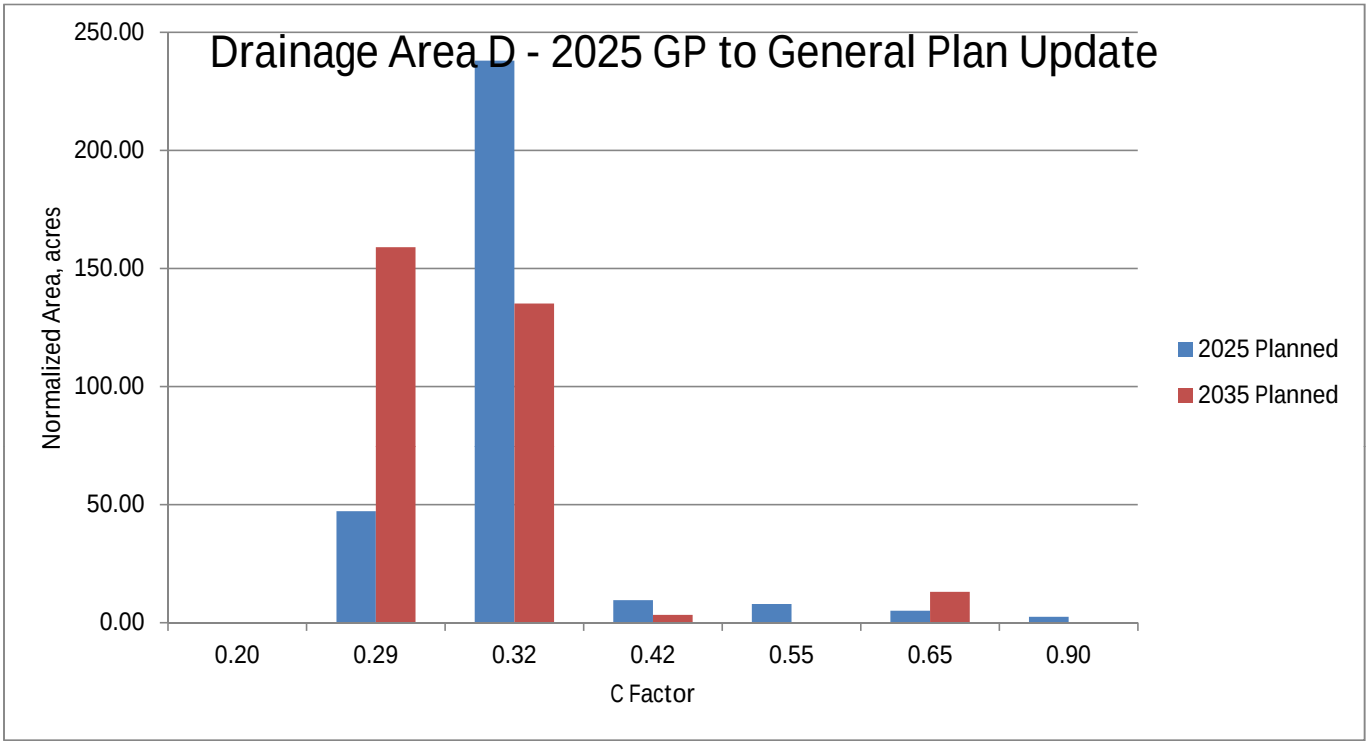

Drainage Area CU - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.00
0.32
0.65
0.75
C Factor
2025 Planned
2035 Planned

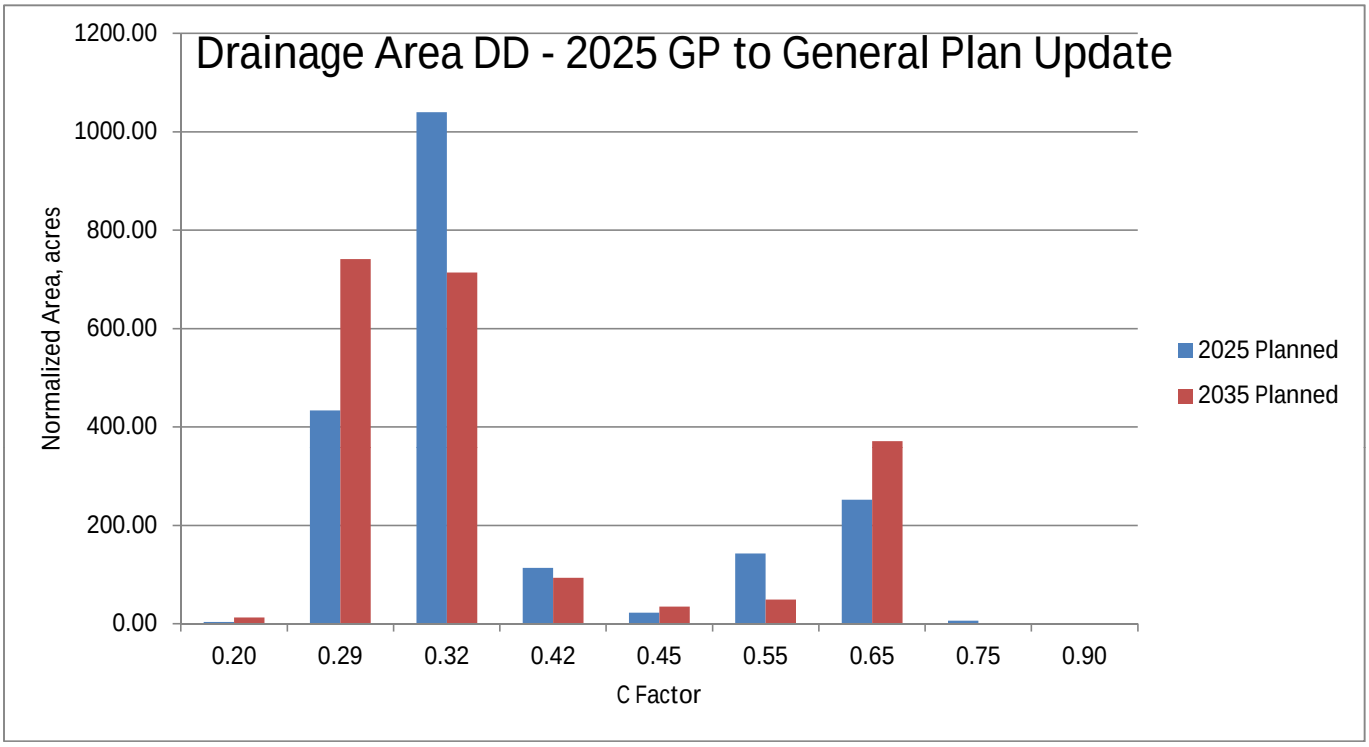

Drainage Area CW - 2025 GP to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

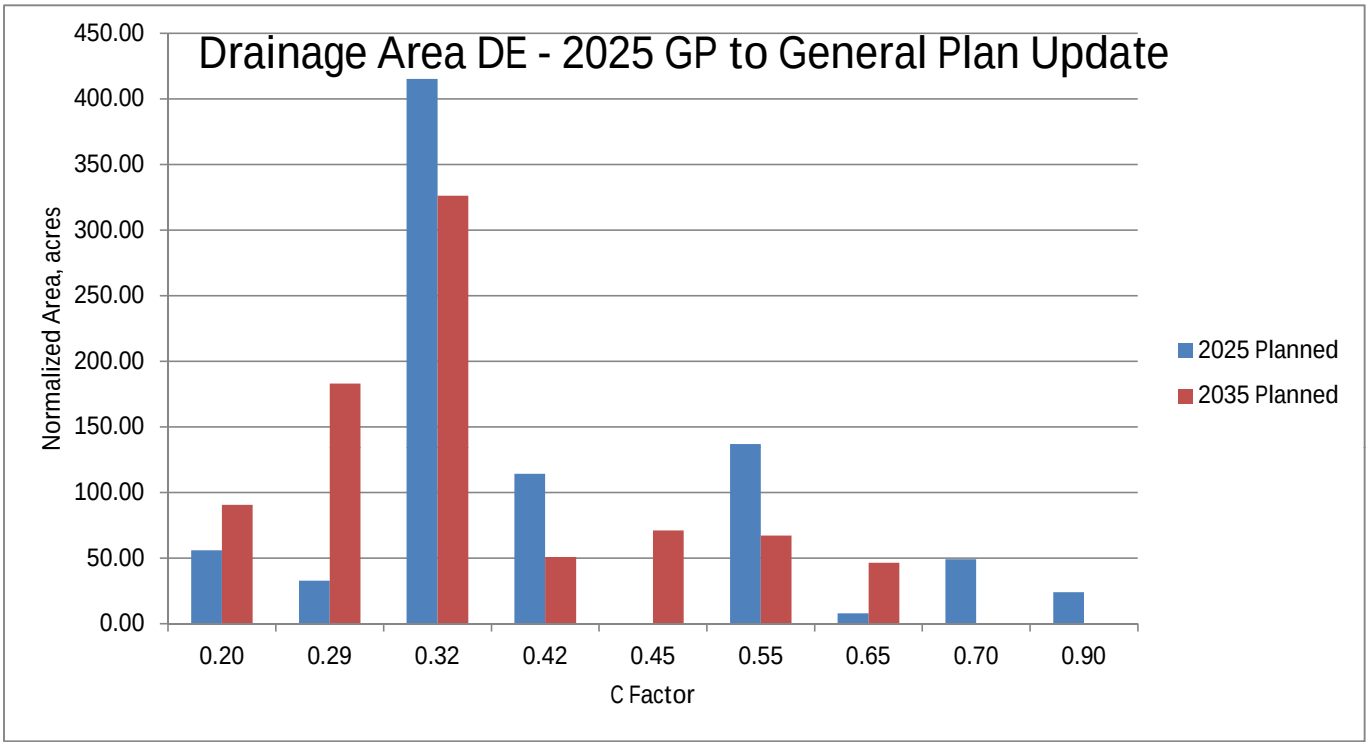

Drainage Area CX - 2025 GP to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

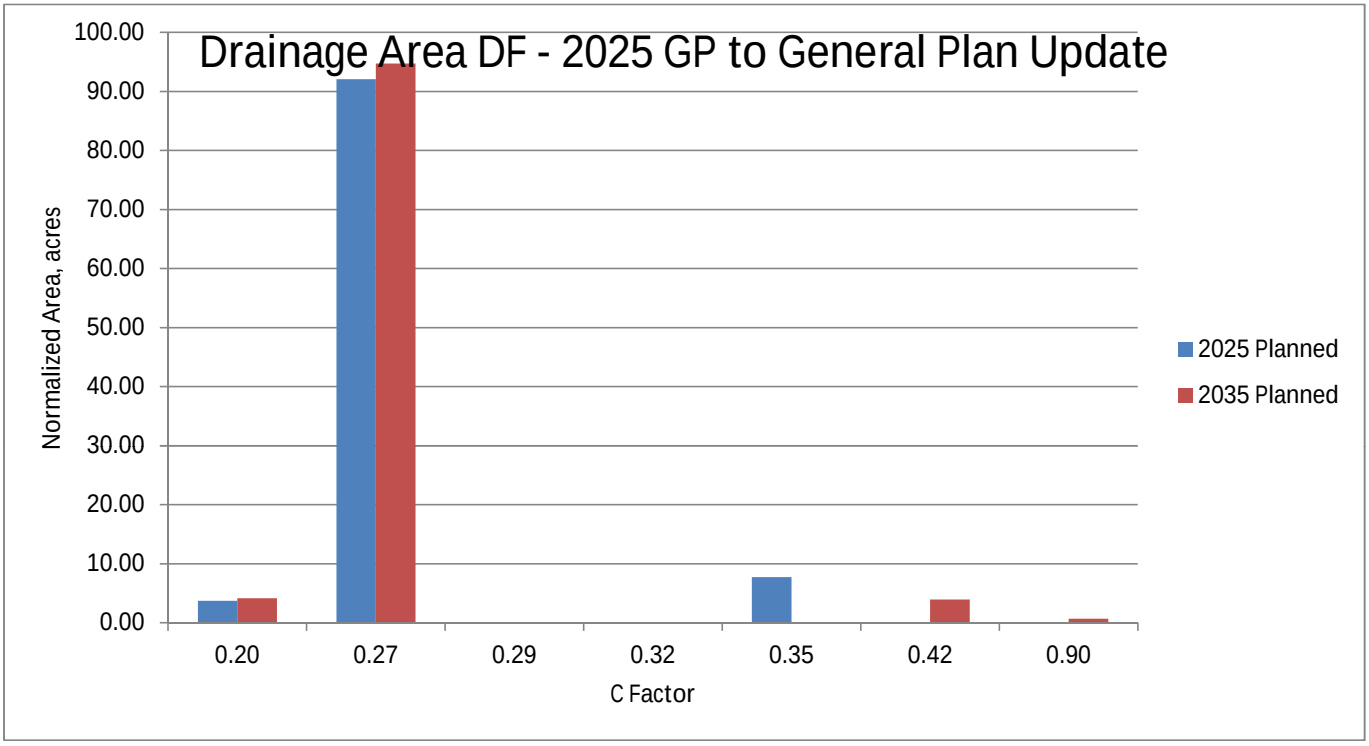

Drainage Area CY - 2025 GP to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.41
0.42
0.46
0.55
0.60
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

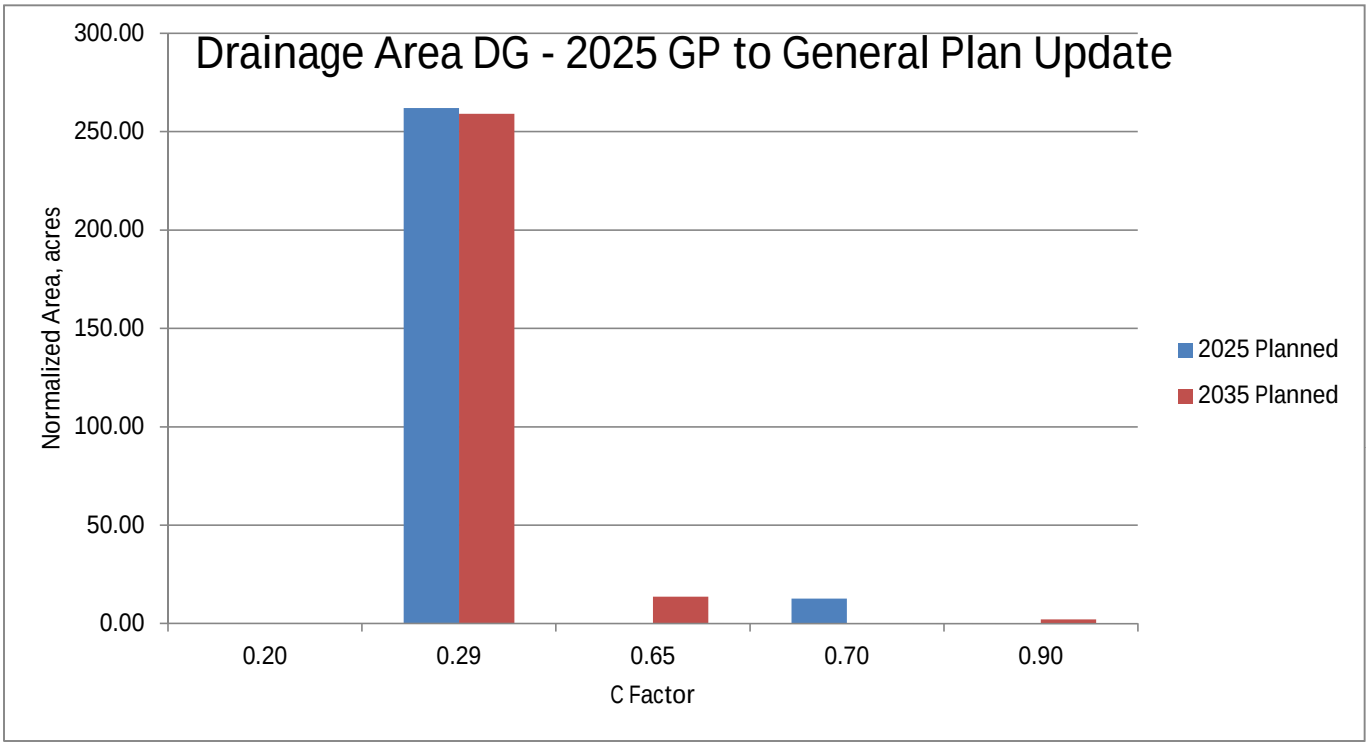

Drainage Area CZ - 2025 GP to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.29
0.32
0.35
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

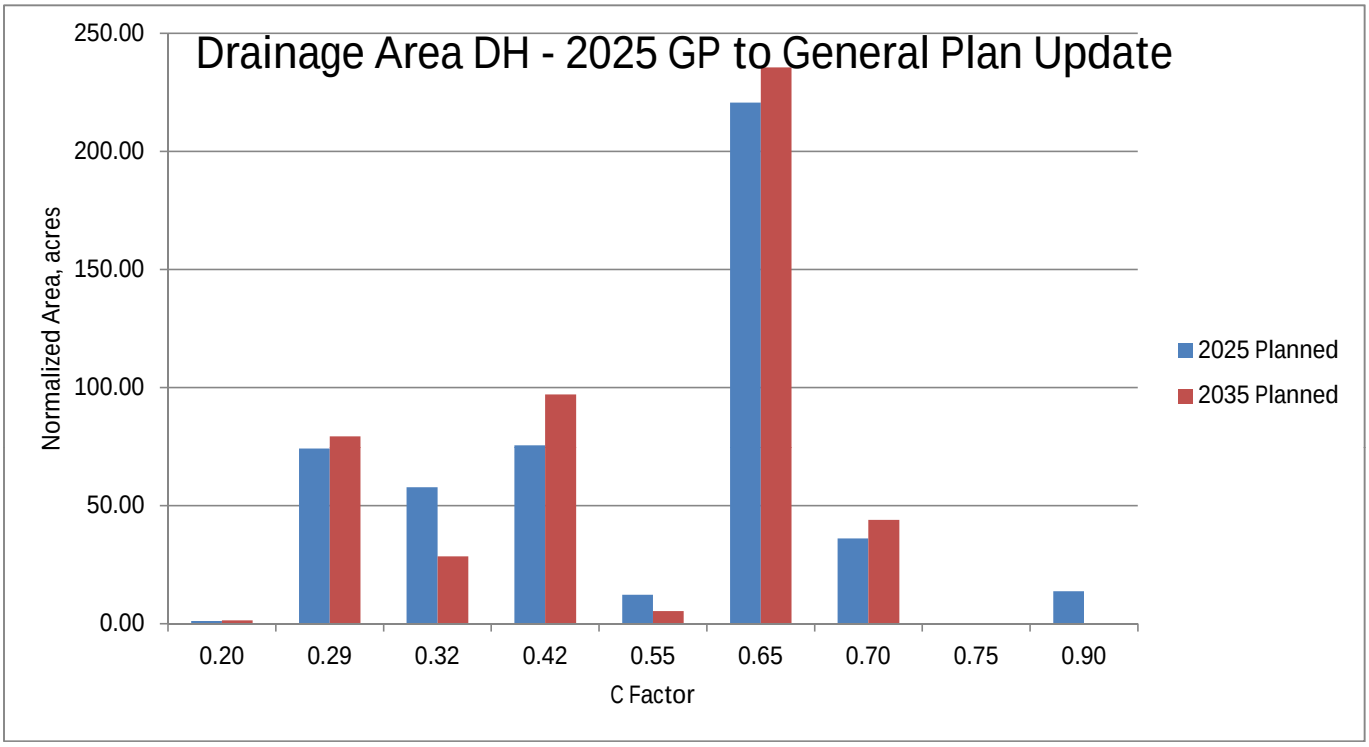

Drainage Area D - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

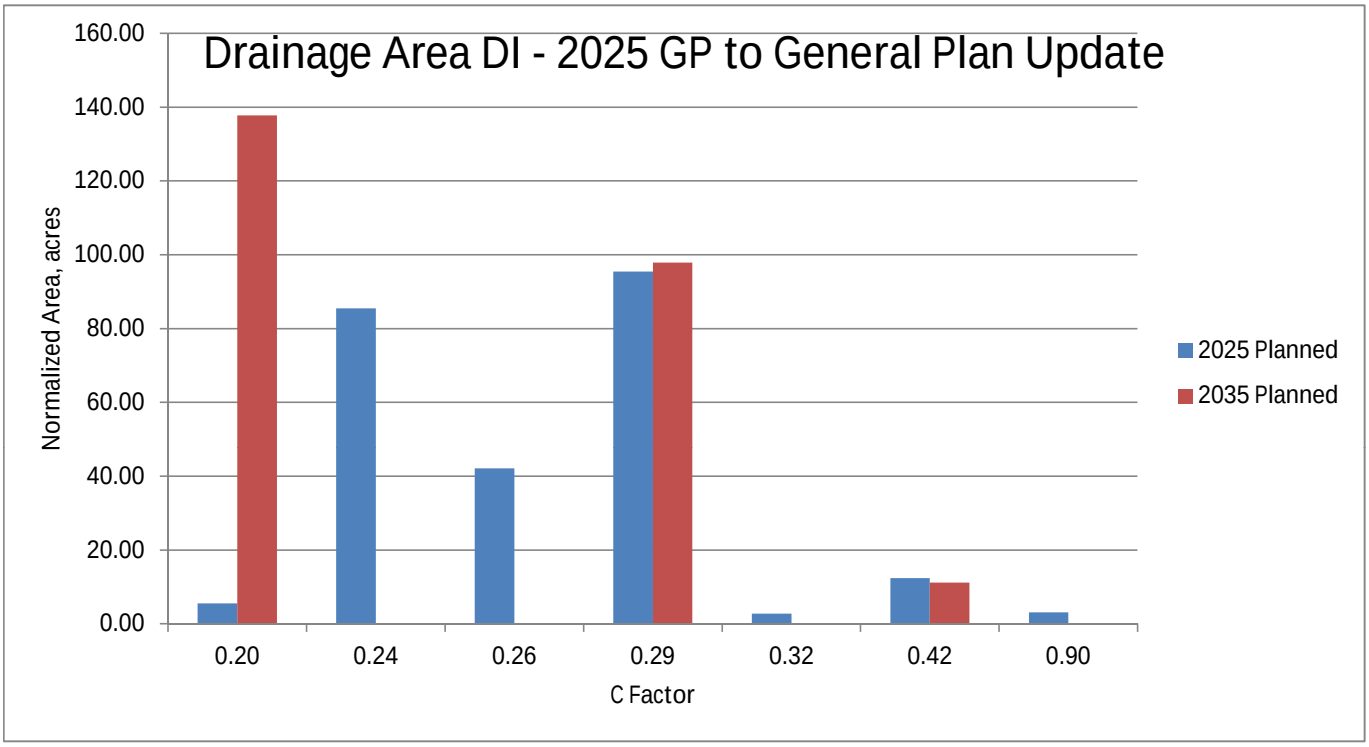

Drainage Area DD - 2025 GP to General Plan Update
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

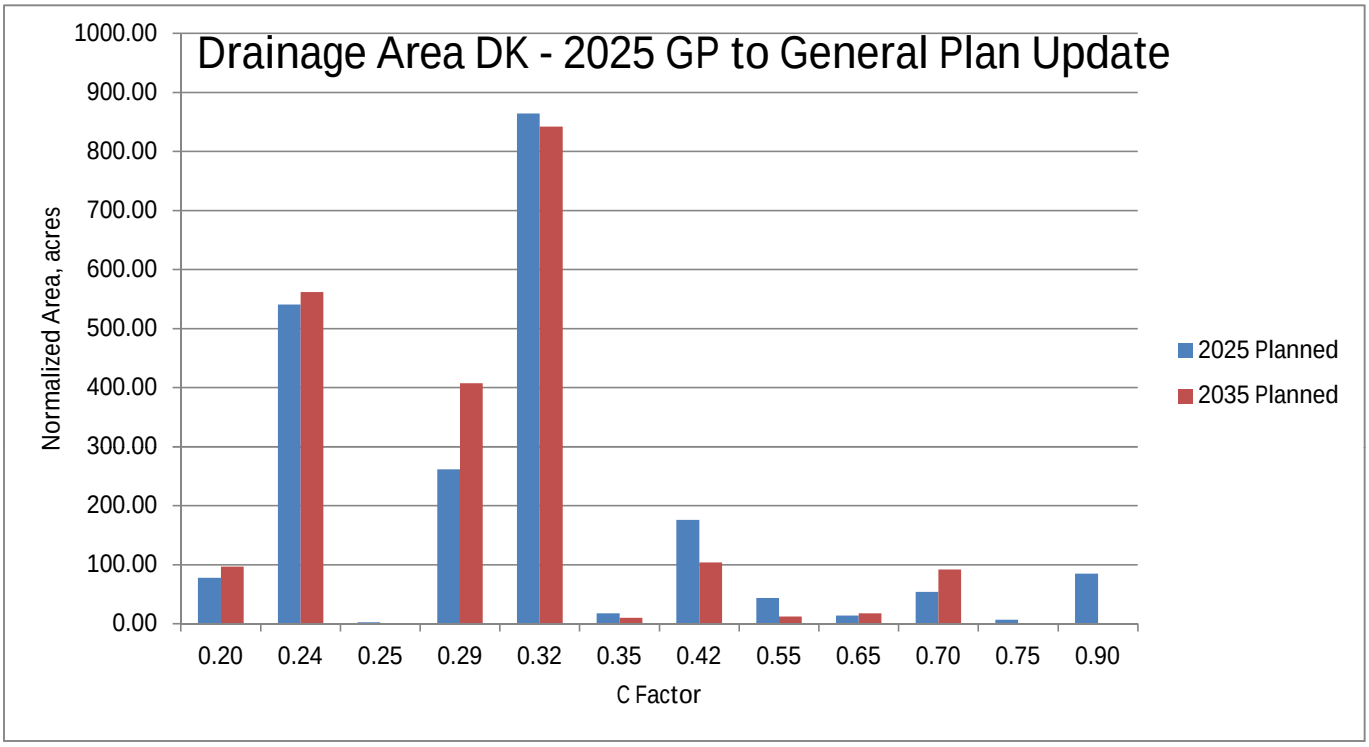

Drainage Area DE - 2025 GP to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

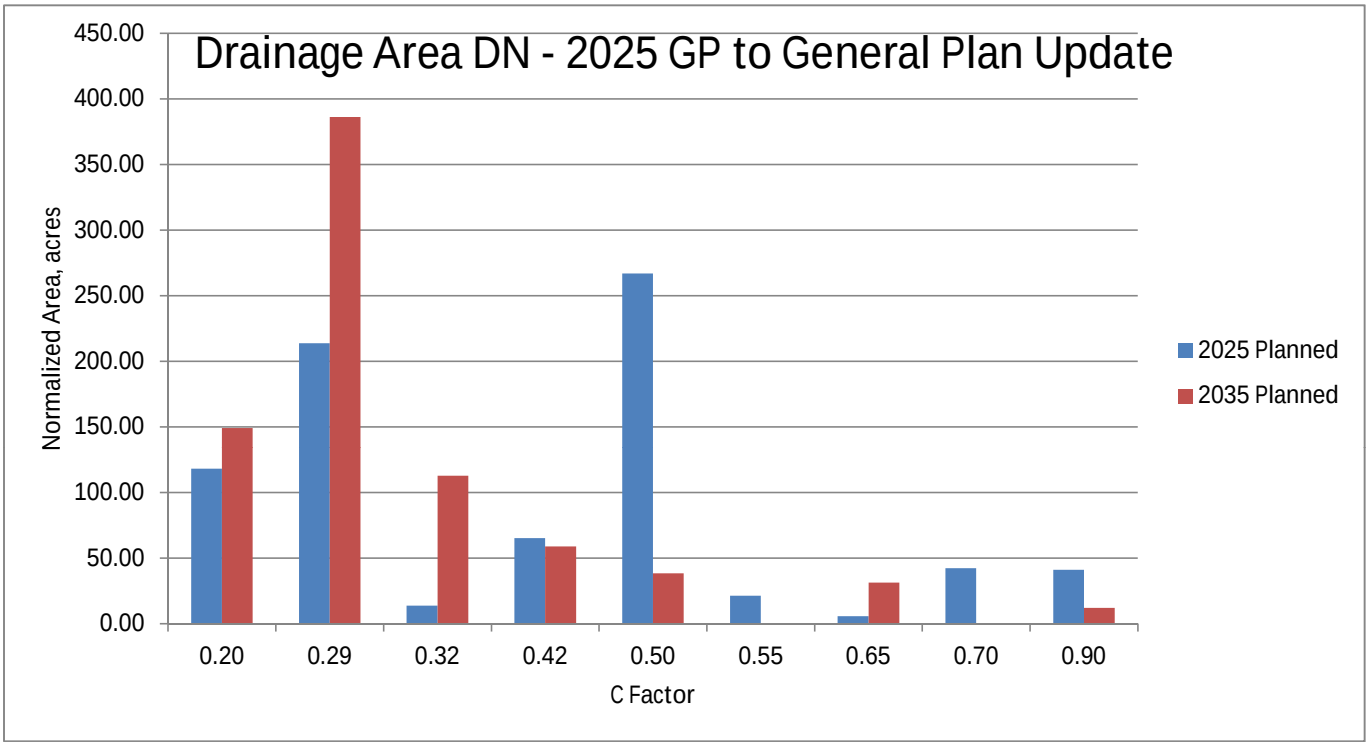

Drainage Area DF - 2025 GP to General Plan Update
Normalized Area, acres
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.20
0.27
0.29
0.32
0.35
0.42
0.90
C Factor
2025 Planned
2035 Planned

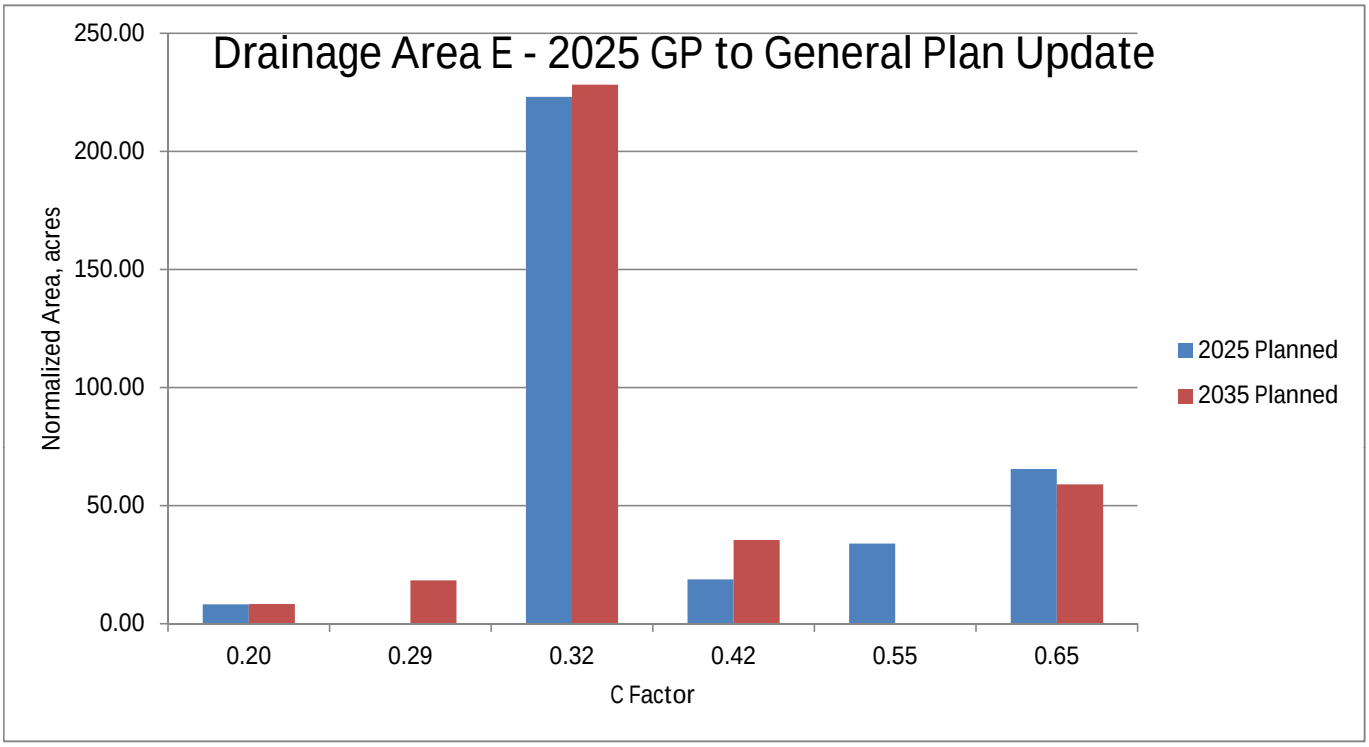

Drainage Area DG - 2025 GP to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

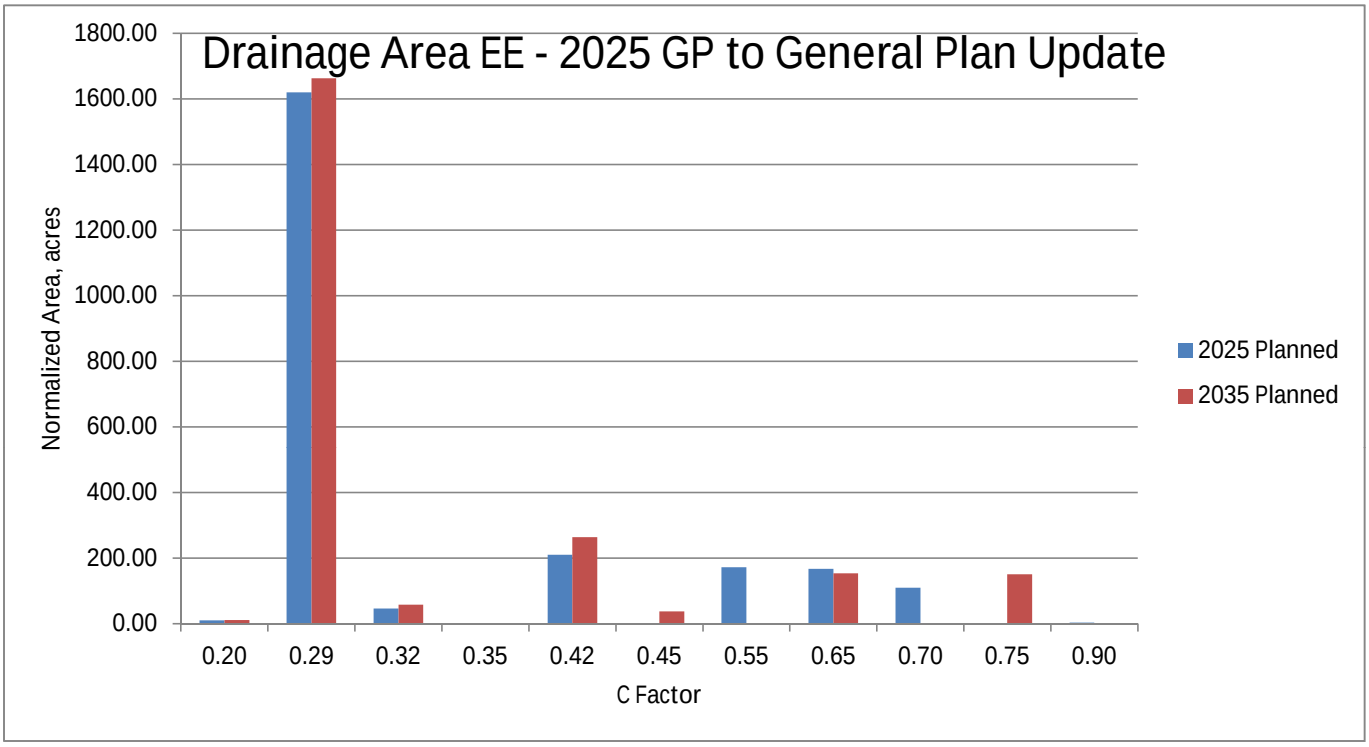

Drainage Area DH - 2025 GP to General Plan Update
Normalized Area, acres
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

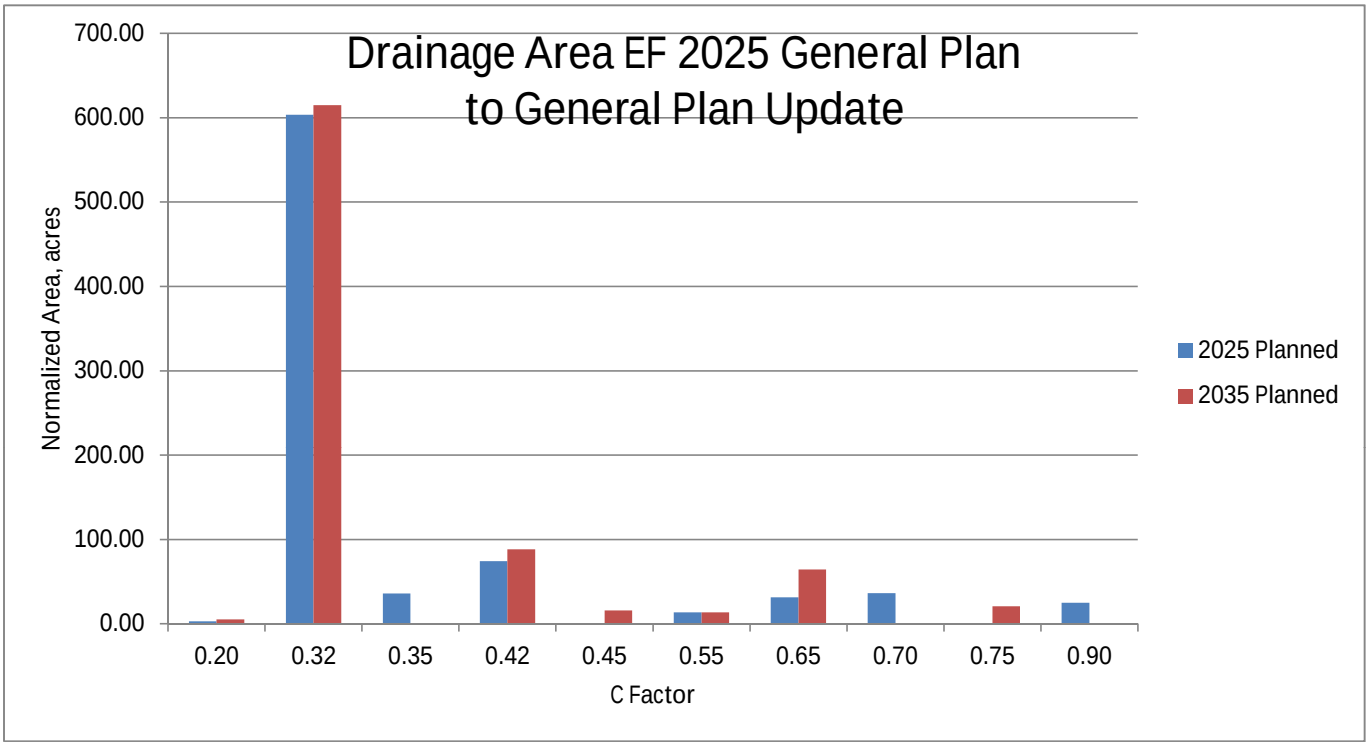

Drainage Area DI - 2025 GP to General Plan Update
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.24
0.26
0.29
0.32
0.42
0.90
C Factor
2025 Planned
2035 Planned

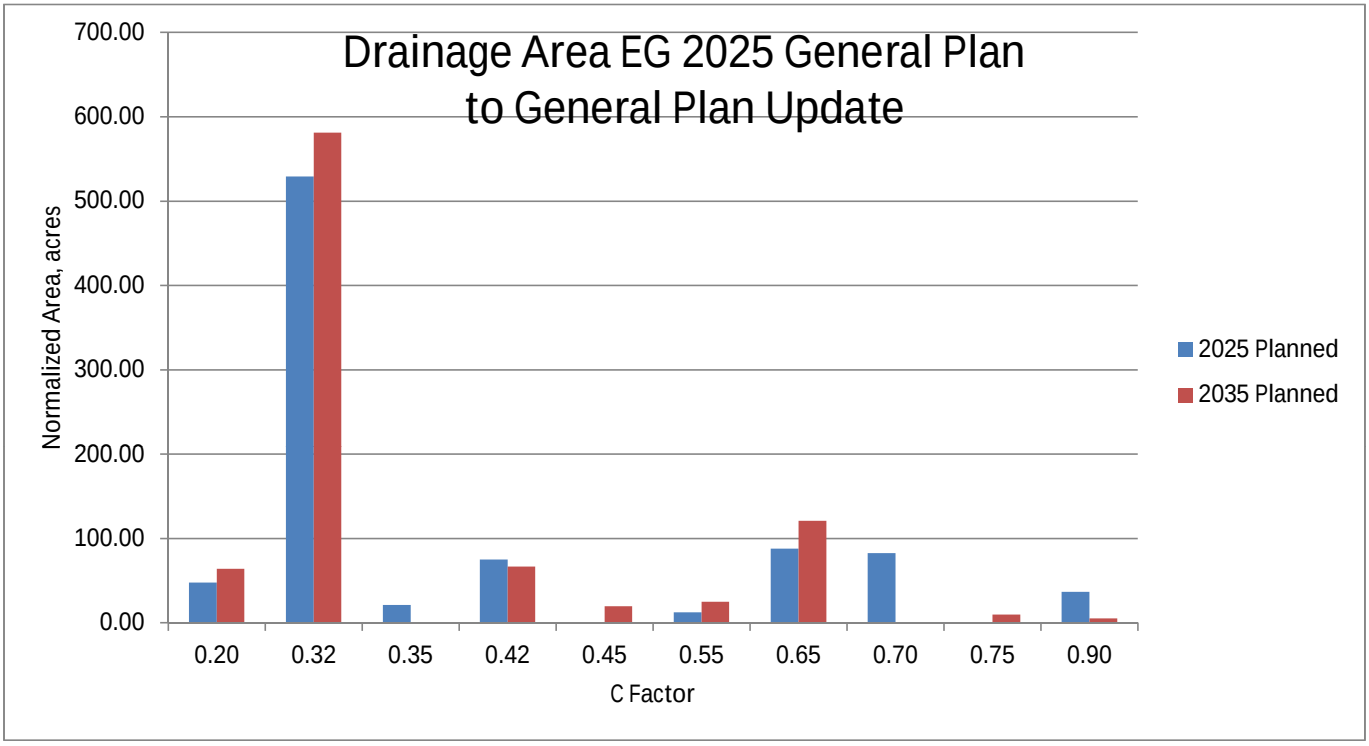

Drainage Area DK - 2025 GP to General Plan Update
Normalized Area, acres
1000.00
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.24
0.25
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

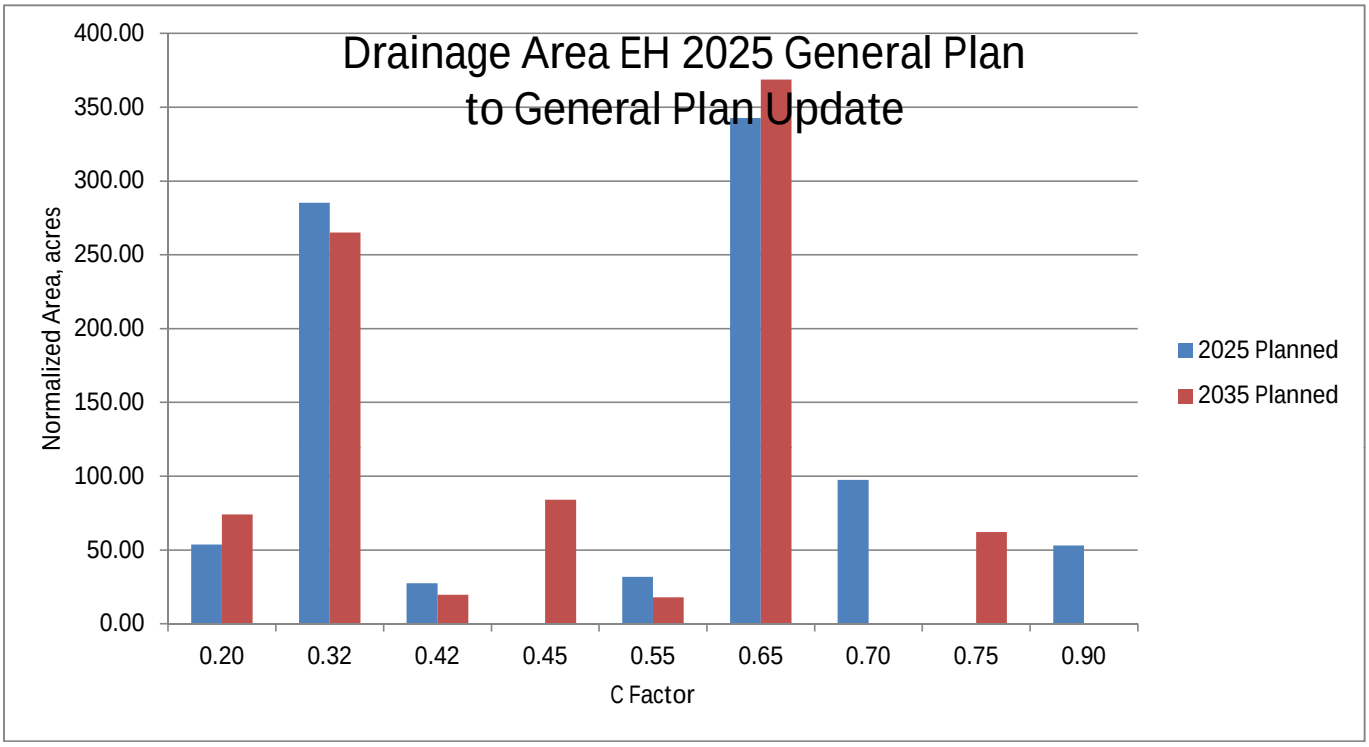

Drainage Area DN - 2025 GP to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

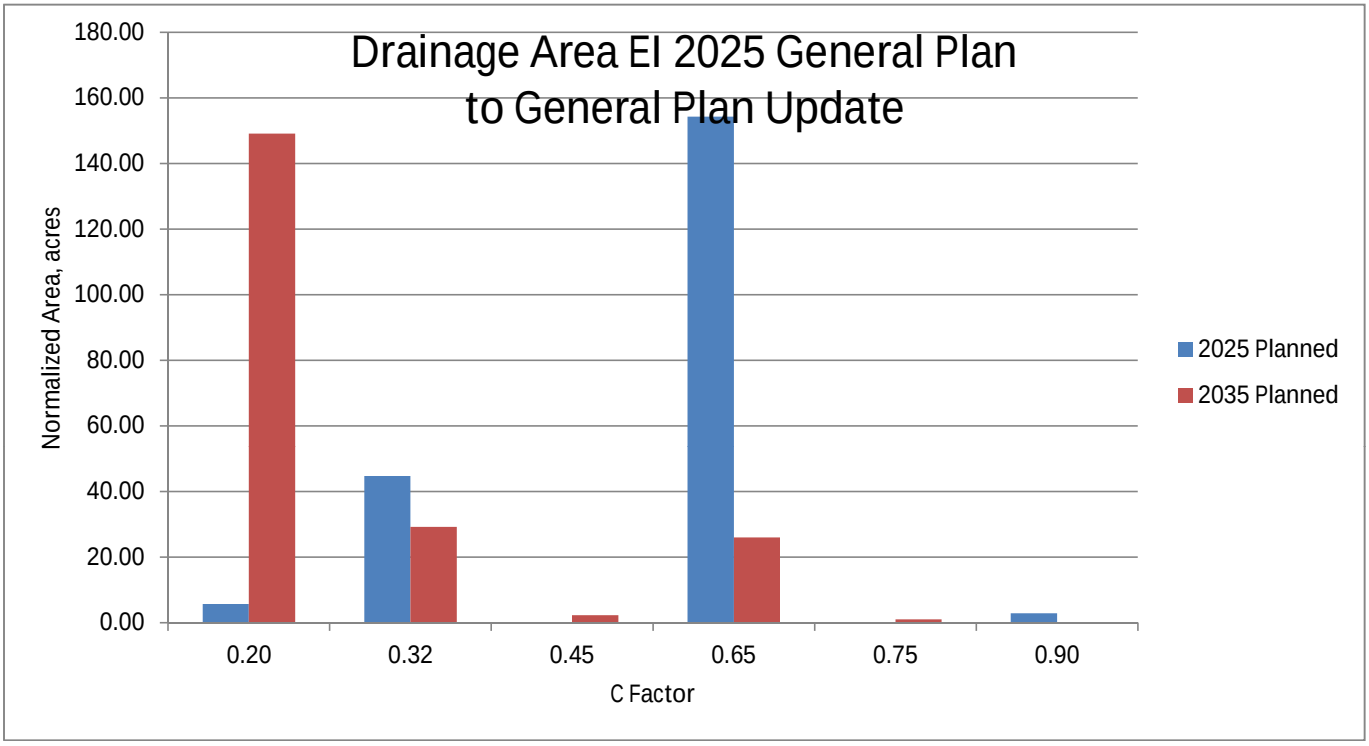

Drainage Area E - 2025 GP to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
C Factor
2025 Planned
2035 Planned

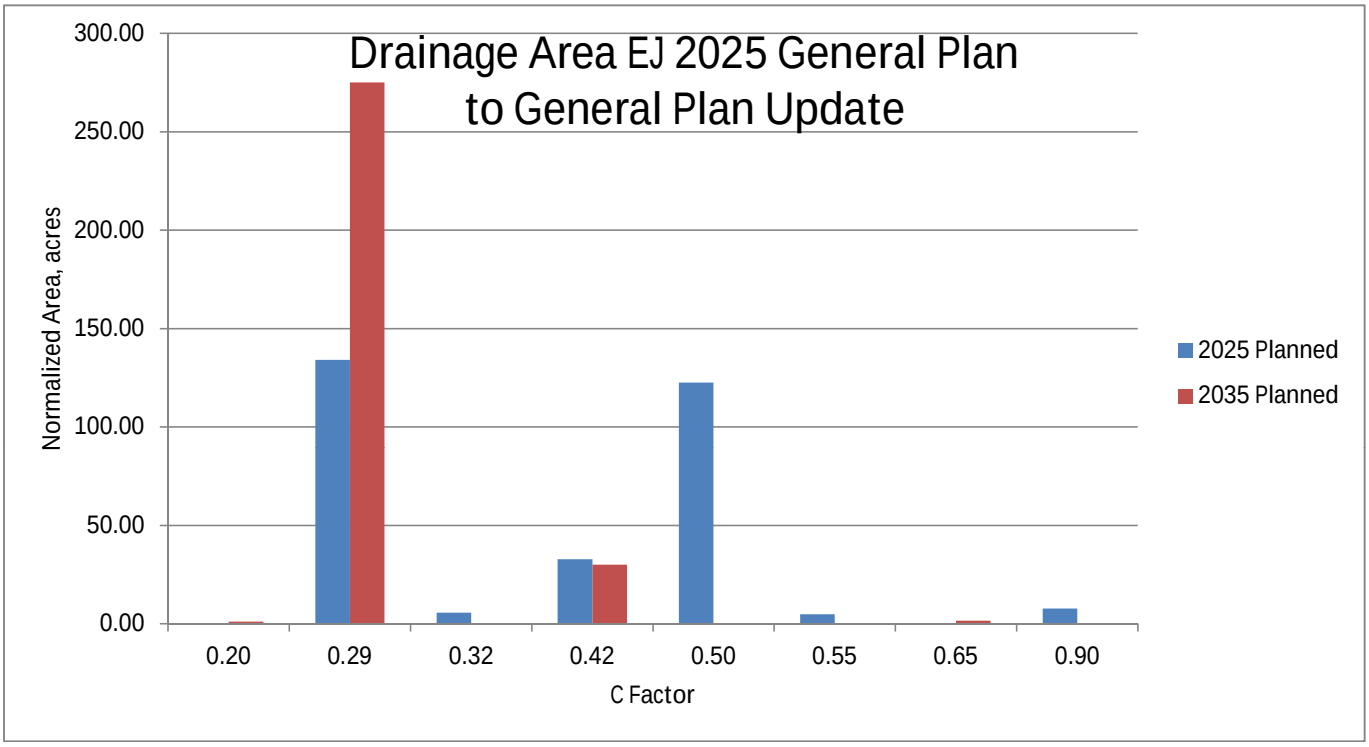

Drainage Area EE - 2025 GP to General Plan Update
Normalized Area, acres
1800.00
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
0.20
0.29
0.32
0.35
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

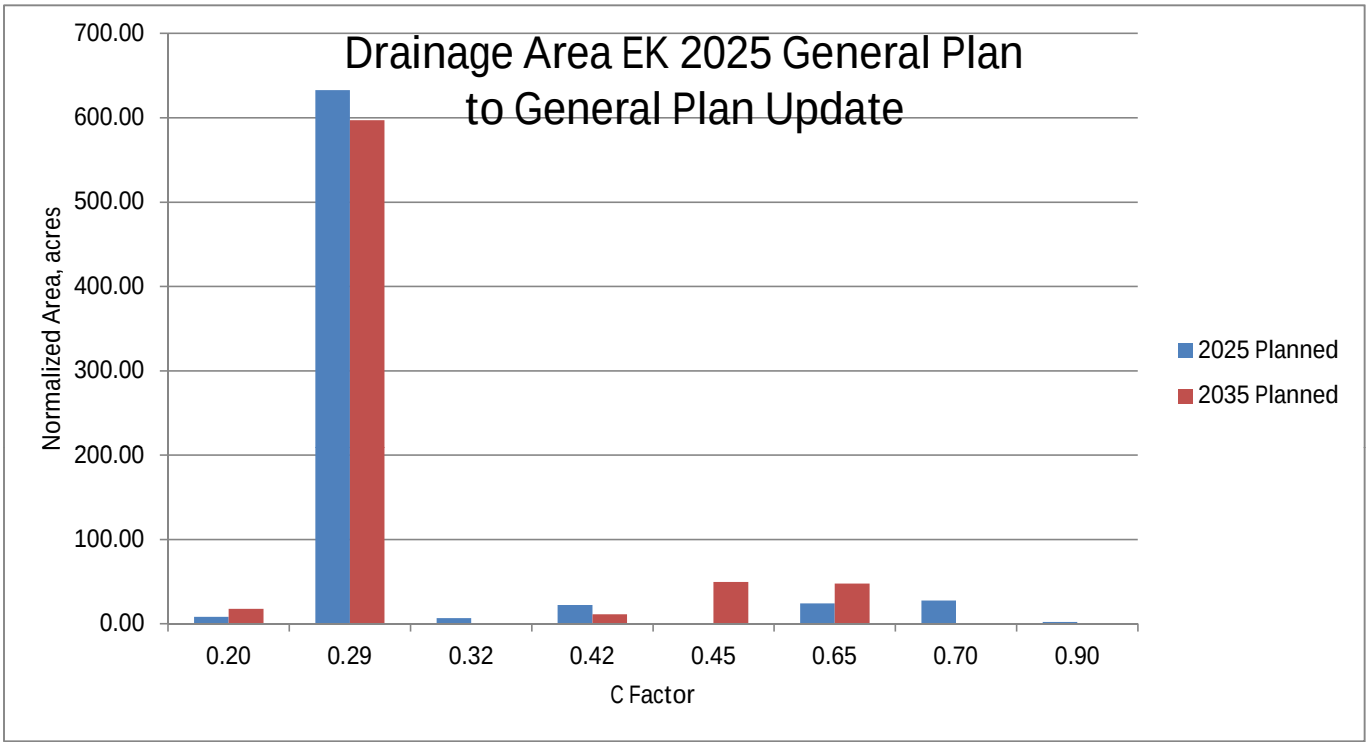

Drainage Area EF 2025 General Plan to General Plan Update
Normalized Area, acres
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.32
0.35
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

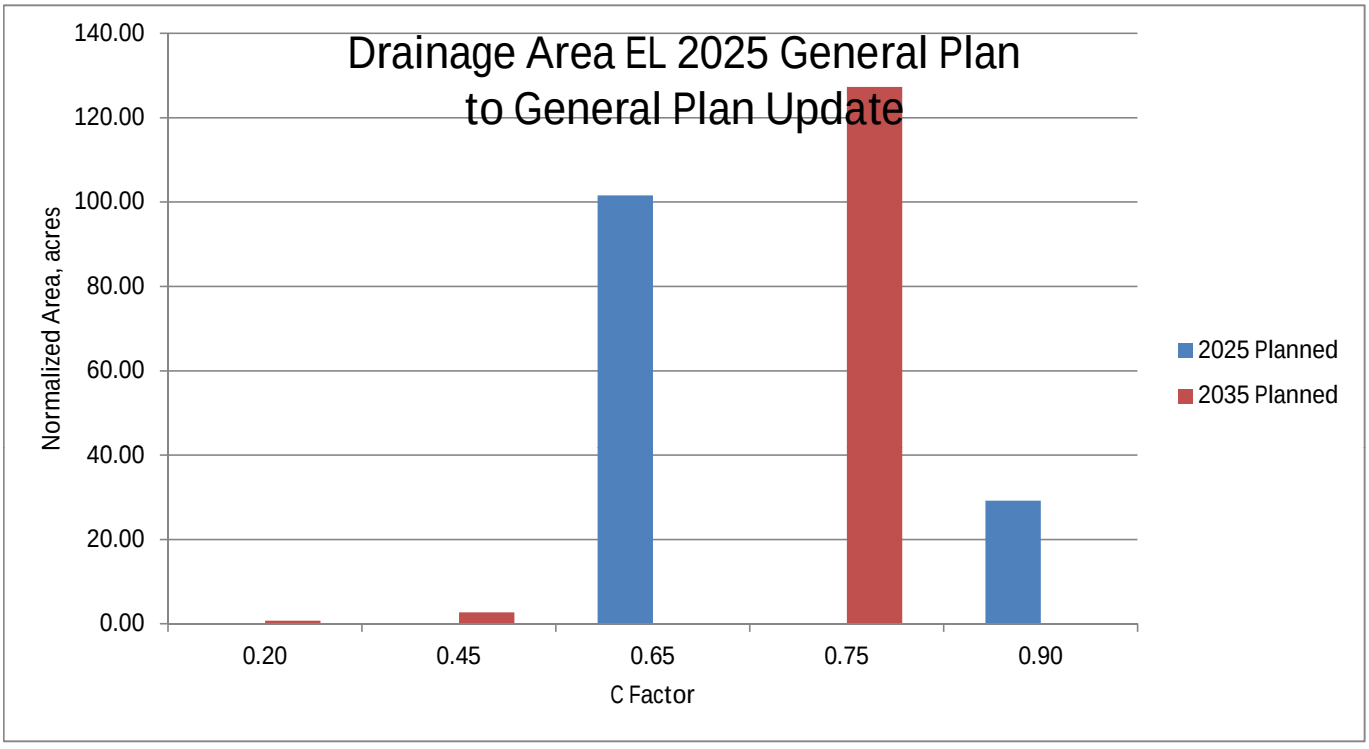

Drainage Area EG 2025 General Plan
to General Plan Update
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.32
0.35
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

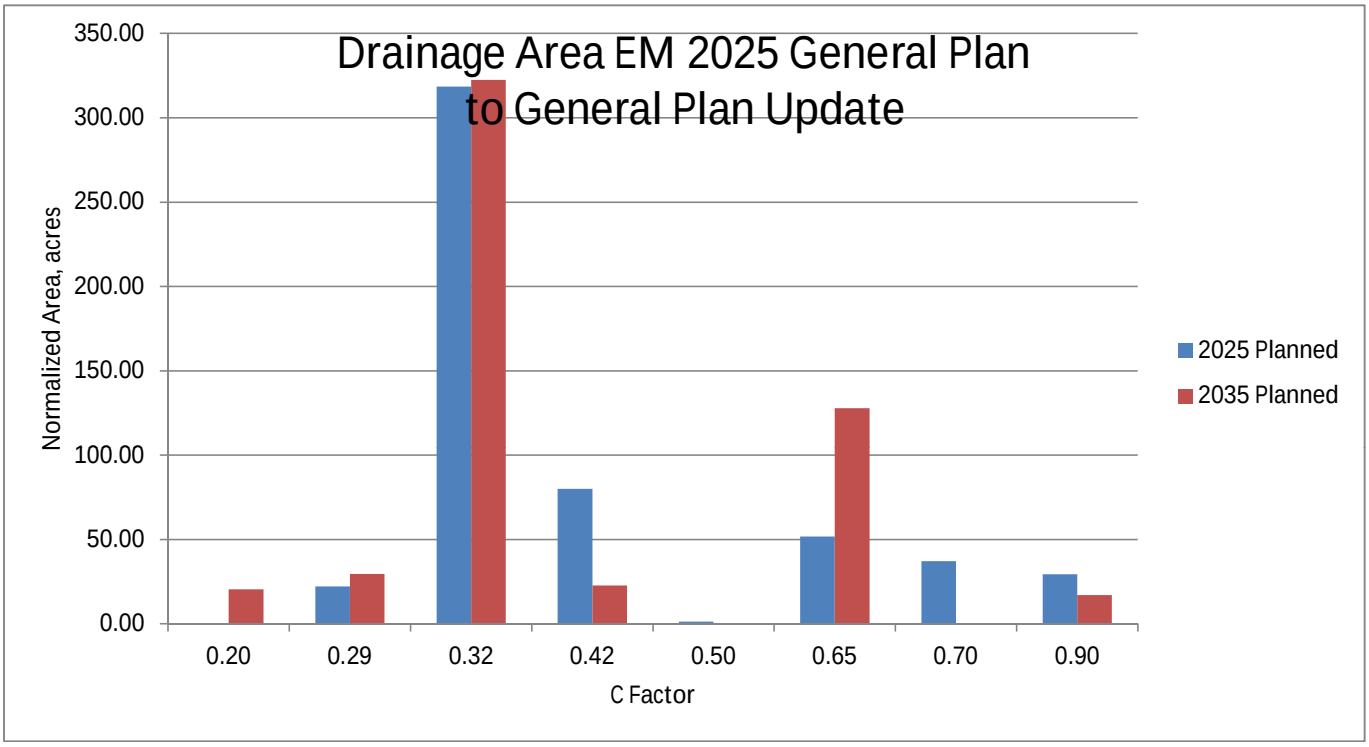

Drainage Area EH 2025 General Plan to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

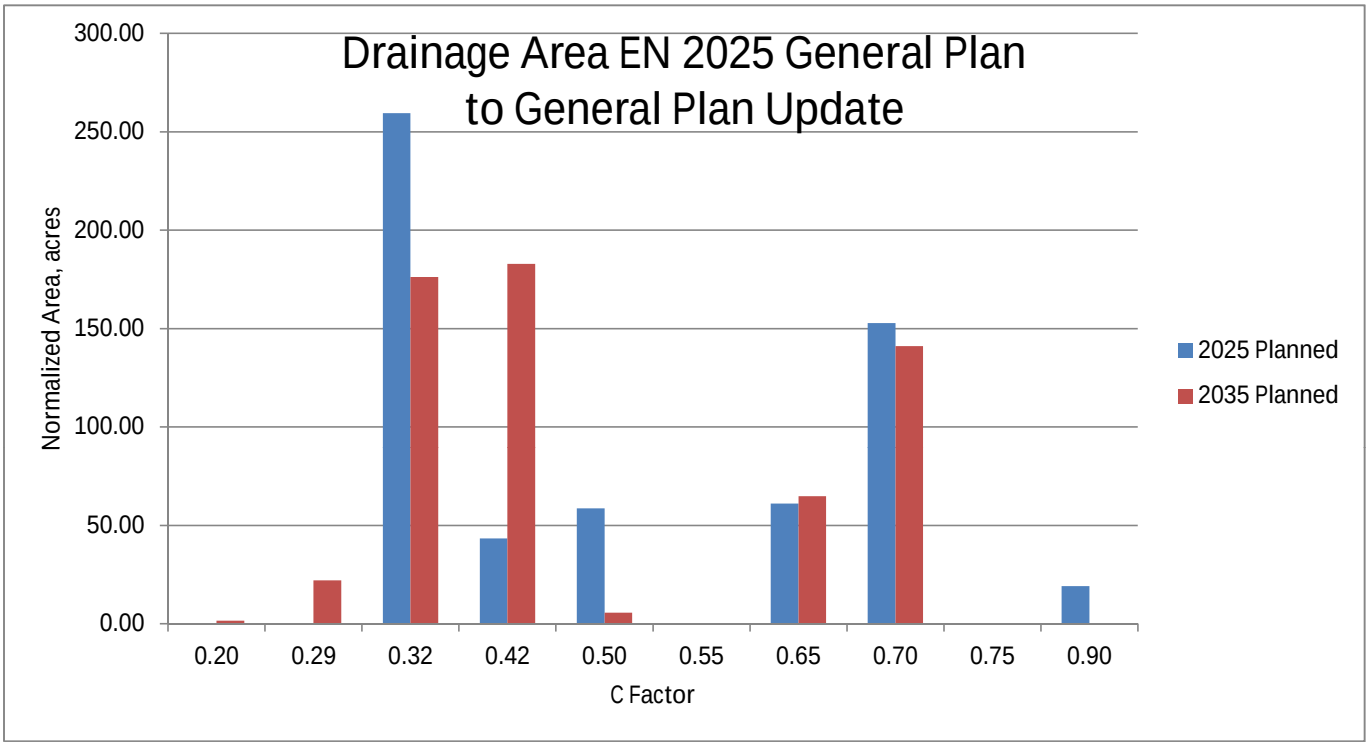

Drainage Area EI 2025 General Plan to General Plan Update
Normalized Area, acres
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.32
0.45
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

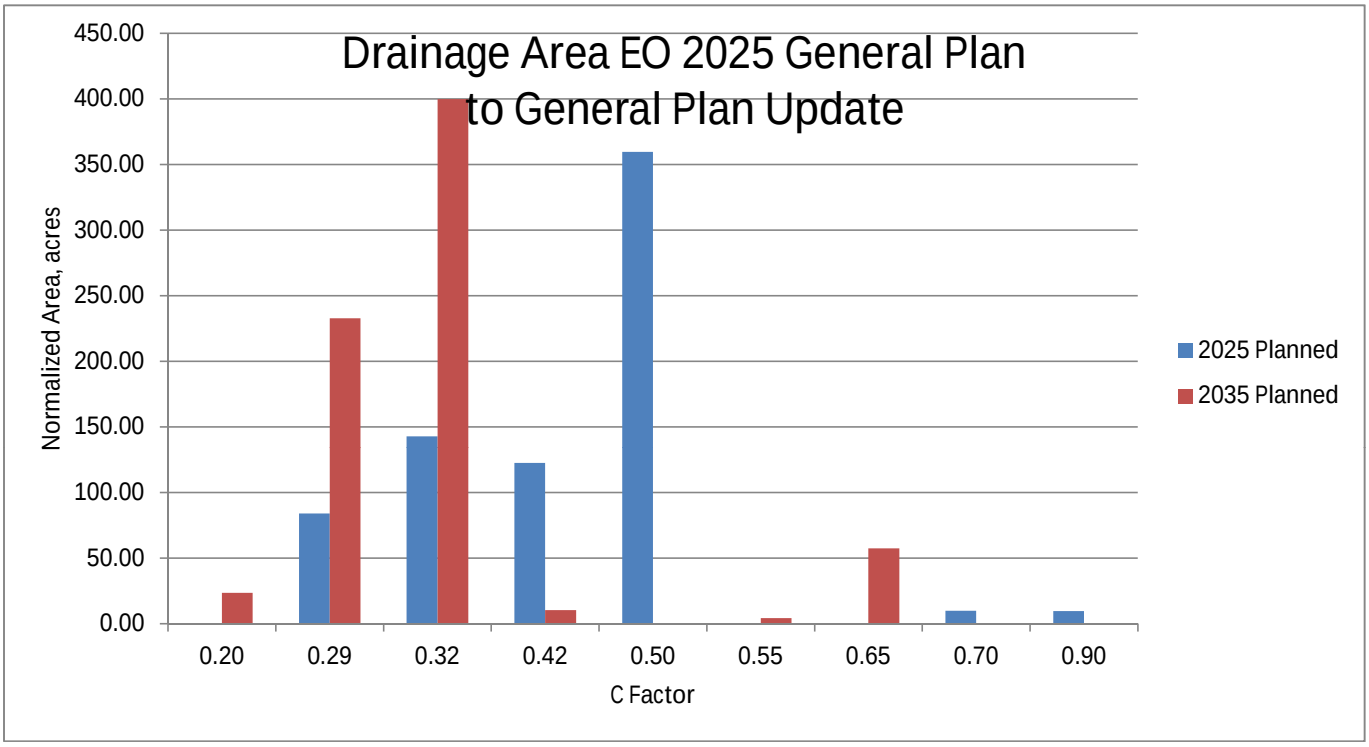

Drainage Area EJ 2025 General Plan to General Plan Update
Normalized Area, acres
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

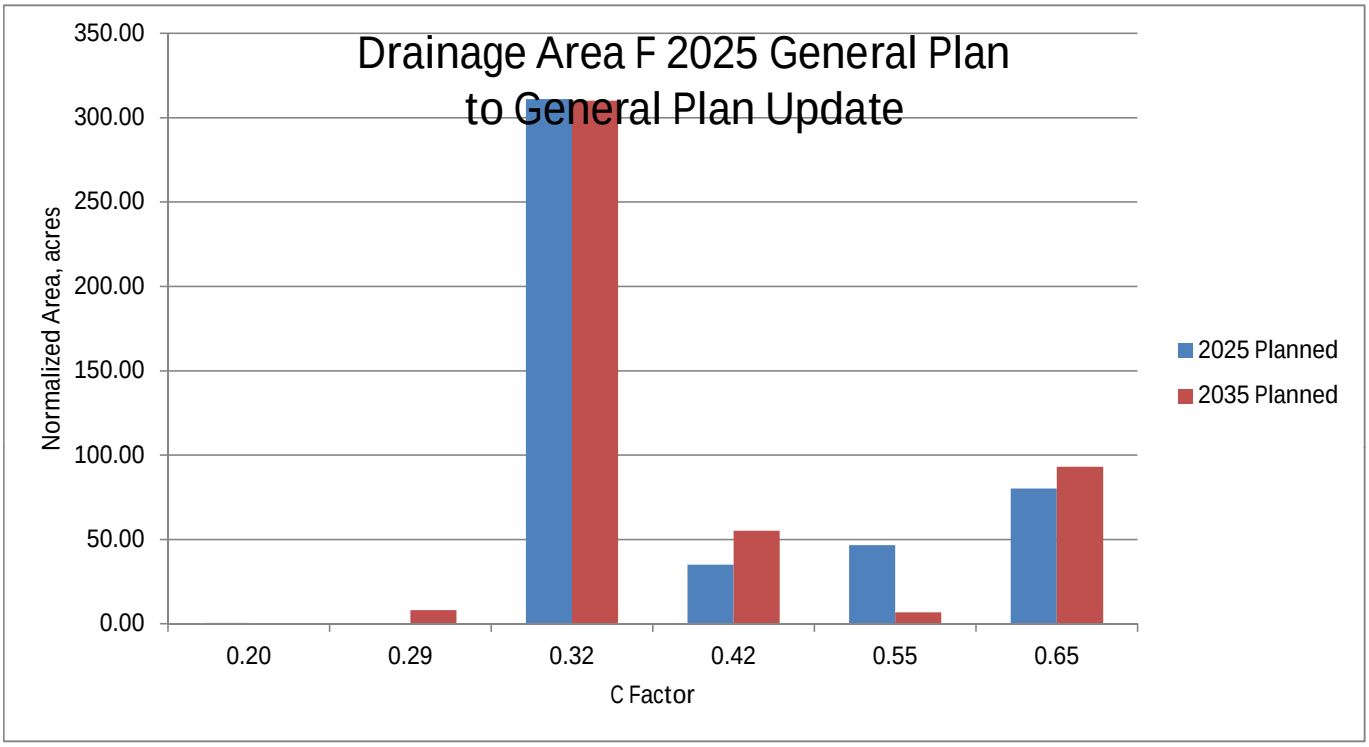

Drainage Area EK 2025 General Plan to General Plan Update
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

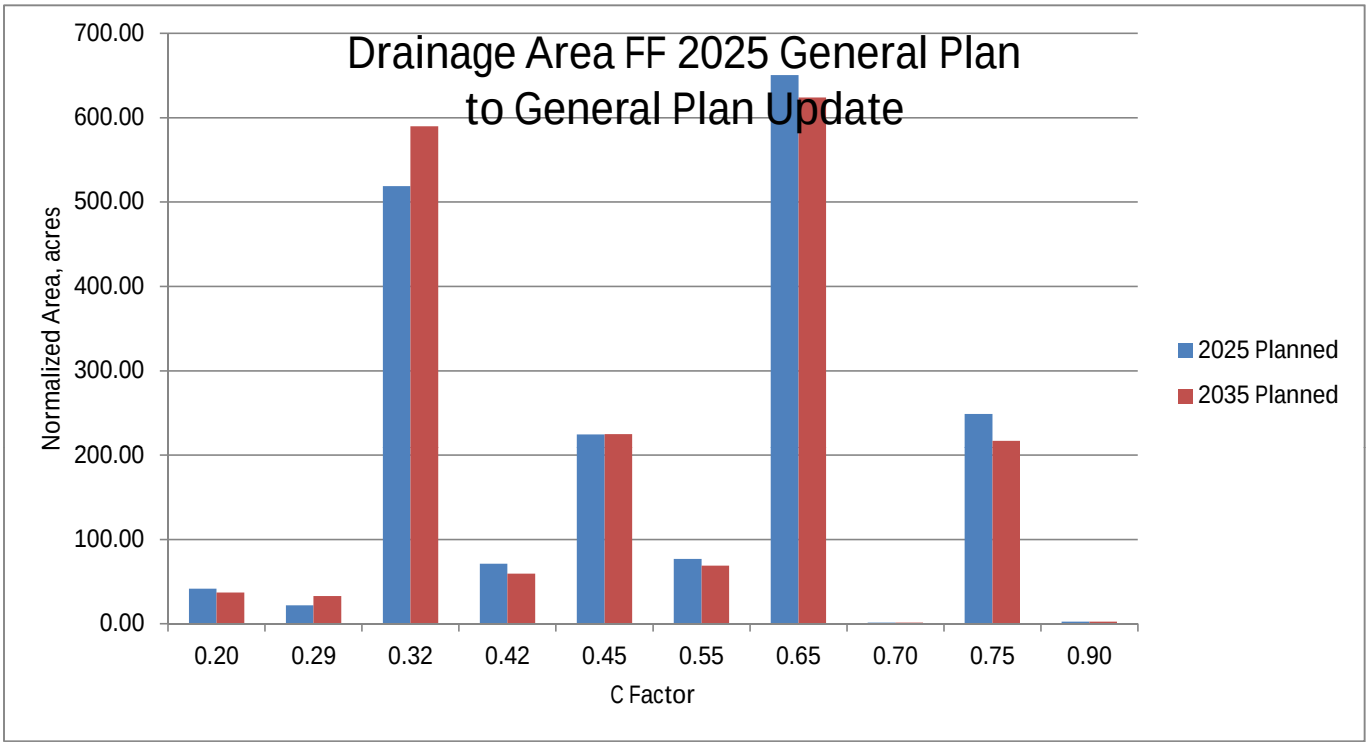

Drainage Area EL 2025 General Plan to General Plan Update
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.45
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

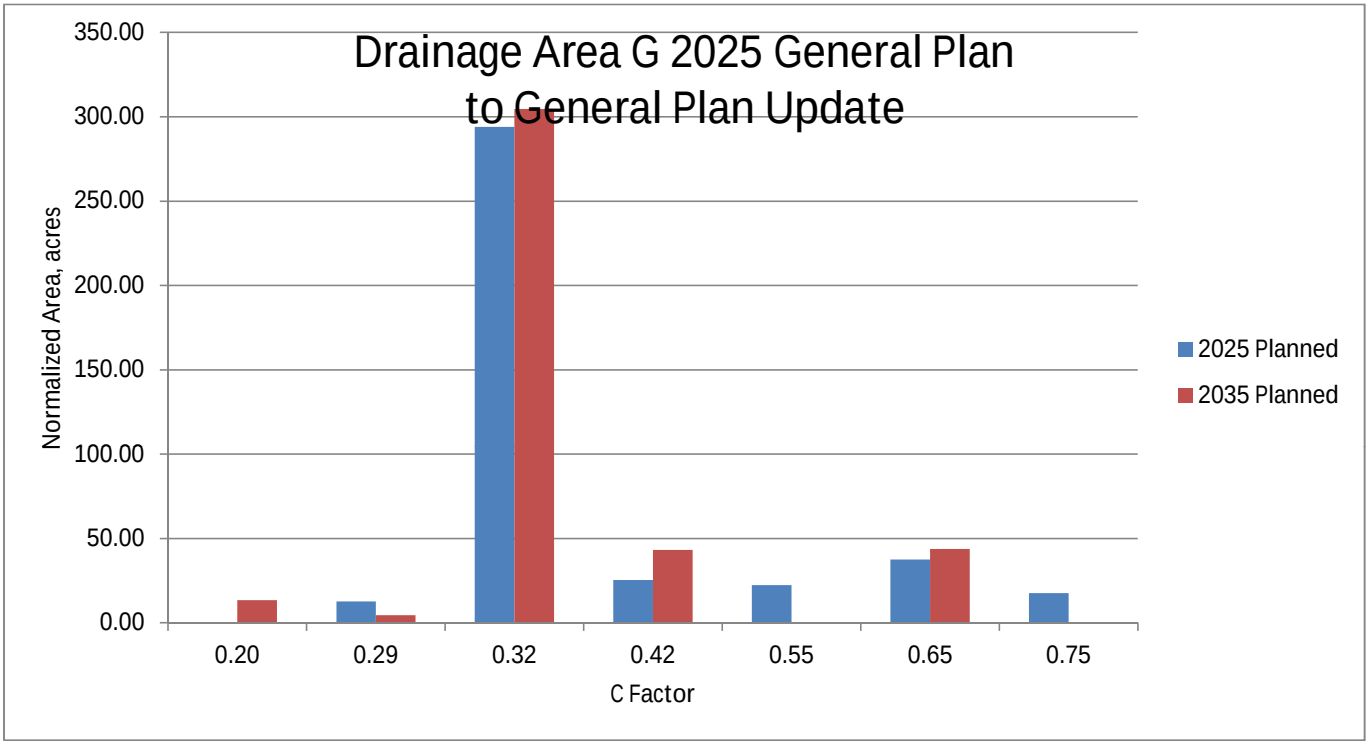

Drainage Area EM 2025 General Plan to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

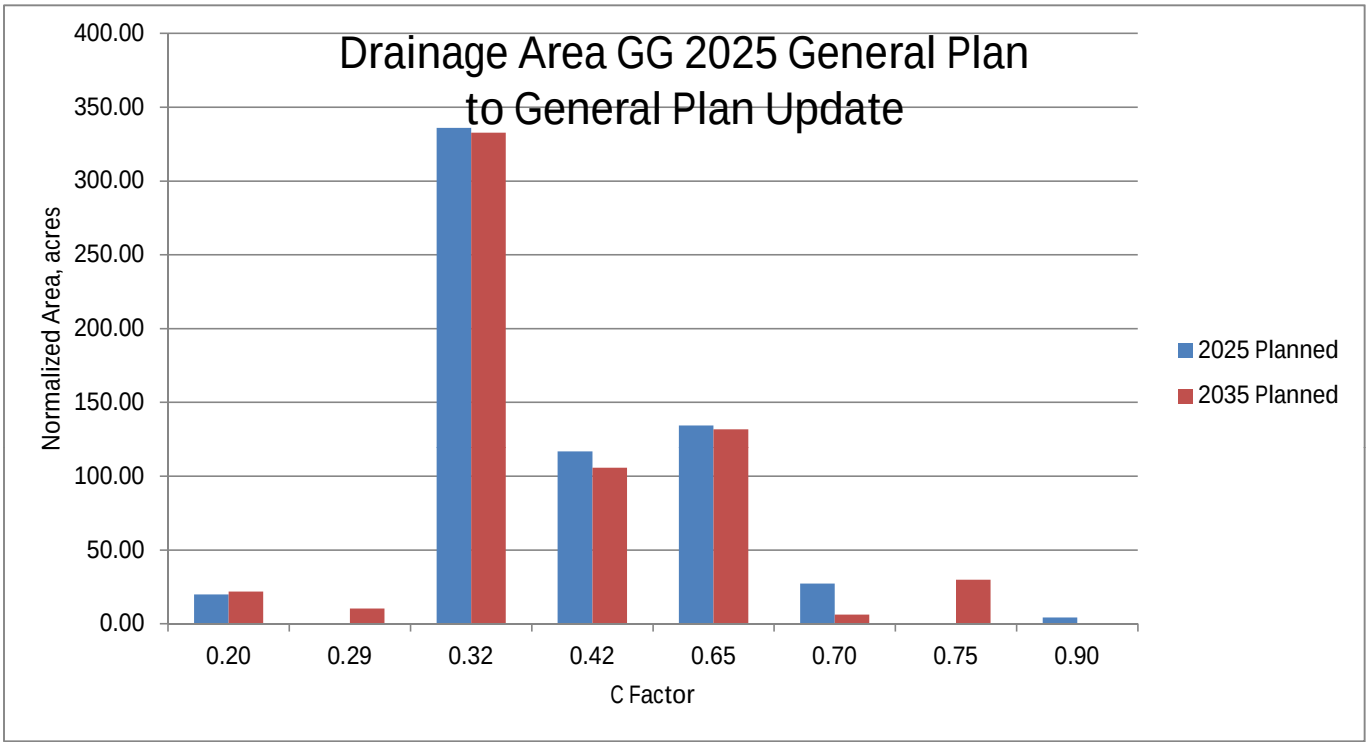

Drainage Area EN 2025 General Plan to General Plan Update
Normalized Area, acres
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

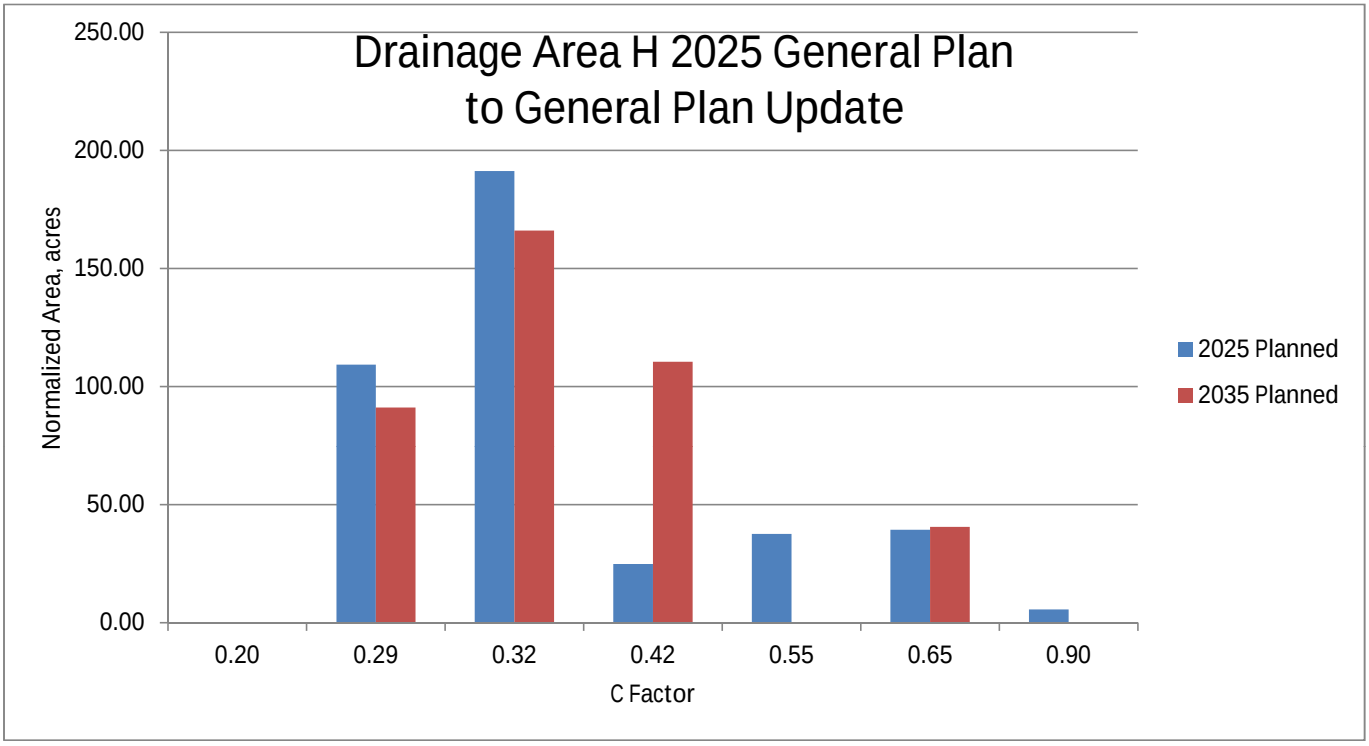

Drainage Area EO 2025 General Plan
to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

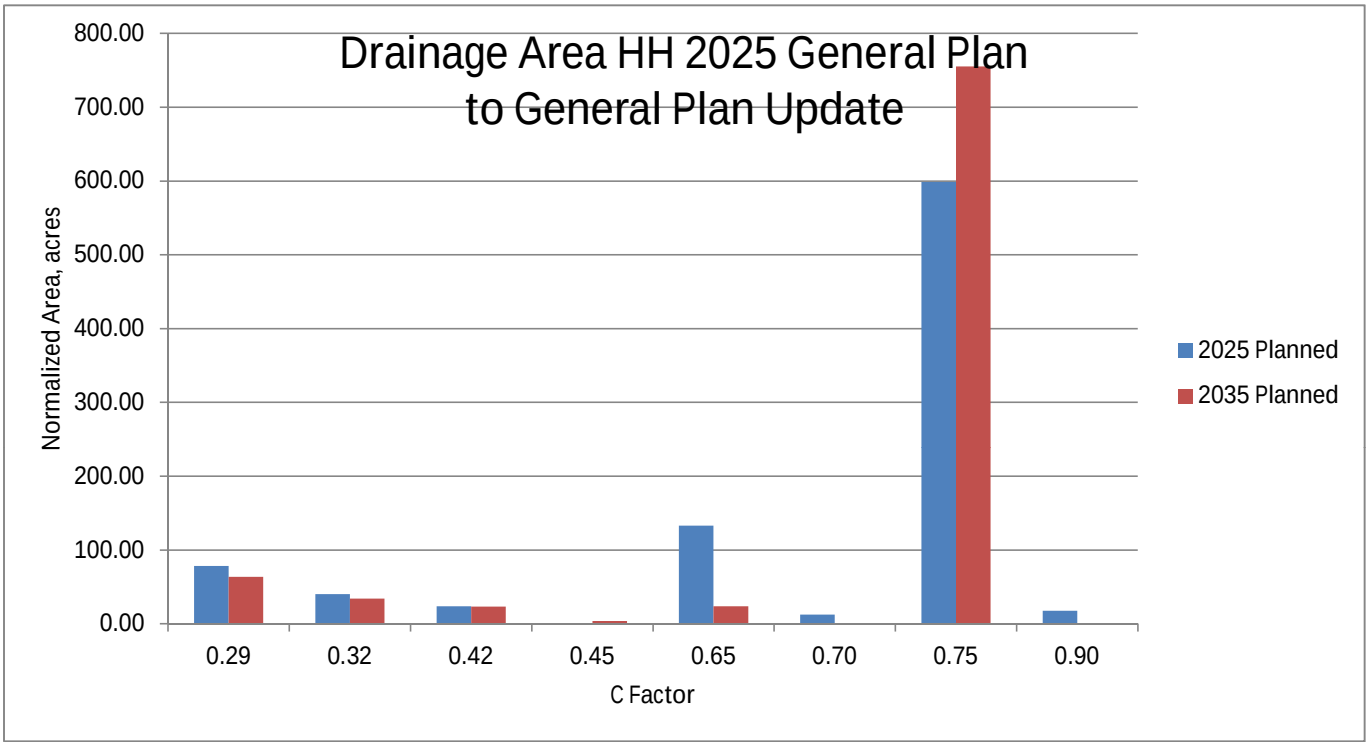

Drainage Area F 2025 General Plan to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
C Factor
2025 Planned
2035 Planned

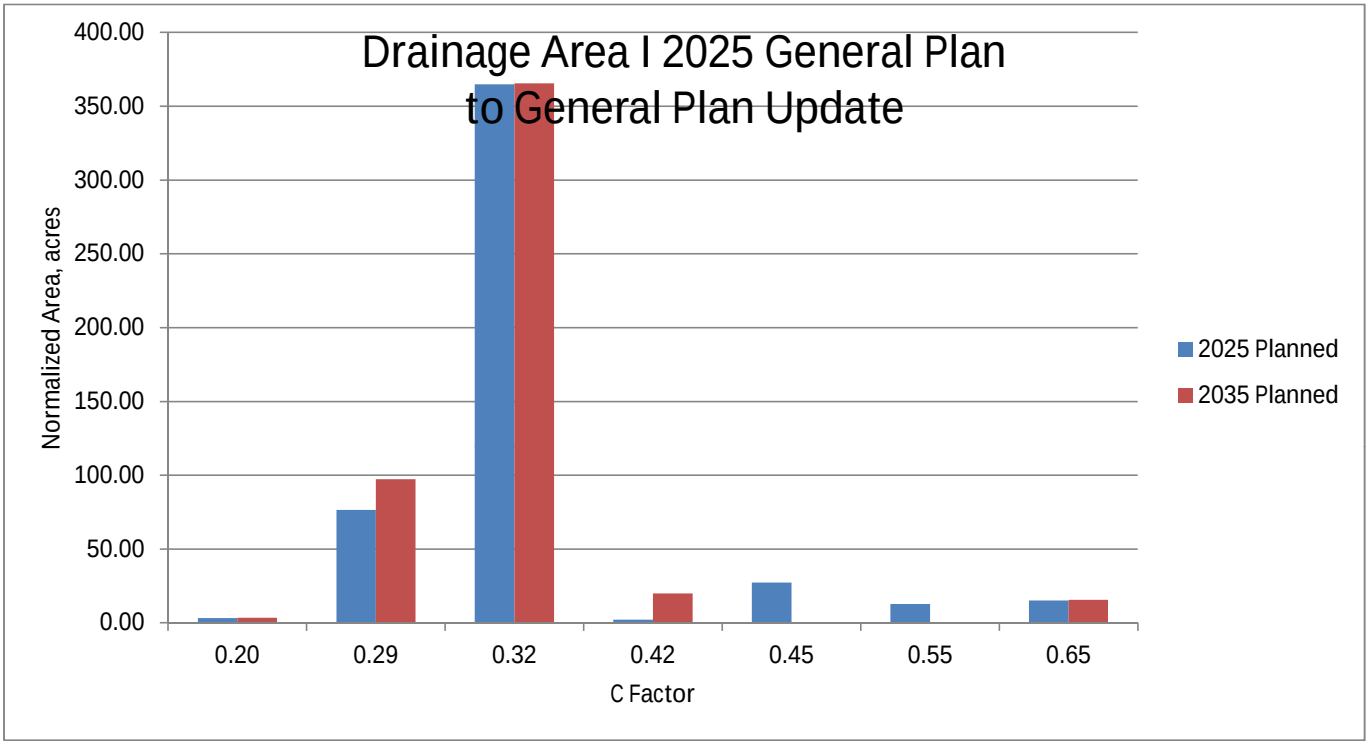

Drainage Area FF 2025 General Plan to General Plan Update
Normalized Area, acres
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

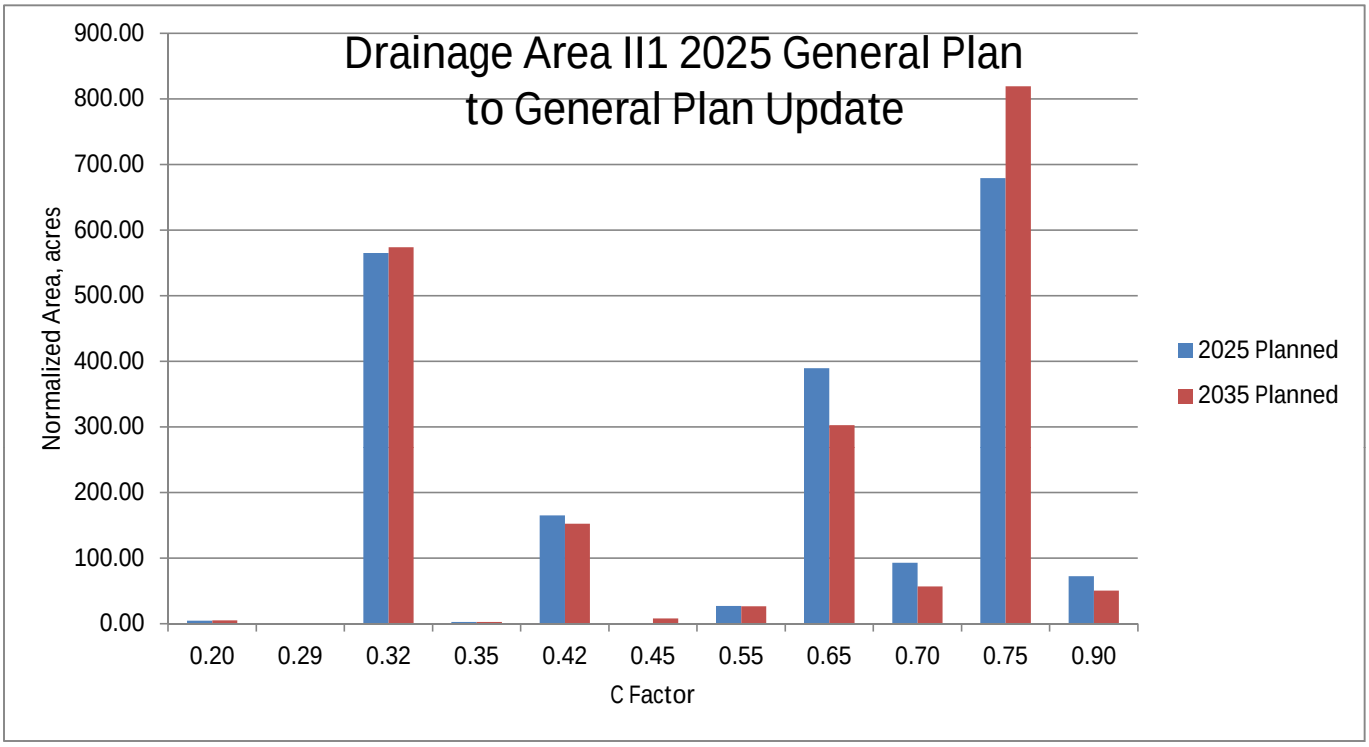

Drainage Area G 2025 General Plan to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
0.75
C Factor
2025 Planned
2035 Planned

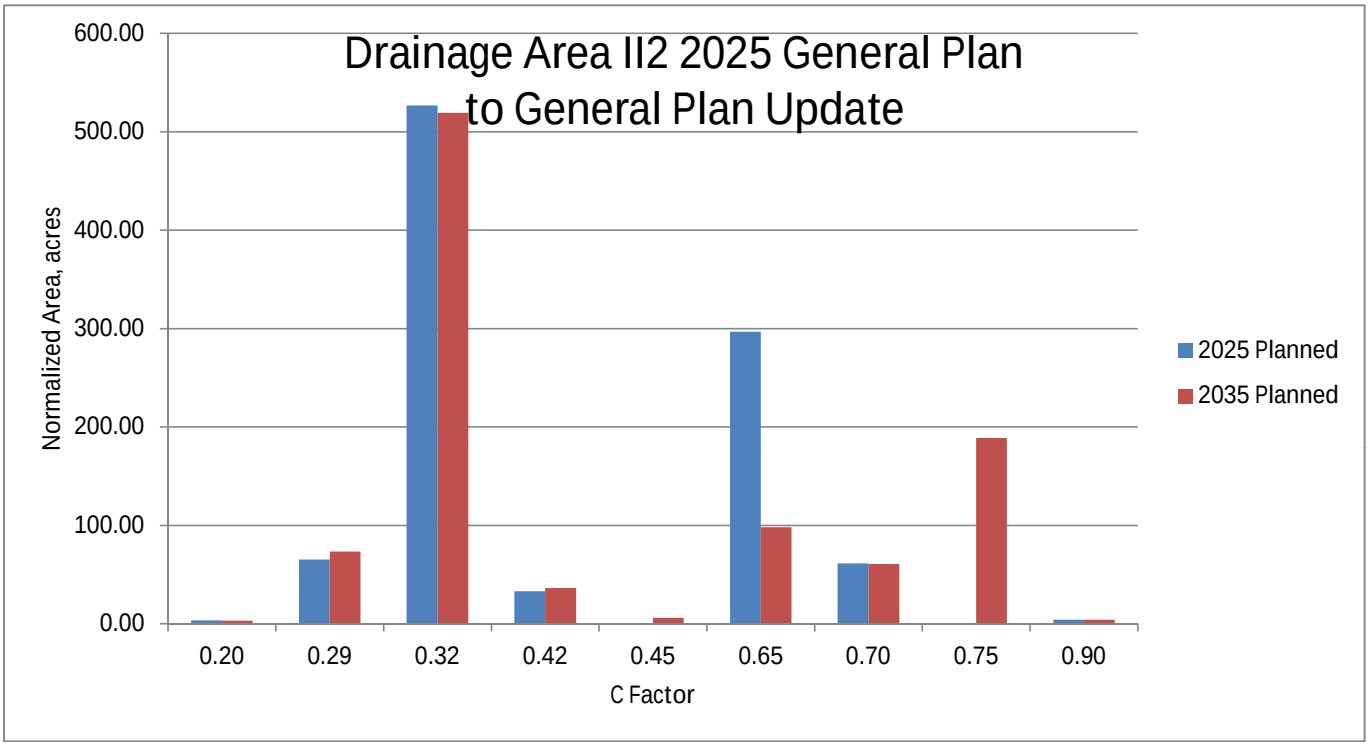

Drainage Area GG 2025 General Plan
to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

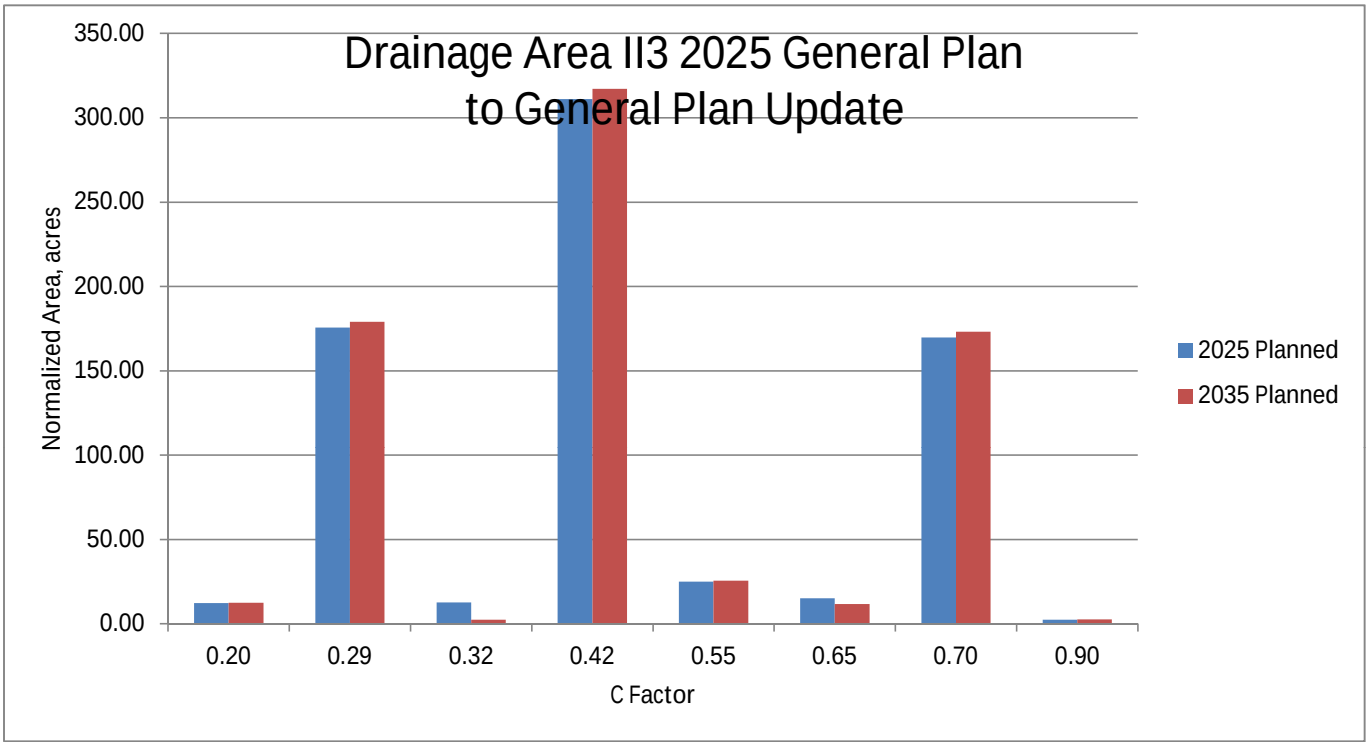

Drainage Area H 2025 General Plan
to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

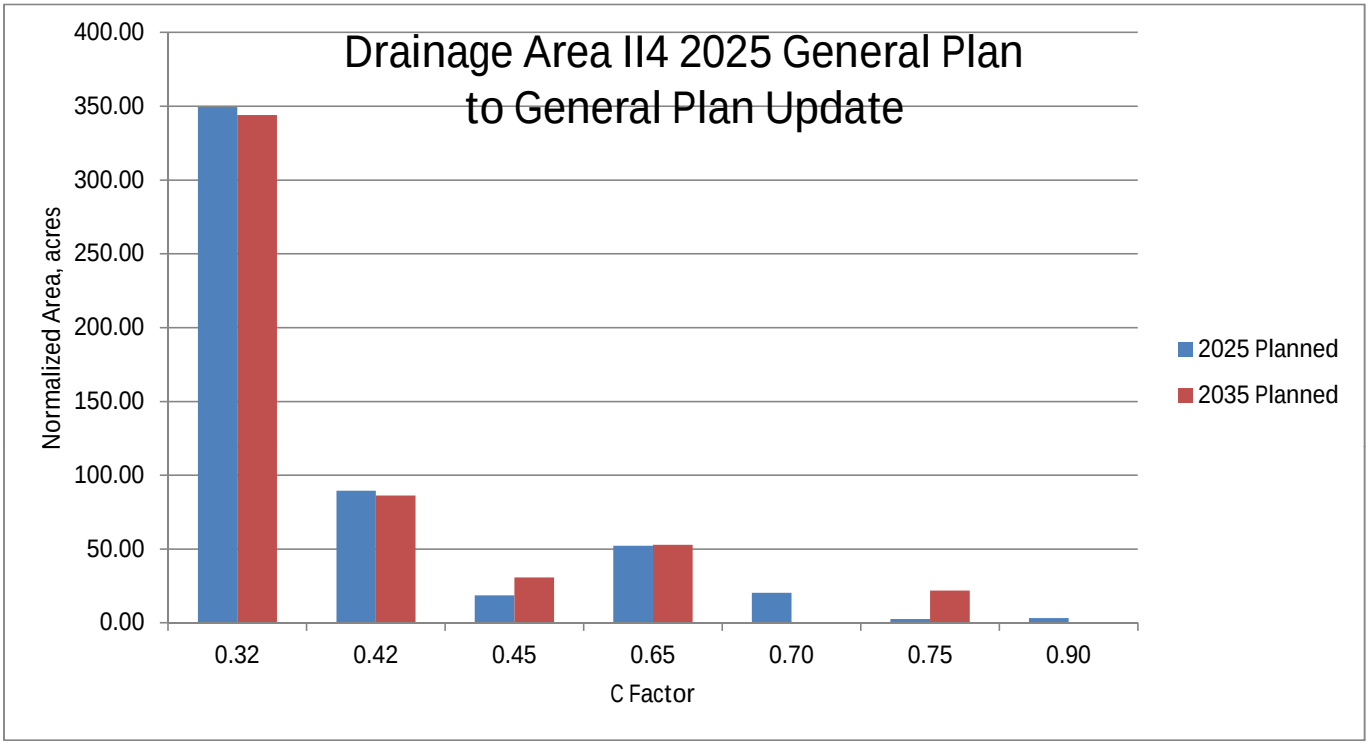

Drainage Area HH 2025 General Plan to General Plan Update
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.29
0.32
0.42
0.45
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

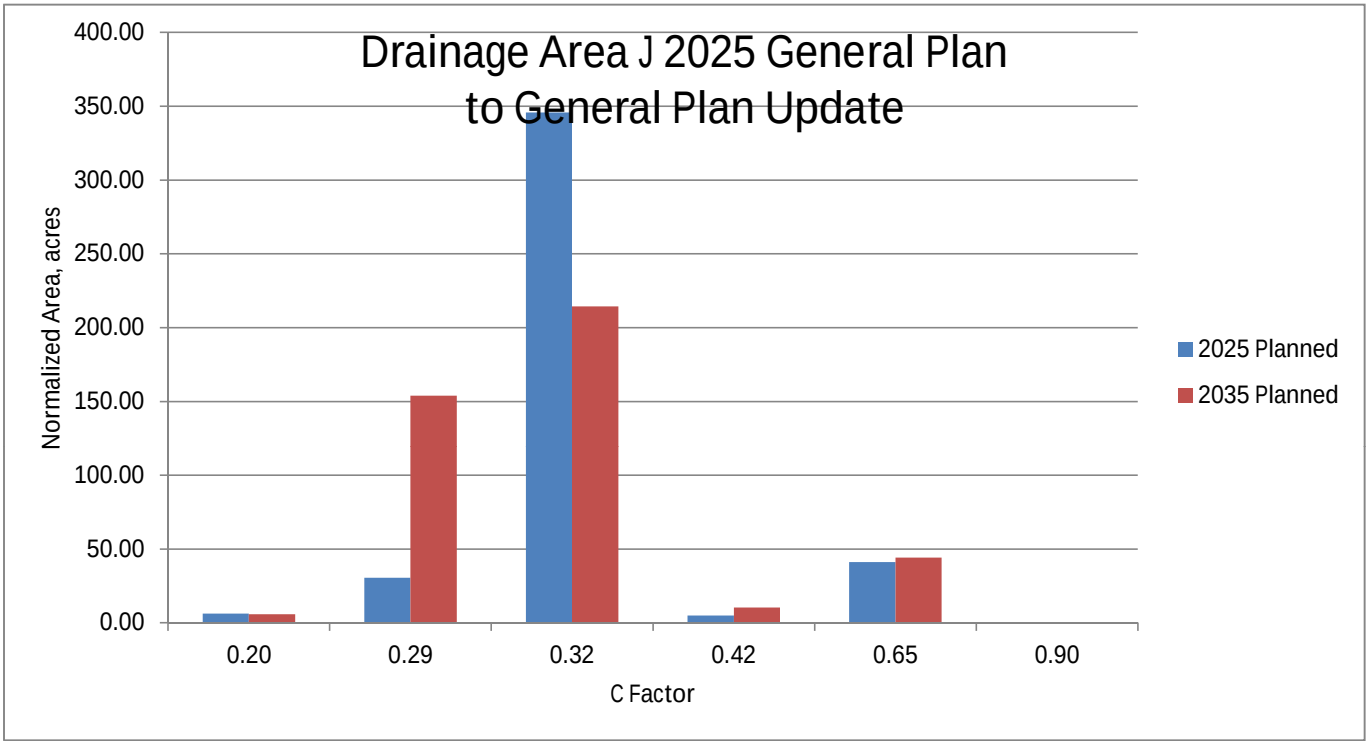

Drainage Area I 2025 General Plan to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.55
0.65
C Factor
2025 Planned
2035 Planned

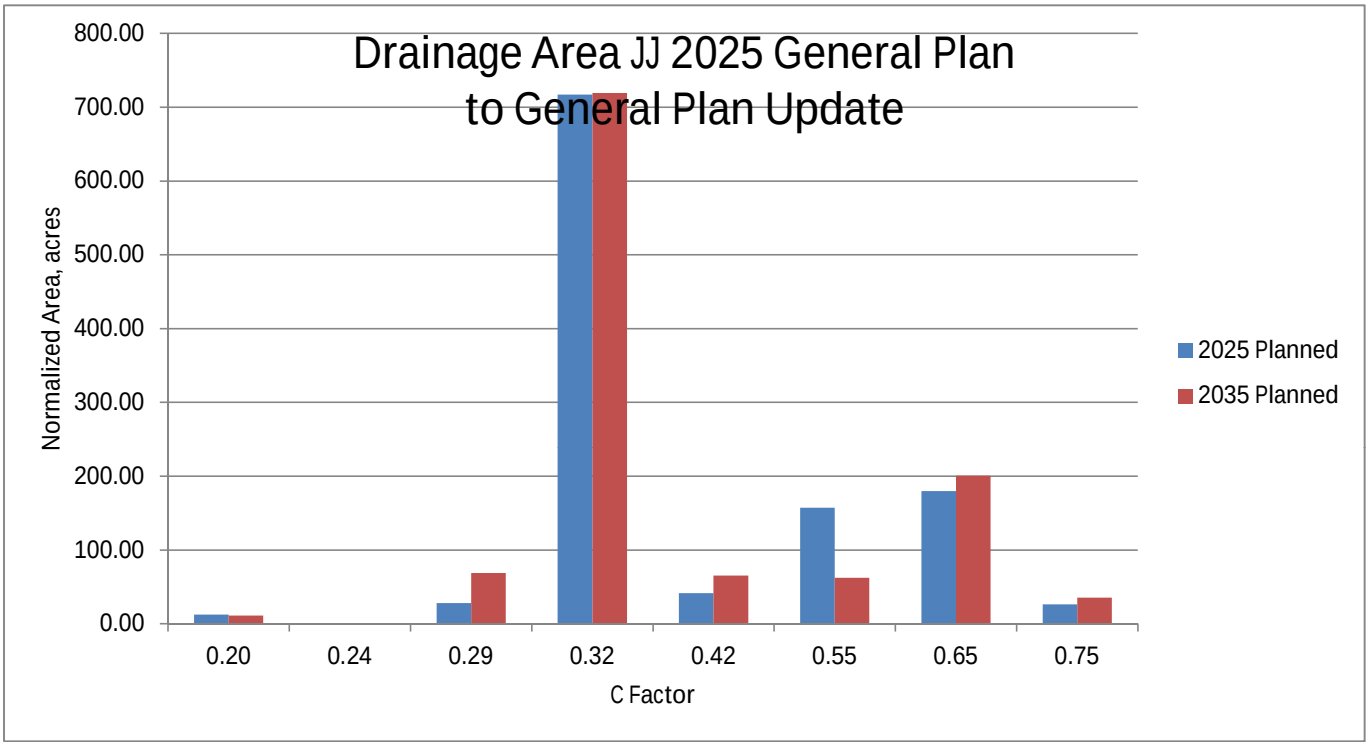

Drainage Area II1 2025 General Plan to General Plan Update
Normalized Area, acres
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.29
0.32
0.35
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

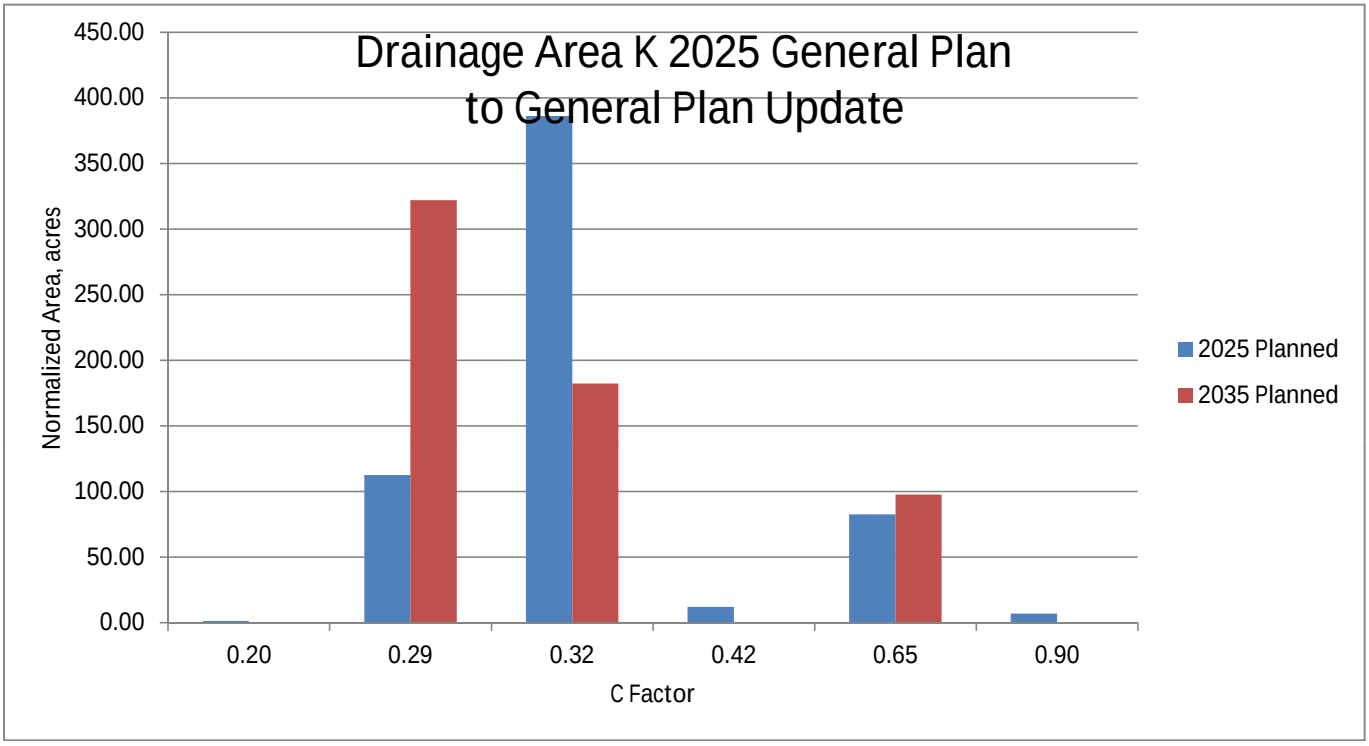

Drainage Area II2 2025 General Plan
to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

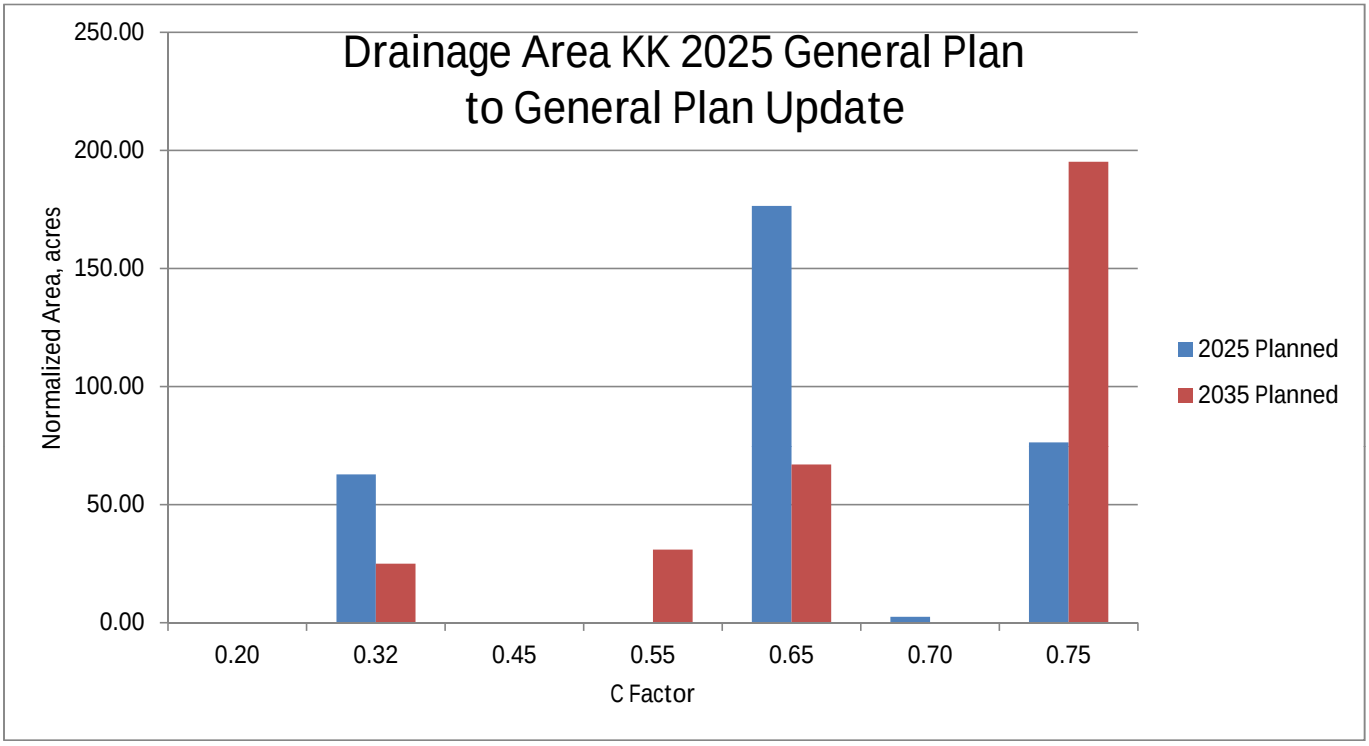

Drainage Area II3 2025 General Plan to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

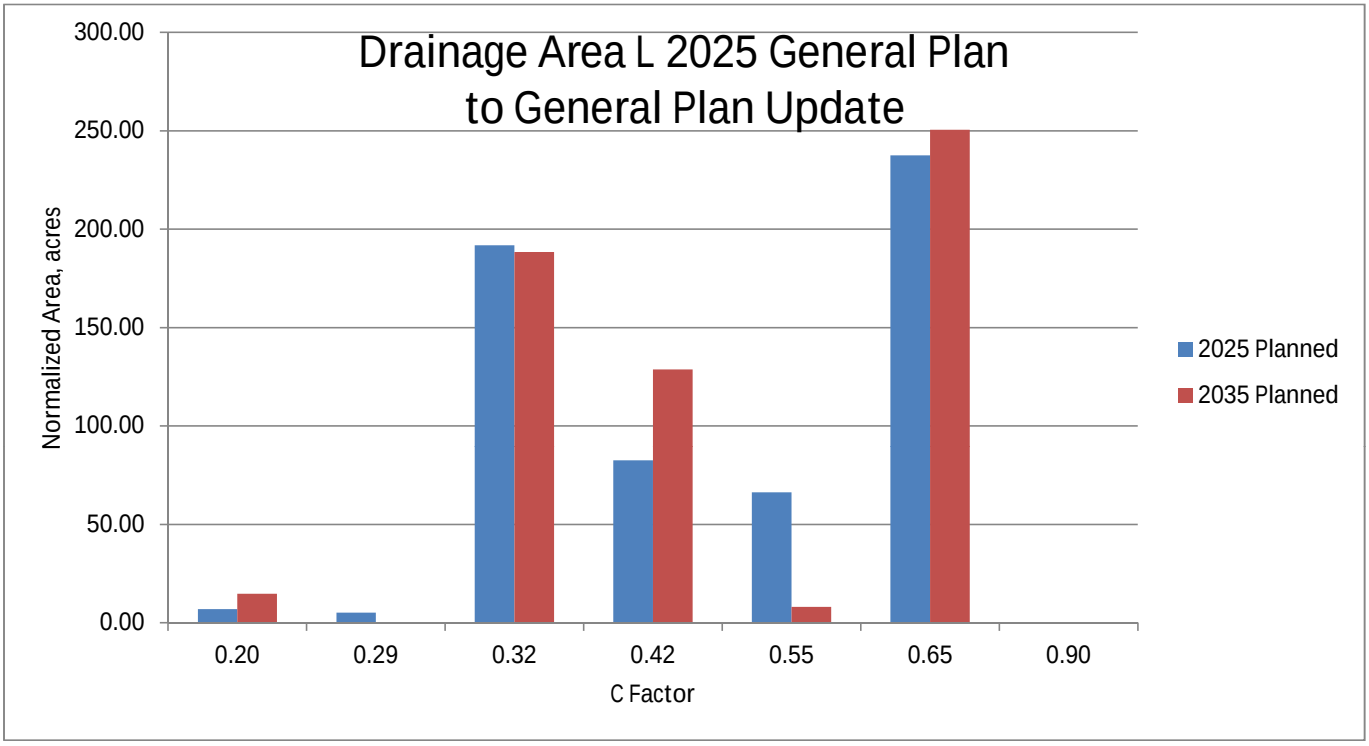

Drainage Area II4 2025 General Plan to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.32
0.42
0.45
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

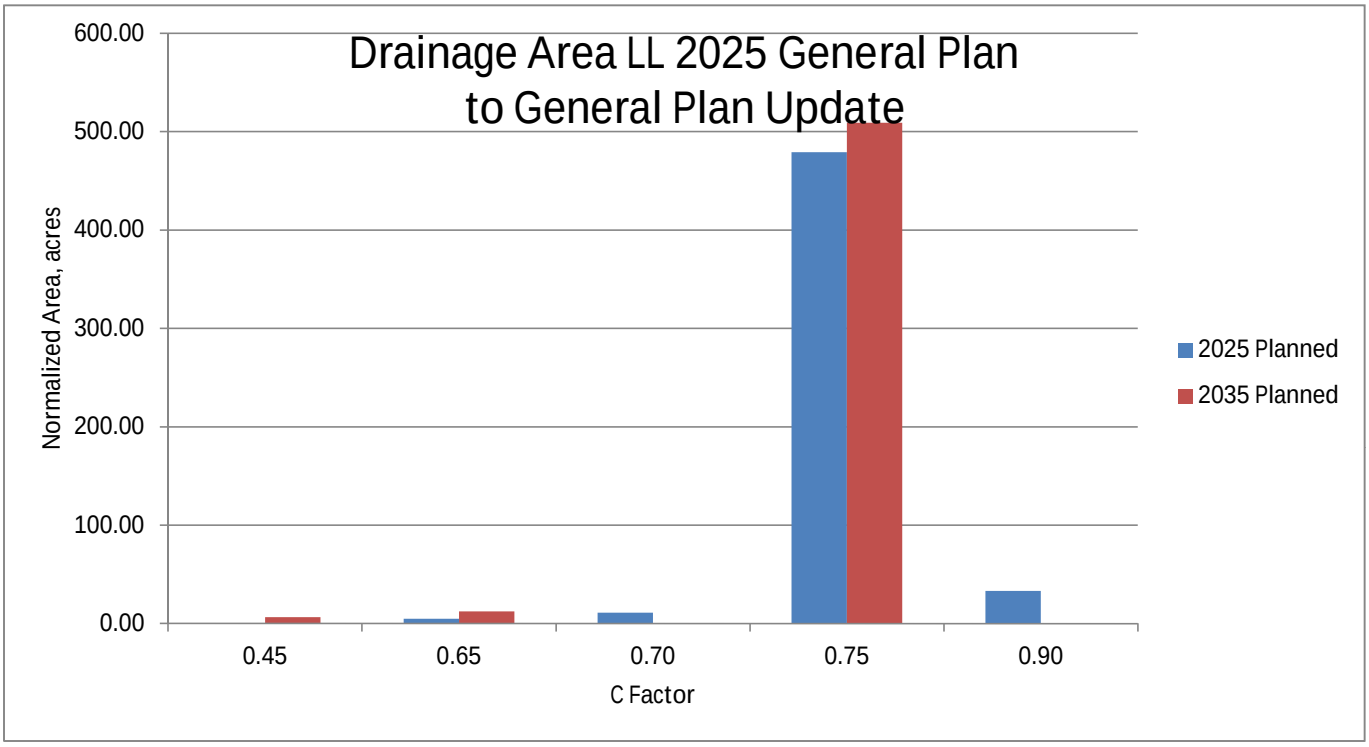

Drainage Area J 2025 General Plan to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.65
0.90
C Factor
2025 Planned
2035 Planned

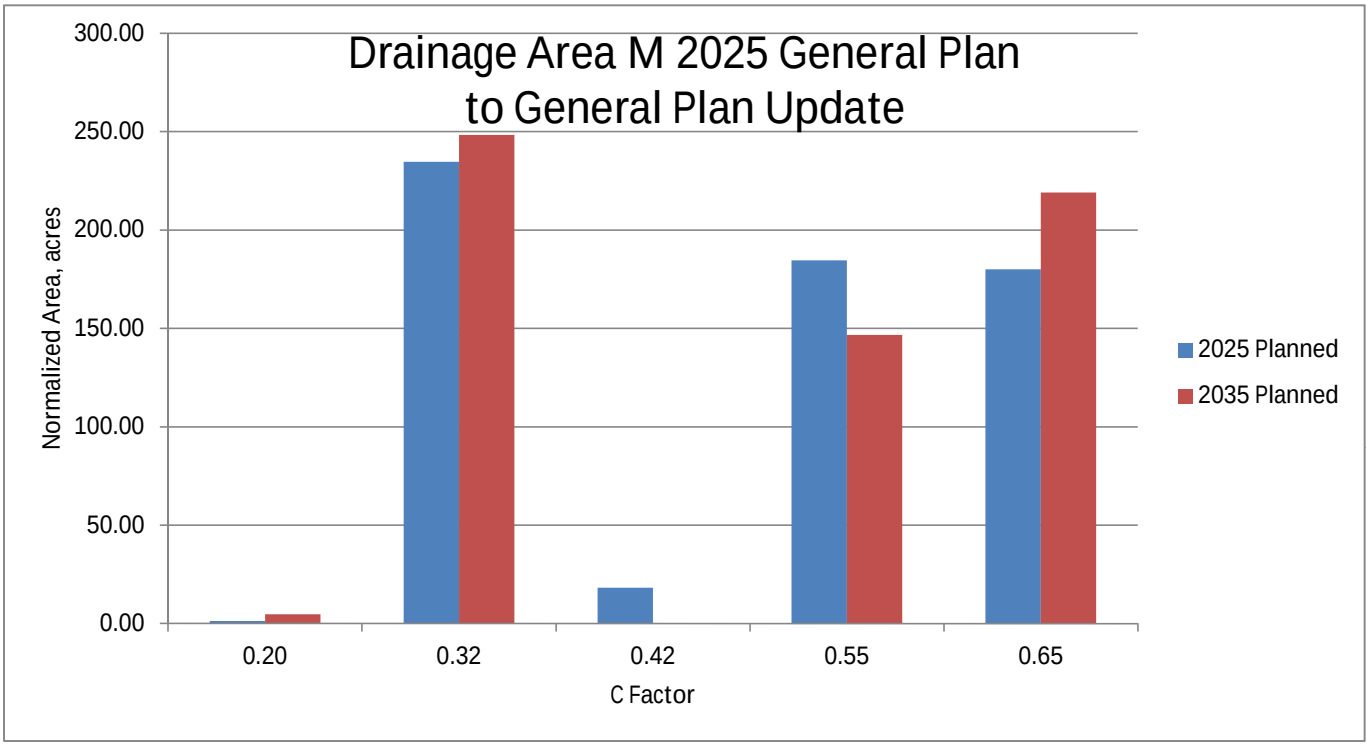

Drainage Area JJ 2025 General Plan to General Plan Update
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.75
C Factor
2025 Planned
2035 Planned

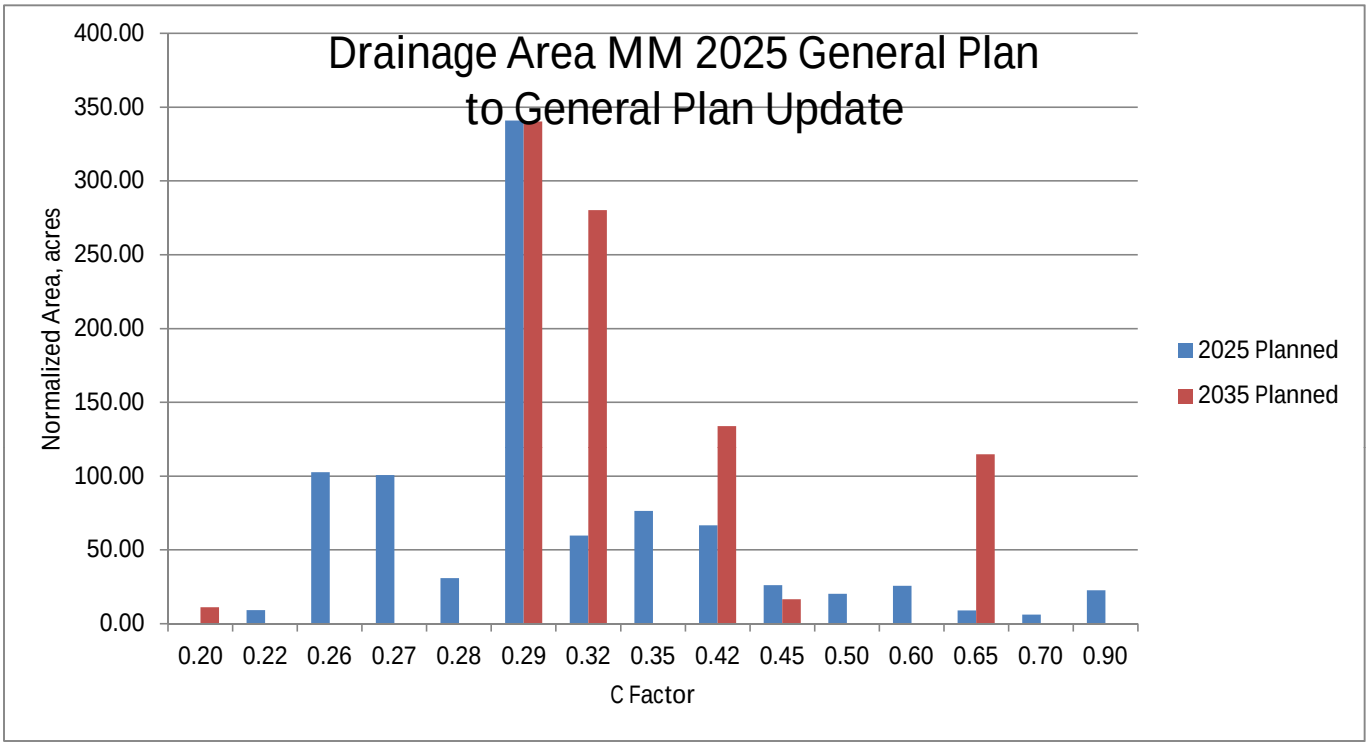

Drainage Area K 2025 General Plan
to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.65
0.90
C Factor
2025 Planned
2035 Planned

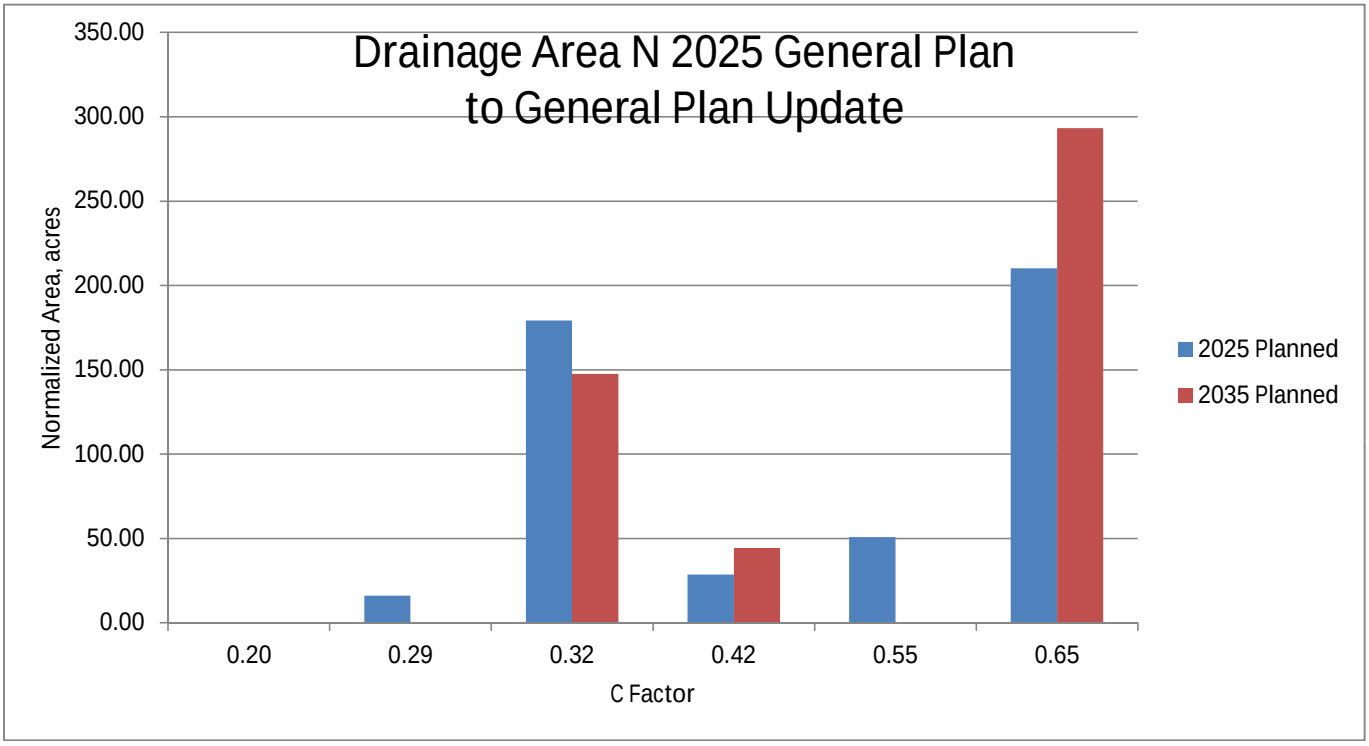

Drainage Area KK 2025 General Plan to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.32
0.45
0.55
0.65
0.70
0.75
C Factor
2025 Planned
2035 Planned

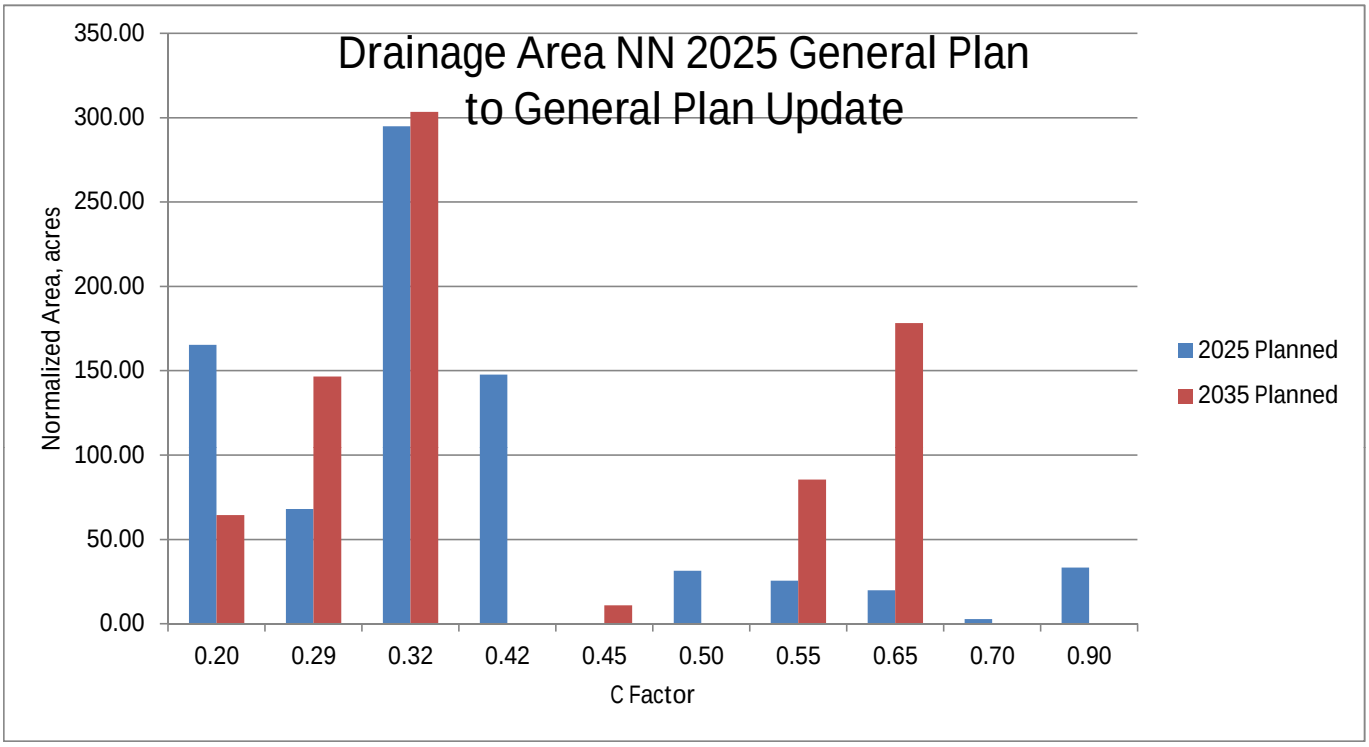

Drainage Area L 2025 General Plan to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

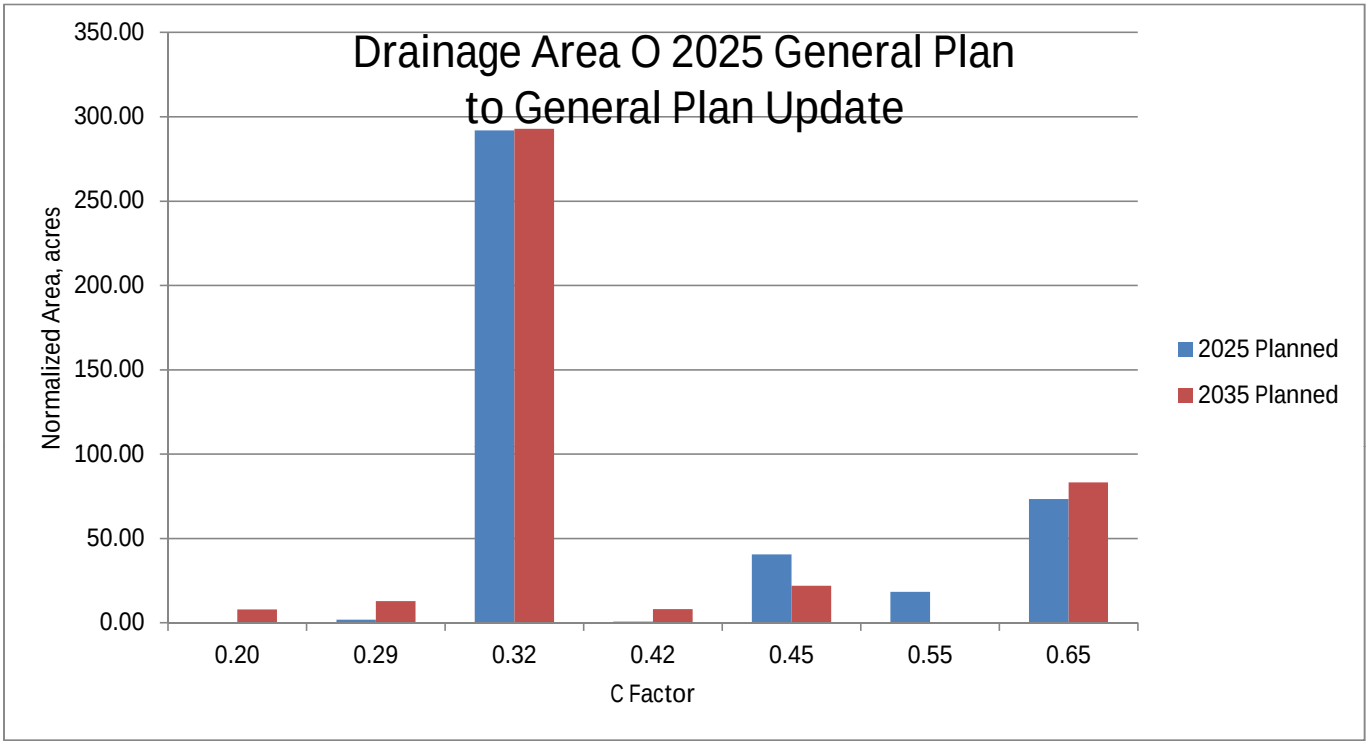

Drainage Area LL 2025 General Plan
to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.45
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

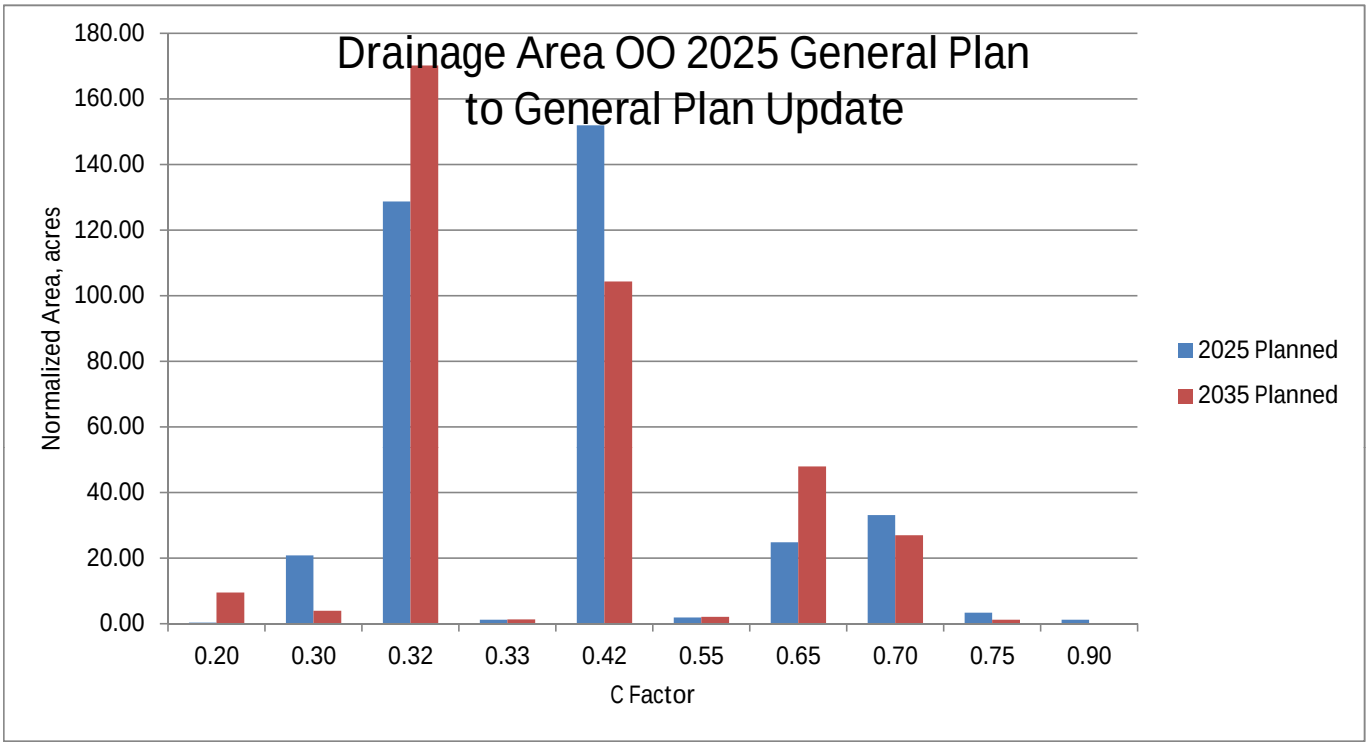

Drainage Area M 2025 General Plan
to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.32
0.42
0.55
0.65
C Factor
2025 Planned
2035 Planned

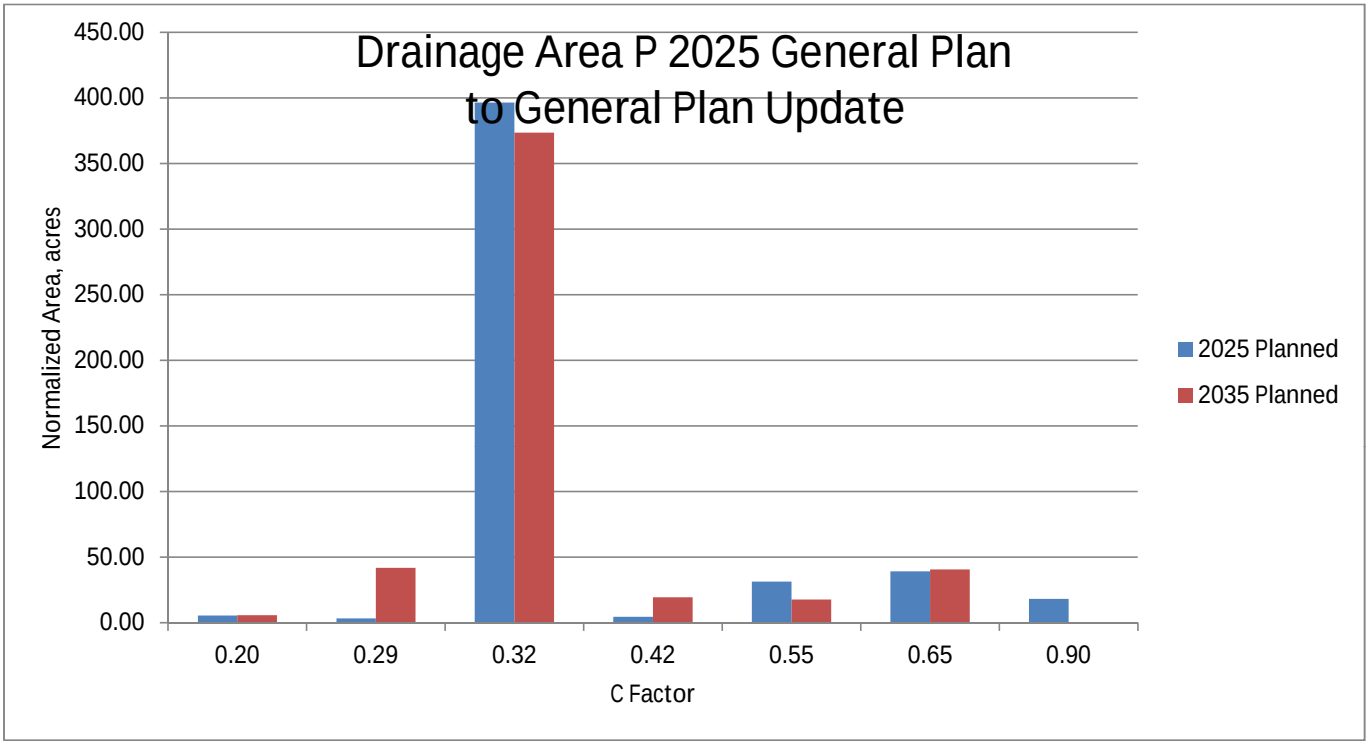

Drainage Area MM 2025 General Plan to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.22
0.26
0.27
0.28
0.29
0.32
0.35
0.42
0.45
0.50
0.60
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

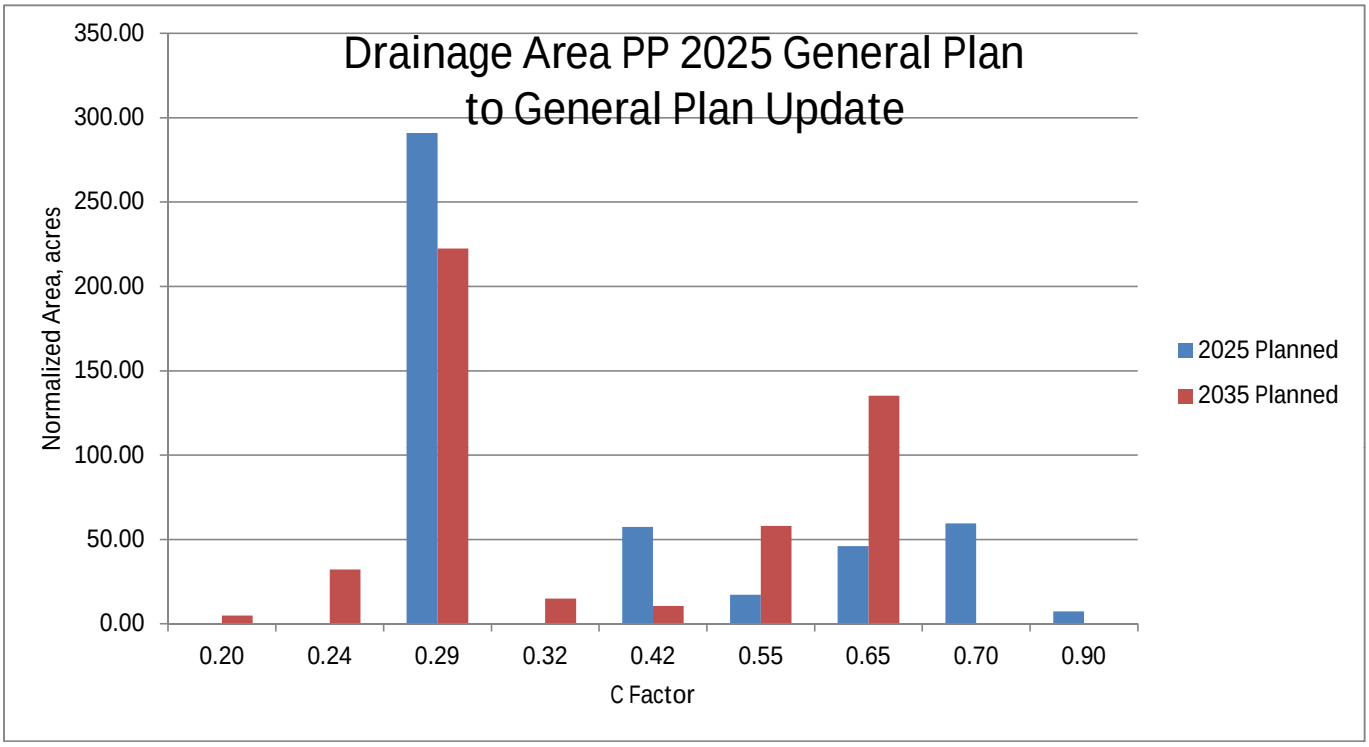

Drainage Area N 2025 General Plan to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
C Factor
2025 Planned
2035 Planned

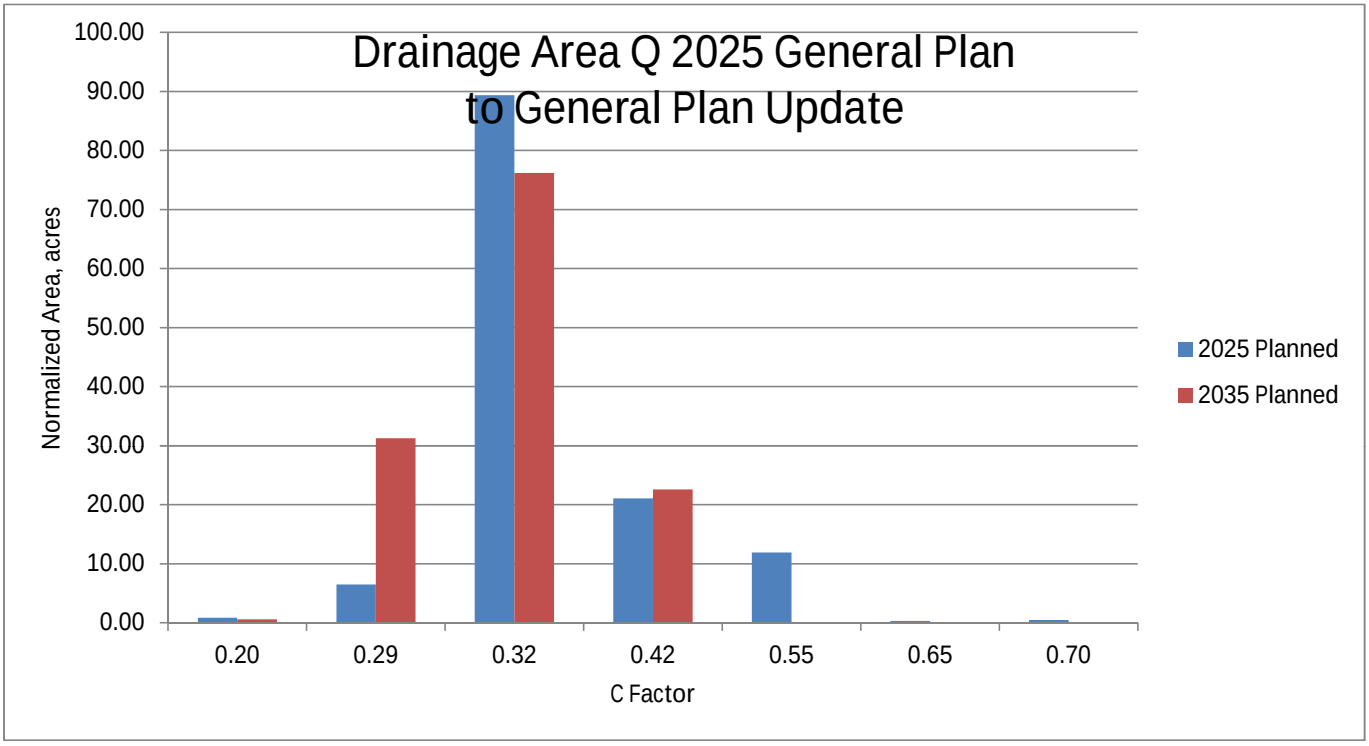

Drainage Area NN 2025 General Plan to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

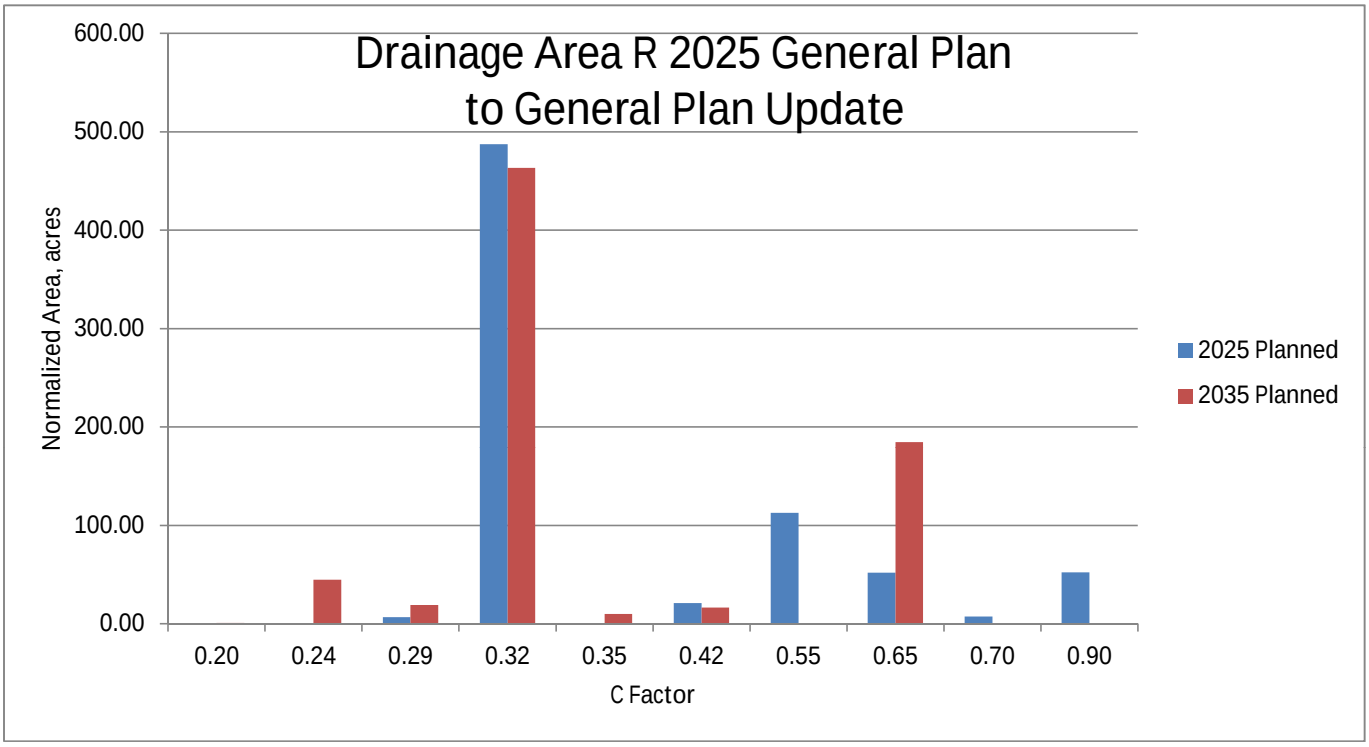

Drainage Area O 2025 General Plan to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.55
0.65
C Factor
2025 Planned
2035 Planned

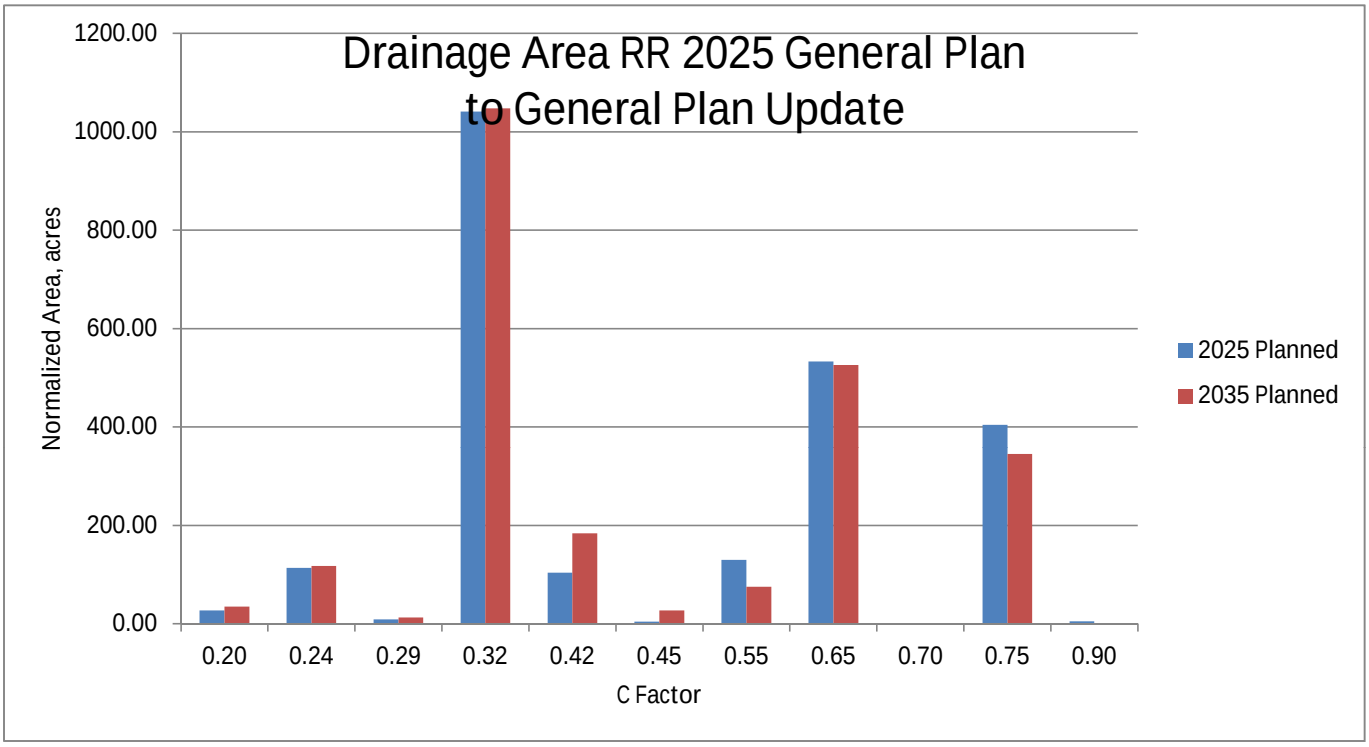

Drainage Area OO 2025 General Plan to General Plan Update
Normalized Area, acres
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.30
0.32
0.33
0.42
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

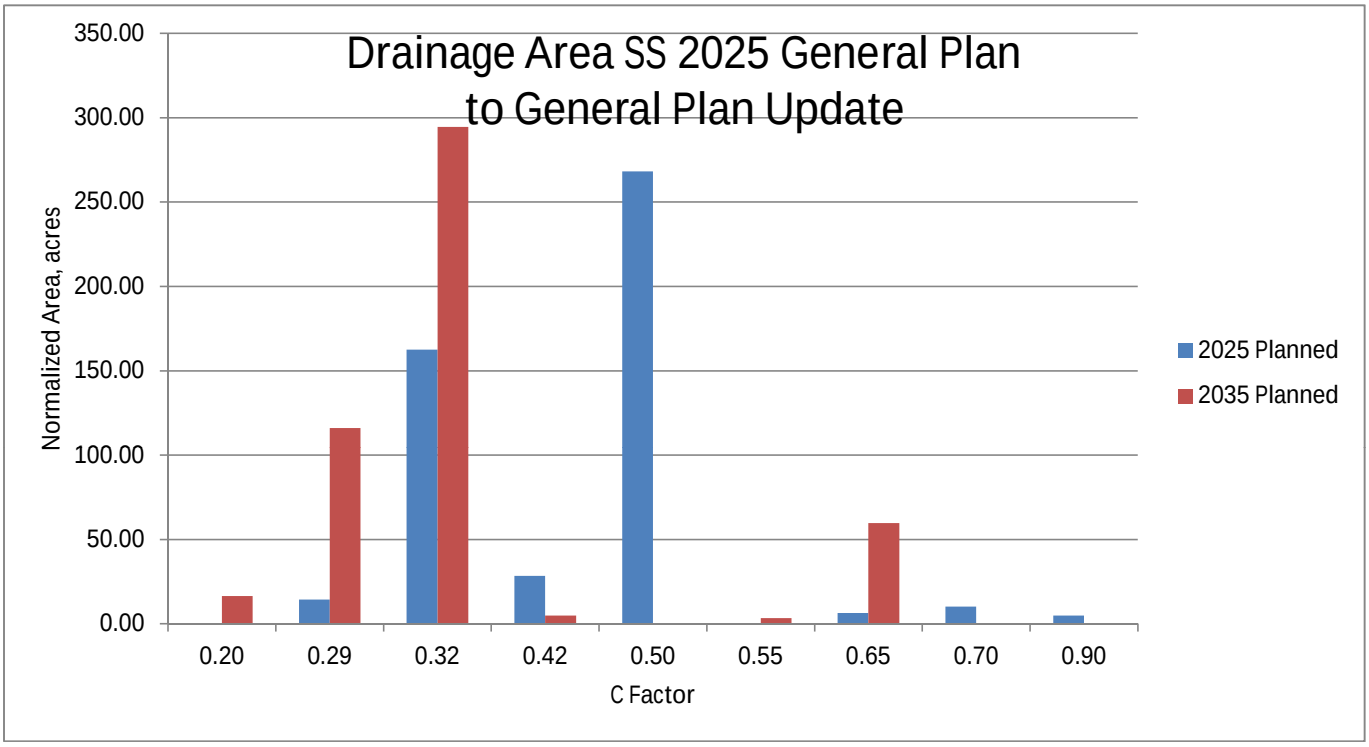

Drainage Area P 2025 General Plan to General Plan Update
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

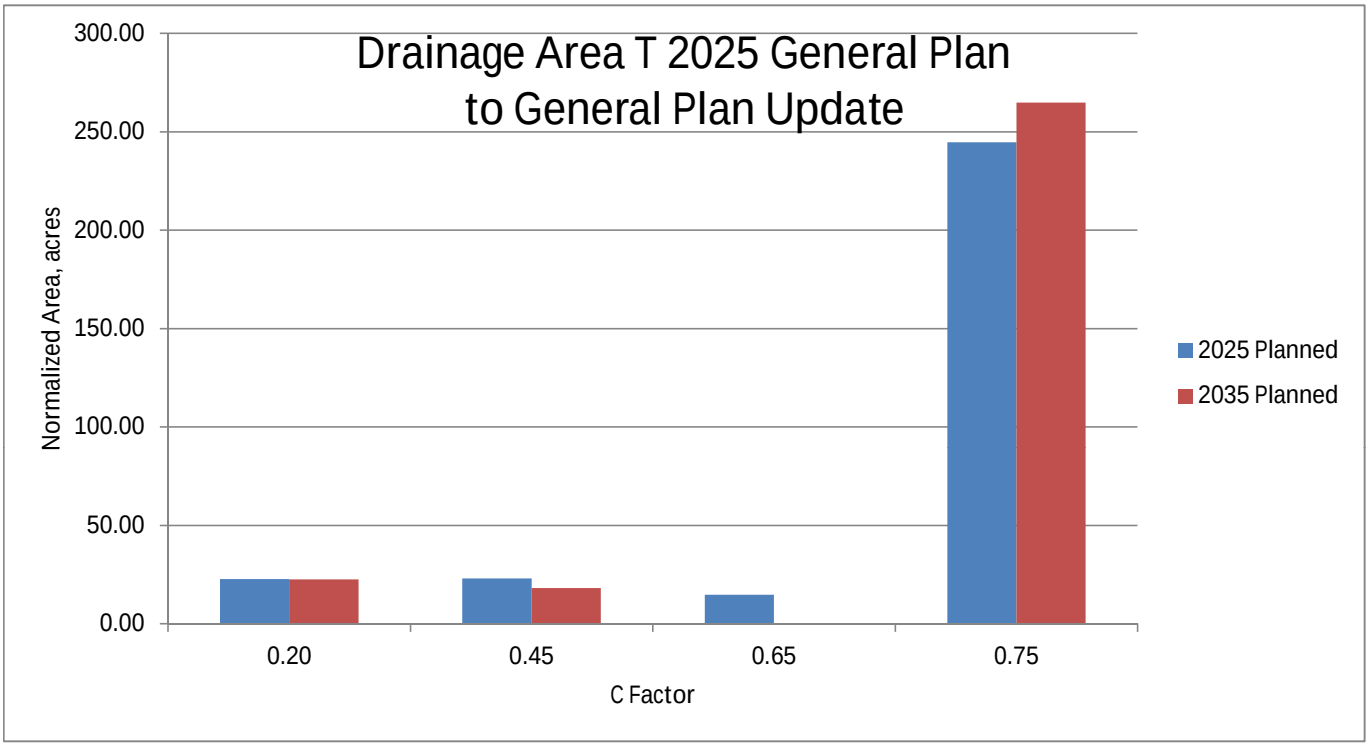

Drainage Area PP 2025 General Plan
to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

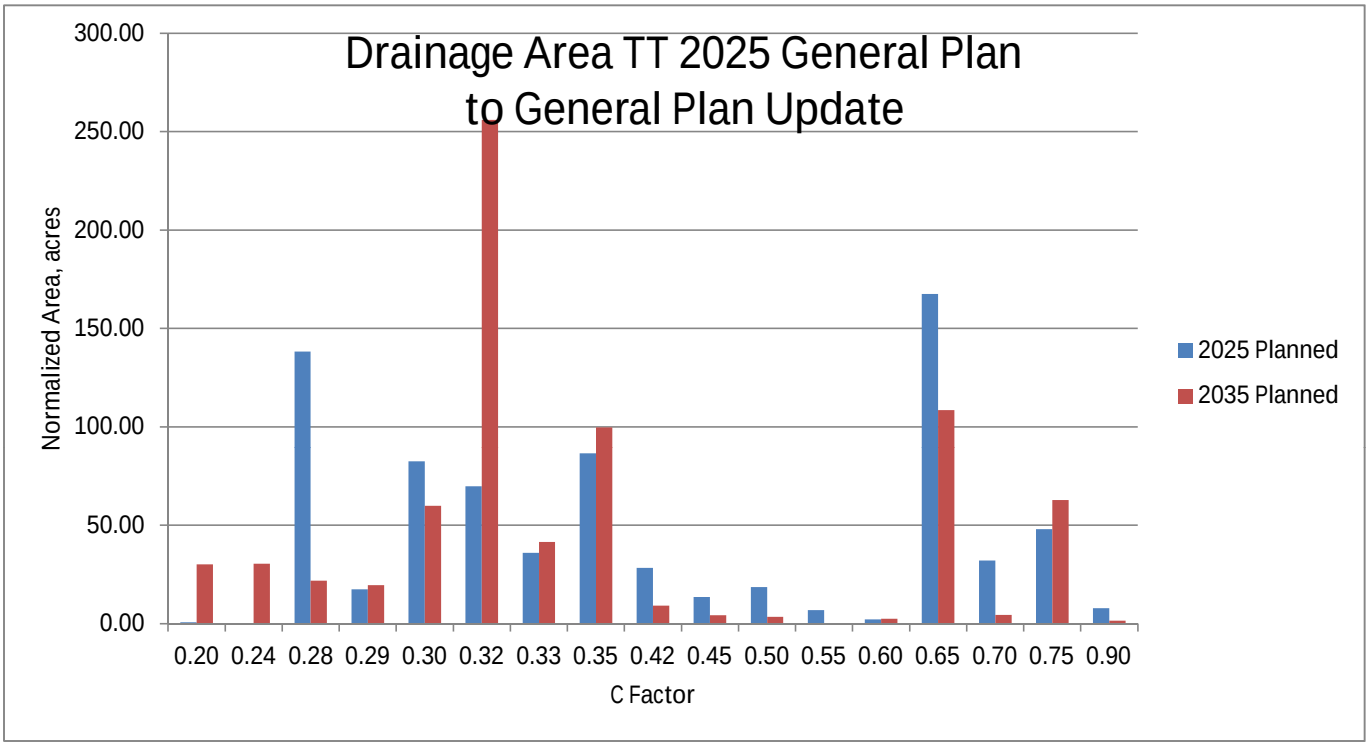

Drainage Area Q 2025 General Plan to General Plan Update
Normalized Area, acres
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.20
0.29
0.32
0.42
0.55
0.65
0.70
C Factor
2025 Planned
2035 Planned

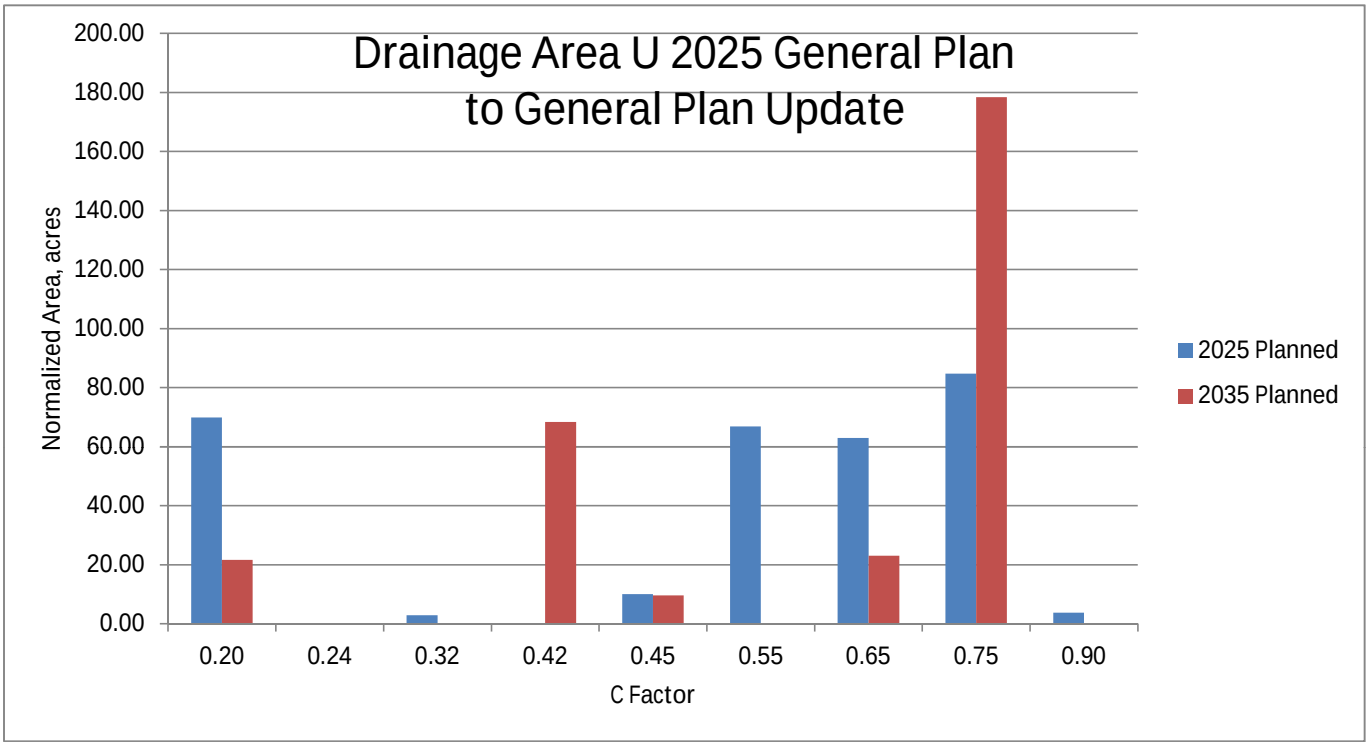

Drainage Area R 2025 General Plan to General Plan Update
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.35
0.42
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

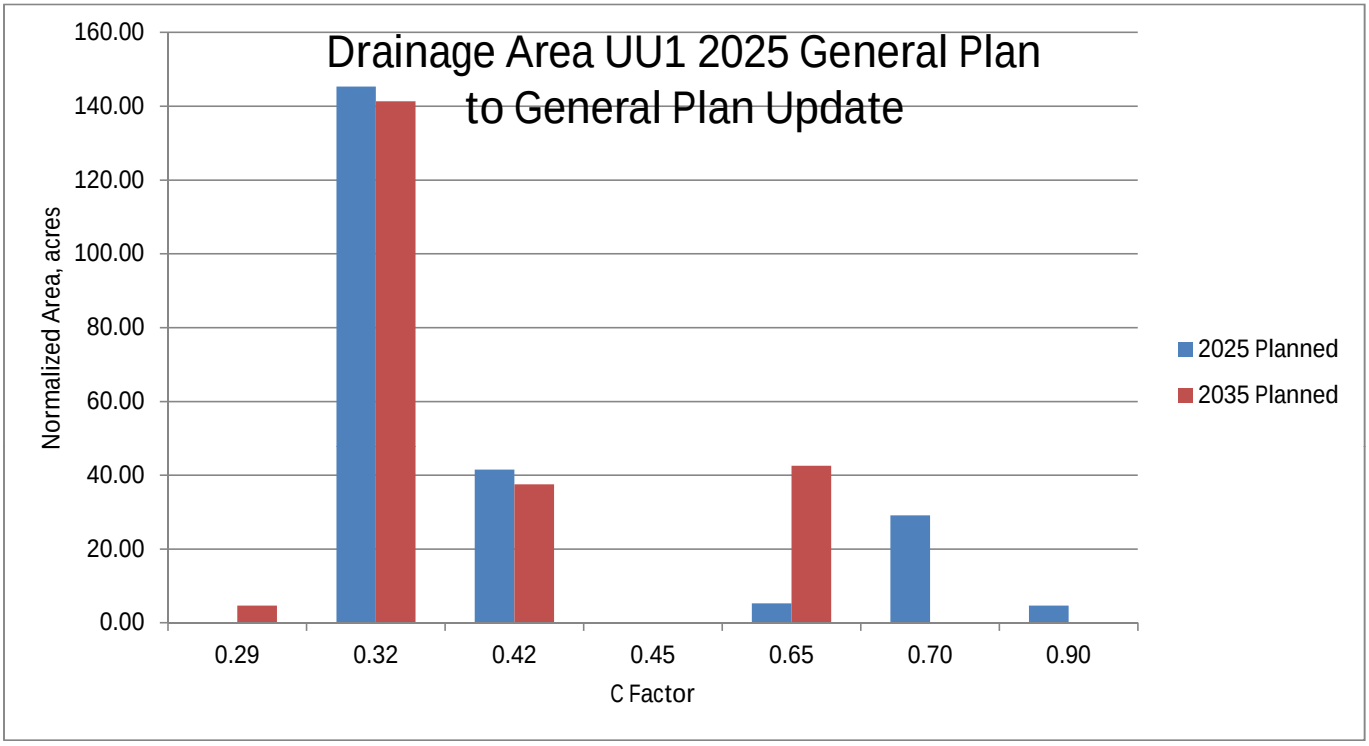

Drainage Area RR 2025 General Plan
to General Plan Update
Normalized Area, acres
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

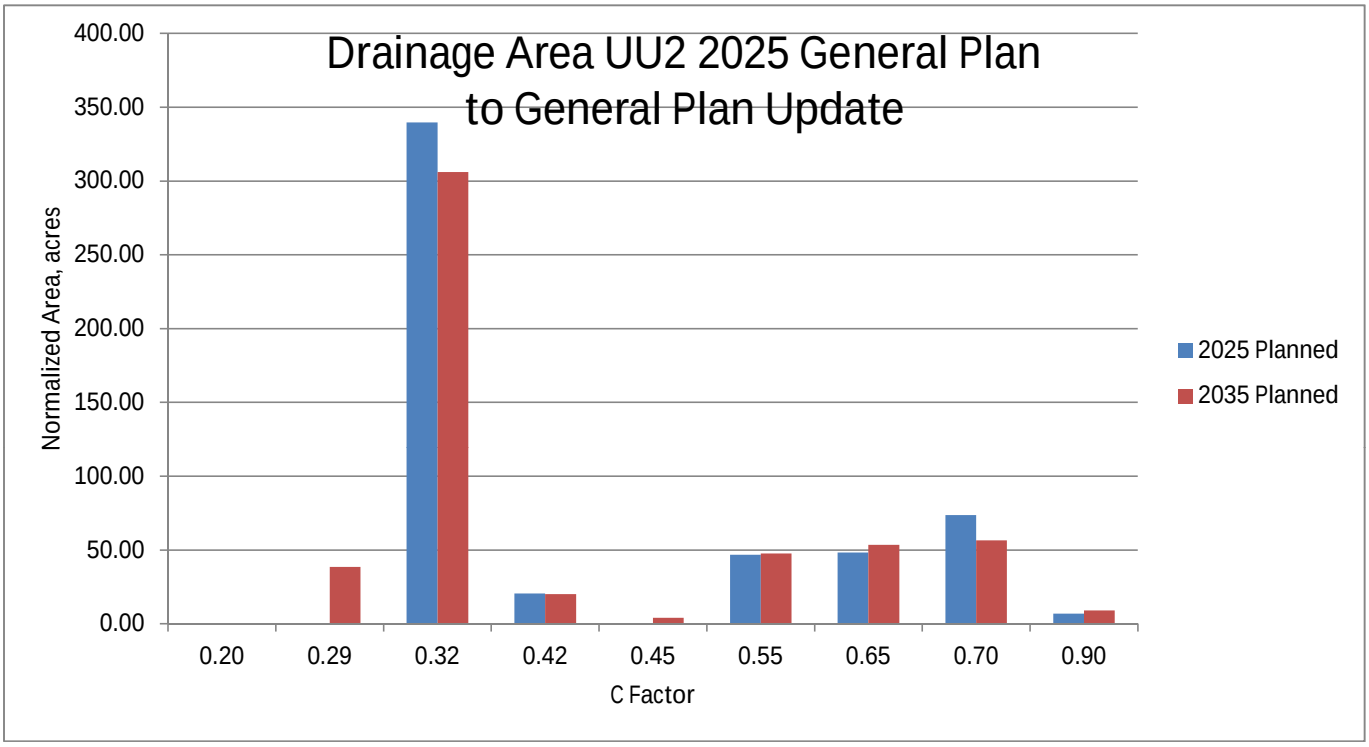

Drainage Area SS 2025 General Plan
to General Plan Update
Normalized Area, acres
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

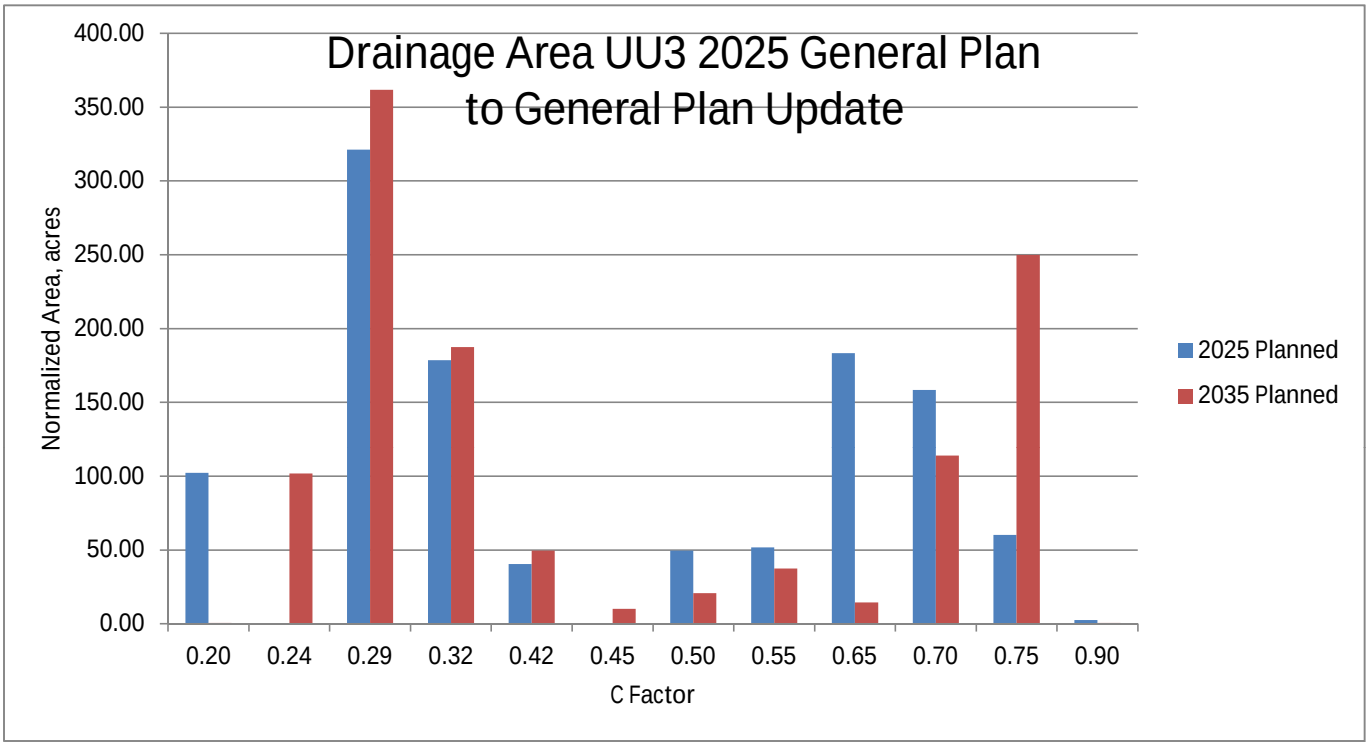

Drainage Area T 2025 General Plan to General Plan Update
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.45
0.65
0.75
C Factor
2025 Planned
2035 Planned

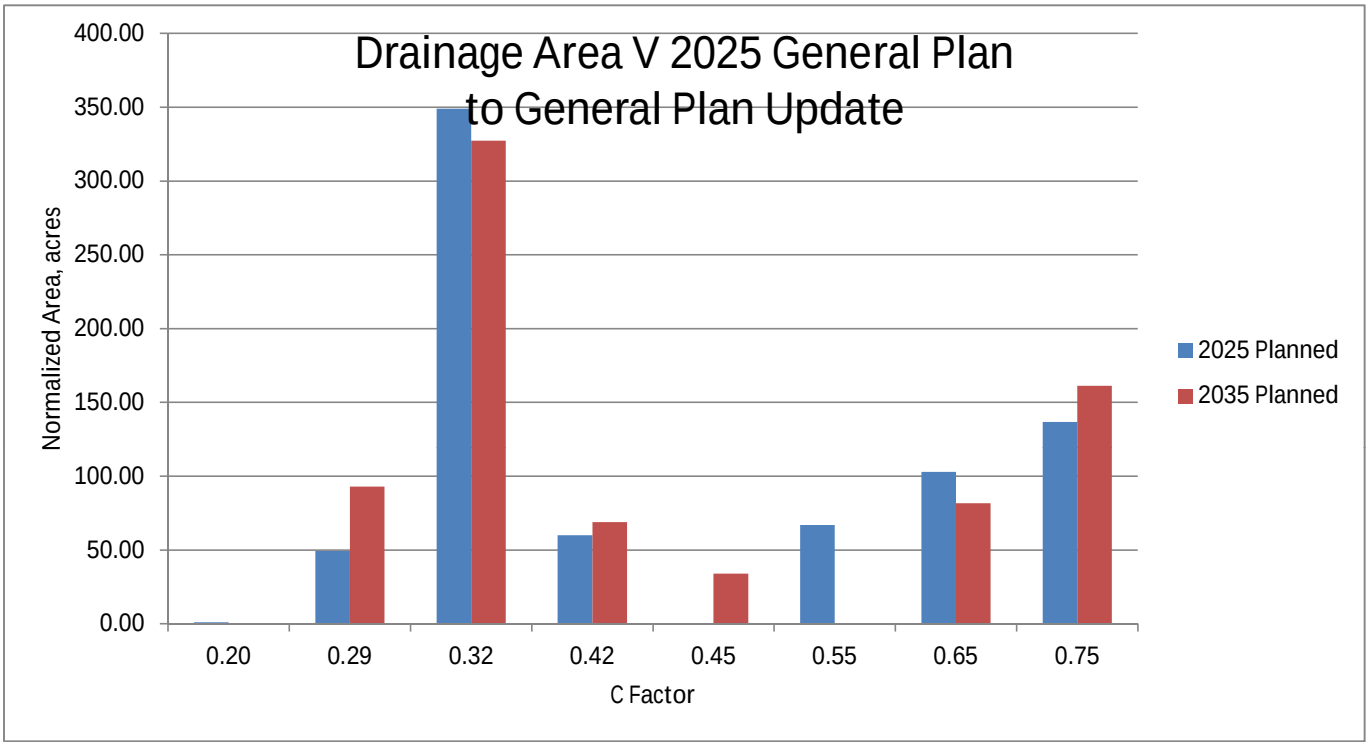

Drainage Area TT 2025 General Plan to General Plan Update
Normalized Area, acres
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20 0.24 0.28 0.29 0.30 0.32 0.33 0.35 0.42 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.90
C Factor
2025 Planned
2035 Planned

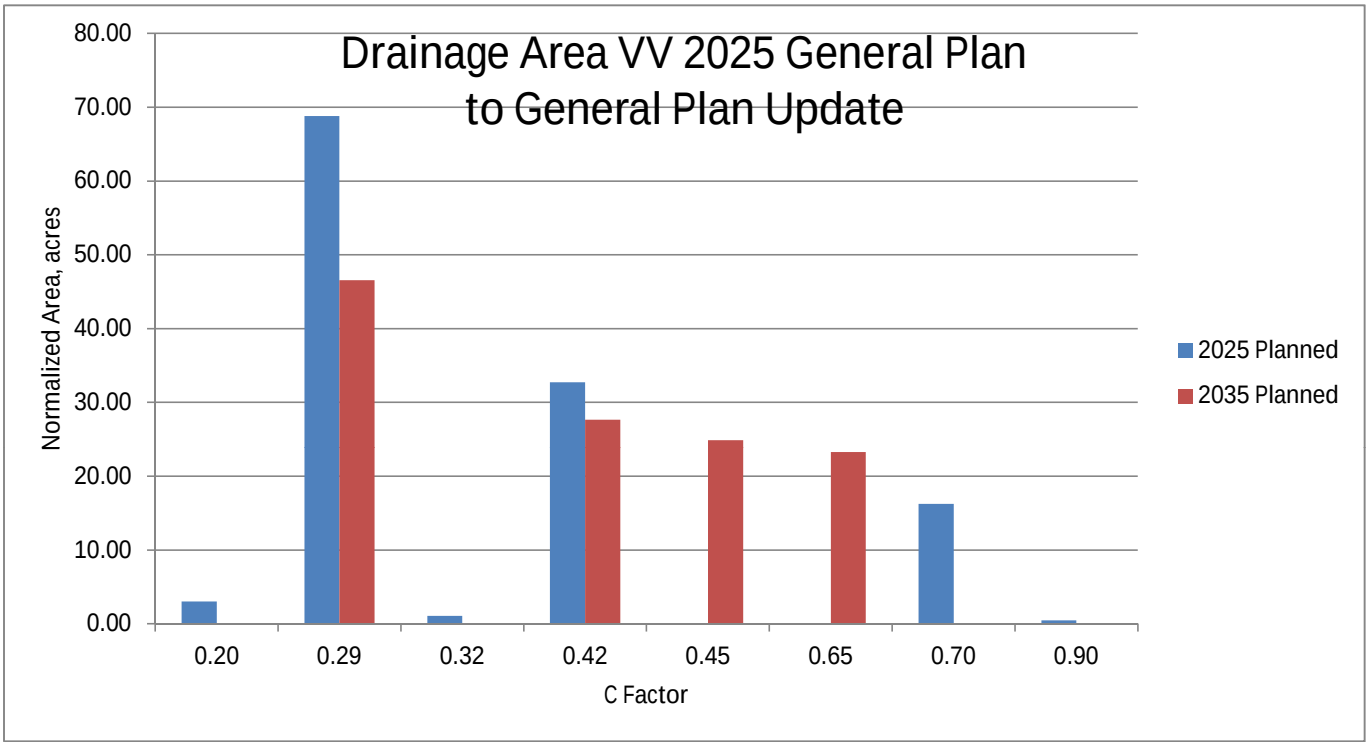

Drainage Area U 2025 General Plan to General Plan Update
Normalized Area, acres
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.24
0.32
0.42
0.45
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

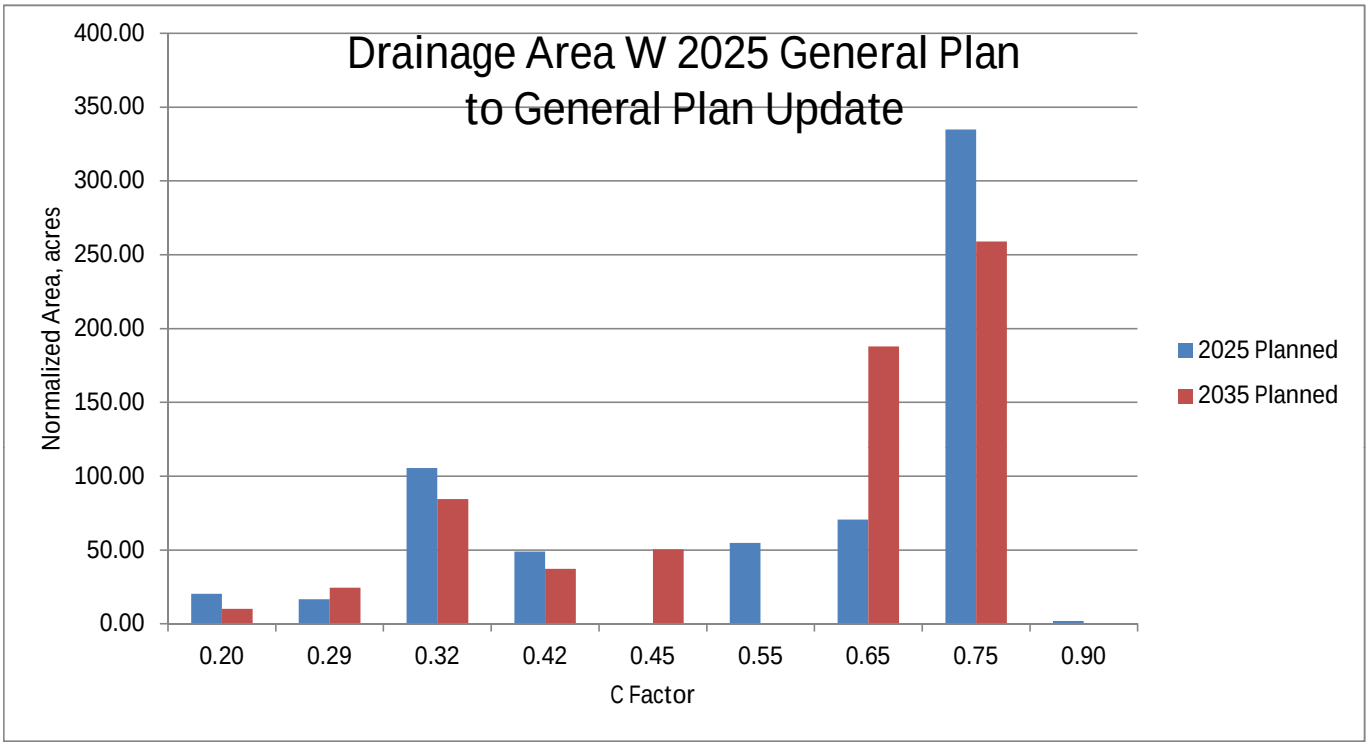

Drainage Area UU1 2025 General Plan to General Plan Update
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.29
0.32
0.42
0.45
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

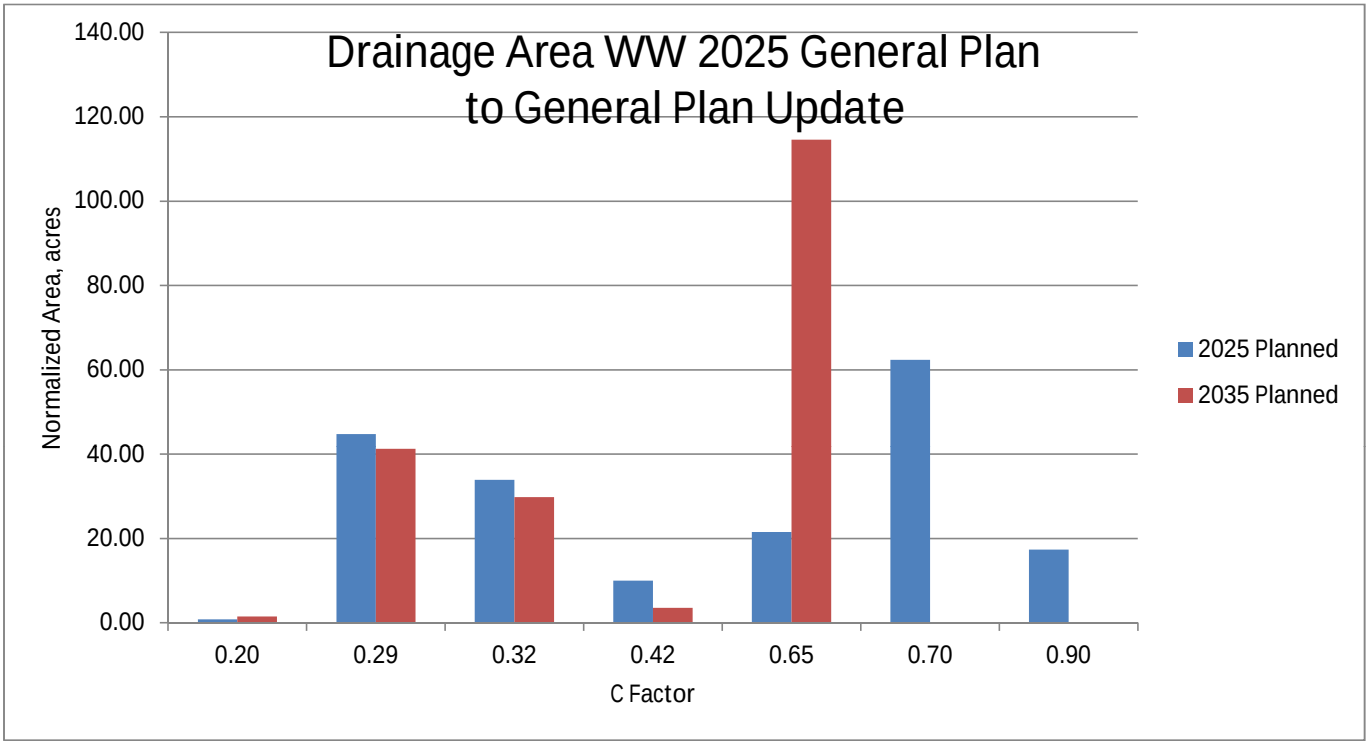

Drainage Area UU2 2025 General Plan to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

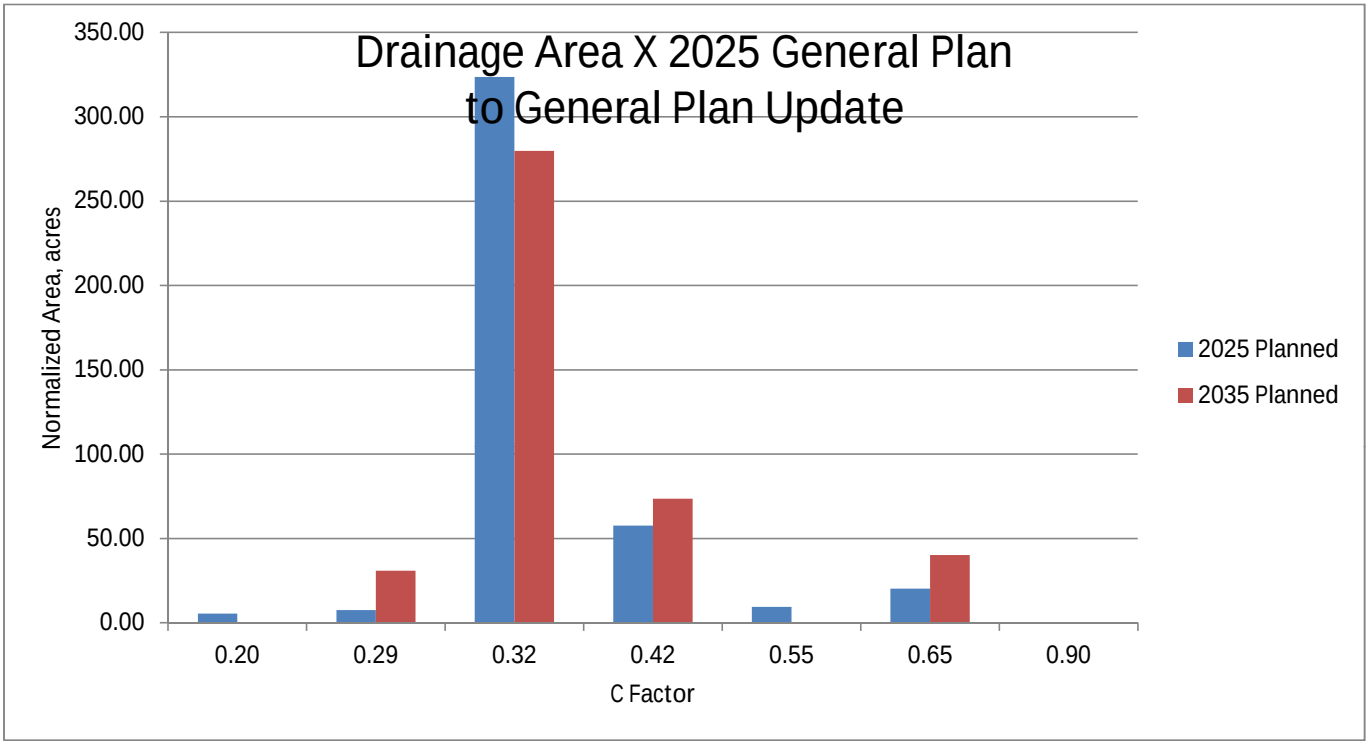

Drainage Area UU3 2025 General Plan to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.24
0.29
0.32
0.42
0.45
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

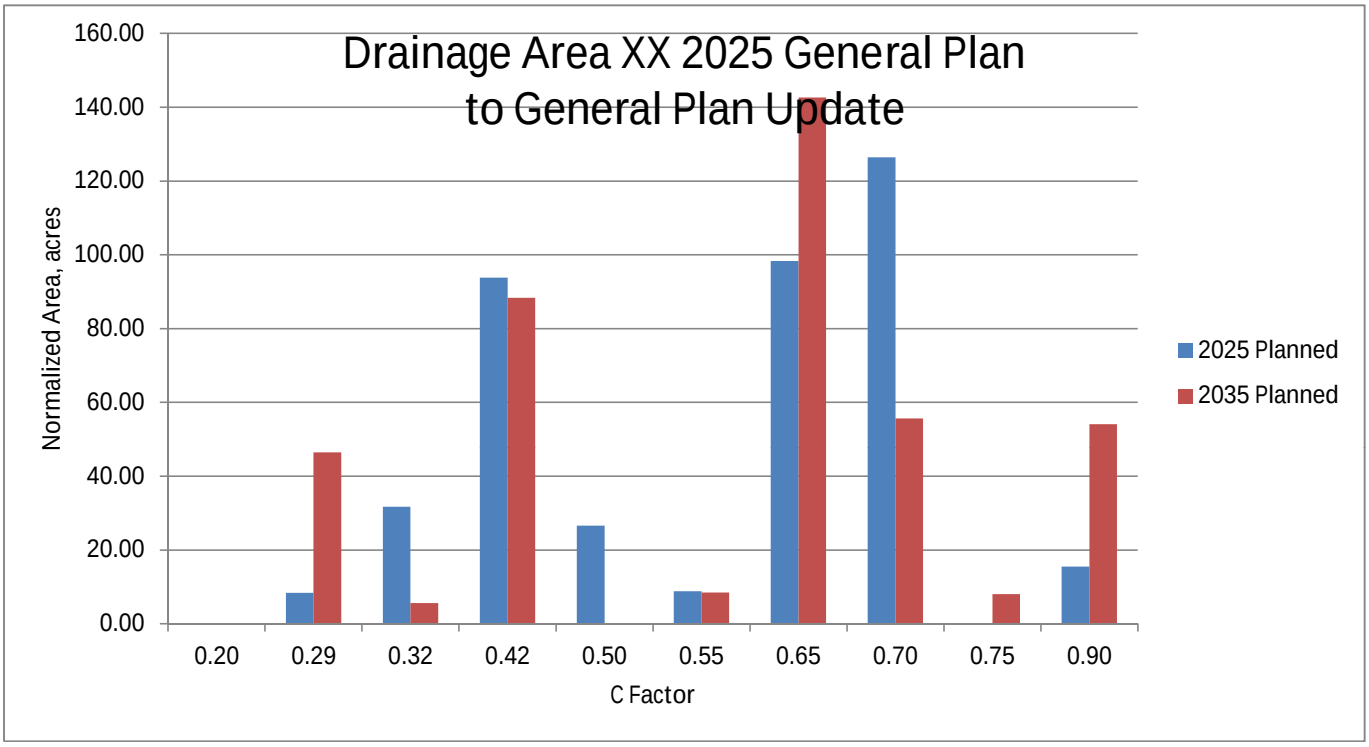

Drainage Area V 2025 General Plan
to General Plan Update
Normalized Area, acres
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.75
C Factor
2025 Planned
2035 Planned

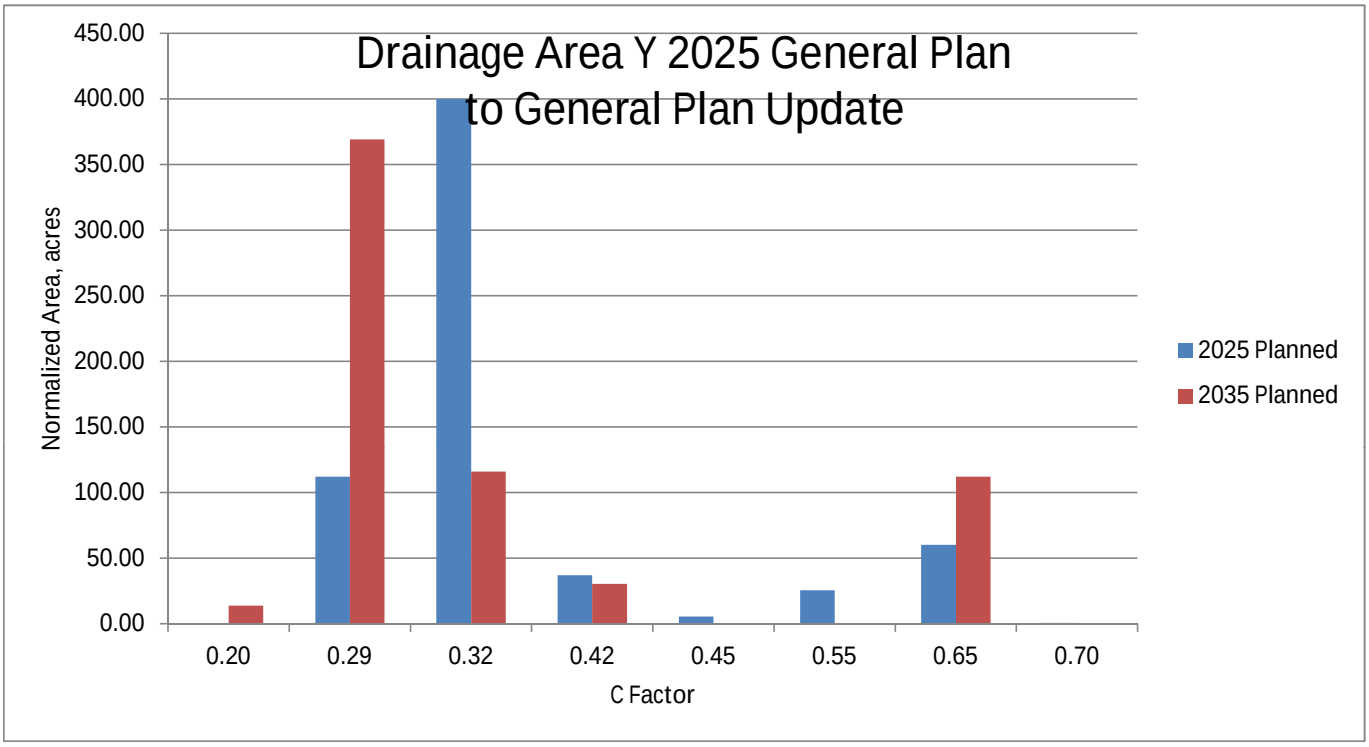

Drainage Area VV 2025 General Plan to General Plan Update
Normalized Area, acres
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.20
0.29
0.32
0.42
0.45
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned

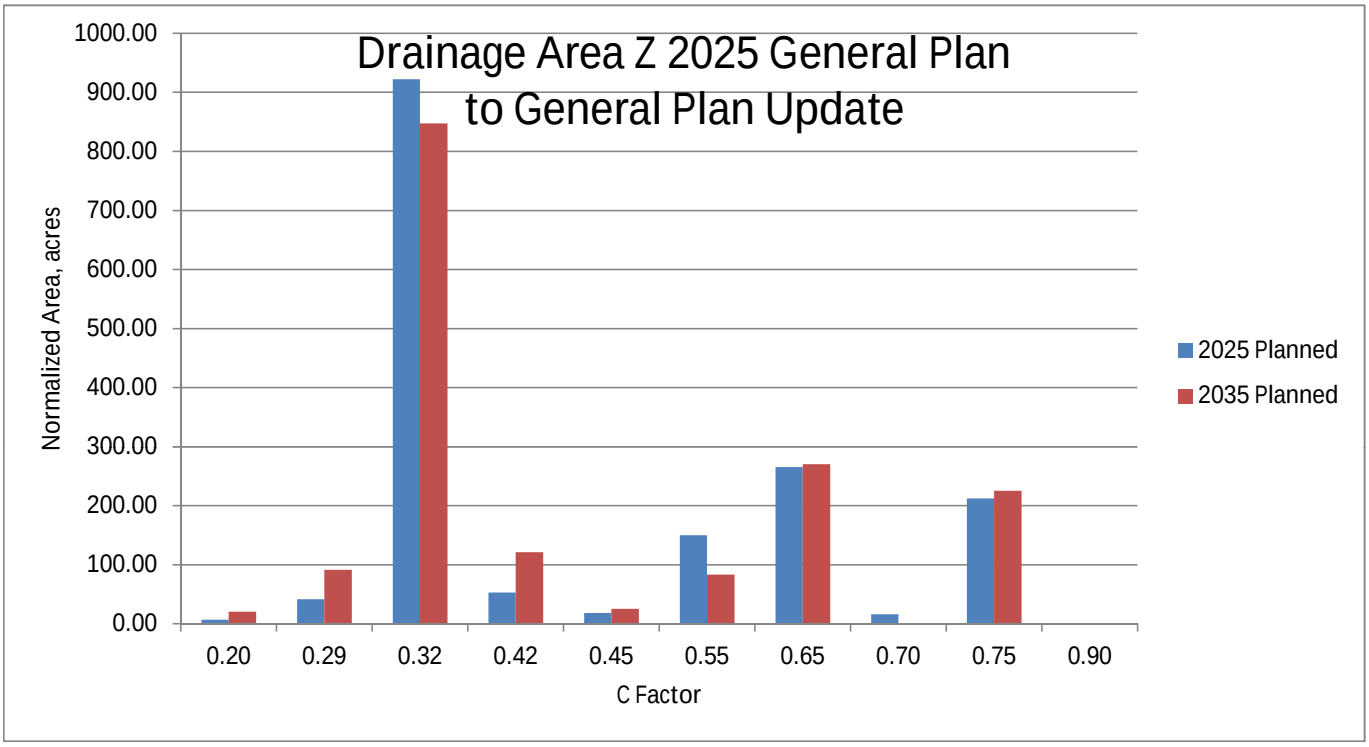

Drainage Area W 2025 General Plan to General Plan Update
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.75
0.90
C Factor
2025 Planned
2035 Planned

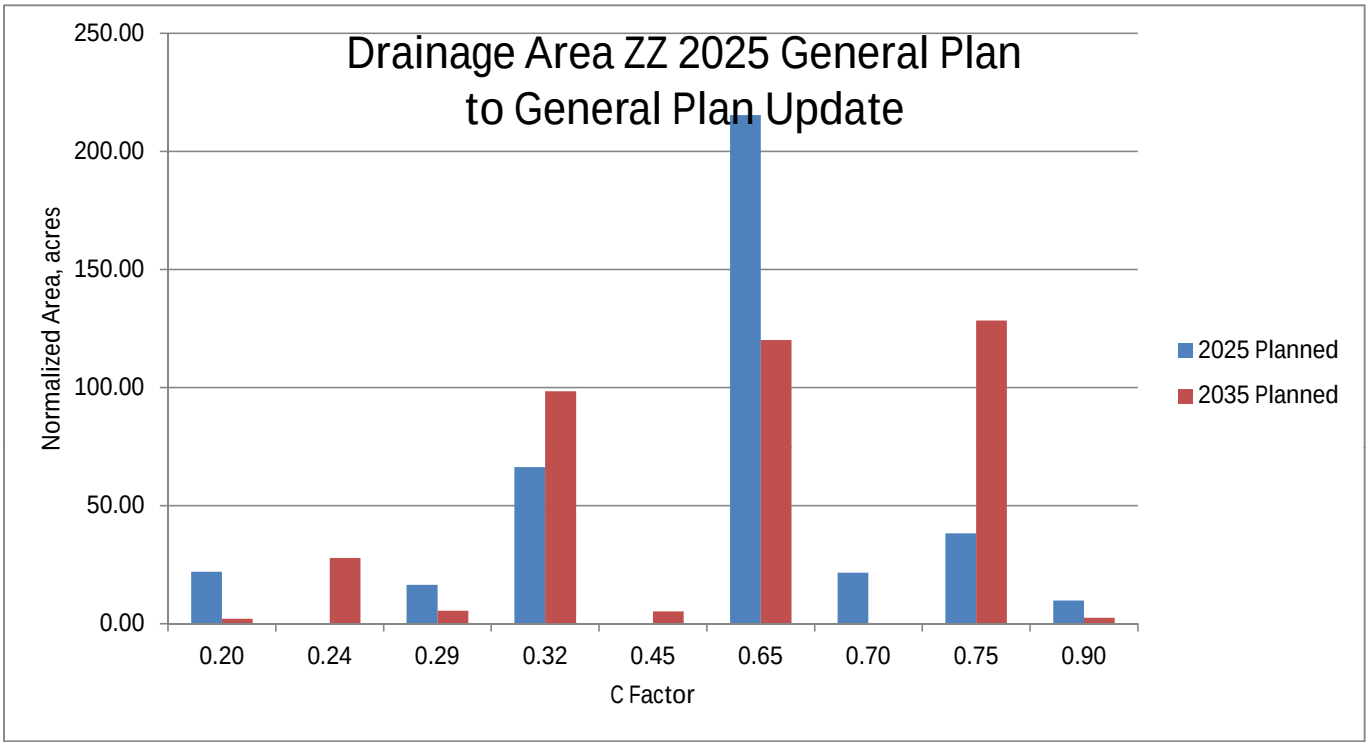

Drainage Area WW 2025 General Plan to General Plan Update
Normalized Area, acres
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.20
0.29
0.32
0.42
0.65
0.70
0.90
C Factor
2025 Planned
2035 Planned


Drainage Area X 2025 General Plan to General Plan Update
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.55
0.65
0.90
C Factor
2025 Planned
2035 Planned

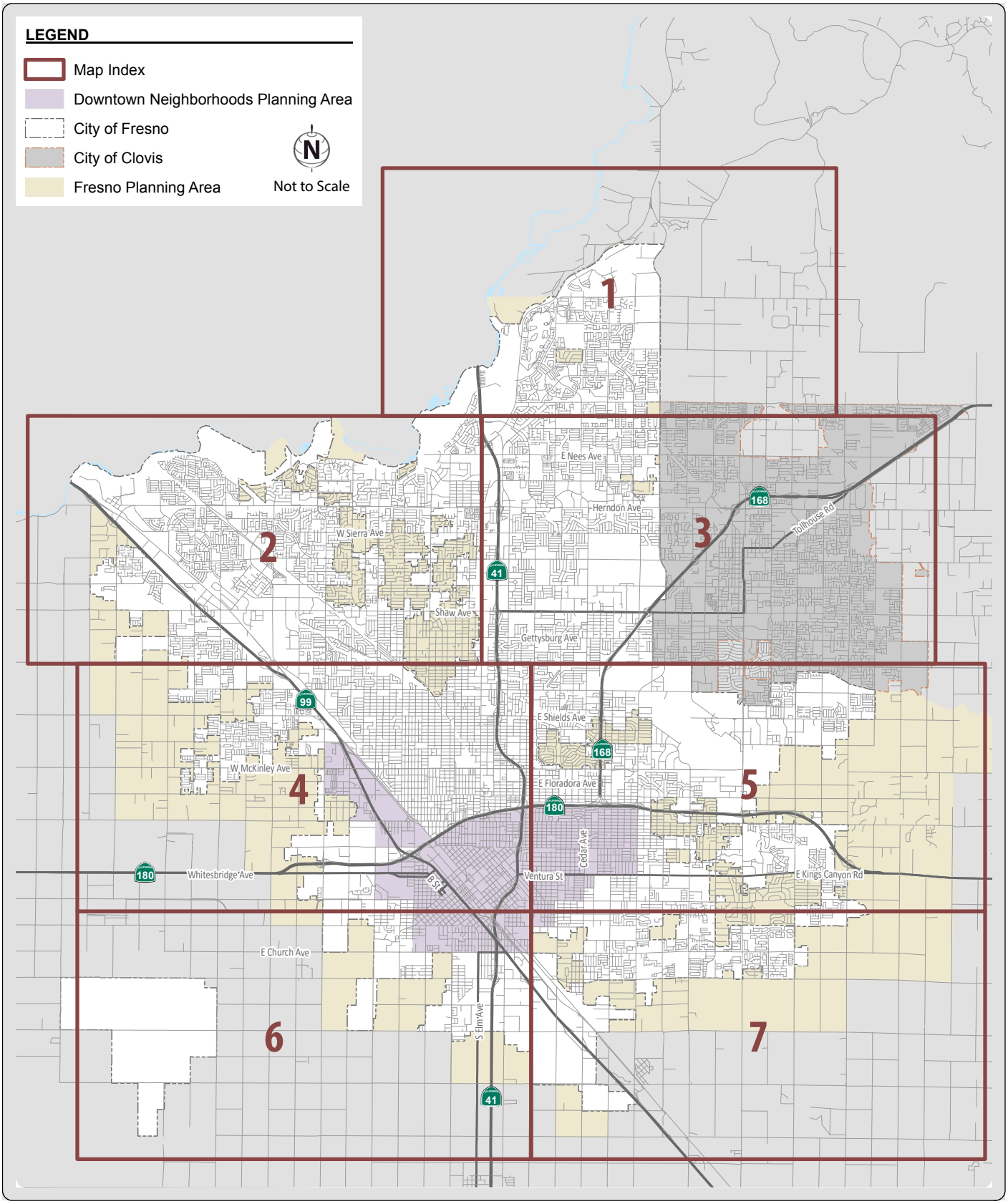

Drainage Area XX 2025 General Plan to General Plan Update
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Normalized Area, acres
0.20
0.29
0.32
0.42
0.50
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned


Drainage Area Y 2025 General Plan to General Plan Update
Normalized Area, acres
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
C Factor
2025 Planned
2035 Planned


Drainage Area Z 2025 General Plan to General Plan Update
Normalized Area, acres
1000.00
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
0.20
0.29
0.32
0.42
0.45
0.55
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned


Drainage Area ZZ 2025 General Plan
to General Plan Update
250.00
200.00
150.00
100.00
50.00
0.00
Normalized Area, acres
0.20
0.24
0.29
0.32
0.45
0.65
0.70
0.75
0.90
C Factor
2025 Planned
2035 Planned

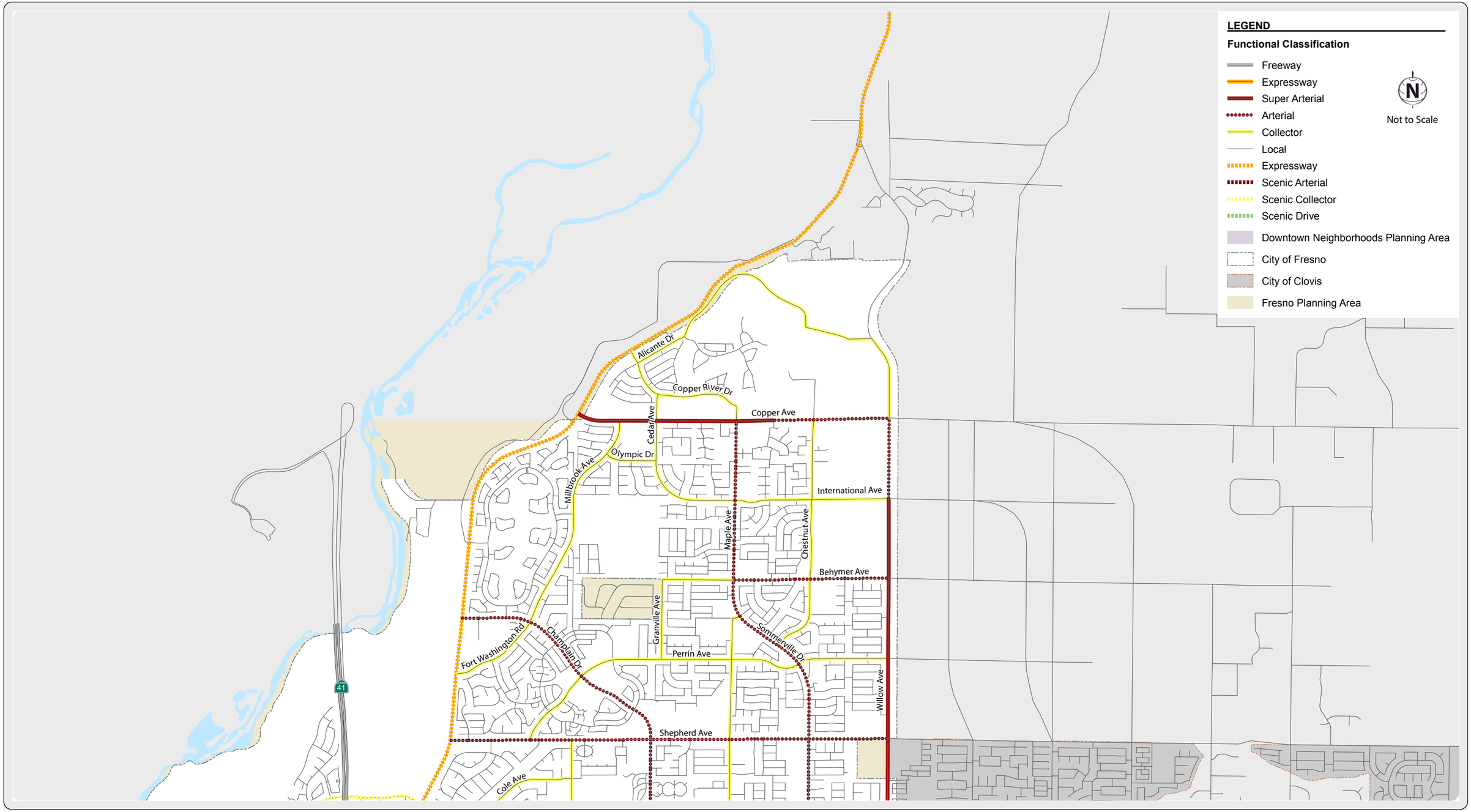
H.1 - Planning Area Exhibits – Existing Roadway Functional Classifications



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-1.1

LEGEND

Functional Classification

- Freeway
- Expressway
- Super Arterial
- Arterial
- Collector
- Local
- Expressway
- Scenic Arterial
- Scenic Collector
- Scenic Drive
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

N

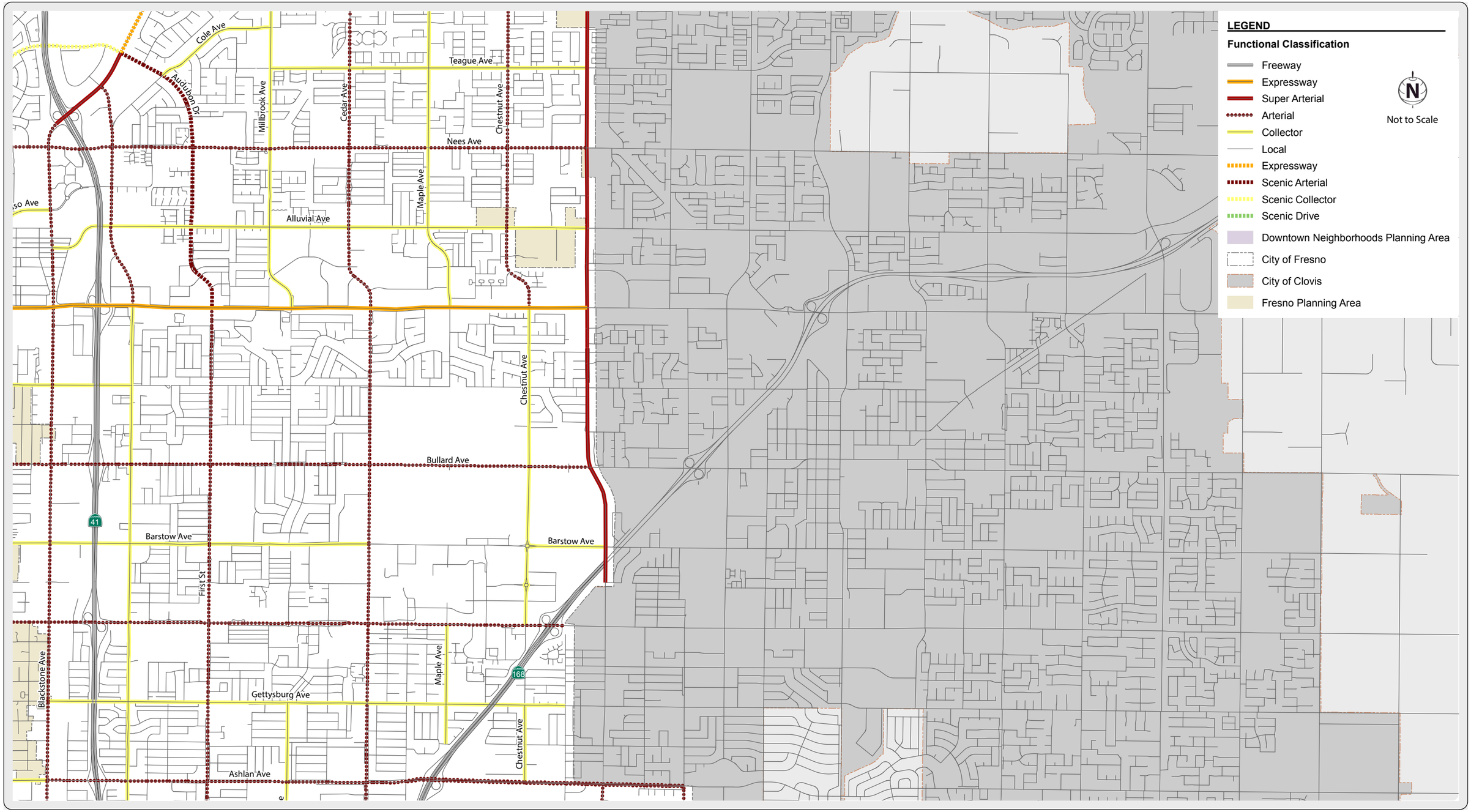
Not to Scale

River Vista Dr
Alluvial Ave
Spruce Ave
Herndon Ave
Milburn Ave
Palo Alto Ave
Hayes Ave
Bryan Ave
Polk Ave
Parkway Dr
Golden State Blvd
Sierra Ave
Jeanne Ave
Santa Fe Ave
Figarden Dr
Brawley Ave
Escalon Ave
Dante Ave
Cecelia Ave
Bullard Ave
Garfield Ave
Barstow Ave
Gates Ave
Blythe Ave
San Jose Ave
Valentine Ave
Marty Ave
Emerson Ave
Gettysburg Ave
Ashlan Ave
Shaw Ave
Maroa Ave
Blackstone Ave
Ingram Ave
Alluvial Ave
El Paso Ave
Locust Ave
99

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

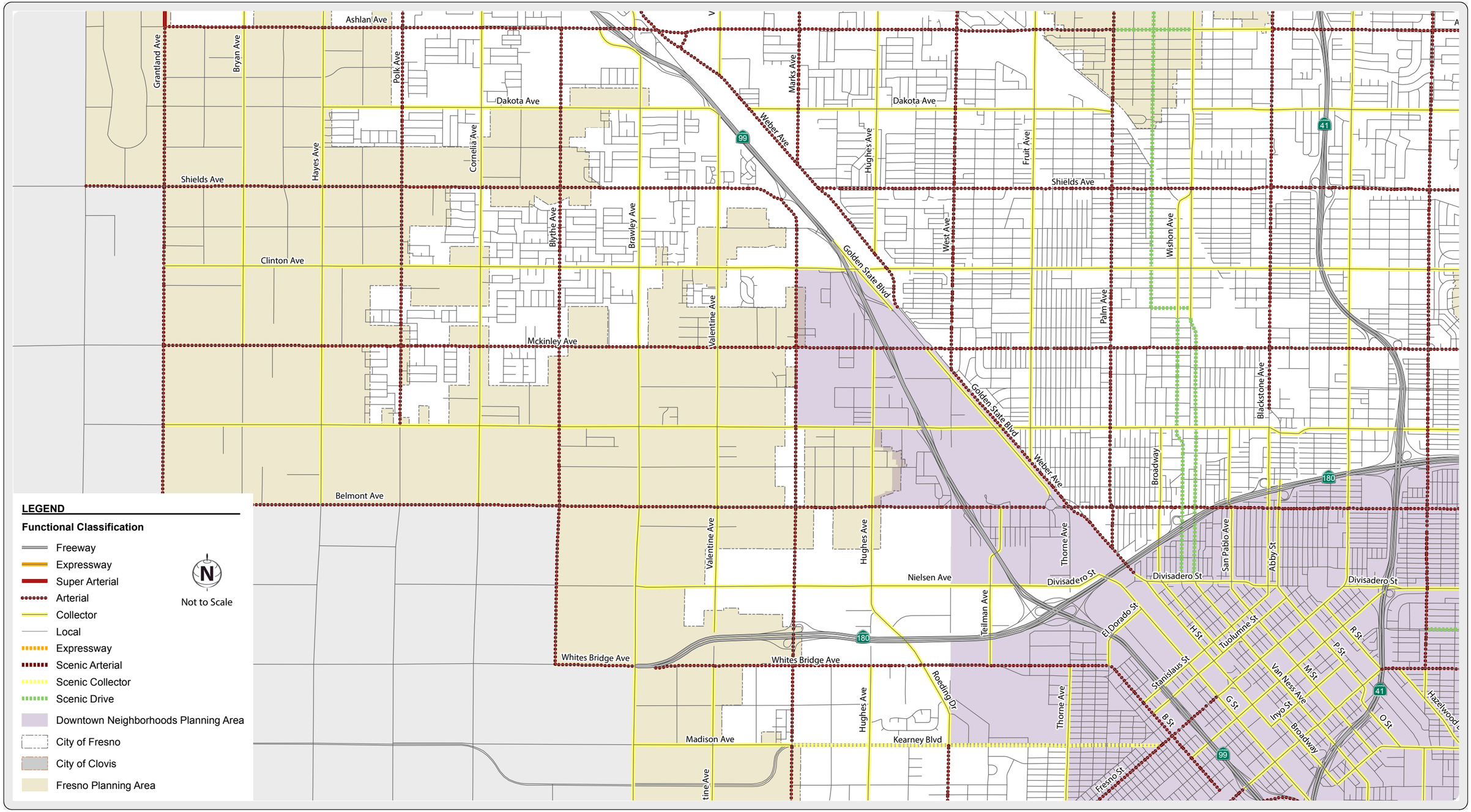
CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-1.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-1.3

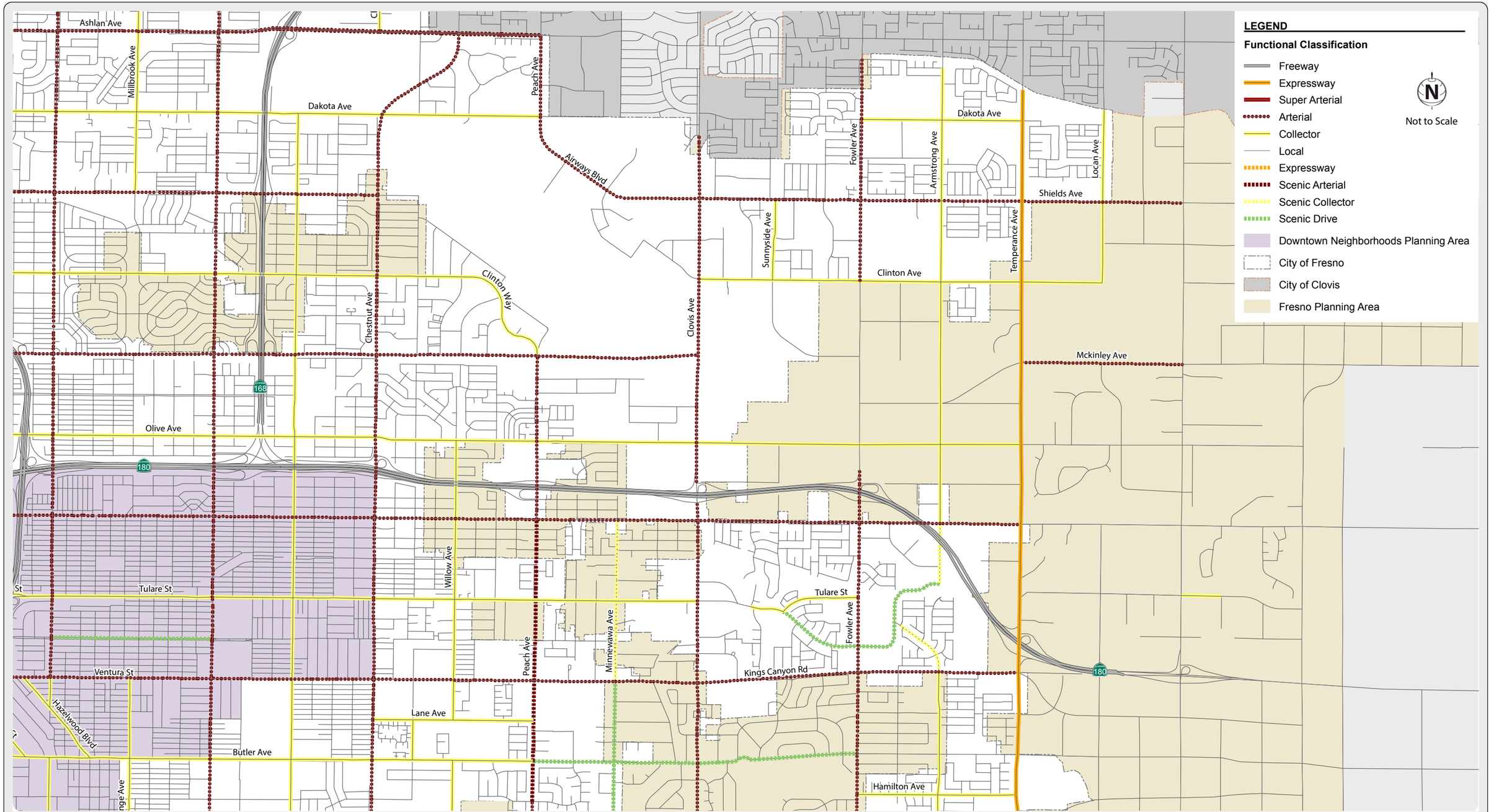


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION

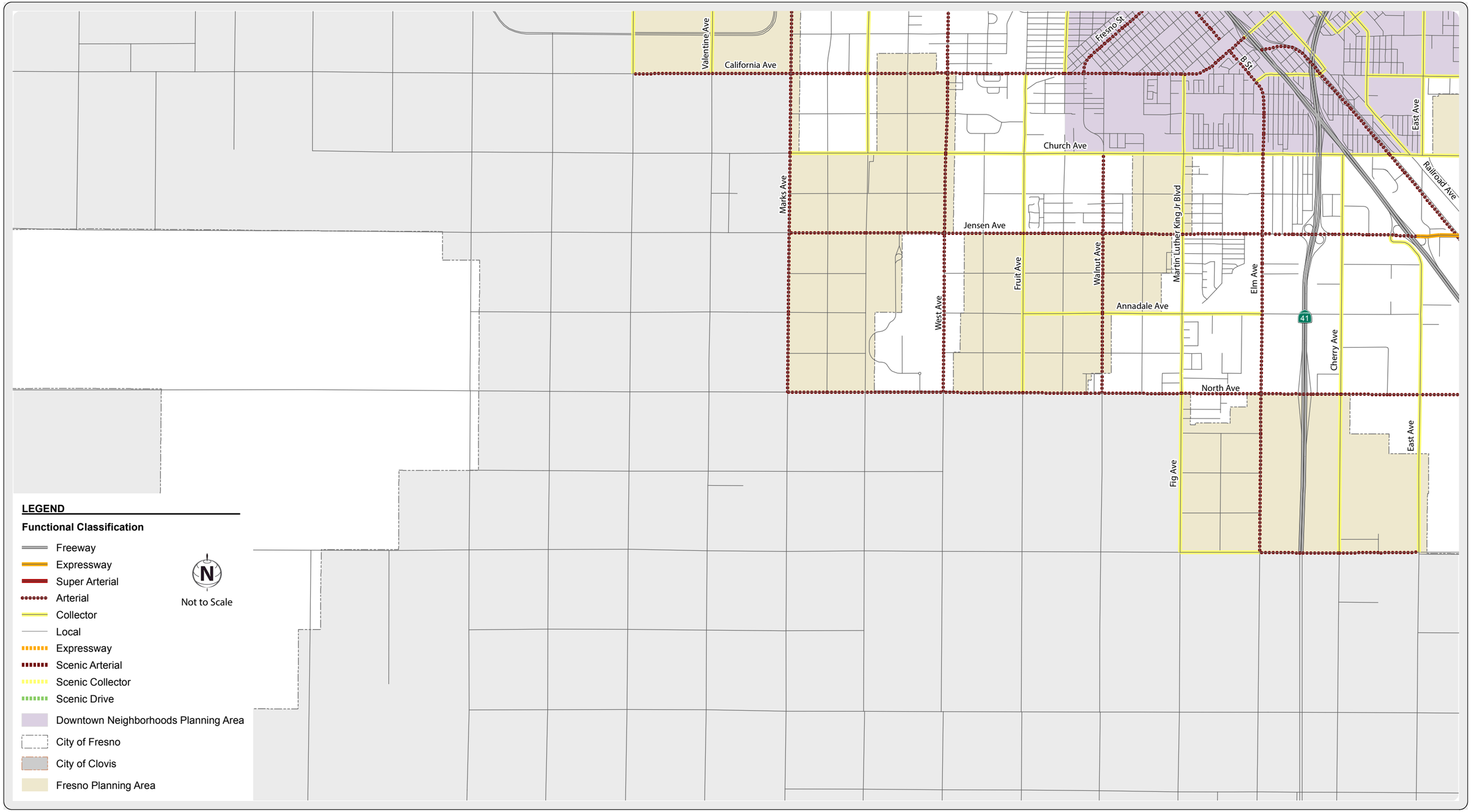
Appendix H-1.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

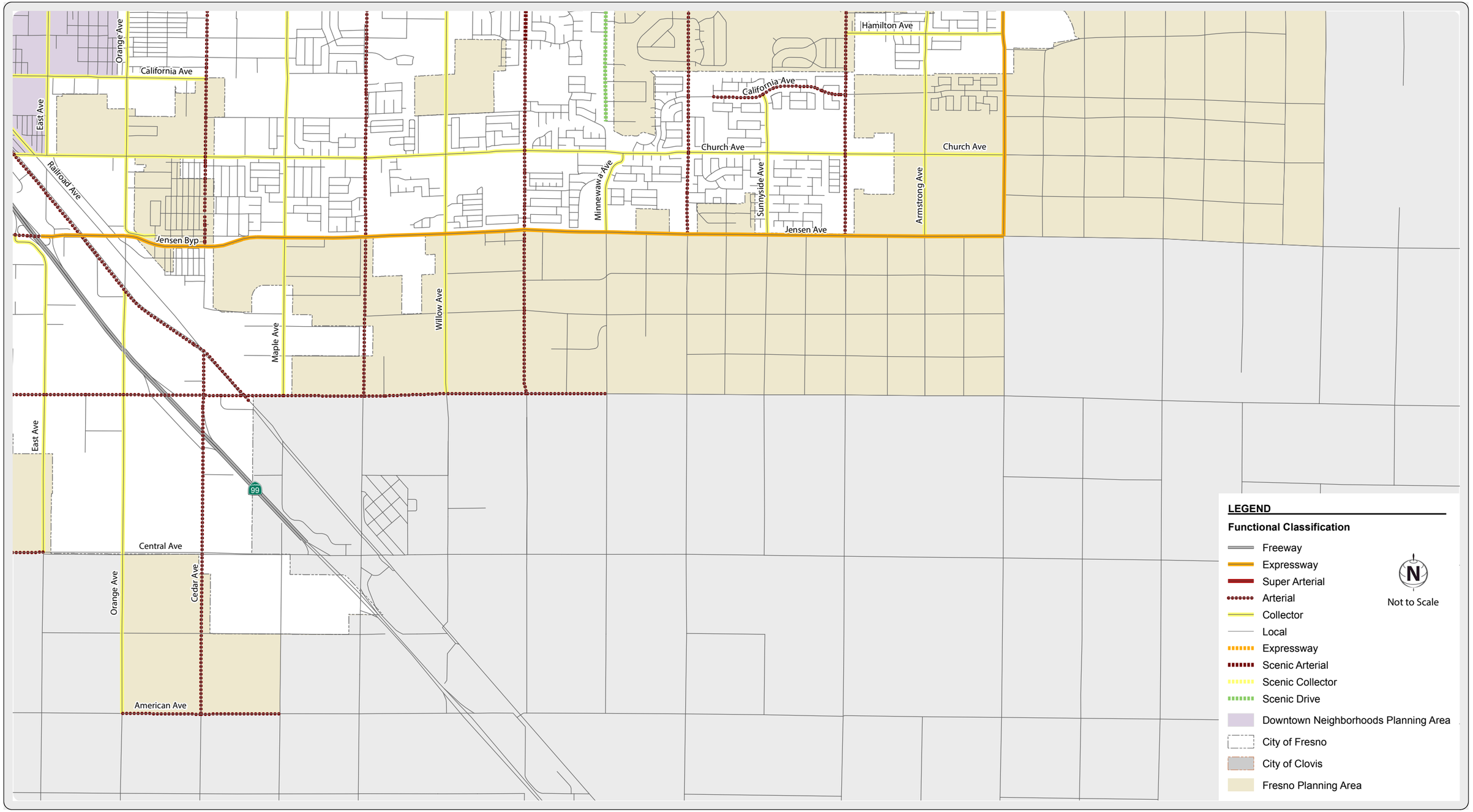
CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-1.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-1.6

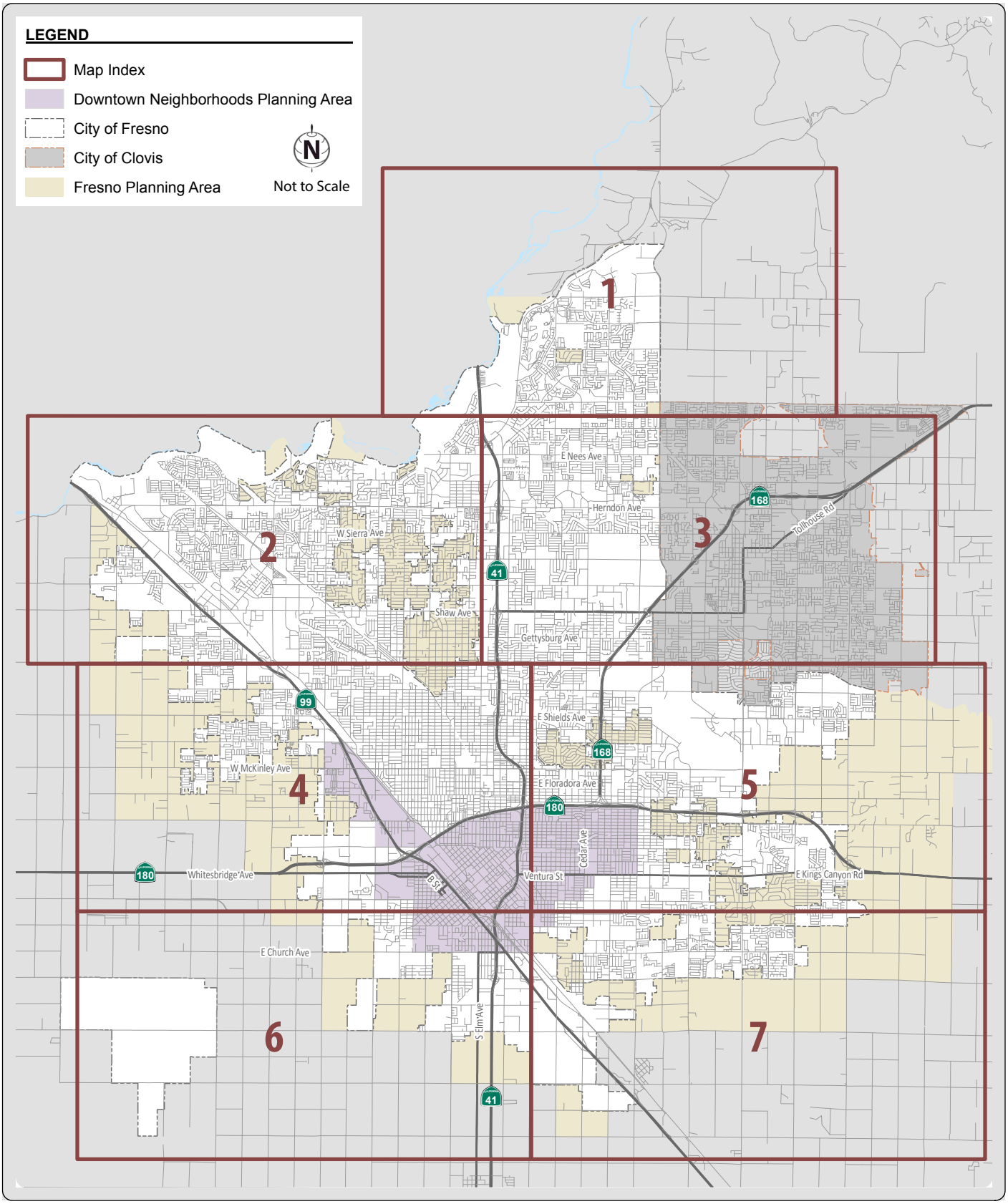


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH1_BaseFuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-1.7

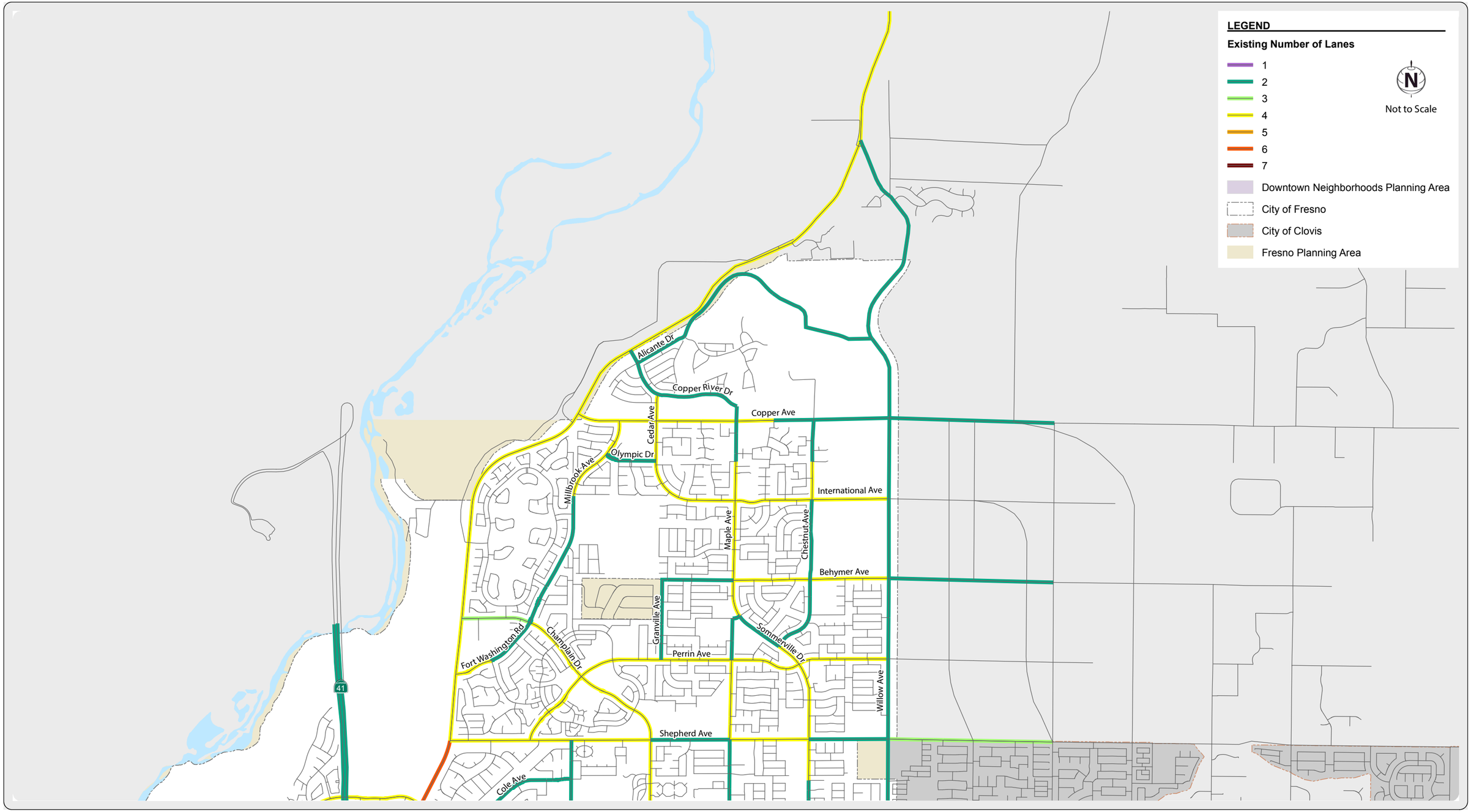
H.2 - Planning Area Exhibits - Existing Roadway Number of Lanes



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.1

LEGEND

Existing Number of Lanes

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Not to Scale

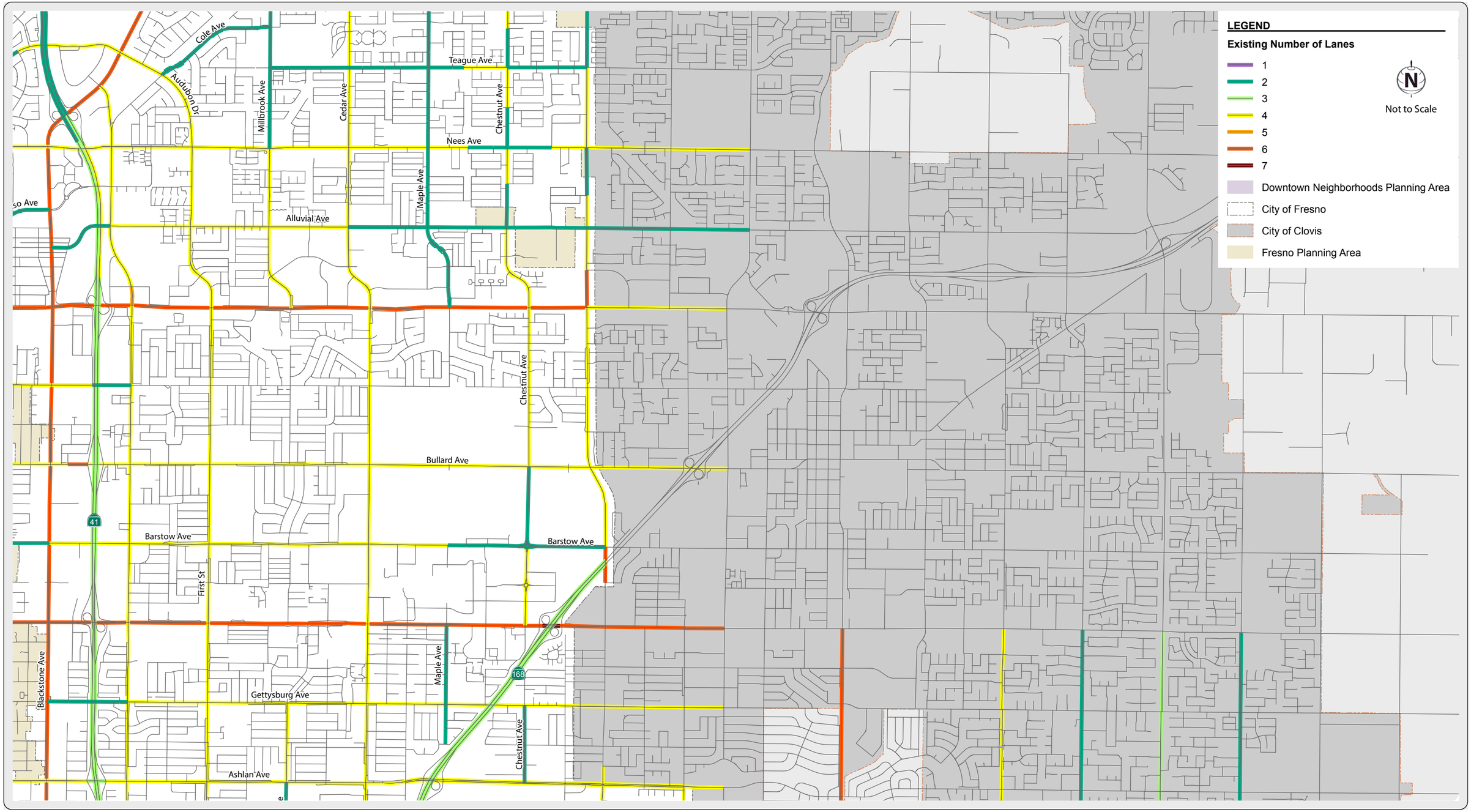
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

River Vista Dr
Alluvial Ave
Spruce Ave
Herndon Ave
Milburn Ave
Spruce Ave
Bryan Ave
Hayes Ave
Polk Ave
Palo Alto Ave
Palo Alto Ave
Jeanne Ave
Santa Fe Ave
Figarden Dr
Brawley Ave
Sierra Ave
Sierra Ave
Escalon Ave
Dante Ave
Cecelia Ave
Bullard Ave
Bullard Ave
Bryan Ave
Garfield Ave
Barstow Ave
Barstow Ave
Gates Ave
Blythe Ave
San Jose Ave
Valentine Ave
Marty Ave
Emerson Ave
Emerson Ave
Brawley Ave
Valentine Ave
Gettysburg Ave
Ashlan Ave
Shaw Ave
Maroa Ave
Blackstone Ave
Alluvial Ave
Ingram Ave
El Paso Ave
Locust Ave
Parkway Dr
Golden State Blvd
99
99

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

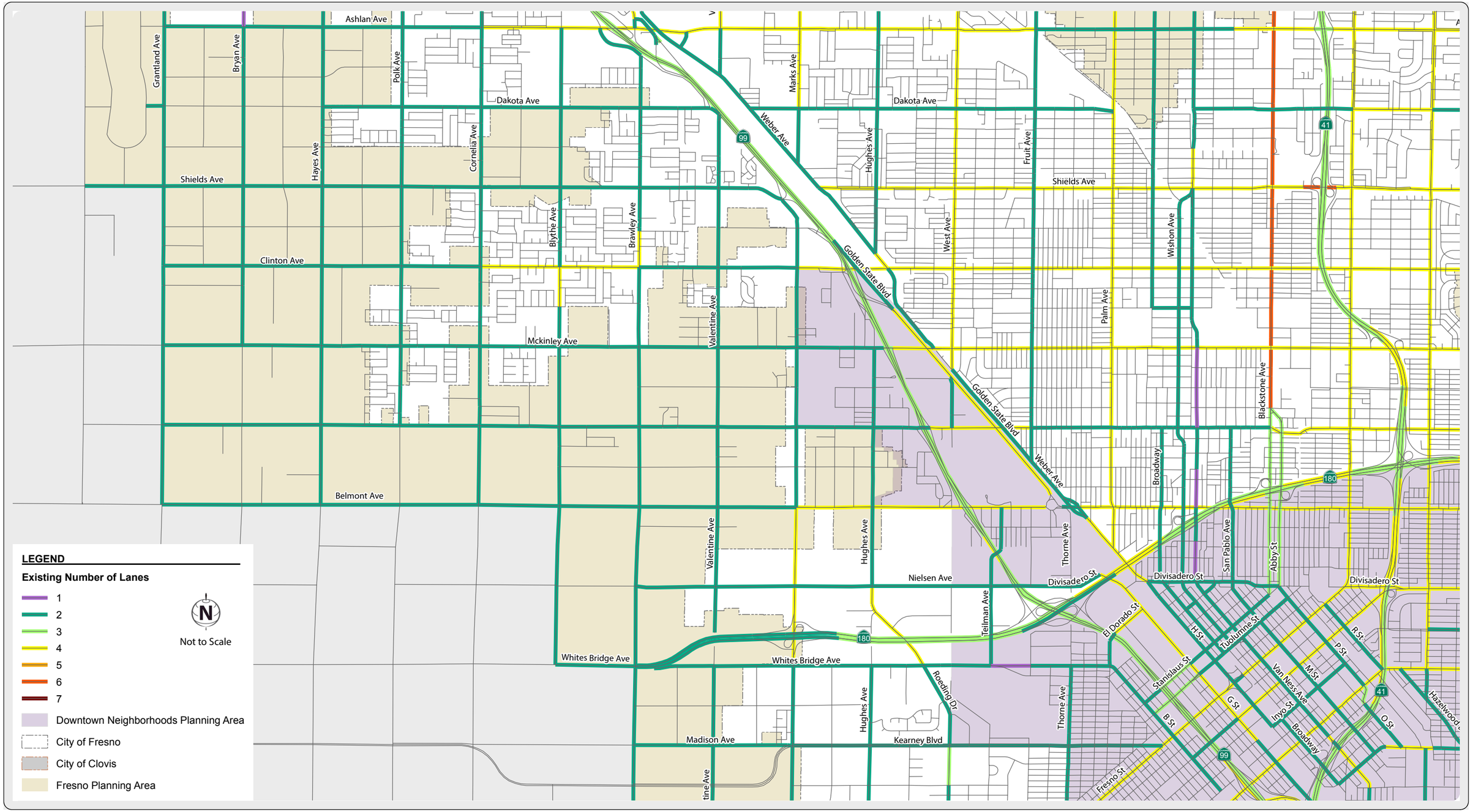
CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

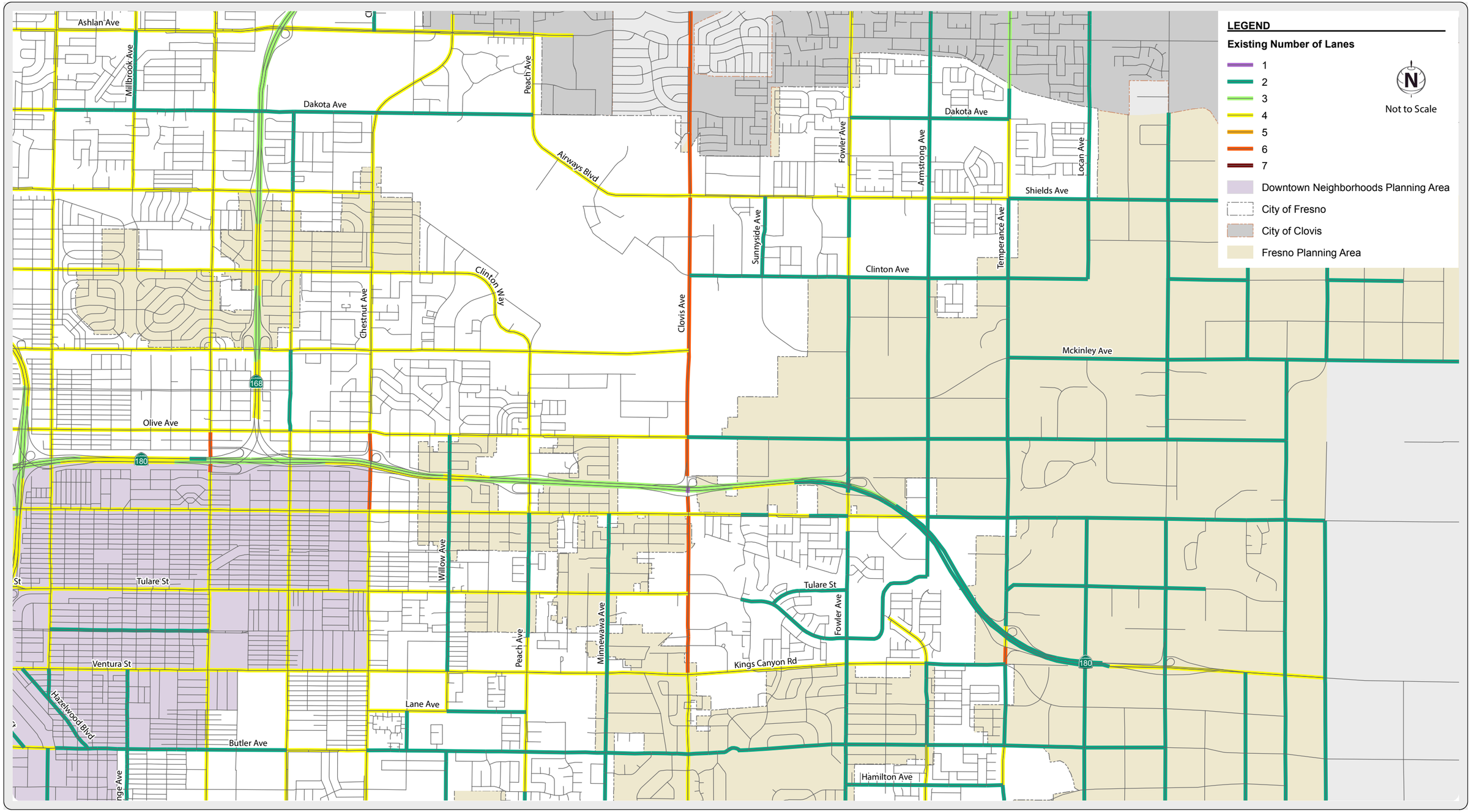
CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

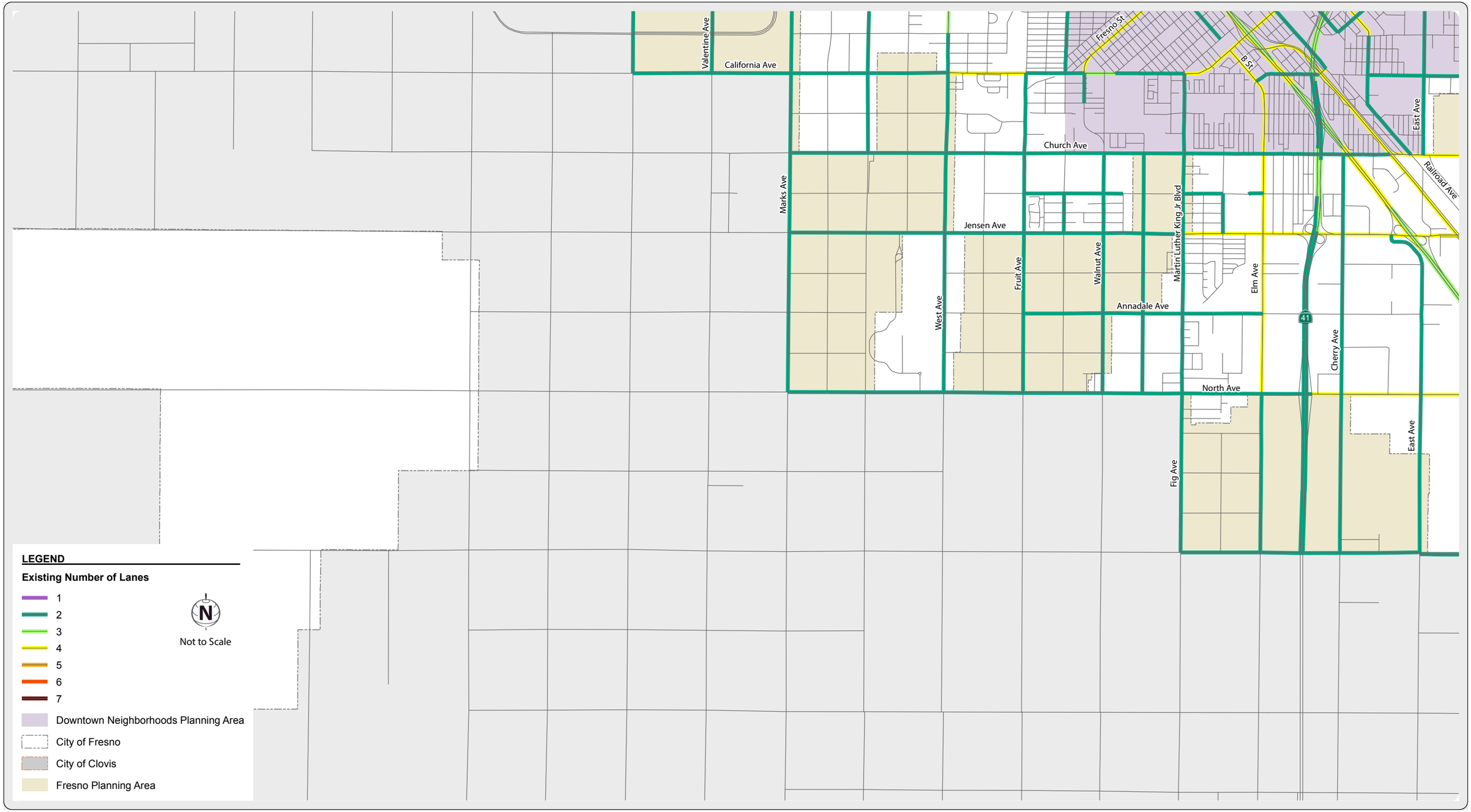
CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

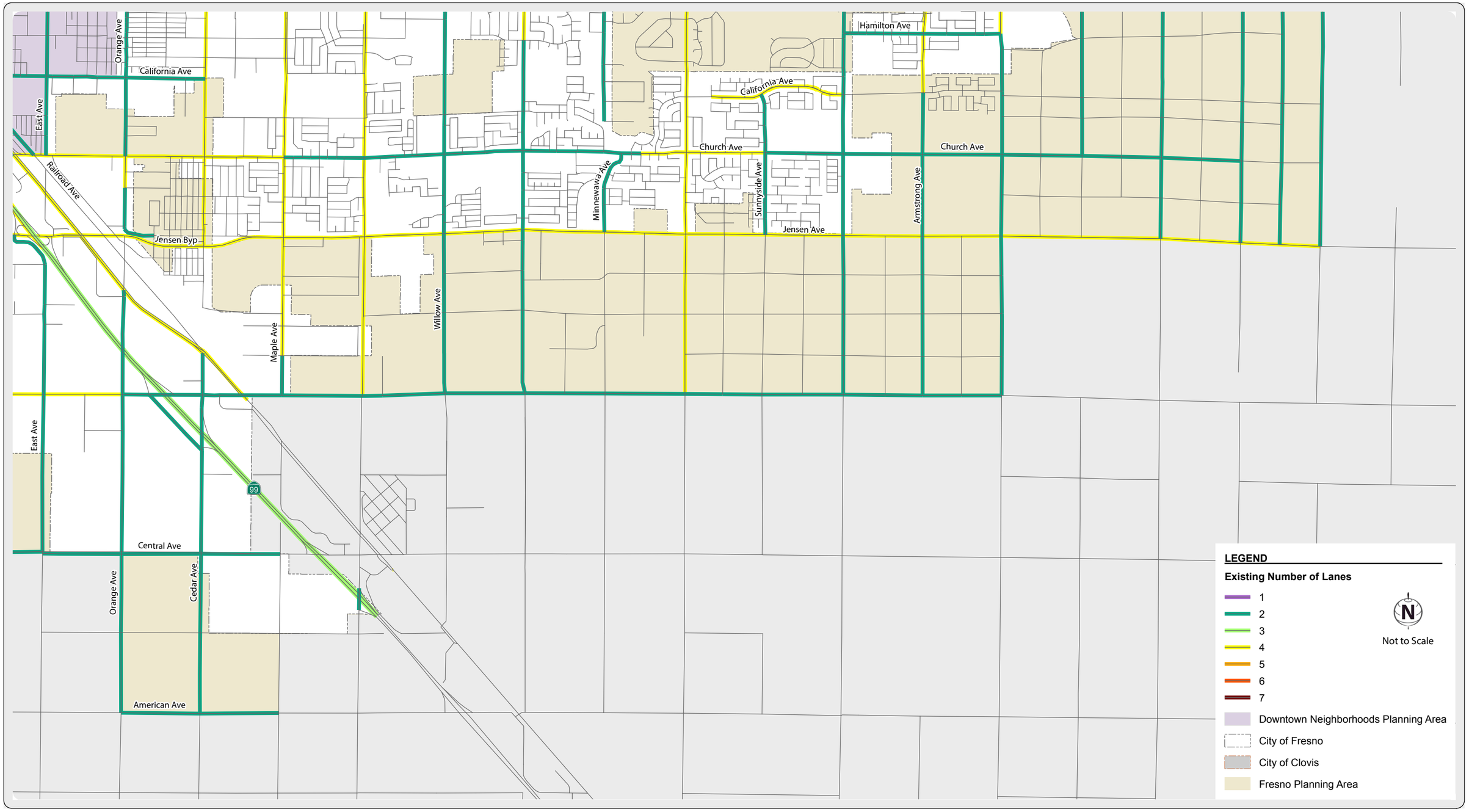
CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.6

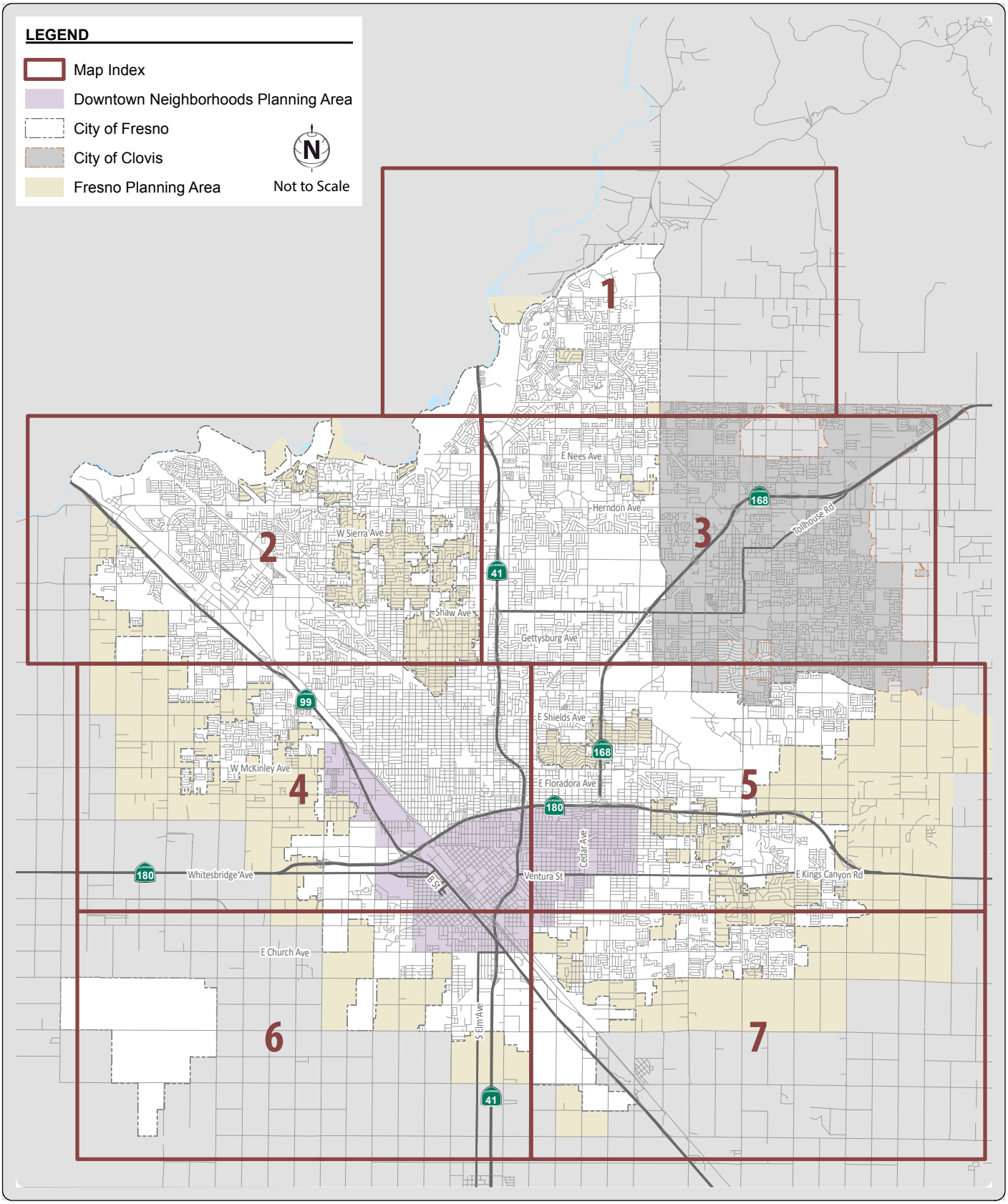


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH2_BaseLanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY NUMBER OF LANES
Appendix H-2.7

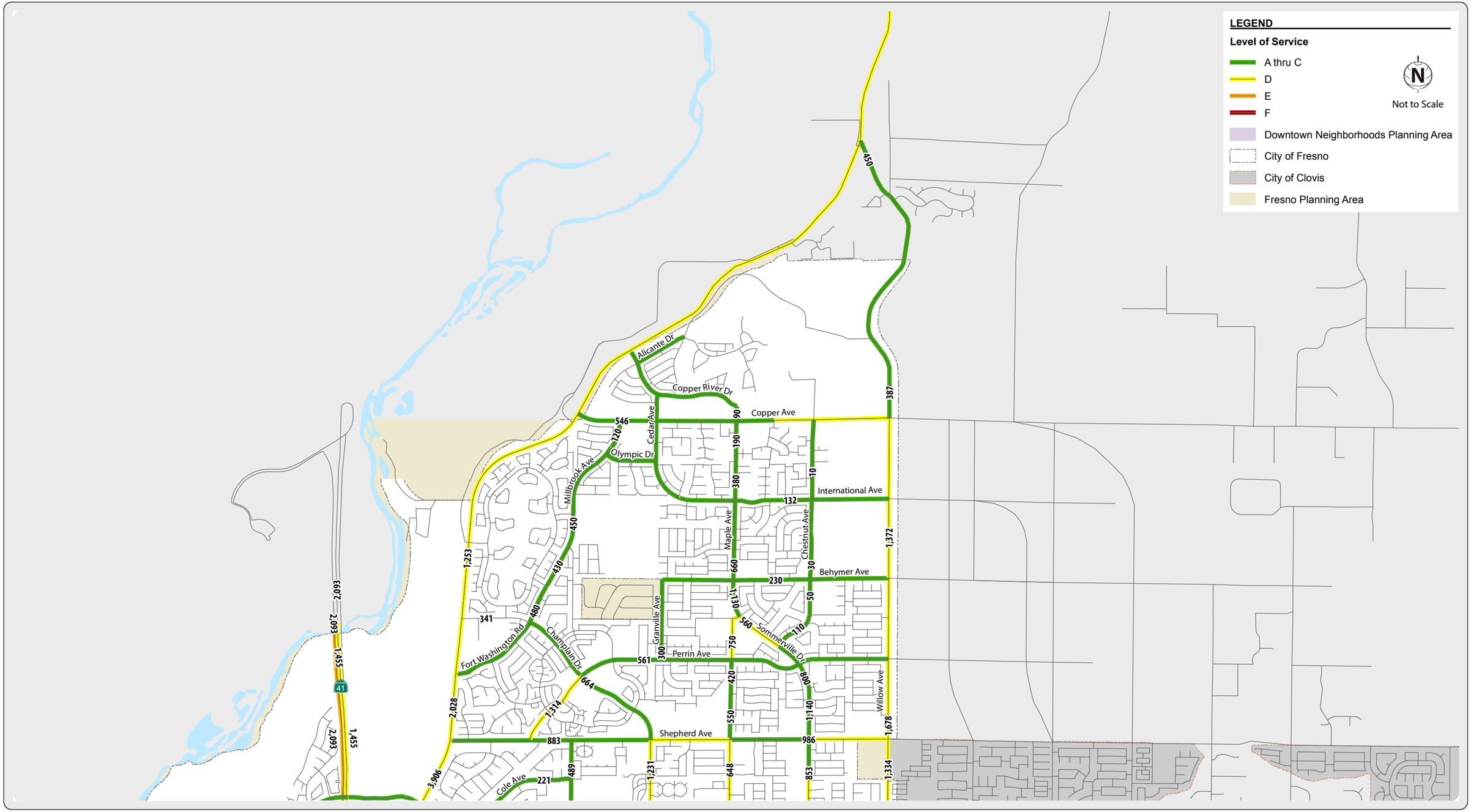
H.3 - Planning Area Exhibits – AM Peak Hour Volumes and LOS – Existing Year Conditions



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH3_AM_LOS_Base.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-3.1

LEGEND

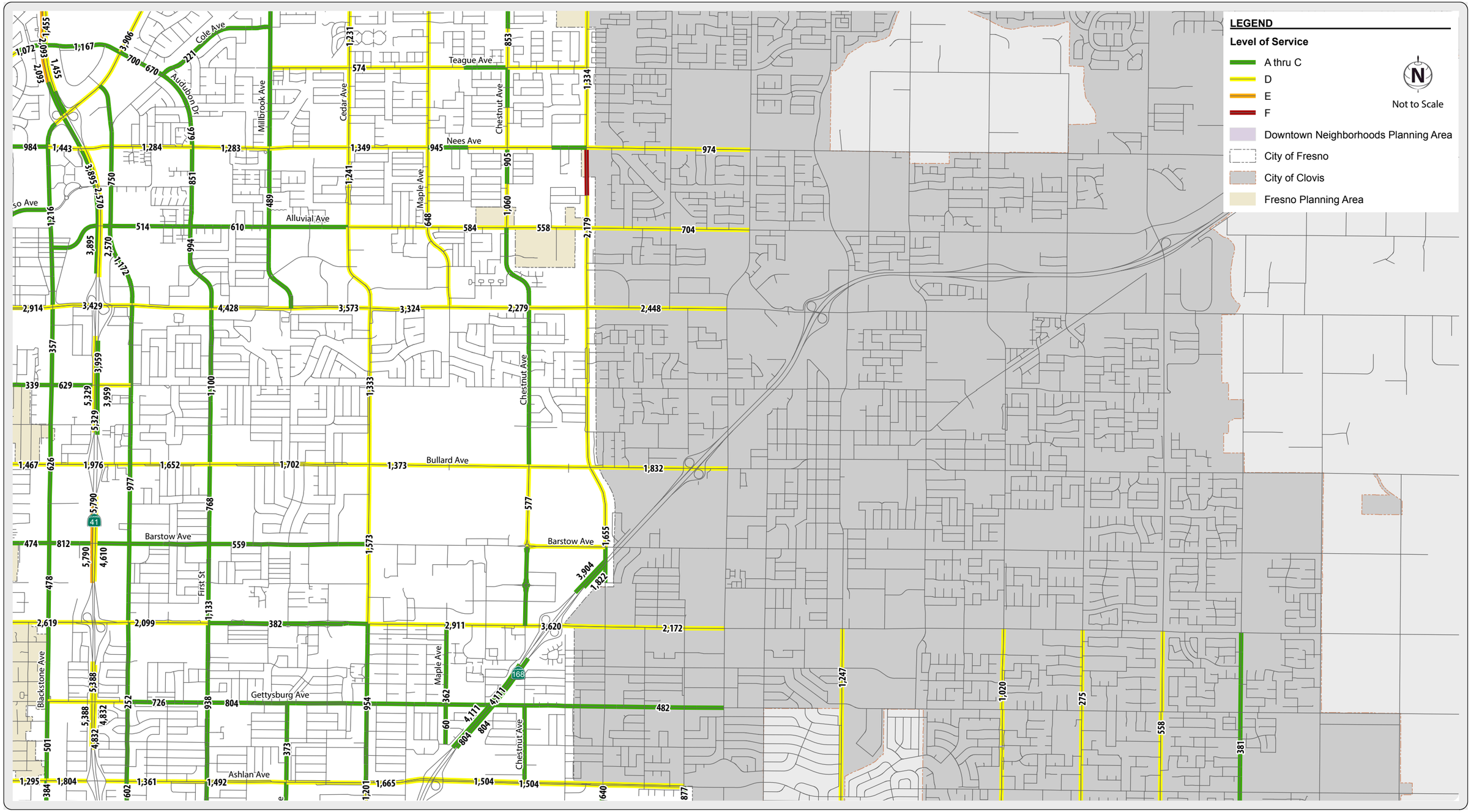
Level of Service

- A thru C
- D
- E
- F

Not to Scale

- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

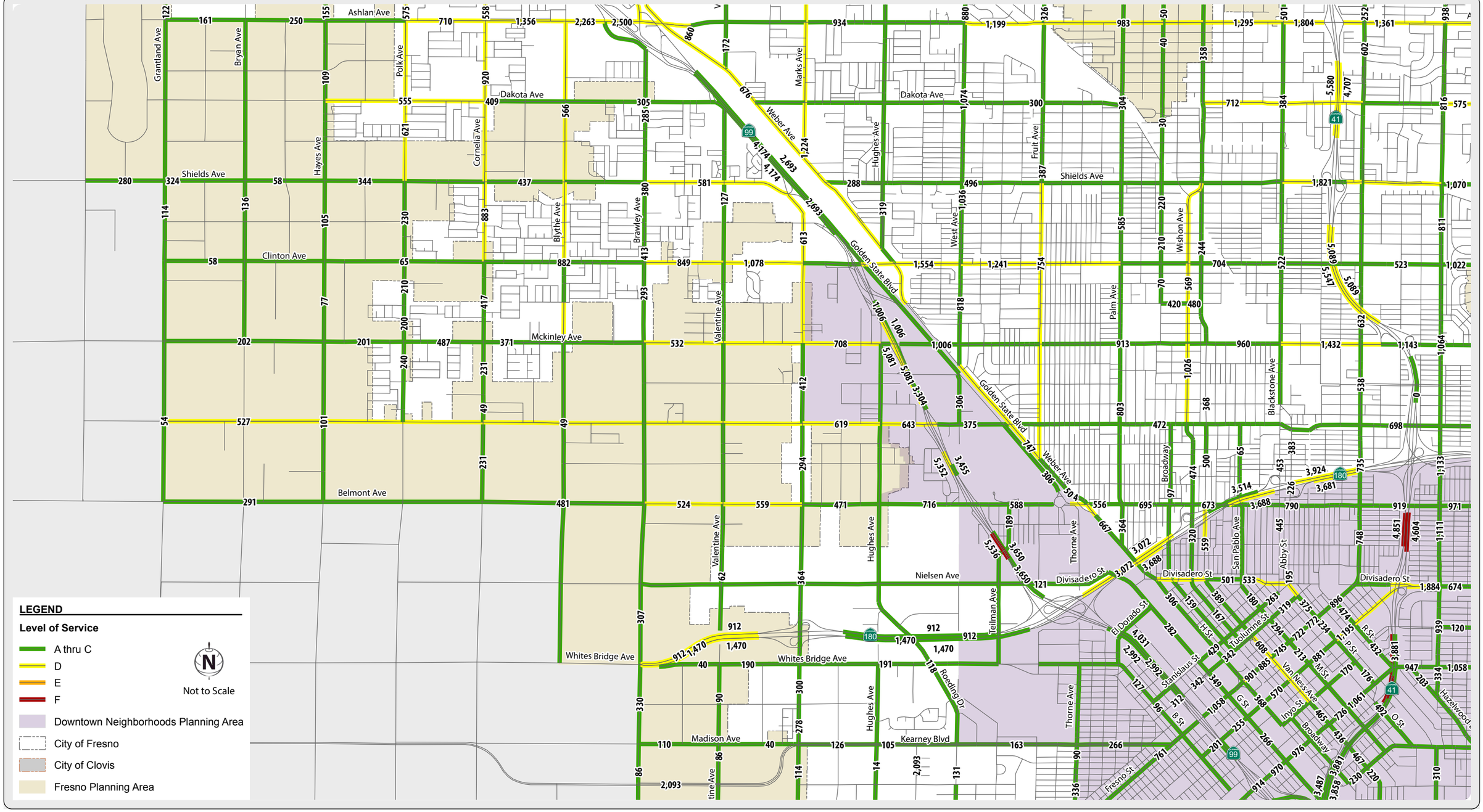
River Vista Dr · Alluvial Ave · Spruce Ave · Herndon Ave · Palo Alto Ave · Sierra Ave · Bullard Ave · Barstow Ave · Gettysburg Ave · Ashlan Ave · San Jose Ave · Shaw Ave · Locust Ave · El Paso Ave · Ingram Ave · Parkway Dr · Golden State Blvd · Garfield Ave · Bryan Ave · Hayes Ave · Polk Ave · Dante Ave · Escalon Ave · Cecelia Ave · Jeanne Ave · Santa Fe Ave · Figarden Dr · Brawley Ave · Milburn Ave · Gates Ave · Blythe Ave · Marty Ave · Valentine Ave · Emerson Ave · Maroa Ave · Blackstone Ave · Millbrook Ave · Fresno Ave · 99



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH3_AM_LOS_Base.mxd

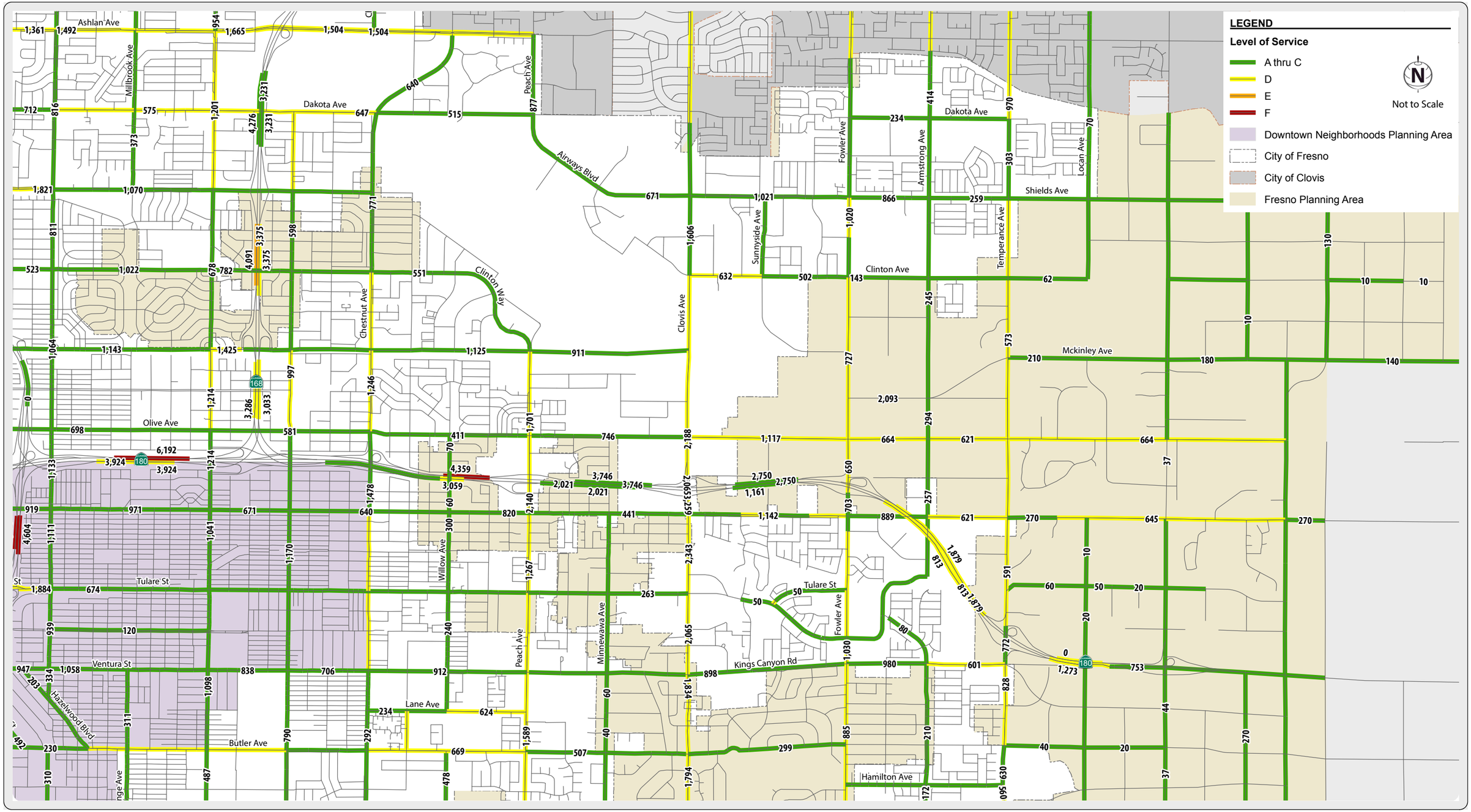
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-3.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH3_AM_LOS_Base.mxd

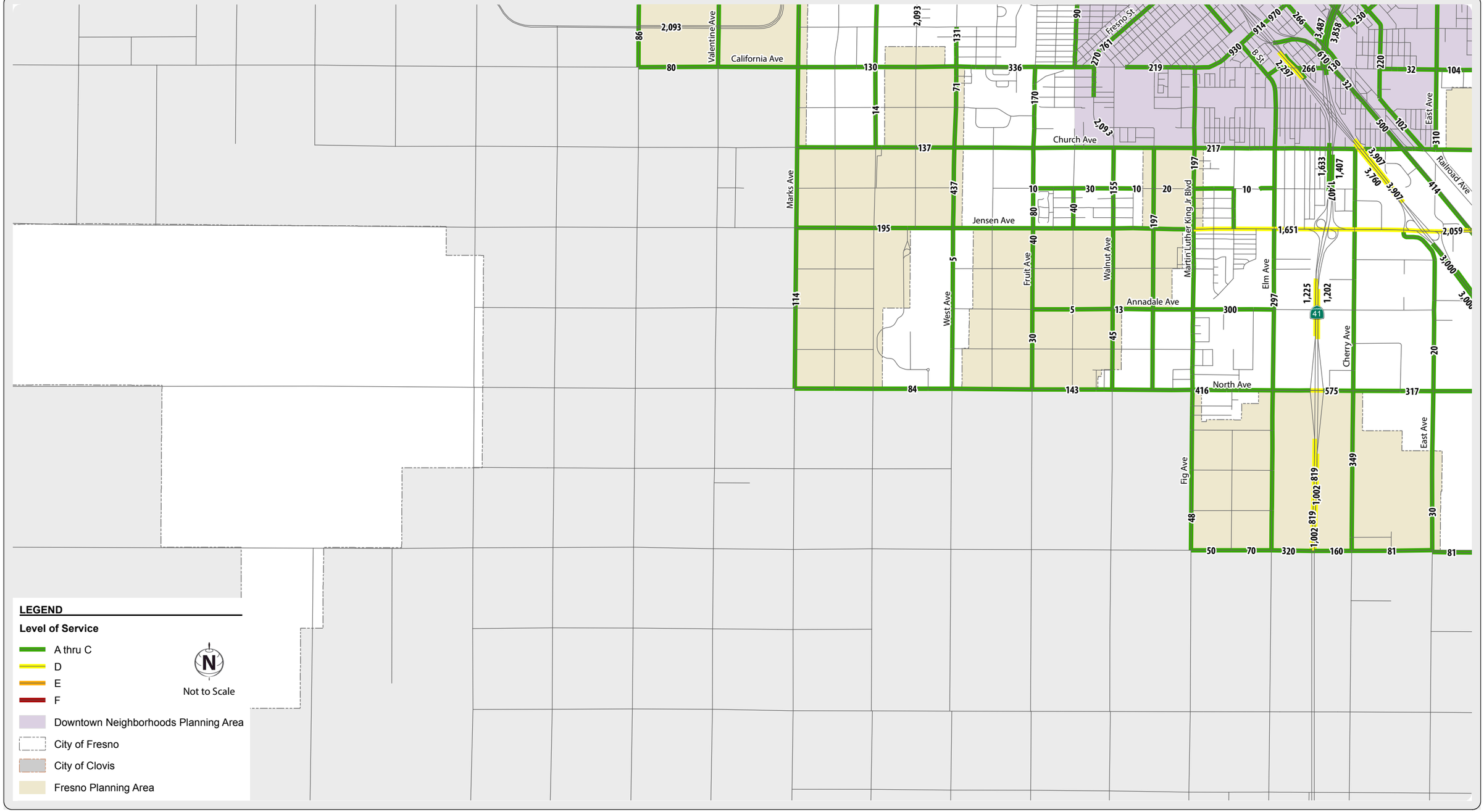
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-3.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH3_AM_LOS_Base.mxd

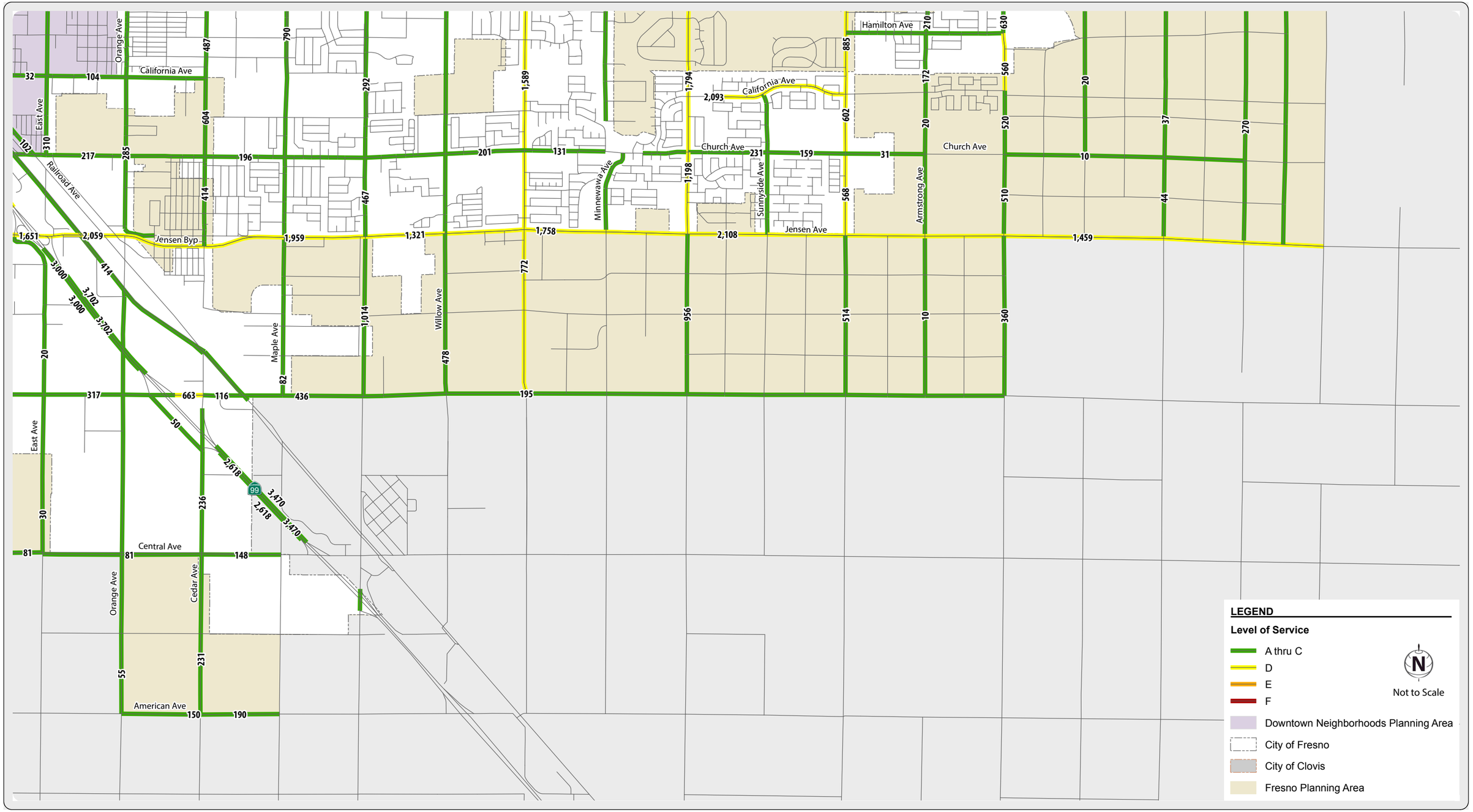
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-3.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH3_AM_LOS_Base.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-3.6

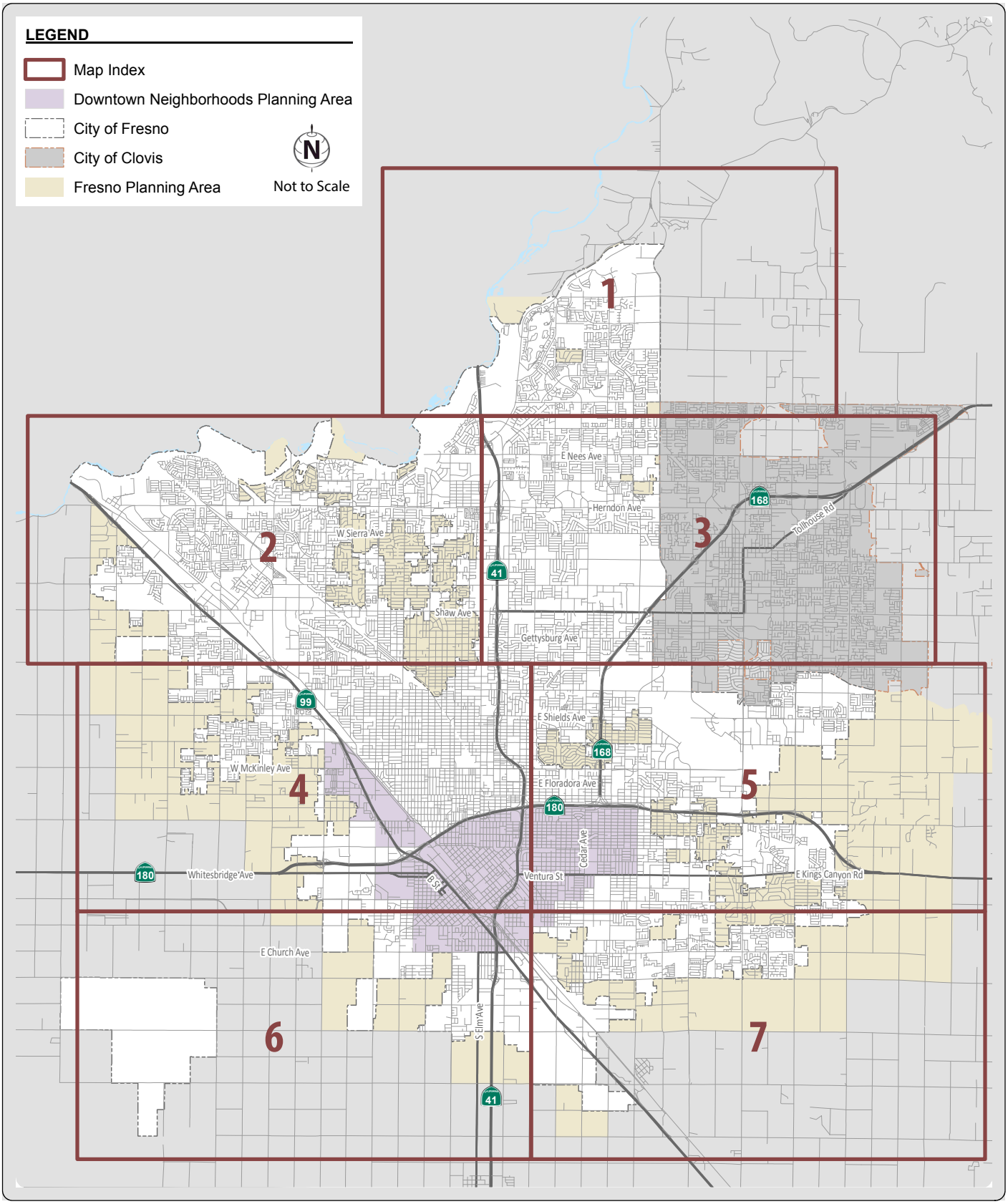


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH3_AM_LOS_Base.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-3.7

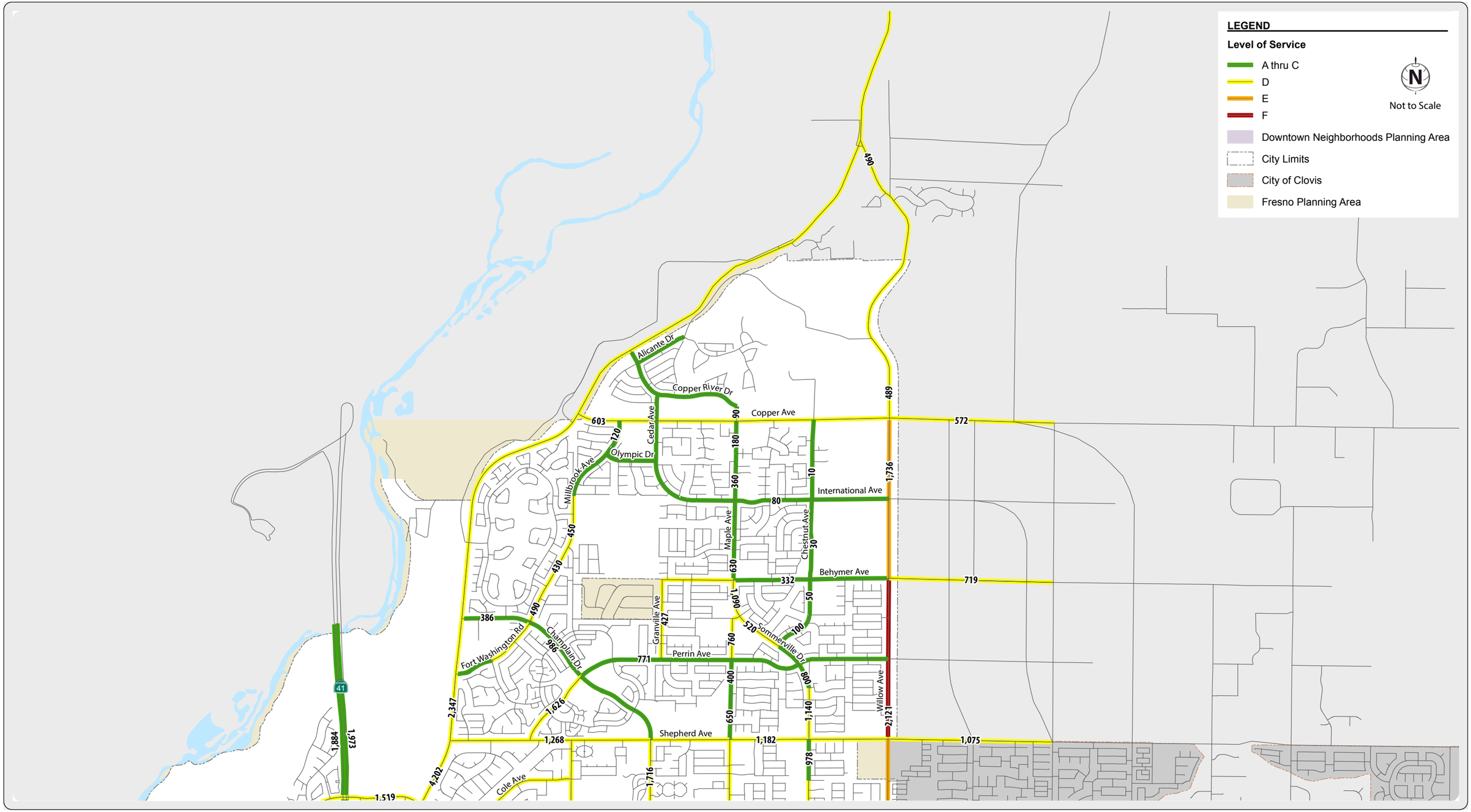
H.4 - Planning Area Exhibits – PM Peak Hour Volumes and LOS – Existing Year Conditions



FEHR PEERS

MAP INDEX

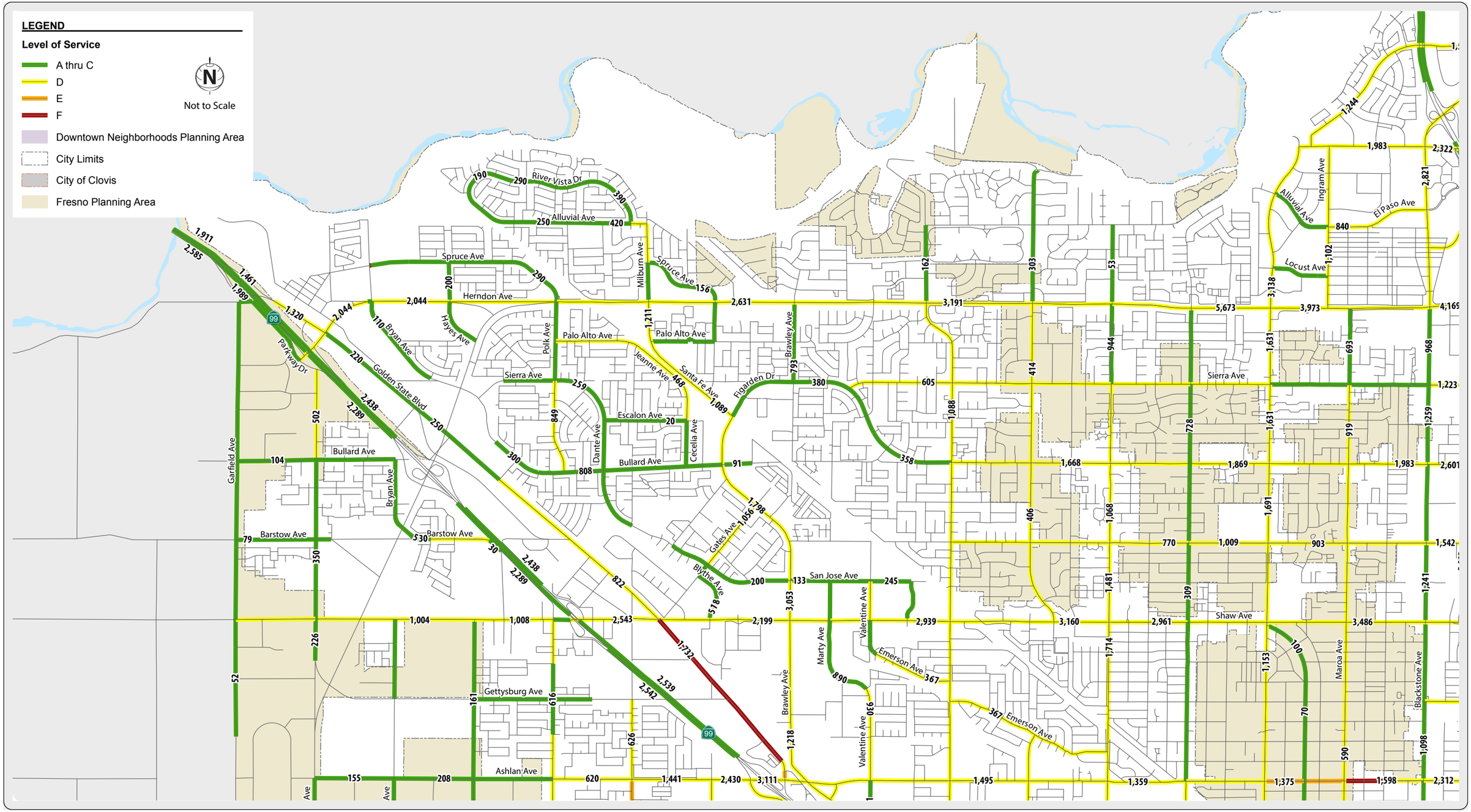
Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

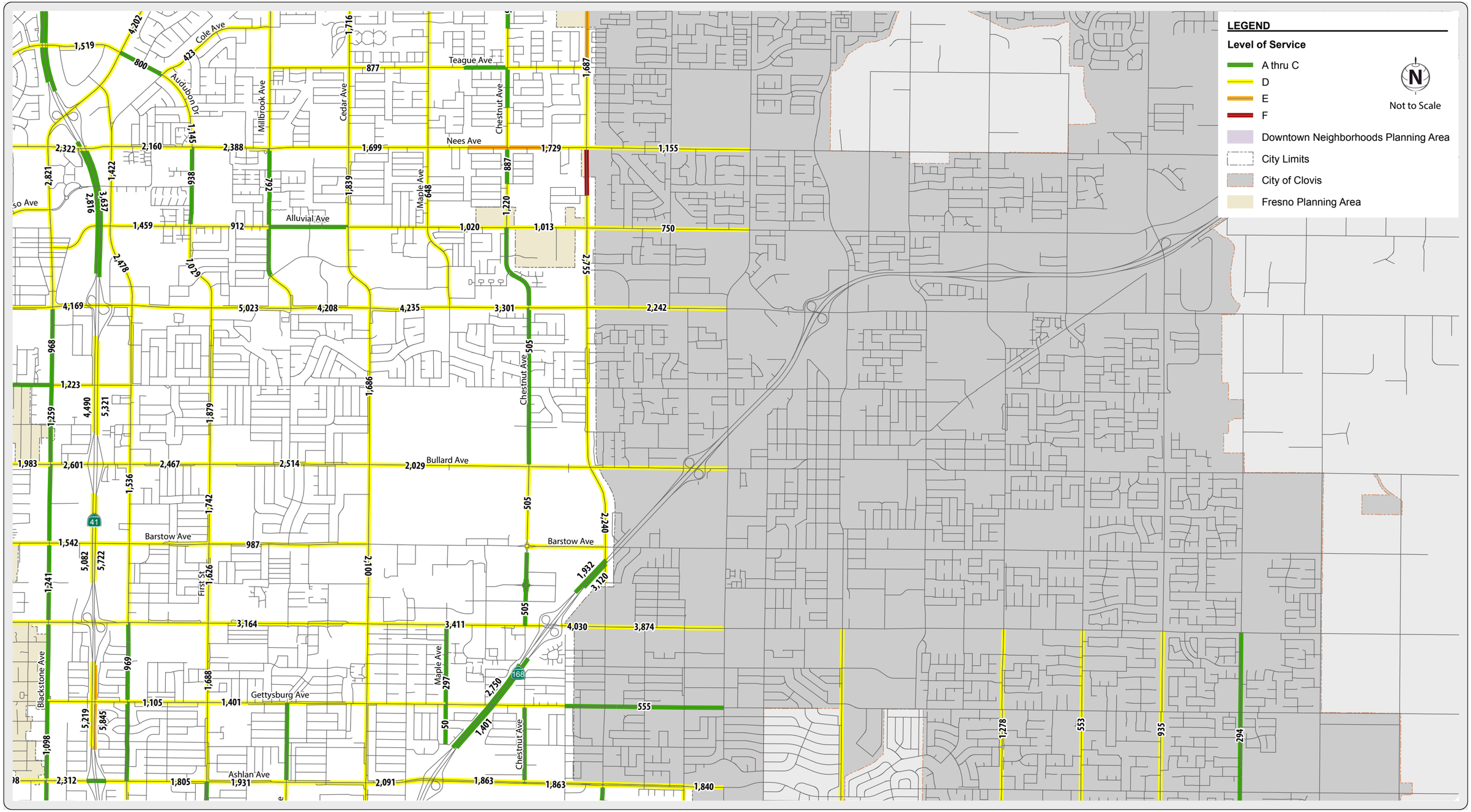
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.1



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

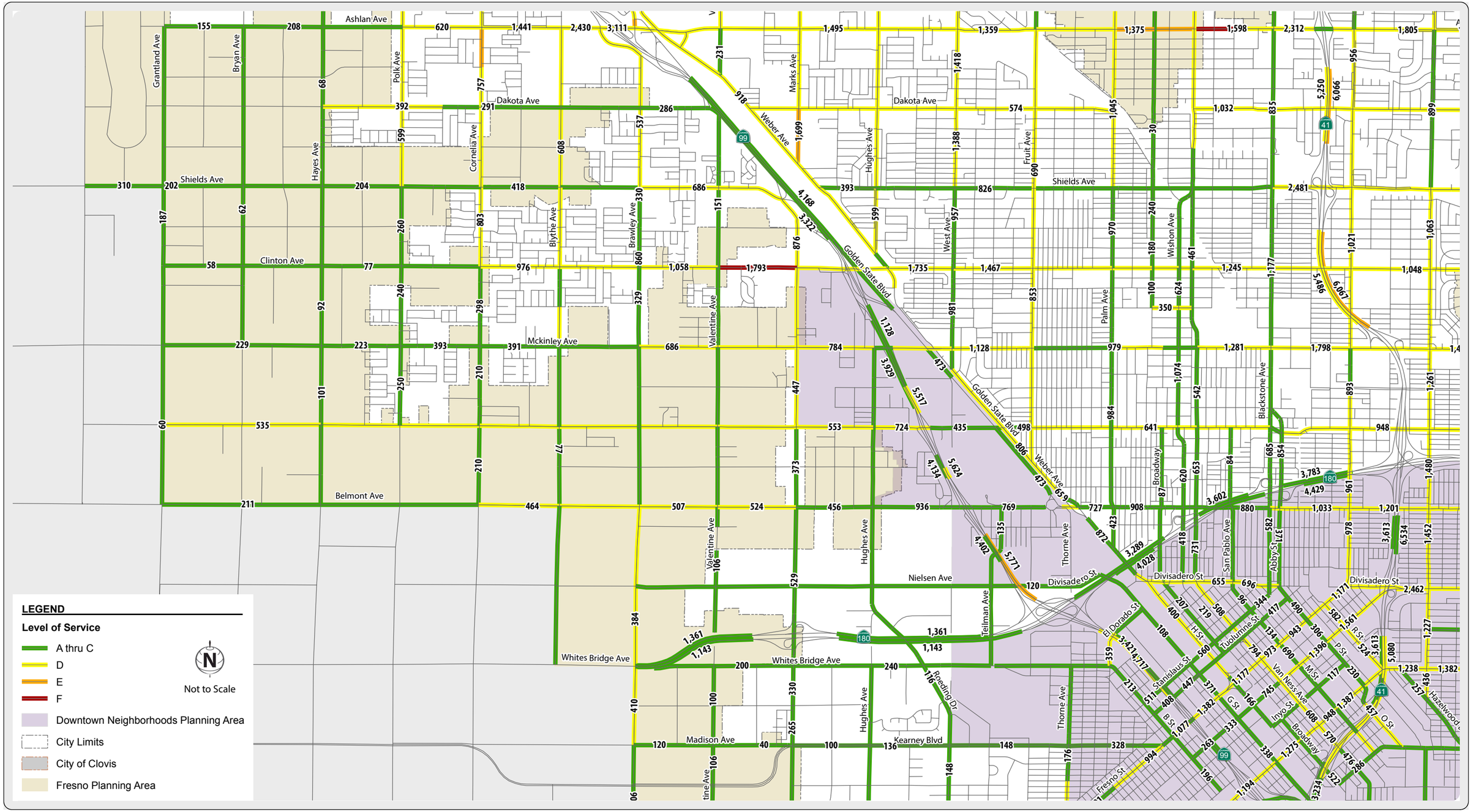
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

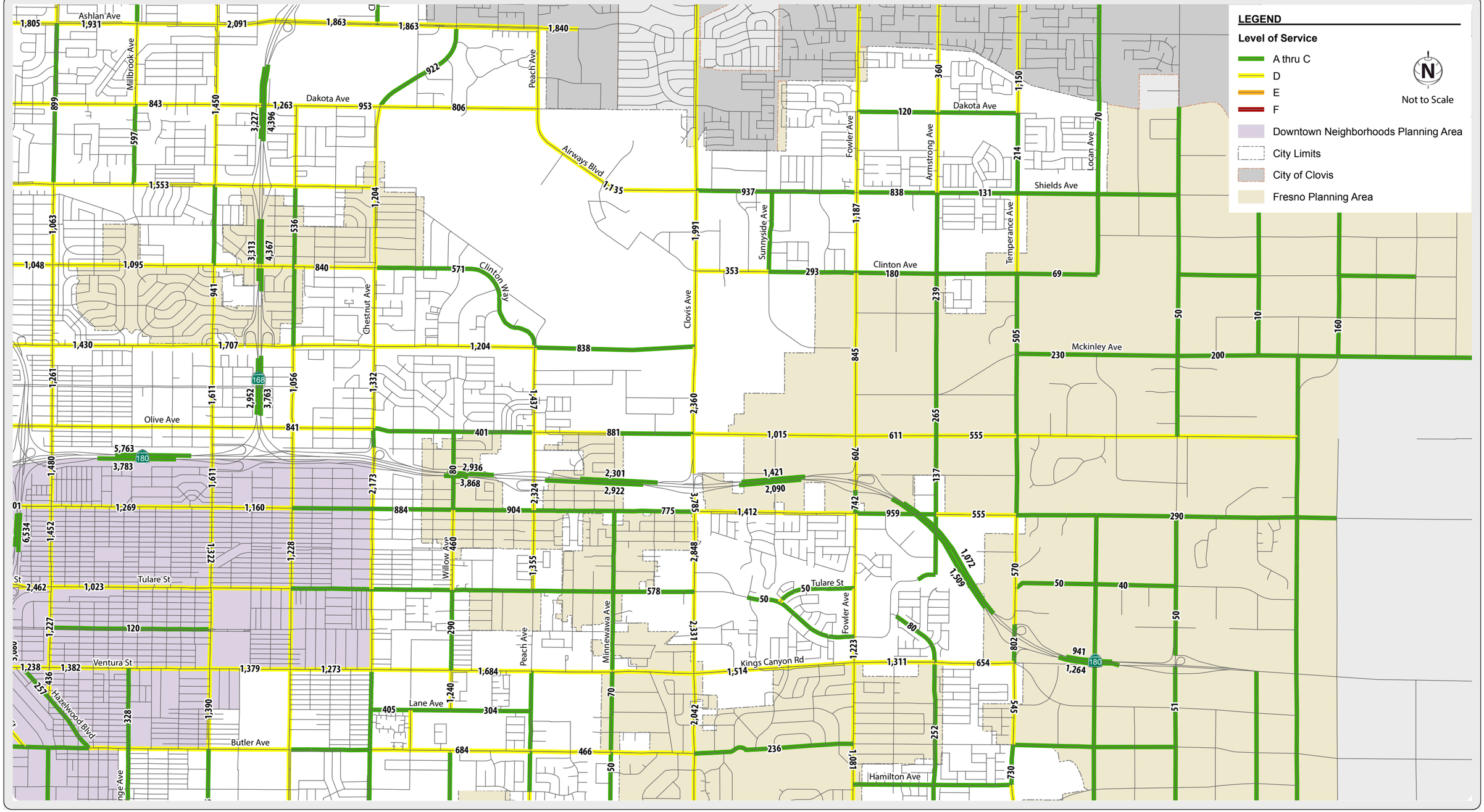
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

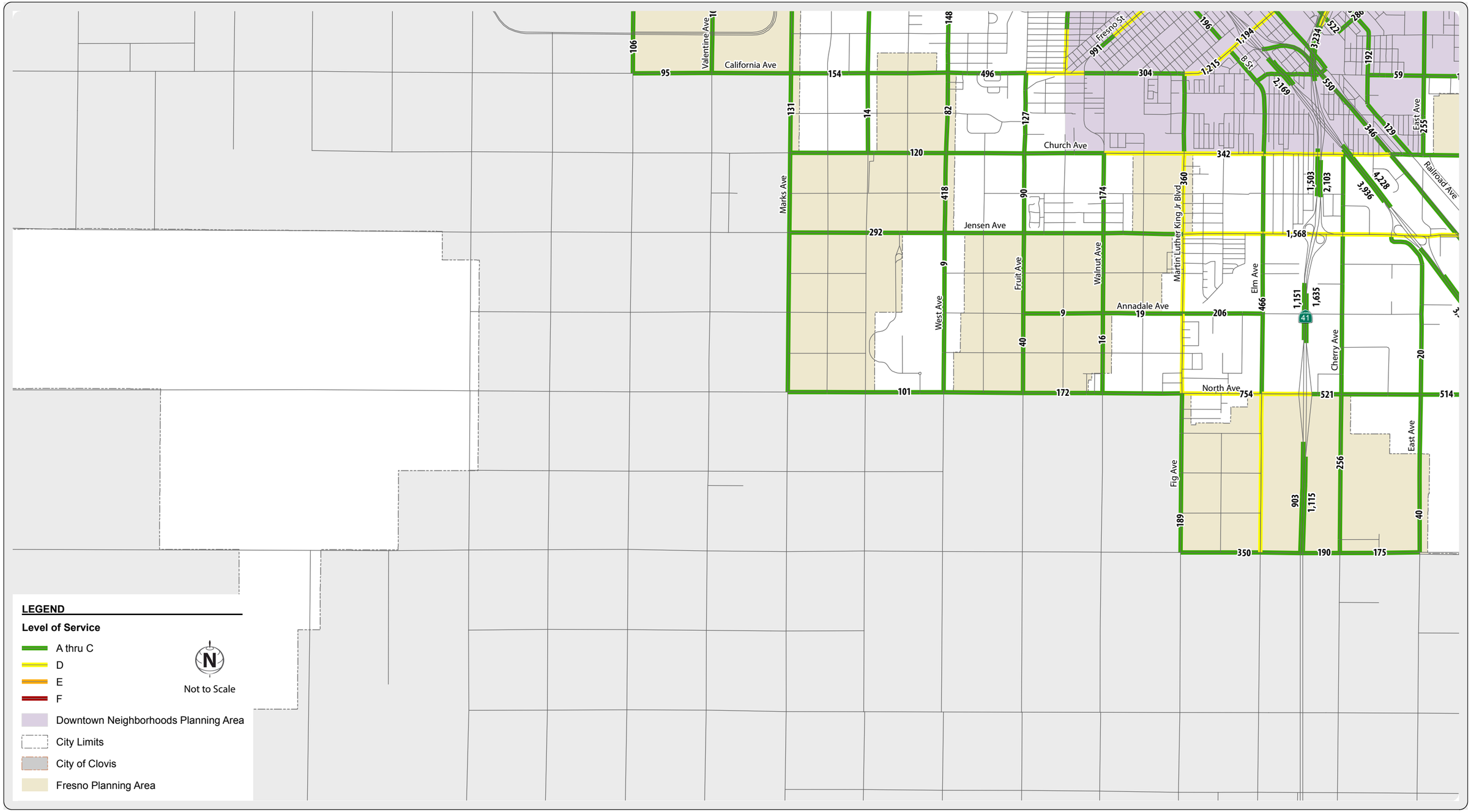
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

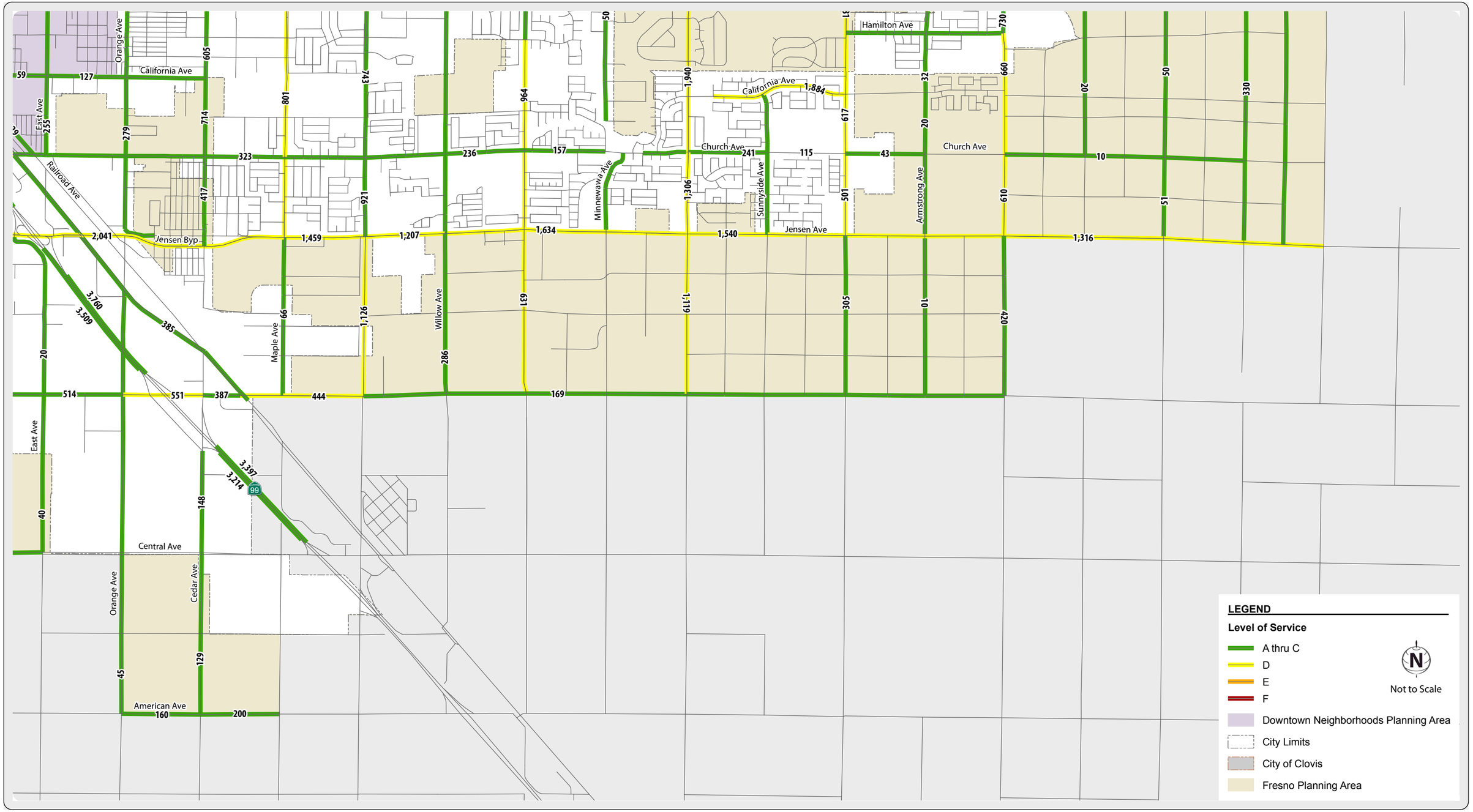
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.6

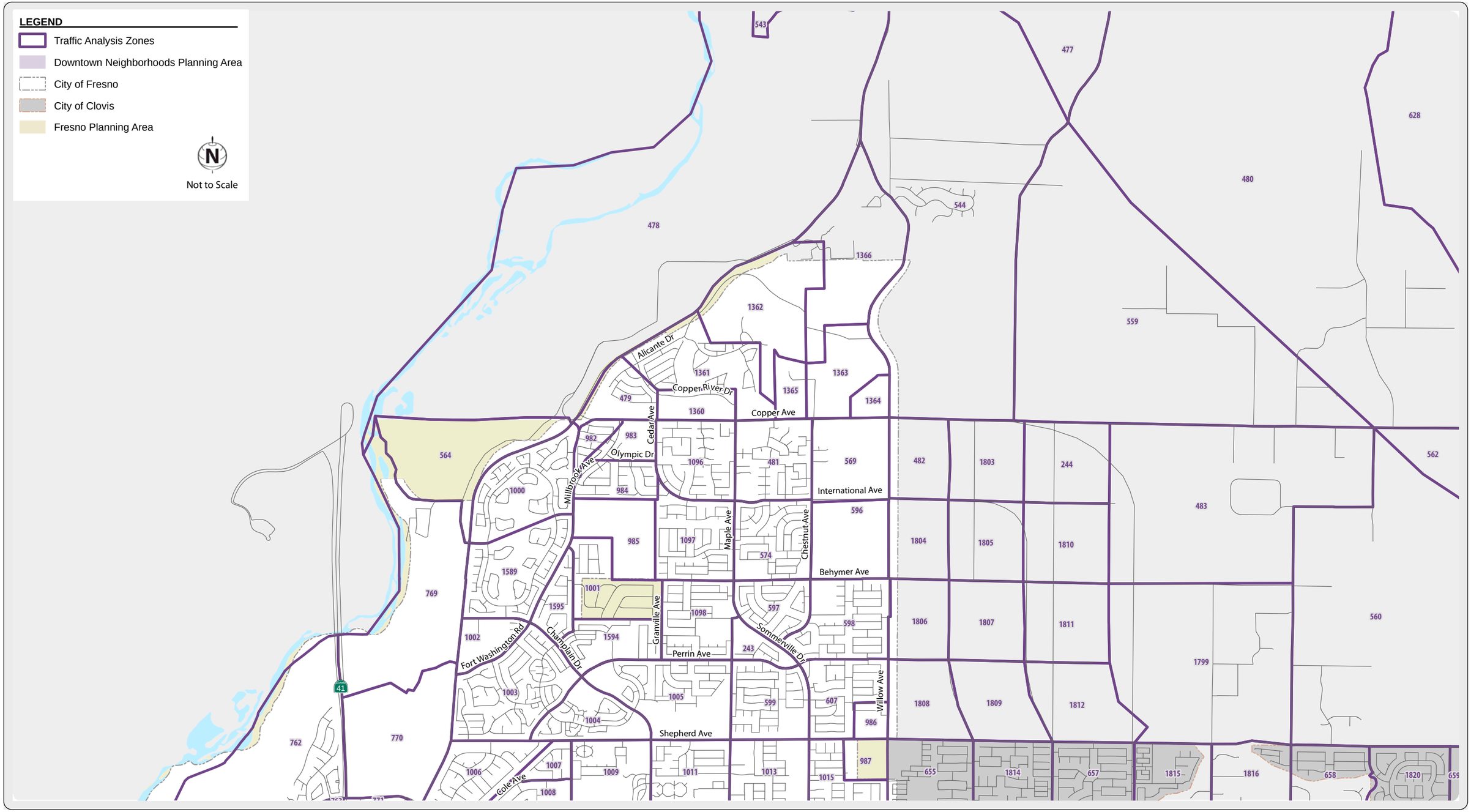


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\App4_PM_LOS_Base.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING YEAR CONDITIONS
Appendix H-4.7

H.5 - Traffic Analysis Zones and Travel Demand Forecasting Model Inputs



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

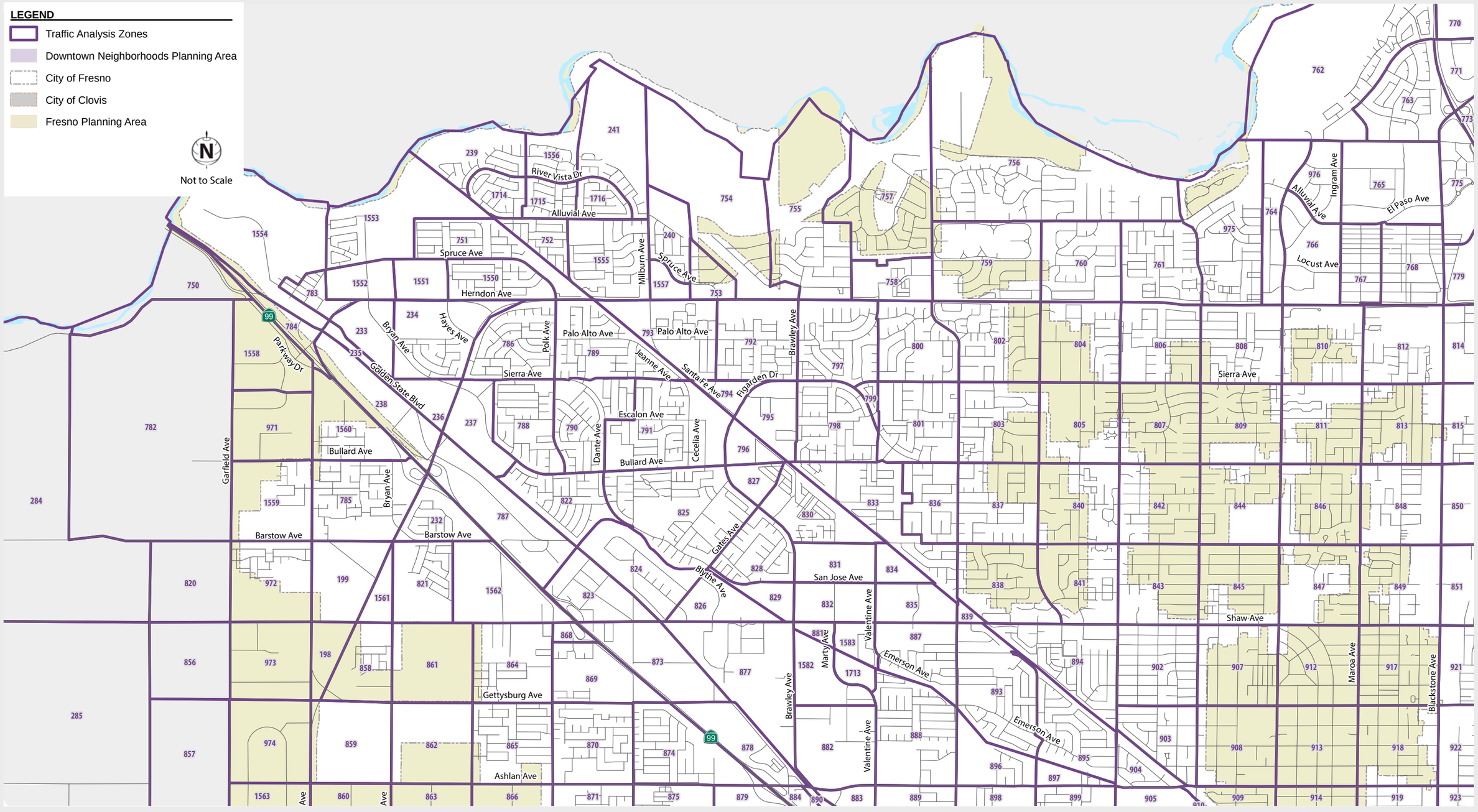
CITY OF FRESNO GENERAL PLAN UPDATE
TRAFFIC ANALYSIS ZONES
Appendix E.1

LEGEND

- Traffic Analysis Zones
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

N

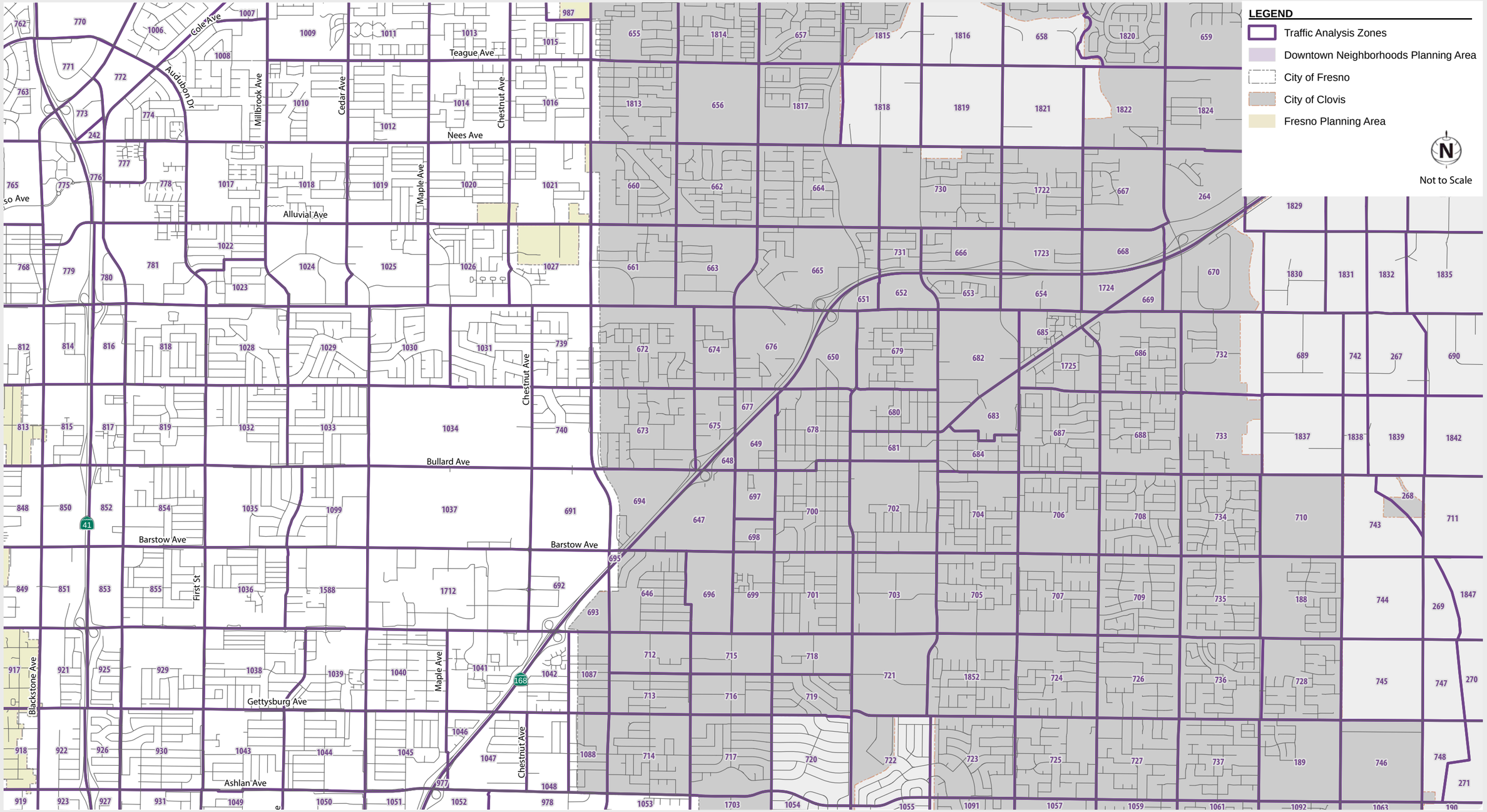
Not to Scale



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

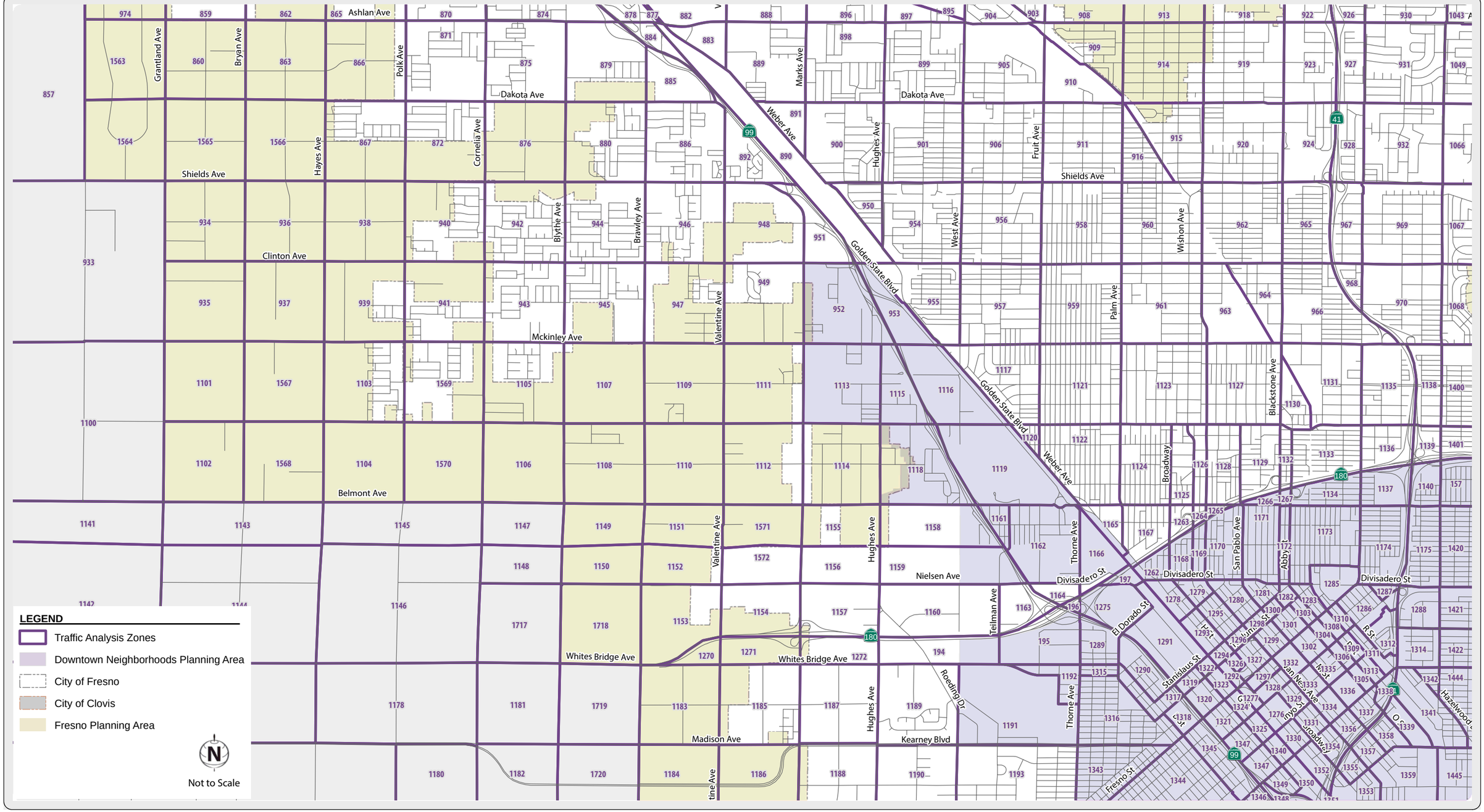
CITY OF FRESNO GENERAL PLAN UPDATE
TRAFFIC ANALYSIS ZONES
Appendix E.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

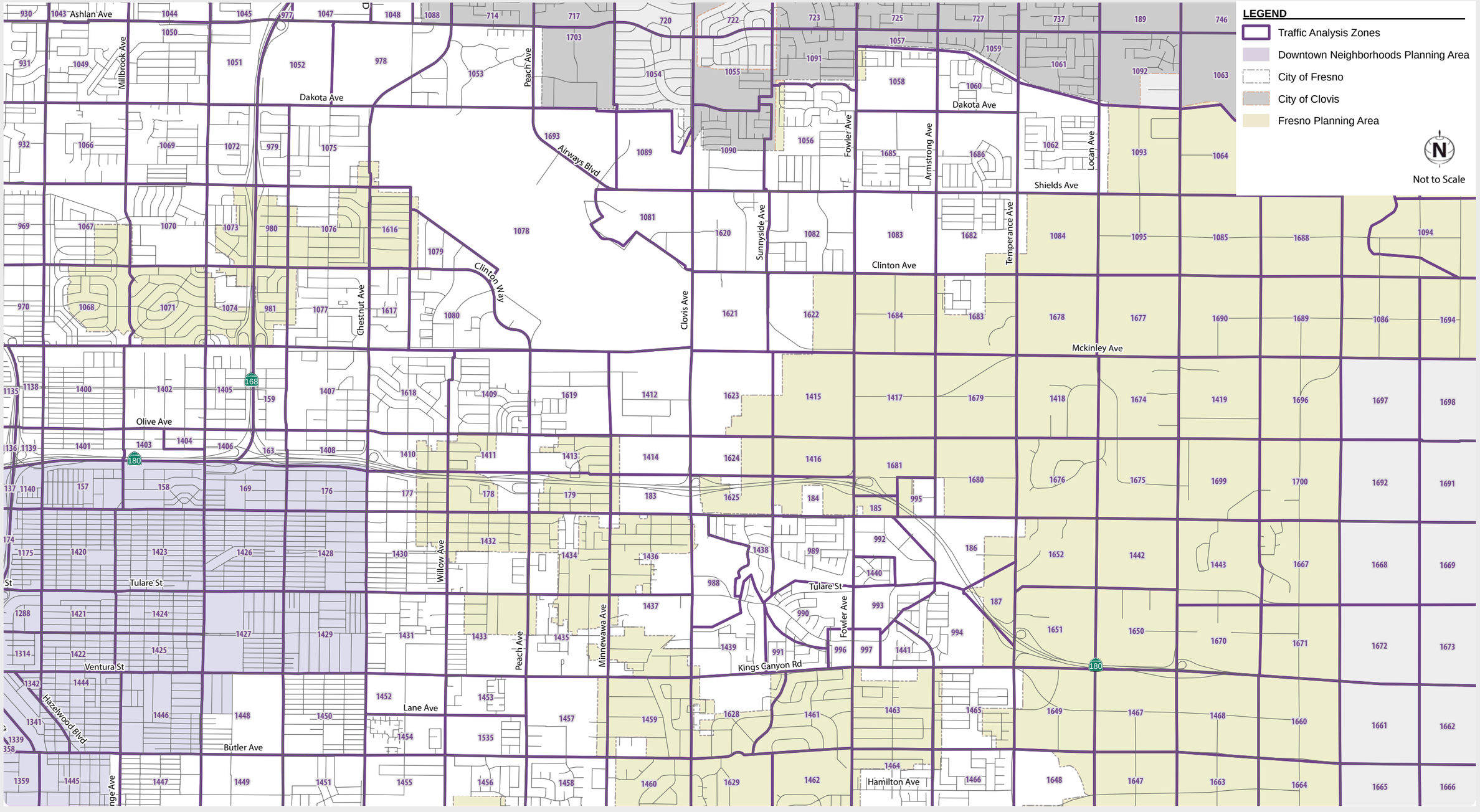
CITY OF FRESNO GENERAL PLAN UPDATE
TRAFFIC ANALYSIS ZONES
Appendix E.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

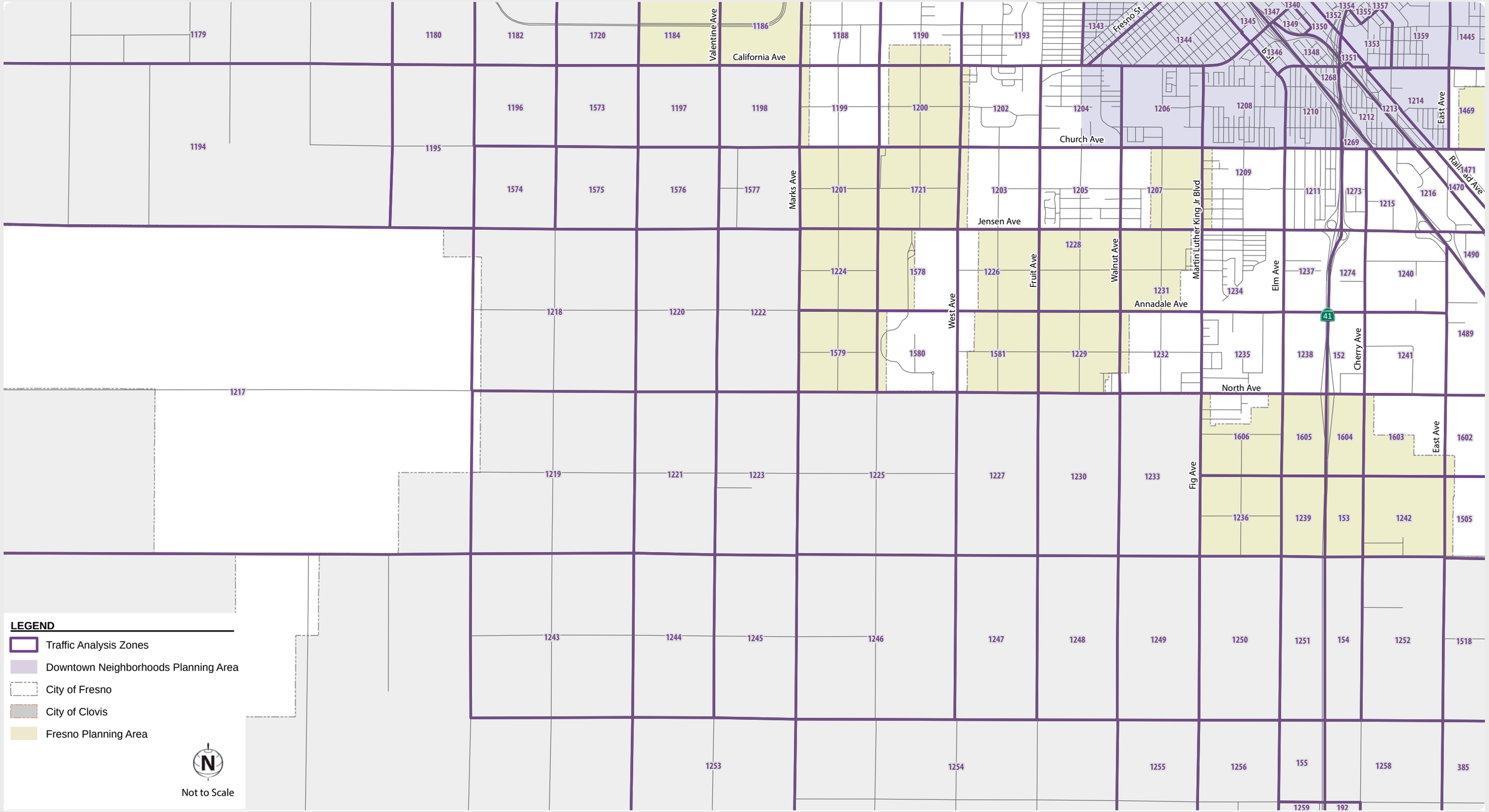
CITY OF FRESNO GENERAL PLAN UPDATE
TRAFFIC ANALYSIS ZONES
Appendix E.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

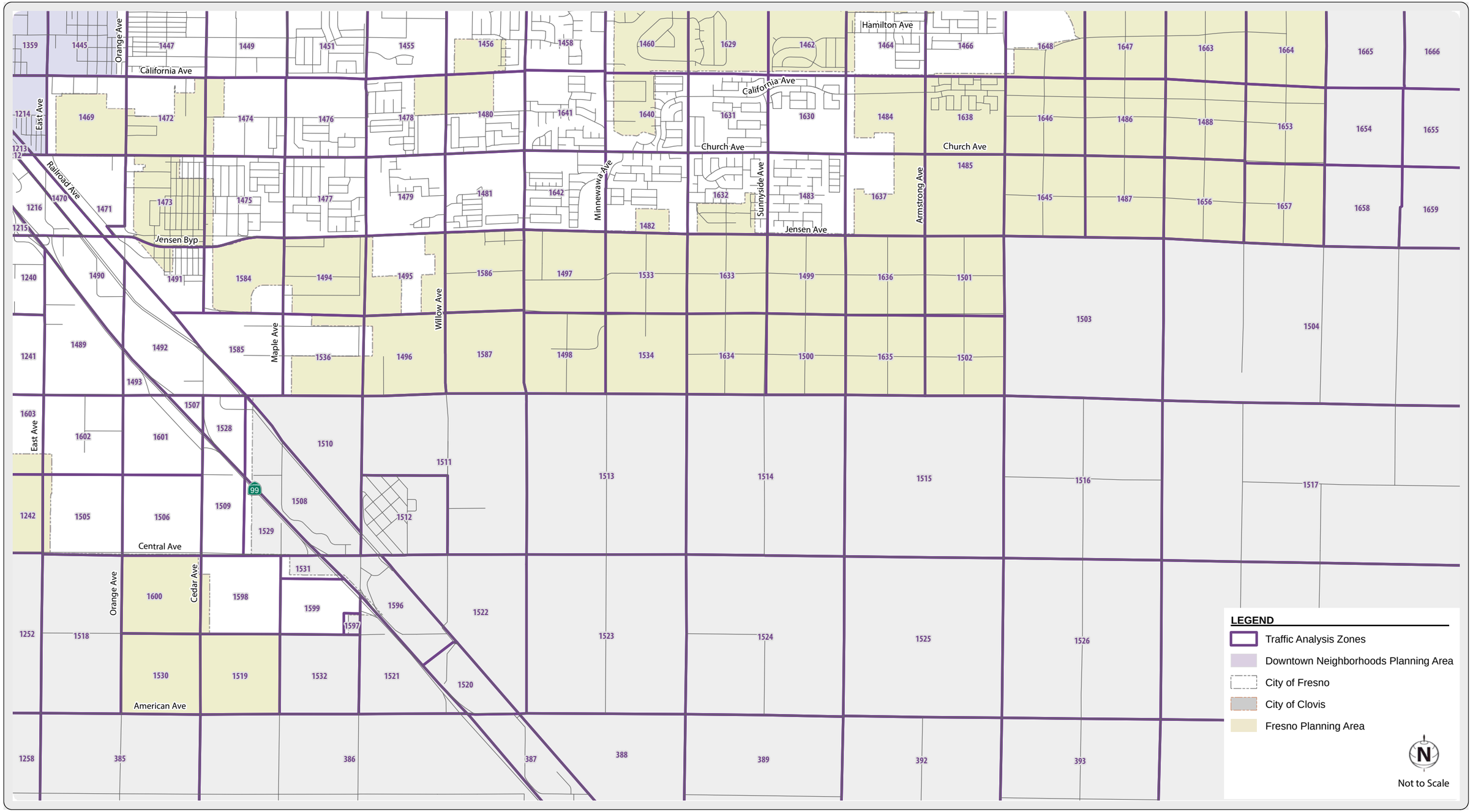
CITY OF FRESNO GENERAL PLAN UPDATE
TRAFFIC ANALYSIS ZONES
Appendix E.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
TRAFFIC ANALYSIS ZONES
Appendix E.6



LEGEND

- Traffic Analysis Zones
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

N

Not to Scale

FEHR & PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppE_TAZ.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION

Appendix E.7

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
100	1,292	14	65	265	-	4	17	-	-	-	-	544	365	544
101	591	-	19	60	3	28	23	-	-	-	-	443	133	443
102	17	-	1	4	-	-	-	-	-	-	-	173	5	173
103	24	-	-	3	-	-	-	2	-	-	-	484	3	486
104	377	2	4	44	-	14	17	-	-	-	-	165	81	165
105	40	1	1	7	-	-	1	-	2	-	-	193	10	195
106	4	-	-	2	-	-	-	-	-	-	-	56	2	56
107	5	-	-	-	-	-	-	12	1	-	-	73	-	86
108	15	-	-	1	-	-	-	-	-	-	-	105	1	105
109	95	-	3	12	-	6	4	-	-	3	35	221	25	259
110	171	-	6	19	-	9	8	18	-	-	-	720	42	738
111	486	14	13	84	3	7	14	1	6	8	-	562	135	577
112	90	-	3	24	-	-	-	-	-	-	-	109	27	109
113	20	1	-	2	-	-	1	83	13	-	-	247	4	343
114	18	1	-	2	-	-	-	-	-	-	-	30	3	30
115	51	1	-	3	-	1	1	-	-	-	-	152	6	152
116	177	5	1	13	1	2	3	-	-	-	-	502	25	502
117	13	-	-	1	-	-	-	-	-	-	-	270	1	270
118	75	4	-	6	-	2	2	2	-	-	-	527	14	529
119	-	-	-	-	-	-	-	10	-	-	-	59	-	69
120	24	-	1	4	-	1	1	-	-	8	-	127	7	135
121	107	5	2	10	2	2	3	-	-	-	-	98	24	98
122	-	-	-	-	-	-	-	-	-	-	-	24	-	24
123	-	-	-	-	-	-	-	-	-	-	43	30	-	73
124	124	-	8	26	-	4	4	1	-	-	-	409	42	410
125	21	2	1	3	-	-	-	-	-	-	-	155	6	155
126	66	4	2	6	-	-	-	-	-	-	-	256	12	256
127	482	21	15	36	-	-	3	-	-	-	-	408	75	408
128	156	9	5	13	-	-	-	-	-	-	-	286	27	286
129	147	9	-	28	-	3	3	-	1	-	-	274	43	275
130	21	1	-	6	-	-	-	1	1	-	-	84	7	86
131	320	19	-	51	1	7	7	-	3	-	-	171	85	174
132	15	2	-	5	-	-	-	-	-	-	-	31	7	31
133	55	4	-	5	-	-	-	-	-	-	-	212	9	212
134	131	6	5	11	-	-	1	-	-	-	-	235	23	235
135	101	6	-	14	-	2	2	-	-	-	-	254	24	254
136	764	-	61	161	-	-	-	23	10	9	106	24	222	172
137	108	-	6	21	-	1	1	-	-	6	-	103	29	109
138	-	-	-	-	-	-	-	-	-	-	-	11	-	11
139	141	-	8	27	-	1	1	1	-	-	-	154	37	155
140	14	-	-	4	-	-	-	-	-	-	-	39	4	39
141	45	-	2	9	-	-	-	25	-	-	-	108	11	133
142	390	21	16	38	-	1	4	-	-	-	35	304	80	339
143	2	-	-	1	-	-	-	-	-	-	-	76	1	76
144	583	-	18	69	3	13	23	16	153	-	35	136	126	340
145	38	-	-	5	-	-	-	-	-	-	-	271	5	271
146	125	-	6	22	-	-	-	-	-	-	-	330	28	330
147	199	-	7	28	-	3	3	4	-	-	20	235	41	259
148	11	-	-	2	-	-	-	-	3	-	-	36	2	39
149	241	-	6	22	1	4	7	2	-	-	-	234	40	236
150	617	-	20	80	3	14	28	2	-	-	-	1,246	145	1,248
151	217	-	6	22	-	4	7	4	-	-	-	517	39	521
152	-	-	-	-	-	-	-	7	9	-	-	1,197	-	1,213
153	57	1	3	10	-	1	1	-	1	-	-	1	16	2
154	93	1	3	11	-	1	1	-	2	-	-	28	17	30
155	57	-	3	8	-	-	-	2	18	-	-	2	11	22
156	305	5	13	58	-	6	3	-	4	-	69	13	85	86
157	1,787	52	65	104	63	72	31	13	39	-	84	12	387	148
158	1,275	14	125	91	25	34	27	22	56	5	-	3	316	86
159	91	-	4	7	4	7	4	15	102	-	-	344	26	461
160	4,145	21	106	508	81	161	81	50	46	34	-	7	958	137
161	3	-	-	1	-	-	-	17	-	-	-	50	1	67
162	337	-	8	39	8	16	7	91	124	64	105	108	78	492
163	48	-	3	5	3	6	3	9	22	-	-	43	20	74
164	323	2	9	47	3	10	7	22	11	8	-	178	78	219
165	1,038	2	36	146	11	39	23	11	1	-	-	19	257	31
166	950	15	78	152	-	23	22	7	23	8	319	20	290	377
167	7	-	-	1	-	-	-	-	-	-	-	3	1	3
168	-	-	-	-	-	-	-	-	-	-	-	10	-	10
169	1,255	7	50	58	31	55	34	19	43	-	103	72	235	237
170	525	-	12	71	-	-	-	-	23	-	-	5	83	28
171	2,382	45	103	221	40	98	45	19	10	-	-	87	552	116
172	1,347	-	29	163	18	50	64	43	52	4	136	-	324	235
173	962	43	16	122	16	16	24	90	51	38	88	75	237	342
174	1,007	16	27	94	57	25	-	1	3	-	-	-	219	4
175	1,776	52	83	160	77	35	37	34	15	8	-	14	444	71
176	792	7	31	66	22	52	23	26	34	-	-	67	201	127
177	427	14	23	48	6	20	14	18	3	-	-	1	125	22
178	1,726	15	80	170	53	199	78	21	24	-	42	70	595	157
179	356	1	21	46	12	14	13	-	8	-	-	4	107	12

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
180	2,171	14	75	251	19	55	37	35	43	16	112	19	451	225
181	726	6	24	87	6	19	13	19	10	-	-	46	155	75
182	969	-	22	58	31	57	35	2	23	50	-	10	203	85
183	-	-	-	-	-	-	-	12	5	-	-	-	-	17
184	102	1	12	20	-	-	1	5	-	-	-	1	34	6
185	20	-	1	4	-	-	-	-	10	-	-	-	5	10
186	53	-	1	5	3	4	1	3	3	-	-	18	14	24
187	35	1	1	5	2	4	1	-	2	-	-	-	14	2
188	915	-	60	238	-	-	-	-	-	-	-	15	298	15
189	529	-	26	148	-	-	-	-	24	-	-	12	174	36
190	36	-	1	8	-	-	-	-	-	-	-	3	9	3
191	-	-	-	-	-	-	-	-	-	-	-	1	-	1
192	70	-	8	23	-	-	-	-	1	-	-	1	31	2
193	29	-	1	4	-	-	-	-	-	-	-	1	5	1
194	3	-	1	1	-	-	-	1	168	-	-	39	2	208
195	196	12	26	16	-	3	-	-	119	-	-	21	57	140
196	-	-	-	-	-	-	-	-	-	-	-	-	-	-
197	-	-	-	-	-	-	-	-	2	389	-	15	-	406
198	-	-	-	-	-	-	-	-	-	-	-	1	-	1
199	-	-	-	-	-	-	-	-	-	-	-	6	-	6
200	68	1	4	17	-	1	2	-	-	-	-	134	25	134
201	270	1	10	25	4	11	21	-	-	25	-	901	72	926
202	503	1	16	38	9	18	34	-	-	-	-	495	116	495
203	-	-	-	-	-	-	-	-	-	-	-	9	-	9
204	248	-	36	13	-	3	10	-	-	-	23	603	62	626
205	583	1	45	16	-	5	11	8	99	4	-	544	78	655
206	359	1	45	17	-	6	10	-	296	-	-	403	79	699
207	32	-	7	1	-	-	1	-	-	-	-	410	9	410
208	51	-	2	4	1	2	3	121	44	-	-	62	12	227
209	118	-	5	10	1	6	9	-	-	-	-	141	31	141
210	83	-	14	4	-	-	2	-	-	-	-	230	20	230
211	384	2	52	17	-	5	12	-	3	-	-	258	88	261
212	69	-	5	2	-	-	1	-	-	-	-	531	8	531
213	26	-	2	6	-	-	1	-	-	-	-	-	9	-
214	179	1	7	22	-	1	3	2	-	-	-	7	34	9
215	98	-	5	9	2	5	8	-	3	-	-	204	29	207
216	422	-	-	-	-	-	-	-	2	-	50	8	-	60
217	33	-	1	9	-	1	1	-	-	-	-	7	12	7
218	267	-	16	29	-	11	10	1	273	-	-	20	66	294
219	137	-	1	10	1	2	10	76	9	15	-	305	24	405
220	-	-	-	-	-	-	-	-	370	-	-	41	-	411
221	38	-	-	2	1	1	2	12	2	-	-	896	6	910
222	5	-	-	1	-	-	-	-	-	-	-	183	1	183
223	584	-	-	35	28	29	39	-	2	-	-	65	131	67
224	186	-	-	-	16	11	13	4	2	3	-	128	40	137
225	142	-	-	7	6	6	7	-	115	-	-	287	26	402
226	22	-	-	1	1	1	1	-	-	-	-	385	4	385
227	694	6	36	122	2	6	19	5	11	2	-	471	191	489
228	6	-	-	2	-	-	-	-	3	1,285	-	189	2	1,477
229	4,583	-	-	3	3	3	4	-	2	-	-	165	13	167
230	-	-	-	-	-	-	-	-	-	-	-	86	-	86
231	48	-	-	3	3	3	3	-	-	-	-	135	12	135
232	-	-	-	-	-	-	-	-	-	-	-	2	-	2
233	-	-	-	-	-	-	-	-	-	-	-	2	-	2
234	103	1	7	19	-	-	-	-	-	-	154	3	27	157
235	-	-	-	-	-	-	-	-	1	-	-	-	-	1
236	-	-	-	-	-	-	-	-	-	-	-	1	-	1
237	228	2	21	56	-	-	-	-	-	-	-	2	79	2
238	-	-	-	-	-	-	-	58	4	-	-	9	-	71
239	852	1	50	198	-	4	2	-	2	-	-	9	255	11
240	304	-	19	71	-	3	1	-	13	-	-	-	94	13
241	38	-	4	15	-	-	-	-	12	-	-	2	19	14
242	-	-	-	-	-	-	-	-	26	-	-	34	-	60
243	285	1	13	85	-	-	1	2	-	-	-	26	100	28
244	-	-	-	-	-	-	-	1	-	-	-	16	-	17
245	-	-	-	-	-	-	-	-	-	-	-	19	-	19
246	-	-	-	-	-	-	-	-	-	-	-	1	-	1
247	-	-	-	-	-	-	-	-	-	-	-	1	-	1
248	-	-	-	-	-	-	-	-	-	-	-	1	-	1
249	-	-	-	1	-	-	-	-	-	-	-	2	1	2
250	948	-	110	241	-	-	-	2	34	-	1	3	351	40
251	659	19	30	109	3	25	7	134	32	-	595	2	193	763
252	1,868	2	102	185	21	94	95	1	73	8	-	16	499	98
253	1,437	29	76	316	-	29	21	67	82	-	150	5	471	304
254	571	21	36	110	-	9	-	167	258	354	28	109	176	916
255	1,808	2	121	189	53	168	80	21	72	29	-	48	613	170
256	1,430	15	35	183	94	140	41	64	12	-	-	4	508	80
257	1,670	47	68	254	3	78	24	47	21	3	-	54	474	125
258	351	1	9	94	-	8	9	-	1	-	-	40	121	41
259	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
260	119	-	-	9	7	7	10	26	4	45	-	6	33	81
261	2,362	9	35	126	111	144	64	1	46	-	42	58	489	147
262	1,981	19	63	189	73	49	57	19	9	-	-	5	450	33
263	1,614	17	55	173	44	28	34	26	64	2	91	249	351	432
264	292	-	15	72	-	-	10	-	1	-	-	24	97	25
265	103	2	3	26	1	1	-	-	-	-	-	4	33	4
266	41	1	1	11	-	-	-	-	-	-	-	2	13	2
267	104	1	5	27	-	-	1	-	1	-	-	1	34	2
268	5	-	-	2	-	-	-	-	-	-	-	1	2	1
269	61	1	3	17	-	-	-	-	4	-	-	10	21	14
270	3	-	-	2	-	-	-	-	-	-	-	2	2	2
271	6	-	-	2	-	-	-	-	-	-	-	2	2	2
272	42	-	-	18	-	-	-	-	-	-	-	6	18	6
273	-	-	-	-	-	-	-	-	-	-	-	1	-	1
274	-	-	-	-	-	-	-	-	-	-	-	2	-	2
275	309	-	17	44	-	6	6	-	17	-	-	89	73	106
276	821	-	36	191	-	-	8	19	11	-	67	245	235	342
277	70	-	6	14	-	1	1	-	2	-	-	30	22	32
278	259	-	29	49	-	5	8	1	6	-	-	150	91	157
279	146	-	15	26	-	3	3	-	13	-	-	34	47	47
280	208	5	25	60	-	1	1	-	9	-	-	60	92	69
281	270	3	22	53	-	-	-	-	4	-	-	97	78	101
282	87	-	9	17	-	-	2	-	1	-	-	52	28	53
283	92	2	9	19	-	-	-	-	1	-	134	26	30	161
284	149	-	15	36	1	-	5	-	16	-	-	141	57	157
285	281	-	27	58	-	-	9	3	44	-	-	77	94	124
286	107	-	9	21	-	-	3	2	-	-	-	28	33	30
287	197	-	11	33	-	2	2	-	23	-	-	241	48	264
288	409	-	28	72	-	7	7	-	-	-	-	108	114	108
289	111	-	7	19	-	4	4	-	1	-	-	27	34	28
290	256	1	15	46	-	8	8	130	7	4	-	28	78	169
291	103	-	3	12	3	5	3	-	-	-	-	29	26	29
292	134	2	6	18	3	6	3	66	23	-	-	43	38	132
293	186	-	19	39	-	4	3	2	5	-	-	59	65	66
294	107	1	9	21	-	3	1	1	6	-	-	49	35	56
295	123	-	13	27	-	4	4	1	4	-	-	50	48	55
296	105	-	11	21	-	2	-	2	1	-	-	25	34	28
297	1,371	-	34	118	6	106	57	1	5	16	-	560	321	582
298	274	2	16	54	-	5	5	8	2	-	-	9	82	19
299	83	-	5	27	-	-	-	-	-	2	-	29	32	31
300	2,280	38	89	290	44	81	42	2	9	-	-	55	584	66
301	150	2	7	21	3	8	3	1	3	-	-	33	44	37
302	534	16	19	80	-	15	13	5	4	-	-	152	143	161
303	109	-	11	22	-	1	1	-	2	-	-	181	35	183
304	480	15	21	77	-	15	13	2	81	-	-	41	141	124
305	109	-	11	22	-	3	-	-	12	-	35	39	36	86
306	53	2	2	10	-	2	2	-	-	-	-	28	18	28
307	64	2	3	11	-	2	2	-	1	-	-	25	20	26
308	127	-	2	12	-	11	5	-	1	-	-	429	30	430
309	304	-	8	29	1	26	12	2	-	-	-	302	76	304
310	100	-	2	9	-	1	2	-	-	-	-	57	14	57
311	65	-	4	10	-	1	4	-	-	-	-	158	19	158
312	829	13	23	140	-	8	32	22	8	-	-	504	216	534
313	408	5	15	72	-	4	4	5	26	-	-	254	100	285
314	14	-	1	5	-	-	-	-	-	-	-	3	6	3
315	18	-	-	1	-	1	1	-	-	-	-	67	3	67
316	175	-	9	18	-	1	9	-	-	-	-	289	37	289
317	922	1	43	121	3	12	43	8	220	-	46	287	223	561
318	-	-	-	-	-	-	-	-	-	-	-	-	-	-
319	198	-	9	32	1	3	9	1	8	-	-	36	54	45
320	449	-	17	55	-	17	21	-	2	-	-	194	110	196
321	218	-	7	22	-	2	10	-	-	-	-	27	41	27
322	74	-	3	10	-	3	3	1	-	-	-	14	19	15
323	309	4	17	57	-	3	2	-	-	-	-	13	83	13
324	598	9	21	99	-	4	6	1	97	-	55	208	139	361
325	114	-	6	18	-	6	6	-	-	-	-	53	36	53
326	372	-	20	65	3	1	4	2	1	-	30	140	93	173
327	202	-	11	34	4	3	4	13	-	-	-	74	56	87
328	73	1	4	14	-	-	1	-	-	-	-	7	20	7
329	61	-	3	11	-	-	1	1	2	-	-	6	15	9
330	46	-	2	8	-	-	-	-	5	-	-	5	10	10
331	213	1	10	24	1	3	10	-	-	-	-	115	49	115
332	267	1	14	31	1	4	14	-	-	-	24	267	65	291
333	462	1	17	58	2	19	21	3	2	-	-	79	118	84
334	705	-	20	130	3	15	3	14	6	-	-	333	171	353
335	46	-	1	11	-	1	-	1	-	-	-	6	13	7
336	837	-	38	96	-	25	28	6	8	-	-	356	187	370
337	493	-	13	78	-	13	31	6	-	-	-	319	135	325
338	464	2	16	78	-	13	28	15	7	-	-	168	137	190
339	99	3	4	21	-	2	4	2	-	-	-	44	34	46

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
340	241	5	7	44	-	6	9	65	3	-	-	67	71	135
341	143	-	4	27	-	1	4	-	-	-	-	149	36	149
342	330	-	12	72	-	6	9	29	27	-	-	73	99	129
343	139	-	5	29	-	2	3	-	-	-	-	124	39	124
344	153	-	4	30	-	3	3	-	-	-	-	496	40	496
345	114	-	7	15	-	5	5	-	2	-	-	112	32	114
346	189	-	5	26	-	5	9	4	-	-	-	104	45	108
347	277	-	9	44	-	9	18	1	-	-	-	85	80	86
348	533	13	20	113	-	12	21	18	45	-	-	120	179	183
349	1,244	15	57	241	-	4	3	9	37	5	141	27	320	219
350	64	-	3	14	-	-	2	-	1	-	-	24	19	25
351	95	2	4	21	-	-	1	-	10	-	-	9	28	19
352	251	4	8	43	-	1	2	7	109	-	-	273	58	389
353	93	-	6	19	-	-	1	-	-	-	-	19	26	19
354	78	-	3	10	-	-	-	-	-	-	-	12	13	12
355	1,023	-	21	198	-	-	-	9	4	13	23	260	219	309
356	141	-	5	26	-	4	-	-	-	-	-	17	35	17
357	-	-	-	-	-	-	-	-	-	-	-	3	-	3
358	32	-	1	6	-	-	-	-	-	-	-	5	7	5
359	-	-	-	-	-	-	-	-	1	-	-	1	-	2
360	1,259	8	72	230	3	43	44	103	171	11	206	6	400	497
361	1,866	27	71	220	56	98	54	21	96	-	-	22	526	139
362	641	-	37	162	-	4	2	-	10	-	50	43	205	103
363	1,386	-	42	285	14	39	21	27	139	2	63	63	401	294
364	1,948	42	92	279	10	38	17	22	58	46	189	135	478	450
365	5	-	-	2	-	-	-	2	1	3	-	144	2	150
366	27	-	-	2	-	1	-	4	25	-	-	62	3	91
367	18	1	-	1	-	-	1	-	-	-	-	10	3	10
368	135	4	2	8	2	2	3	-	-	-	-	146	21	146
369	-	-	-	-	-	-	-	-	-	-	-	-	-	-
370	891	10	49	158	-	7	7	1	6	-	81	8	231	96
371	678	19	52	122	-	-	-	64	54	-	98	10	193	226
372	233	6	20	47	-	-	-	32	37	-	-	114	73	183
373	13	-	-	1	-	-	-	-	-	-	-	110	1	110
374	99	3	1	6	1	2	2	-	-	-	-	95	15	95
375	1,110	-	67	207	4	27	23	29	126	-	121	34	328	310
376	21	2	-	3	-	-	-	49	1	-	-	38	5	88
377	443	10	32	78	7	16	7	1	8	-	63	20	150	92
378	831	17	46	110	11	25	13	12	5	-	39	6	222	62
379	114	-	10	27	1	2	2	-	-	-	-	20	42	20
380	81	3	-	13	-	2	2	-	-	-	-	341	20	341
381	101	1	6	12	1	2	6	-	2	-	-	183	28	185
382	-	-	-	-	-	-	-	-	-	-	-	-	-	-
383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
385	416	8	27	52	-	12	21	1	3	-	-	60	120	64
386	897	17	64	122	-	23	52	16	50	-	1	232	278	299
387	13	-	1	3	-	-	1	25	106	-	-	316	5	447
388	93	-	5	19	1	1	1	2	-	-	-	19	27	21
389	584	3	29	112	9	5	5	4	6	-	-	25	163	35
390	64	-	5	5	-	3	3	8	-	-	-	2	16	10
391	2	-	-	-	-	-	-	-	-	-	-	1	-	1
392	644	1	40	157	9	9	9	2	4	-	66	44	225	116
393	137	-	7	30	2	2	2	-	-	-	-	26	43	26
394	309	-	11	44	-	1	2	1	134	-	-	81	58	216
395	253	3	12	57	-	3	6	33	15	48	-	261	81	357
396	1,223	5	62	285	-	6	18	8	10	-	-	194	376	212
397	306	-	21	26	2	18	17	9	5	-	-	18	84	32
398	690	1	63	127	-	21	21	49	81	48	36	247	233	461
399	1,502	22	45	217	32	64	39	1	130	-	152	289	419	572
400	280	-	28	32	2	20	19	53	20	-	-	788	101	861
401	28	-	3	3	-	2	2	-	2	-	-	30	10	32
402	81	1	4	17	1	5	3	-	-	-	-	47	31	47
403	231	-	13	47	-	1	3	-	7	-	-	106	64	113
404	204	5	10	34	-	2	3	5	62	-	29	88	54	184
405	91	-	2	21	-	2	2	-	-	-	-	25	27	25
406	865	23	41	141	-	6	9	123	149	7	70	207	220	556
407	66	1	-	14	-	2	2	110	2	-	-	13	19	125
408	752	-	24	143	-	16	23	1	5	-	74	215	206	295
409	876	14	-	195	-	18	19	7	14	-	24	166	246	211
410	7	-	-	3	-	-	-	14	-	-	-	386	3	400
411	1,757	40	55	332	9	15	12	4	25	-	-	211	463	240
412	177	2	12	8	4	16	8	526	40	-	4	466	50	1,036
413	293	11	8	70	-	-	2	377	1	-	-	40	91	418
414	3,848	56	137	571	27	25	38	444	109	14	66	25	854	658
415	498	13	36	100	-	3	14	-	27	-	57	155	166	239
416	486	10	27	79	-	1	9	5	479	-	-	55	126	539
417	427	16	13	66	-	8	7	35	77	66	-	307	110	485
418	103	-	6	28	-	-	-	-	10	-	-	24	34	34
419	453	-	30	106	-	-	-	-	22	-	27	143	136	192

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
420	416	-	4	42	-	6	6	-	-	6	-	61	58	67
421	934	-	16	173	-	28	28	17	8	-	-	318	245	343
422	820	-	10	167	-	9	17	23	28	-	-	192	203	243
423	228	-	2	53	-	2	3	4	7	-	-	72	60	83
424	695	9	14	116	-	17	37	20	6	-	-	365	193	391
425	124	3	3	23	-	4	7	5	-	-	-	26	40	31
426	5	-	-	1	-	-	-	-	-	-	-	857	1	857
427	113	-	8	26	-	-	-	-	2	-	-	75	34	77
428	322	1	19	74	-	1	-	-	1	-	-	67	95	68
429	4	-	-	1	-	-	-	-	-	-	-	3	1	3
430	2,844	-	129	471	2	6	62	-	8	-	-	36	670	44
431	1,522	7	86	373	8	5	22	2	35	-	76	1	501	114
432	837	8	91	143	9	5	16	-	19	-	223	4	272	246
433	2,241	12	159	172	57	291	141	53	133	88	98	92	832	464
434	1,413	9	95	293	-	11	23	3	9	-	13	5	431	30
435	1,052	18	73	83	26	102	47	227	142	-	21	24	349	414
436	1,684	-	69	169	49	116	72	123	347	49	3	537	475	1,059
437	1,307	14	62	324	2	20	18	99	35	39	202	6	440	381
438	1,745	32	110	241	8	20	9	58	2	-	32	1	420	93
439	1,531	15	86	227	21	43	27	29	66	59	6	53	419	213
440	-	-	-	-	-	-	-	-	-	-	-	-	-	-
441	-	-	-	-	-	-	-	-	-	-	-	-	-	-
442	-	-	-	-	-	-	-	-	-	-	-	-	-	-
443	-	-	-	-	-	-	-	-	-	-	-	-	-	-
444	-	-	-	-	-	-	-	-	-	-	-	-	-	-
445	676	2	19	113	7	29	15	141	36	-	-	31	185	208
446	18	-	1	5	-	1	-	44	14	-	-	14	7	72
447	31	-	1	5	1	1	-	64	1	-	-	8	8	73
448	1,151	2	39	229	14	58	32	1	1	-	74	27	374	103
449	1,054	18	50	204	19	94	44	4	113	-	-	2	429	119
450	377	1	15	85	7	25	12	-	2	-	-	10	145	12
451	754	7	46	179	-	-	2	1	3	-	-	6	234	10
452	686	9	46	182	-	1	1	-	11	-	11	-	239	22
453	51	1	4	15	-	-	-	-	-	-	-	8	20	8
454	686	-	53	121	15	17	9	-	2	-	-	42	215	44
455	1,917	2	165	361	65	74	43	88	43	-	-	2	710	133
456	768	11	25	115	26	6	34	1	24	-	71	291	217	387
457	785	-	59	128	19	20	12	18	2	11	-	16	238	47
458	45	1	2	5	1	3	1	61	36	-	-	69	13	166
459	366	11	19	63	6	43	18	165	523	139	61	244	160	1,132
460	500	-	62	122	-	17	1	-	31	-	174	22	202	227
461	274	-	25	56	-	6	1	1	28	-	-	-	88	29
462	-	-	-	-	-	-	-	-	-	-	-	-	-	-
463	-	-	-	-	-	-	-	-	-	-	-	-	-	-
464	-	-	-	-	-	-	-	-	-	-	-	-	-	-
465	-	-	-	-	-	-	-	-	-	-	-	-	-	-
466	-	-	-	-	-	-	-	-	-	-	-	-	-	-
467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
468	-	-	-	-	-	-	-	-	-	-	-	-	-	-
469	-	-	-	-	-	-	-	-	-	-	-	-	-	-
470	-	-	-	-	-	-	-	-	-	-	-	-	-	-
471	-	-	-	-	-	-	-	-	-	-	-	-	-	-
472	-	-	-	-	-	-	-	-	-	-	-	-	-	-
473	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474	-	-	-	-	-	-	-	-	-	-	-	-	-	-
475	230	7	21	32	-	16	20	6	8	9	-	6	96	29
476	293	8	31	42	-	22	28	25	-	75	1	14	131	115
477	58	1	6	7	-	3	4	-	-	2	-	9	21	11
478	145	1	5	5	5	14	16	13	2	-	-	114	46	129
479	606	8	49	145	-	-	-	-	-	-	-	2	202	2
480	287	-	8	76	-	2	1	5	1	-	1	12	87	19
481	837	12	68	199	-	-	-	-	1	-	-	4	279	5
482	4	-	-	1	-	-	-	-	42	-	-	2	1	44
483	393	4	4	106	-	-	2	1	3	-	-	32	116	36
484	23	-	1	6	-	-	-	-	9	-	-	58	7	67
485	1,857	-	64	525	-	-	6	2	18	-	-	107	595	127
486	978	-	35	280	-	-	4	42	422	6	34	32	319	536
487	802	5	17	207	-	13	4	35	10	-	-	76	246	121
488	233	-	11	57	-	1	6	-	5	-	-	28	75	33
489	137	-	5	28	-	-	4	-	2	-	-	34	37	36
490	277	-	13	69	-	1	8	15	13	-	207	41	91	276
491	662	-	33	164	-	4	20	1	5	-	42	35	221	83
492	543	-	24	122	-	2	16	7	7	-	-	47	164	61
493	991	6	15	269	-	18	3	4	12	-	-	240	311	256
494	228	-	12	46	3	12	2	4	3	-	-	47	75	54
495	321	1	17	42	-	26	34	7	106	-	-	216	120	329
496	242	1	10	30	-	18	26	29	8	-	-	32	85	69
497	209	-	10	44	2	10	3	-	-	-	-	28	69	28
498	164	-	6	41	-	5	5	-	-	-	-	26	57	26
499	1,937	-	48	396	16	61	90	45	10	-	-	37	611	92

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
500	320	-	5	85	-	3	13	3	9	35	-	100	106	147
501	316	-	6	71	-	3	10	-	-	-	-	30	90	30
502	112	1	6	15	-	9	12	4	7	-	31	17	43	59
503	116	1	8	23	-	3	9	2	4	-	-	30	44	36
504	615	9	38	139	-	16	55	3	26	-	-	152	257	181
505	164	-	8	31	-	8	-	-	3	-	-	86	47	89
506	179	-	8	31	-	8	2	17	-	-	12	142	49	171
507	632	-	22	98	4	27	11	41	28	-	81	23	162	173
508	10	-	-	2	-	-	-	23	62	-	-	681	2	766
509	75	-	1	27	-	1	3	-	7	-	-	31	32	38
510	209	2	9	35	-	3	14	-	15	-	1	121	63	137
511	924	-	40	194	-	8	16	8	8	-	41	307	258	364
512	107	-	3	25	-	-	-	-	2	-	37	40	28	79
513	187	-	6	31	-	2	8	-	-	-	-	25	47	25
514	159	1	7	29	-	2	1	-	11	-	-	14	40	25
515	40	-	3	10	-	1	-	1	-	-	-	6	14	7
516	79	-	2	15	1	1	4	-	-	-	-	13	23	13
517	95	-	2	17	-	1	4	-	-	-	-	21	24	21
518	231	-	10	46	-	4	2	-	-	-	-	37	62	37
519	495	1	23	103	-	12	4	1	3	-	35	120	143	159
520	201	1	10	42	-	6	16	2	-	-	-	79	75	81
521	251	-	13	51	-	2	8	2	1	-	-	30	74	33
522	119	-	1	21	-	6	1	-	-	-	-	28	29	28
523	201	1	6	40	-	9	4	-	-	-	-	29	60	29
524	485	-	11	50	11	22	16	-	10	-	-	234	110	244
525	290	-	8	57	2	5	16	-	2	-	-	48	88	50
526	117	-	5	20	-	2	5	-	-	-	-	25	32	25
527	124	-	6	18	-	3	4	-	-	-	47	50	31	97
528	614	-	56	74	-	2	2	-	11	-	35	150	134	196
529	1,402	-	86	305	4	17	50	1	6	74	54	133	462	268
530	327	1	7	56	1	12	6	2	1	-	-	743	83	746
531	211	-	8	29	8	13	10	-	54	-	-	106	68	160
532	2,996	-	73	286	64	107	100	-	35	-	9	48	630	92
533	508	4	23	69	5	13	18	-	-	-	-	31	132	31
534	920	4	39	118	5	24	34	99	43	-	-	69	224	211
535	736	15	37	96	12	49	101	19	23	113	-	196	310	351
536	419	3	18	71	3	14	11	8	2	5	-	83	120	98
537	108	-	10	25	-	-	-	10	5	-	50	23	35	88
538	435	5	33	85	-	-	-	9	15	-	-	60	123	84
539	227	2	20	51	-	-	-	8	3	-	-	258	73	269
540	35	1	4	10	-	-	-	-	-	-	-	14	15	14
541	150	2	14	40	-	-	-	2	-	-	-	27	56	29
542	240	-	7	31	7	13	10	2	-	-	9	95	68	106
543	6	-	1	1	-	1	1	-	-	-	-	2	4	2
544	87	3	9	13	-	5	6	1	20	-	-	26	36	47
545	680	3	37	149	23	37	30	-	6	-	-	-	279	6
546	1,038	6	74	119	62	78	40	97	184	4	-	1	379	286
547	1,262	38	62	137	41	77	23	153	61	-	49	151	378	414
548	884	4	16	173	-	-	-	-	-	-	-	3	193	3
549	874	10	81	103	32	23	51	24	108	-	9	7	300	148
550	1,091	37	152	75	12	33	14	140	312	99	241	116	323	908
551	3,544	5	178	484	26	83	39	106	87	7	57	59	815	316
552	1,236	-	60	226	-	40	17	1	43	-	80	3	343	127
553	1,103	33	84	167	-	2	12	39	17	-	270	10	298	336
554	1,274	27	66	158	-	12	11	24	7	-	39	104	274	174
555	1,285	35	119	246	-	2	6	2	10	-	39	1	408	52
556	1,229	6	17	127	40	79	34	117	54	4	29	58	303	262
557	1,463	47	39	58	71	81	46	3	39	-	9	928	342	979
558	840	32	35	111	-	-	8	-	-	-	-	1	186	1
559	278	-	8	76	-	1	2	2	6	-	1	27	87	36
560	360	-	10	86	5	5	5	1	23	-	-	36	111	60
561	34	-	1	9	-	-	-	-	-	-	-	2	10	2
562	99	-	3	27	-	1	1	-	-	-	-	-	32	-
563	-	-	-	-	-	-	-	-	-	-	-	-	-	-
564	-	-	-	-	-	-	-	1	-	-	-	4	-	5
565	438	22	26	48	-	-	1	12	9	5	25	204	97	255
566	516	28	31	61	1	1	5	-	4	-	-	6	127	10
567	-	-	-	-	-	-	-	-	-	-	-	233	-	233
568	-	-	-	-	-	-	-	-	-	-	-	10	-	10
569	35	-	4	12	-	-	-	-	-	-	397	3	16	400
570	3,135	36	192	289	51	77	19	17	16	-	-	133	664	166
571	5,111	56	232	587	37	90	72	54	55	18	44	25	1,074	196
572	1,675	36	121	170	15	49	15	69	77	-	42	213	406	401
573	711	-	51	64	8	48	21	3	22	-	250	1	192	276
574	1,766	-	138	476	-	-	-	3	25	-	-	1	614	29
575	-	-	-	-	-	-	-	-	-	2	601	2	-	605
576	718	7	31	142	-	86	5	11	9	-	-	2	271	22
577	754	-	48	189	-	11	21	2	371	-	-	-	269	373
578	1,116	-	62	239	-	11	35	2	13	-	66	12	347	93
579	2,380	30	120	299	36	34	28	108	130	-	2	17	547	257

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
580	-	-	-	-	-	-	-	41	8	-	-	-	-	49
581	272	-	30	67	-	-	-	36	3	-	198	1	97	238
582	693	-	31	75	29	18	27	22	21	2	43	3	180	91
583	1,089	31	47	281	1	2	8	38	15	-	-	33	370	86
584	1,102	49	74	117	13	38	21	96	152	-	43	227	312	518
585	1,555	15	67	254	37	41	23	286	589	76	217	321	437	1,489
586	3,326	9	24	274	138	124	80	203	48	-	54	828	649	1,133
587	1,320	23	17	123	55	54	44	-	4	12	5	2	316	23
588	1,310	8	75	138	10	71	27	-	2	-	-	-	329	2
589	1,407	18	86	186	20	40	22	-	5	-	121	177	372	303
590	-	-	-	-	-	-	-	-	5	-	-	-	-	5
591	21	1	1	4	1	2	4	-	-	-	-	1	13	1
592	1,201	-	109	249	-	22	6	1	2	-	69	4	386	76
593	1,156	5	59	243	5	40	11	-	184	-	-	2	363	186
594	228	-	16	35	-	8	1	1	-	30	-	7	60	38
595	20	-	2	5	-	1	-	-	12	-	-	132	8	144
596	-	-	-	-	-	-	-	-	-	-	483	3	-	486
597	531	-	22	163	-	-	-	1	12	-	-	7	185	20
598	1,241	1	52	382	-	-	1	5	8	-	53	8	436	74
599	1,440	4	68	409	-	-	2	4	19	-	-	19	483	42
600	196	6	8	15	2	4	4	-	2	-	-	1	39	3
601	1,782	56	84	159	21	30	42	3	20	-	95	-	392	118
602	5	-	-	-	-	-	-	4	5	-	-	140	-	149
603	1,037	13	86	88	15	20	8	60	77	1	-	17	230	155
604	1,150	29	75	87	17	37	17	29	7	-	93	6	262	135
605	1,165	11	46	191	-	1	2	5	6	-	49	175	251	235
606	587	8	50	50	7	11	6	17	27	42	1	38	132	125
607	1,355	1	57	382	-	-	1	1	19	11	-	9	441	40
608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
609	-	-	-	-	-	-	-	-	-	-	-	-	-	-
610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
611	-	-	-	-	-	-	-	-	-	-	-	-	-	-
612	-	-	-	-	-	-	-	-	-	-	-	-	-	-
613	-	-	-	-	-	-	-	-	-	-	-	-	-	-
614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
615	1,266	2	43	279	3	49	57	4	93	-	60	79	433	236
616	312	-	25	74	-	-	-	4	532	-	18	14	99	568
617	1,283	3	90	218	18	63	35	53	224	58	94	122	427	551
618	898	7	53	235	13	14	14	6	164	13	22	21	336	226
619	223	-	6	72	-	8	6	98	69	13	2	34	92	216
620	137	2	11	47	-	-	-	16	72	5	1	45	60	139
621	274	-	21	94	-	-	5	2	2	-	-	22	120	26
622	1,265	2	67	230	-	37	122	17	1,468	9	66	37	458	1,597
623	932	9	47	182	12	31	42	4	8	-	-	26	323	38
624	76	-	-	35	-	-	-	-	48	33	-	5	35	86
625	18	-	-	7	-	-	-	1	8	-	-	-	7	9
626	1,095	2	55	196	-	33	103	132	33	6	65	22	389	258
627	1,559	23	58	335	16	33	89	31	68	-	166	24	554	289
628	229	-	-	89	-	-	-	-	6	-	-	21	89	27
629	285	1	9	77	-	6	8	3	7	-	-	-	101	10
630	751	4	19	194	-	14	17	-	8	-	-	20	248	28
631	20	-	-	5	-	-	-	-	-	-	-	6	5	6
632	368	1	10	103	-	8	10	-	7	-	-	88	132	95
633	1,014	17	34	101	4	66	112	16	8	25	3	323	334	375
634	38	-	2	6	-	3	6	-	-	-	-	16	17	16
635	778	5	40	183	-	48	15	14	69	16	-	78	291	177
636	82	-	2	18	-	6	2	-	1	-	-	74	28	75
637	80	-	4	16	-	5	1	-	-	-	-	70	26	70
638	973	2	40	205	8	82	17	4	24	5	5	81	354	119
639	500	3	26	122	-	31	7	3	14	66	-	13	189	96
640	479	1	18	99	4	40	7	8	14	5	-	5	169	32
641	2,171	13	63	301	88	139	206	14	37	8	52	46	810	157
642	359	-	-	96	-	28	35	4	167	-	22	3	159	196
643	-	-	-	-	-	-	-	-	-	-	-	-	-	-
644	133	-	10	39	-	-	2	2	4	-	-	-	51	6
645	123	-	-	45	-	-	-	47	30	-	-	24	45	101
646	1,672	-	157	254	28	150	47	118	168	2	138	29	636	455
647	1,926	7	21	18	54	540	327	1	106	103	-	4	967	214
648	7	-	-	1	-	1	1	1	195	-	-	34	3	230
649	595	-	-	37	104	185	35	13	53	-	-	3	361	69
650	326	7	17	83	18	42	14	2	7	-	-	7	181	16
651	12	-	-	1	-	-	-	61	22	-	-	10	1	93
652	76	-	3	14	-	3	3	13	-	-	-	2	23	15
653	482	-	19	93	1	10	16	1	7	-	-	8	139	16
654	28	-	1	5	-	1	1	102	17	-	-	19	8	138
655	2,032	-	64	575	-	-	-	1	1	-	-	7	639	9
656	-	-	-	-	-	-	-	-	91	-	530	-	-	621
657	1,534	-	-	470	-	-	-	-	-	-	61	-	470	61
658	694	-	33	190	-	-	-	-	-	-	-	-	223	-
659	473	-	22	126	2	2	2	-	-	-	-	2	154	2

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
660	1,316	-	60	336	24	2	8	2	102	-	3	16	430	123
661	559	-	9	152	-	-	4	7	155	-	-	14	165	176
662	1,650	-	90	416	-	-	-	33	7	-	-	4	506	44
663	352	-	7	102	-	1	3	40	155	20	163	312	113	690
664	1,552	9	44	372	-	-	-	1	54	-	-	18	425	73
665	1,159	-	49	230	-	53	44	15	31	-	-	92	376	138
666	367	-	17	79	-	9	14	-	5	-	-	24	119	29
667	594	-	26	125	1	12	20	-	8	-	-	4	184	12
668	44	-	1	7	-	1	1	-	1	-	-	1	10	2
669	23	-	1	7	-	-	-	-	4	-	-	145	8	149
670	30	-	1	8	-	-	-	-	889	-	-	2	9	891
671	192	3	6	52	1	2	-	1	11	-	-	4	64	16
672	915	-	81	212	-	-	-	22	14	-	-	19	293	55
673	1,738	5	92	292	10	117	114	-	32	-	65	14	630	111
674	461	-	41	110	-	-	-	-	34	-	-	1	151	35
675	390	1	20	64	2	23	23	2	6	-	-	22	133	30
676	200	1	4	17	4	9	3	4	64	-	-	74	38	142
677	250	-	-	10	27	49	10	1	5	-	-	-	96	6
678	1,165	16	46	229	49	114	39	157	489	-	79	115	493	840
679	1,163	8	133	280	-	-	-	126	85	-	-	33	421	244
680	581	19	66	133	-	7	16	11	25	-	-	41	241	77
681	218	5	22	47	-	3	4	37	102	819	64	16	81	1,038
682	5	-	-	-	-	-	-	245	211	63	872	528	-	1,919
683	668	-	65	69	7	119	50	10	24	2	-	68	310	104
684	864	13	129	96	-	-	-	1	33	-	-	3	238	37
685	128	-	-	55	-	-	-	16	26	-	-	1	55	43
686	1,183	5	72	310	-	-	-	-	12	-	-	12	387	24
687	1,568	4	69	418	-	-	9	8	27	-	-	18	500	53
688	1,463	25	64	361	-	-	-	5	17	-	3	6	450	31
689	55	-	3	14	-	-	-	-	-	-	-	3	17	3
690	67	1	3	16	-	-	-	1	-	-	-	1	20	2
691	-	-	-	-	-	-	-	-	-	-	-	3	-	3
692	-	-	-	-	-	-	-	-	-	-	-	2	-	2
693	-	-	-	-	-	-	-	249	54	-	-	-	-	303
694	295	2	5	7	11	64	20	-	14	-	-	3	109	17
695	-	-	-	-	-	-	-	-	-	-	-	-	-	-
696	668	15	39	20	-	159	162	209	64	-	-	7	395	280
697	616	-	-	-	47	222	104	22	134	-	-	1	373	157
698	884	-	-	-	-	145	178	1	7	-	-	-	323	8
699	916	12	61	12	64	302	43	99	128	-	-	43	494	270
700	1,381	29	65	229	34	58	58	116	418	71	21	132	473	758
701	1,532	7	130	153	20	139	47	146	410	-	61	79	496	696
702	1,598	34	72	151	14	81	92	54	124	-	132	291	444	601
703	929	-	-	27	34	187	129	231	248	-	-	1,017	377	1,496
704	1,666	-	77	433	-	-	-	-	19	-	-	10	510	29
705	1,413	-	136	318	-	-	3	22	39	-	68	75	457	204
706	806	-	18	236	-	-	-	1	7	-	298	13	254	319
707	1,250	25	87	323	-	-	-	92	200	-	-	39	435	331
708	1,875	3	104	465	-	-	-	1	31	-	-	15	572	47
709	1,805	5	128	442	-	-	-	1	10	-	-	14	575	25
710	382	1	18	103	-	-	-	-	4	-	-	14	122	18
711	56	-	2	13	-	-	-	-	3	-	-	4	15	7
712	1,144	1	4	6	54	194	194	132	67	-	1	5	453	205
713	1,165	11	142	120	21	95	81	1	16	-	-	8	470	25
714	2,692	32	98	273	88	423	185	19	104	-	-	40	1,099	163
715	1,575	-	10	-	208	416	82	168	157	-	-	19	716	344
716	487	-	13	110	6	13	13	-	7	-	82	6	155	95
717	1,962	11	169	369	17	47	35	5	12	-	-	8	648	25
718	490	-	23	-	23	120	45	144	245	-	9	69	211	467
719	1,134	18	84	190	-	44	9	6	36	-	-	25	345	67
720	856	1	87	219	-	-	-	3	28	-	3	8	307	42
721	2	-	-	1	-	-	-	527	196	-	31	50	1	804
722	1,125	2	162	202	-	-	-	36	238	-	-	505	366	779
723	1,782	-	112	417	-	-	-	36	11	-	-	2	529	49
724	973	-	30	307	4	17	8	103	83	-	-	17	366	203
725	872	-	23	223	2	12	6	20	46	-	59	6	266	131
726	739	-	17	184	3	8	4	1	20	-	-	-	216	21
727	664	-	18	170	4	7	5	1	19	-	-	28	204	48
728	1,151	-	46	322	-	-	-	21	2	-	-	4	368	27
729	19	-	1	6	-	-	-	2	-	-	-	3	7	5
730	1,230	9	52	331	-	-	-	-	13	-	2	3	392	18
731	404	-	16	74	-	16	14	-	1	-	-	2	120	3
732	384	3	16	88	-	1	2	-	5	-	50	3	110	58
733	316	3	25	80	-	-	-	-	-	-	-	24	108	24
734	2,269	4	145	613	-	1	2	-	3	-	-	3	765	6
735	1,759	6	105	456	-	2	2	1	14	-	53	16	571	84
736	1,022	-	60	241	-	-	-	-	2	-	72	2	301	76
737	510	-	40	166	-	-	-	-	4	-	-	11	206	15
738	1,295	-	65	368	2	2	-	-	-	-	61	-	437	61
739	948	-	81	241	-	-	-	14	17	-	-	27	322	58

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
740	615	-	52	152	-	-	-	2	3	-	-	7	204	12
741	91	1	3	22	-	1	-	1	-	-	-	31	27	32
742	-	-	2	6	-	-	-	-	2	-	-	-	8	2
743	56	-	3	13	-	-	-	-	2	-	-	7	16	9
744	104	-	5	27	-	-	-	2	1	-	-	19	32	22
745	27	-	2	10	-	-	-	-	-	-	-	3	12	3
746	-	-	-	-	-	-	-	-	-	-	459	-	-	459
747	18	-	1	3	-	-	-	-	-	-	-	1	4	1
748	-	-	-	-	-	-	-	-	-	-	-	1	-	1
749	9	-	-	2	-	-	-	-	-	-	-	3	2	3
750	29	-	1	4	-	-	-	-	-	-	-	1	5	1
751	715	2	62	185	-	-	-	32	39	-	-	16	249	87
752	553	1	38	145	-	6	4	1	7	-	-	10	194	18
753	50	-	5	16	-	-	-	-	10	-	2	11	21	23
754	251	1	17	68	-	4	2	1	6	-	-	22	92	29
755	824	3	63	236	-	11	8	4	101	-	-	155	321	260
756	1,020	-	47	343	-	-	-	3	102	-	-	10	390	115
757	1,000	3	77	268	9	12	28	9	100	-	2	18	397	129
758	210	2	23	64	3	5	11	109	156	-	42	11	108	318
759	703	10	43	217	-	-	-	31	323	-	-	93	270	447
760	785	13	46	222	-	-	-	2	28	-	-	2	281	32
761	1,412	-	142	260	13	132	44	73	167	-	5	20	591	265
762	1,404	7	48	210	18	221	176	2	17	-	-	16	680	35
763	2,372	11	69	310	33	361	289	36	121	-	-	47	1,073	204
764	6	-	1	2	-	-	-	55	320	-	-	122	3	497
765	874	56	26	75	26	183	113	519	1,654	-	4	1,493	479	3,670
766	185	1	20	31	-	3	5	201	720	-	-	558	60	1,479
767	1,263	36	15	49	15	117	71	6	22	-	-	11	303	39
768	1,507	78	90	123	11	35	27	81	97	-	58	22	364	258
769	350	5	20	17	17	52	55	6	7	-	-	4	166	17
770	19	-	-	2	-	2	2	-	-	-	-	-	6	-
771	-	-	-	-	-	-	-	187	894	-	-	9	-	1,090
772	-	-	-	-	-	-	-	-	-	-	-	-	-	-
773	-	-	-	-	-	-	-	-	449	-	18	-	-	467
774	1,106	-	125	224	20	37	55	-	7	-	-	1	461	8
775	11	-	-	1	-	-	-	820	243	-	7	36	1	1,106
776	-	-	-	-	-	-	-	1	57	-	-	-	-	58
777	738	8	43	24	27	163	96	1	153	-	-	16	361	170
778	2,143	21	110	63	71	423	251	172	424	-	-	49	939	645
779	1	-	-	-	-	-	-	256	103	-	-	14	-	373
780	19	2	2	3	-	1	1	14	314	-	-	-	9	328
781	151	1	7	4	4	28	17	82	1,951	22	-	190	61	2,245
782	98	-	4	22	-	2	2	1	2	-	-	17	30	20
783	155	-	12	39	-	-	-	4	2	-	-	-	51	6
784	-	-	-	-	-	-	-	-	-	-	-	53	-	53
785	54	-	3	12	-	1	1	-	14	-	-	13	17	27
786	1,204	4	118	291	-	-	-	1	11	-	-	8	413	20
787	13	-	-	3	-	-	-	39	76	-	-	632	3	747
788	1,563	10	128	335	4	13	43	2	8	-	64	7	533	81
789	1,694	6	156	388	-	-	5	2	14	-	-	5	555	21
790	1,437	15	129	336	-	-	-	1	3	-	-	7	480	11
791	2,274	19	177	469	7	32	100	74	42	-	3	21	804	140
792	1,220	7	64	184	11	88	83	4	8	-	-	16	437	28
793	1,138	14	80	229	16	110	103	2	37	-	-	9	552	48
794	-	-	-	-	-	-	-	-	-	-	-	1	-	1
795	304	-	20	-	20	84	9	-	2	-	70	1	133	73
796	8	-	1	2	-	-	-	27	-	-	-	-	3	27
797	1,197	15	61	359	-	-	-	2	21	-	-	38	435	61
798	1,778	18	119	407	-	2	25	-	23	-	-	3	571	26
799	36	-	3	11	-	-	-	-	4	-	-	-	14	4
800	938	-	88	260	-	-	-	5	22	-	1	13	348	41
801	1,241	6	84	280	97	7	7	9	214	-	-	61	481	284
802	921	11	156	269	-	-	-	-	41	-	-	4	436	45
803	888	27	77	202	-	46	16	1	15	-	-	27	368	43
804	664	-	53	159	-	-	3	6	54	-	-	2	215	62
805	478	-	50	148	-	-	2	64	61	-	-	-	200	125
806	1,171	31	62	302	-	-	4	3	749	-	63	22	399	837
807	923	-	77	295	-	2	6	66	112	-	-	15	380	193
808	1,315	-	71	333	1	74	40	48	491	-	-	172	519	711
809	818	2	64	155	29	64	40	16	255	-	115	80	354	466
810	970	-	54	257	1	60	32	2	15	-	46	5	404	68
811	1,708	4	143	356	65	144	93	19	102	-	-	13	805	134
812	1,496	37	125	105	71	329	80	149	545	-	-	80	747	774
813	1,477	18	114	238	14	167	31	32	300	-	-	29	582	361
814	585	9	18	29	9	55	88	124	236	-	-	44	208	404
815	662	13	27	43	13	80	127	470	217	-	-	50	303	737
816	96	1	2	3	1	6	9	2	76	-	-	-	22	78
817	-	-	-	-	-	-	-	16	1,899	-	106	-	-	2,021
818	1,847	38	147	388	11	70	114	44	83	-	5	26	768	158
819	1,831	-	165	250	22	132	123	15	813	-	58	11	692	897

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
820	5	-	-	2	-	-	-	-	-	-	-	3	2	3
821	406	-	22	93	-	1	1	-	5	-	-	2	117	7
822	1,092	1	76	233	1	41	8	1	16	-	-	4	360	21
823	378	4	31	33	9	20	14	60	55	4	-	3	111	122
824	8	-	1	3	-	-	-	75	1,071	165	11	844	4	2,166
825	1,891	2	125	383	1	56	10	1	9	-	1	13	577	24
826	-	-	-	-	-	-	-	254	111	20	-	1	-	386
827	7	-	1	3	-	-	-	4	-	-	-	-	4	4
828	1,320	-	33	272	-	52	45	2	11	-	53	16	402	82
829	21	-	1	12	-	2	2	26	23	-	-	4	17	53
830	623	-	37	11	13	170	99	-	9	-	-	5	330	14
831	1,214	-	71	21	27	365	212	2	15	-	-	11	696	28
832	437	-	19	5	6	90	53	349	218	-	-	42	173	609
833	2,653	-	168	321	76	269	162	2	31	-	-	71	996	104
834	342	-	19	6	7	88	51	1	10	-	-	-	171	11
835	403	-	25	7	9	115	67	456	79	-	-	28	223	563
836	801	11	19	253	-	-	-	42	211	-	12	13	283	278
837	850	-	91	243	10	8	7	2	101	-	-	12	359	115
838	620	8	44	192	-	-	-	-	575	7	17	61	244	660
839	-	-	-	-	-	-	-	54	31	-	-	8	-	93
840	438	-	70	136	-	5	2	93	316	-	45	47	213	501
841	644	9	73	197	10	12	12	48	53	-	34	103	313	238
842	843	-	75	253	-	7	-	49	43	-	-	3	335	95
843	823	16	97	198	19	23	23	95	558	18	-	74	376	745
844	537	-	88	149	-	-	11	55	88	-	235	40	248	418
845	732	-	105	182	-	-	12	36	665	-	-	48	299	749
846	1,117	5	128	147	14	126	48	18	429	-	43	57	468	547
847	840	8	139	161	16	138	54	473	1,486	23	-	119	516	2,101
848	663	4	61	132	14	45	36	291	214	-	149	16	292	670
849	1,001	4	96	207	22	70	54	193	201	-	2	62	453	458
850	93	-	3	1	17	41	14	582	108	-	27	29	76	746
851	2	-	-	-	-	1	-	217	292	177	-	87	1	773
852	964	-	19	4	110	258	87	5	592	-	-	-	478	597
853	1,067	-	16	3	97	227	76	69	445	-	6	7	419	527
854	1,821	6	113	253	41	248	98	49	247	-	60	22	759	378
855	1,212	9	96	251	8	52	20	81	1,148	35	37	61	436	1,362
856	6	-	-	2	-	-	-	-	-	-	-	3	2	3
857	18	-	1	4	-	-	1	-	-	-	-	9	6	9
858	68	-	3	14	-	1	2	-	-	-	-	2	20	2
859	-	-	-	-	-	-	-	-	-	-	-	3	-	3
860	271	1	30	37	-	7	7	1	-	-	-	50	82	51
861	61	-	2	12	-	1	1	-	-	-	-	7	16	7
862	66	-	8	9	-	2	2	-	-	-	-	3	21	3
863	163	1	18	23	-	4	4	-	-	-	-	3	50	3
864	1,005	6	62	70	18	47	29	-	3	-	474	22	232	499
865	1,204	8	76	242	-	-	-	-	7	-	6	7	326	20
866	190	2	12	39	-	-	-	2	1	-	-	4	53	7
867	41	1	3	12	-	1	1	-	2	-	-	49	18	51
868	57	-	4	5	1	3	2	-	17	-	-	4	15	21
869	1,453	11	117	133	33	88	57	1	30	-	-	-	439	31
870	1,723	18	113	348	-	-	1	3	13	-	-	3	480	19
871	1,221	9	79	247	-	-	-	-	28	-	304	3	335	335
872	1,021	9	57	207	-	16	9	6	2	-	-	63	298	71
873	46	-	5	6	1	3	3	35	21	-	5	13	18	74
874	2,084	4	161	342	32	45	58	10	40	-	-	15	642	65
875	551	-	33	89	6	14	11	-	56	-	73	1	153	130
876	258	5	5	78	-	-	-	4	2	-	-	4	88	10
877	-	-	-	-	-	-	-	157	626	14	-	1,598	-	2,395
878	-	-	-	-	-	-	-	180	547	30	20	536	-	1,313
879	399	-	25	63	6	12	6	11	5	-	-	10	112	26
880	1,049	18	18	246	-	-	-	21	6	-	-	3	282	30
881	-	-	-	-	-	-	-	45	70	-	-	35	-	150
882	5	-	-	-	-	1	-	81	92	-	-	390	1	563
883	-	-	-	-	-	-	-	-	3	-	-	36	-	39
884	-	-	-	-	-	-	-	-	2	-	-	4	-	6
885	473	-	38	99	7	15	10	19	8	-	-	9	169	36
886	1,978	2	112	229	-	139	99	58	89	-	-	22	581	169
887	1,263	14	61	186	12	99	56	263	76	-	-	33	428	372
888	3,534	41	145	379	63	387	167	34	28	-	-	296	1,182	358
889	1,139	15	75	58	9	179	82	113	116	-	3	418	418	650
890	-	-	-	-	-	-	-	9	4	-	-	48	-	61
891	5	-	-	-	-	1	-	2	55	-	3	95	1	155
892	627	2	45	91	-	56	40	2	20	-	-	3	234	25
893	3,207	30	192	496	17	129	112	58	267	-	89	19	976	433
894	1,013	5	145	286	7	33	40	247	794	6	39	99	516	1,185
895	1,793	15	73	219	16	128	110	31	49	-	-	24	561	104
896	760	2	51	16	44	195	61	12	13	-	10	5	369	40
897	778	3	57	18	50	218	68	14	38	61	-	2	414	115
898	1,843	41	113	267	26	113	47	2	98	-	164	55	607	319
899	2,140	31	166	387	14	47	27	2	49	-	-	2	672	53

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
900	2,806	21	119	195	107	201	90	46	68	126	30	160	733	430
901	2,324	60	218	230	73	168	71	16	49	-	-	93	820	158
902	929	2	152	215	-	-	-	5	213	-	-	37	369	255
903	671	-	70	137	-	15	20	-	7	-	-	9	242	16
904	479	-	3	31	25	51	22	-	1	-	-	-	132	1
905	1,788	8	39	169	111	216	93	99	33	-	-	4	636	136
906	1,689	15	189	341	9	57	37	28	38	-	101	25	648	192
907	884	8	119	184	3	39	48	1	394	6	79	392	401	872
908	444	-	25	138	-	-	-	4	18	8	248	1	163	279
909	1,174	-	92	176	16	61	21	-	21	-	-	18	366	39
910	2,162	5	19	148	125	242	102	-	26	-	-	-	641	26
911	1,600	16	164	265	55	91	41	6	218	-	22	56	632	302
912	624	6	93	152	-	-	-	8	467	-	7	52	251	534
913	585	1	45	181	-	-	-	2	12	5	3	6	227	28
914	702	3	78	204	-	2	1	2	12	-	-	26	288	40
915	769	6	85	153	2	85	35	3	16	-	-	12	366	31
916	741	14	69	113	9	21	12	33	49	-	-	13	238	95
917	687	11	90	156	7	49	40	110	666	-	-	99	353	875
918	689	25	60	92	23	96	42	98	130	-	-	31	338	259
919	1,549	30	121	158	66	161	54	79	254	-	68	76	590	477
920	1,694	73	115	219	26	77	50	60	252	-	91	11	560	414
921	494	2	58	102	-	-	-	125	480	56	-	156	162	817
922	630	3	67	60	23	23	22	137	197	249	1	132	198	716
923	1,449	6	23	47	160	255	74	204	586	64	-	37	565	891
924	479	7	23	46	49	54	14	388	1,023	649	95	2	193	2,157
925	614	2	69	121	-	-	-	166	46	-	-	11	192	223
926	881	4	73	64	27	27	25	24	88	-	-	16	220	128
927	265	6	37	52	1	5	10	3	226	-	58	12	111	299
928	512	13	29	84	10	30	16	-	7	-	-	7	182	14
929	591	8	50	61	36	33	29	1,097	1,076	-	85	84	217	2,342
930	2,161	39	252	323	-	2	2	65	73	-	-	69	618	207
931	1,331	19	146	228	7	26	38	18	18	-	87	7	464	130
932	1,301	23	125	276	19	58	42	31	307	-	30	27	543	395
933	163	-	7	33	-	2	6	31	13	-	67	12	48	123
934	92	-	8	11	-	2	2	2	1	-	-	2	23	5
935	245	1	29	36	-	6	7	2	-	-	-	2	79	4
936	95	-	10	12	-	2	2	1	2	-	-	7	26	10
937	213	1	28	34	-	6	6	2	3	-	-	49	75	54
938	67	1	4	16	-	1	1	1	1	-	-	18	23	20
939	158	2	12	40	-	3	2	-	4	-	45	13	59	62
940	89	1	5	19	-	2	1	-	-	-	-	12	28	12
941	150	1	10	36	-	2	1	-	14	-	-	7	50	21
942	986	20	71	171	-	-	-	-	5	-	-	2	262	7
943	1,697	-	119	377	-	-	-	4	5	-	139	8	496	156
944	2,249	53	175	425	-	1	1	4	6	-	-	104	655	114
945	684	-	50	162	-	-	-	96	27	-	-	1	212	124
946	1,580	-	137	237	23	34	82	16	12	-	11	4	513	43
947	758	-	48	134	9	5	32	-	3	-	-	28	228	31
948	1,368	-	16	30	97	235	124	19	44	-	-	4	502	67
949	693	-	42	117	8	8	27	8	64	-	-	4	202	76
950	1,225	-	45	107	56	77	10	4	16	-	-	67	295	87
951	15	-	-	-	2	5	3	39	135	-	-	60	10	234
952	1,470	8	16	-	77	185	126	26	184	-	-	192	412	402
953	177	2	3	-	16	39	27	10	53	-	-	-	87	63
954	1,822	27	139	176	88	176	33	50	58	-	109	9	639	226
955	1,223	31	52	126	3	98	33	18	17	-	-	20	343	55
956	1,558	35	239	236	14	68	20	6	74	-	-	13	612	93
957	2,119	44	118	330	43	116	37	23	43	8	118	4	688	196
958	1,477	27	164	317	-	68	44	16	55	-	44	22	620	137
959	1,385	56	220	257	-	6	4	8	37	-	80	6	543	131
960	1,502	19	128	342	26	86	71	87	225	3	1	108	672	424
961	1,230	52	209	219	7	49	23	4	129	-	271	6	559	410
962	1,924	48	179	235	43	70	58	172	128	27	26	34	633	387
963	247	3	45	43	-	13	6	-	12	-	1,575	12	110	1,599
964	820	6	33	61	60	62	36	73	41	-	178	3	258	295
965	789	30	92	117	17	24	21	41	115	-	-	20	301	176
966	931	23	71	138	25	38	18	61	146	145	50	159	313	561
967	421	8	53	46	19	24	15	4	55	-	-	3	165	62
968	148	4	9	20	-	2	1	5	54	-	-	3	36	62
969	1,514	12	159	227	53	67	38	42	1,154	16	246	62	556	1,520
970	2,274	-	44	134	213	209	44	23	324	5	23	24	644	399
971	148	-	6	33	-	3	4	-	5	-	72	3	46	80
972	36	-	1	7	-	1	1	-	6	-	-	8	10	14
973	175	-	8	42	-	3	5	-	17	-	-	13	58	30
974	-	-	-	-	-	-	-	1	-	-	-	3	-	4
975	2,232	5	198	274	16	199	104	1	214	-	55	129	796	399
976	-	-	-	-	-	-	-	-	-	-	-	-	-	-
977	-	-	-	-	-	-	-	-	-	-	-	-	-	-
978	2	-	-	-	-	1	-	7	69	17	1	-	1	94
979	1,158	4	49	105	53	103	48	1	19	-	-	22	362	42

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
980	395	-	57	72	-	-	-	2	19	-	1	12	129	34
981	834	2	52	97	19	57	17	1	10	-	-	5	244	16
982	542	8	39	109	-	-	-	-	-	-	-	1	156	1
983	291	4	21	58	-	-	-	-	-	-	73	1	83	74
984	561	9	56	150	-	-	-	-	-	-	-	5	215	5
985	109	-	4	18	-	4	3	1	64	-	-	-	29	65
986	-	-	2	12	-	-	-	-	-	-	-	1	14	1
987	69	-	2	14	-	-	-	-	-	-	-	186	16	186
988	203	-	10	30	-	4	5	-	-	-	-	37	49	37
989	1,422	5	70	298	-	21	24	-	11	-	-	3	418	14
990	13	-	1	3	1	2	1	-	-	-	73	2	8	75
991	-	-	-	-	-	-	-	-	-	-	-	2	-	2
992	240	4	5	29	13	19	6	2	-	-	-	1	76	3
993	-	-	-	-	-	-	-	-	-	-	-	1	-	1
994	528	12	24	95	-	1	-	-	158	-	-	1	132	159
995	-	-	-	-	-	-	-	-	5	-	-	1	-	6
996	-	-	-	-	-	-	-	-	-	-	-	-	-	-
997	-	-	-	-	-	-	-	-	9	-	-	-	-	9
998	-	-	-	-	-	-	-	-	-	-	-	-	-	-
999	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1000	1,253	4	112	291	-	-	-	34	27	-	-	7	407	68
1001	407	-	21	84	-	18	13	1	6	-	-	7	136	14
1002	272	2	36	91	-	-	-	-	52	-	49	6	129	107
1003	2,552	2	160	647	10	133	93	81	74	-	-	25	1,045	180
1004	1,057	1	79	325	4	67	45	108	85	-	-	28	521	221
1005	1,920	-	87	355	6	108	77	-	39	-	-	8	633	47
1006	996	-	20	322	-	-	-	2	30	-	-	13	342	45
1007	299	2	17	81	-	-	-	1	8	-	-	-	100	9
1008	1,680	8	92	443	-	-	-	61	181	-	94	40	543	376
1009	918	3	69	197	9	40	52	92	135	101	265	10	370	603
1010	1,536	2	107	399	-	21	41	23	27	-	-	16	570	66
1011	1,972	4	130	381	17	78	103	3	14	-	1	10	713	28
1012	1,449	-	88	322	-	16	35	48	189	-	-	21	461	258
1013	1,251	-	54	351	-	-	-	55	31	-	-	9	405	95
1014	1,448	-	110	350	-	13	-	1	42	-	79	14	473	136
1015	-	-	19	168	-	-	-	3	5	-	-	4	187	12
1016	690	-	52	196	-	-	-	-	5	-	-	12	248	17
1017	698	-	98	174	-	-	-	74	47	-	186	412	272	719
1018	1,309	-	79	268	66	32	33	7	138	-	-	7	478	152
1019	1,728	9	97	231	47	154	109	-	17	-	-	9	647	26
1020	1,375	9	118	314	-	-	-	25	136	-	89	277	441	527
1021	348	1	37	92	-	-	-	16	42	-	-	4	130	62
1022	790	10	37	224	-	-	-	3	25	-	-	17	271	45
1023	839	-	16	70	16	175	145	2	634	80	-	2	422	718
1024	277	-	33	116	28	14	14	7	2,265	-	8	4	205	2,284
1025	1,683	14	115	269	53	180	123	264	515	-	60	27	754	866
1026	1,498	-	85	321	16	62	93	5	163	-	-	9	577	177
1027	241	-	12	43	2	9	14	-	225	-	-	1	80	226
1028	925	18	71	221	-	8	35	140	3,624	-	33	37	353	3,834
1029	1,744	-	217	374	-	-	-	36	96	-	-	13	591	145
1030	1,282	25	123	282	-	-	-	124	130	-	24	9	430	287
1031	2,044	14	55	439	15	113	147	5	22	-	1	17	783	45
1032	1,205	-	143	271	-	24	24	69	70	-	99	11	462	249
1033	1,235	16	75	355	-	-	-	1	196	24	38	21	446	280
1034	-	-	-	-	-	-	-	-	-	-	-	6	-	6
1035	822	5	38	94	39	122	55	92	97	-	210	32	353	431
1036	1,907	-	31	206	77	144	115	47	911	384	90	62	573	1,494
1037	-	-	-	-	-	-	-	-	7	-	-	5	-	12
1038	2,053	24	147	222	106	172	137	71	780	-	110	210	808	1,171
1039	2,313	18	111	256	80	312	216	159	570	22	3	27	993	781
1040	1,343	-	49	182	57	232	48	43	130	-	35	17	568	225
1041	2,566	-	137	239	88	410	287	31	152	-	1,068	11	1,161	1,262
1042	1,141	-	52	91	32	153	107	4	53	-	-	4	435	61
1043	1,428	6	194	281	28	91	41	64	138	36	64	14	641	316
1044	1,815	35	138	250	34	86	63	107	107	-	73	94	606	381
1045	1,633	31	110	384	-	-	-	1	69	-	1	20	525	91
1046	355	4	10	51	7	13	17	-	1	-	-	-	102	1
1047	903	11	29	142	23	37	48	1	3	-	-	6	290	10
1048	761	7	25	115	18	31	39	-	35	-	76	3	235	114
1049	1,694	8	162	278	51	91	20	36	223	14	-	10	610	283
1050	2,253	25	165	270	90	139	78	4	104	-	93	5	767	206
1051	178	2	7	18	9	16	4	65	19	-	-	36	56	120
1052	17	-	1	2	1	2	-	-	4	-	-	17	6	21
1053	1,840	-	20	32	77	544	252	13	90	-	-	329	925	432
1054	832	-	117	175	-	-	-	23	54	-	-	66	292	143
1055	1,133	9	82	258	-	-	-	32	10	-	-	5	349	47
1056	3,636	22	262	592	1	86	54	6	32	-	-	73	1,017	111
1057	26	-	1	8	-	-	-	15	-	-	-	-	9	15
1058	32	-	1	8	-	-	1	-	3	-	-	2	10	5
1059	443	-	11	113	2	6	4	1	5	-	2	9	136	17

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1060	66	-	3	18	-	1	2	-	-	-	-	1	24	1
1061	1,056	-	60	266	-	-	1	-	5	-	-	14	327	19
1062	11	-	-	5	-	-	-	-	-	-	-	4	5	4
1063	31	-	1	8	-	-	-	-	-	-	-	3	9	3
1064	10	-	-	5	-	-	-	-	-	-	-	7	5	7
1065	75	-	3	17	-	-	-	-	-	-	-	2	20	2
1066	1,937	20	128	158	110	209	97	93	790	1	55	31	722	970
1067	2,370	52	153	272	69	173	42	1	283	514	6	51	761	855
1068	2,583	20	226	190	176	187	117	22	20	-	-	9	916	51
1069	2,042	20	141	187	126	203	100	70	180	-	-	240	777	490
1070	1,094	7	99	246	-	-	7	33	120	11	296	16	359	476
1071	1,887	46	232	297	1	26	7	5	23	-	17	17	609	62
1072	1,150	10	57	125	62	119	46	28	55	-	88	-	419	171
1073	652	13	77	128	-	-	9	68	78	-	-	6	227	152
1074	676	5	39	135	5	44	10	14	28	-	20	21	238	83
1075	1,166	9	43	103	49	96	31	2	18	-	222	66	331	308
1076	2,446	11	223	285	71	91	114	4	46	-	-	26	795	76
1077	1,837	-	96	147	62	151	80	23	28	-	208	6	536	265
1078	-	-	-	-	-	-	-	38	235	552	34	761	-	1,620
1079	-	-	-	-	-	-	-	5	203	232	3	396	-	839
1080	1	-	-	-	-	1	-	175	2,613	310	269	1,660	1	5,027
1081	-	-	-	-	-	-	-	-	34	-	-	-	-	34
1082	-	-	-	-	-	-	-	126	361	-	-	1,882	-	2,369
1083	6	-	-	3	-	-	-	-	-	-	-	3	3	3
1084	65	-	2	19	-	-	-	1	-	-	-	4	21	5
1085	39	-	1	12	-	-	-	-	-	-	-	9	13	9
1086	129	-	4	44	-	-	1	-	1	-	-	4	49	5
1087	718	21	101	106	-	30	22	121	22	-	-	6	280	149
1088	1,021	-	101	137	9	64	90	20	198	-	-	18	401	236
1089	152	-	20	28	-	-	-	25	13	6	-	1	48	45
1090	1,042	12	77	254	-	-	-	106	174	-	-	577	343	857
1091	1,277	2	66	269	-	15	6	2	7	-	64	13	358	86
1092	511	-	23	139	-	-	-	-	-	-	-	6	162	6
1093	78	-	3	28	-	-	-	-	29	-	-	16	31	45
1094	15	-	1	3	-	-	-	-	7	-	-	4	4	11
1095	22	-	1	6	-	-	-	1	-	-	-	4	7	5
1096	1,808	22	148	420	-	1	-	-	18	-	-	29	591	47
1097	1,477	-	70	284	3	57	43	13	21	-	-	16	457	50
1098	1,326	-	67	281	2	60	39	1	11	-	59	12	449	83
1099	2,726	18	118	288	142	452	204	39	91	-	-	8	1,222	138
1100	133	-	8	33	-	3	7	1	19	-	-	13	51	33
1101	-	-	-	2	-	-	-	-	15	-	-	4	2	19
1102	238	-	11	47	-	4	8	-	-	-	-	3	70	3
1103	978	1	51	205	-	1	1	1	6	-	-	3	259	10
1104	-	-	-	-	-	-	-	2	1	-	-	-	-	3
1105	384	15	19	67	-	9	4	2	2	-	-	4	114	8
1106	127	5	6	24	-	2	1	-	-	-	-	3	38	3
1107	169	7	8	29	-	3	2	3	9	-	-	1	49	13
1108	325	14	18	65	-	8	5	1	2	-	-	10	110	13
1109	377	3	14	39	15	35	11	-	4	-	-	15	117	19
1110	274	-	17	39	14	8	6	-	4	-	-	3	84	7
1111	752	6	35	98	39	92	28	12	10	2	-	118	298	142
1112	298	-	22	48	18	10	8	10	5	-	-	58	106	73
1113	1,439	12	81	49	169	154	72	7	10	-	102	24	537	143
1114	948	25	48	109	4	30	49	7	121	-	-	157	265	285
1115	132	1	8	6	18	17	7	40	44	-	-	103	57	187
1116	137	-	4	2	8	7	4	2	70	595	-	574	25	1,241
1117	1,800	-	194	302	125	96	36	19	169	-	1	523	753	712
1118	808	-	64	59	6	42	28	56	91	-	37	74	199	258
1119	16	-	1	1	3	2	1	31	111	-	-	-	8	142
1120	61	1	7	10	-	1	1	-	-	-	-	-	20	-
1121	1,727	69	314	172	63	56	26	38	64	-	-	32	700	134
1122	2,003	64	219	250	-	30	28	38	61	-	-	87	591	186
1123	2,059	38	138	314	83	237	107	243	207	-	72	86	917	608
1124	1,508	35	94	197	30	71	13	53	70	-	101	4	440	228
1125	535	11	42	78	22	45	13	53	119	5	11	6	211	194
1126	213	5	26	33	11	21	10	47	273	-	-	27	106	347
1127	1,800	81	216	183	35	71	52	62	245	-	107	47	638	461
1128	845	19	67	86	30	59	25	28	157	-	-	223	286	408
1129	650	20	51	56	13	26	15	8	105	51	114	37	181	315
1130	38	1	7	5	-	-	-	62	86	-	22	185	13	355
1131	852	-	75	104	21	21	9	49	292	-	-	402	230	743
1132	15	-	3	-	-	1	-	20	31	-	-	9	4	60
1133	1,500	28	59	88	54	51	37	16	73	-	67	46	317	202
1134	716	21	14	62	32	24	19	24	46	-	-	38	172	108
1135	472	21	27	56	11	26	12	3	169	-	26	101	153	299
1136	466	7	10	43	16	35	7	17	48	-	112	7	118	184
1137	174	2	4	19	9	15	2	2	89	-	91	1	51	183
1138	557	20	28	55	11	23	14	9	26	-	-	21	151	56
1139	119	3	4	18	7	14	3	5	7	-	-	-	49	12

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1140	140	3	4	14	5	12	1	3	81	-	-	4	39	88
1141	12	-	1	3	-	-	1	-	-	-	-	5	5	5
1142	23	-	-	10	-	-	-	-	-	-	-	9	10	9
1143	25	-	1	4	-	-	1	-	-	-	-	3	6	3
1144	32	-	-	9	-	-	-	-	-	-	-	9	9	9
1145	87	-	3	10	-	1	-	-	58	-	-	5	14	63
1146	52	-	-	18	-	-	-	-	-	-	-	13	18	13
1147	15	1	1	2	-	-	-	-	-	-	-	4	4	4
1148	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1149	104	5	5	20	-	2	1	-	6	-	-	1	33	7
1150	-	-	-	-	-	-	-	-	18	-	-	42	-	60
1151	53	-	4	10	4	2	2	2	-	-	-	140	22	142
1152	21	-	-	5	-	-	-	-	-	-	-	7	5	7
1153	56	1	1	9	-	-	-	-	3	-	-	65	11	68
1154	14	-	-	5	-	-	-	-	27	-	92	27	5	146
1155	-	-	-	-	-	-	-	4	-	-	-	33	-	37
1156	-	-	-	-	-	-	-	-	-	-	-	12	-	12
1157	92	4	13	16	-	-	-	-	29	-	-	116	33	145
1158	111	-	4	20	-	1	1	4	40	2	-	23	26	69
1159	-	-	-	-	-	-	-	1	35	41	-	30	-	107
1160	52	1	6	8	-	-	-	45	78	-	-	294	15	417
1161	144	-	6	30	-	3	3	1	-	-	-	-	42	1
1162	574	-	21	107	-	6	6	24	94	-	-	204	140	322
1163	-	-	-	-	-	-	-	7	13	38	-	5	-	63
1164	-	-	-	-	-	-	-	-	-	-	-	39	-	39
1165	12	-	-	-	-	6	-	13	25	-	-	441	6	479
1166	-	-	-	-	-	-	-	-	20	-	-	48	-	68
1167	648	-	59	32	36	39	12	15	87	-	-	103	178	205
1168	377	-	21	18	44	25	4	9	182	14	-	20	112	225
1169	208	-	15	11	26	17	3	2	26	-	-	12	72	40
1170	1,688	10	70	55	153	122	28	-	57	-	65	2	438	124
1171	2,123	25	66	54	184	186	46	18	69	-	-	21	561	108
1172	24	-	-	3	2	1	1	85	33	-	-	46	7	164
1173	2,504	24	119	140	147	115	50	46	229	-	52	22	595	349
1174	1,690	17	116	47	74	74	54	20	48	-	53	68	382	189
1175	1,316	31	63	80	53	65	9	23	67	-	-	7	301	97
1176	19	-	-	5	-	-	-	-	-	-	-	6	5	6
1177	11	-	-	4	-	-	-	-	10	-	-	6	4	16
1178	12	-	-	6	-	-	-	-	17	-	-	9	6	26
1179	22	-	1	6	-	-	-	-	-	9	-	11	7	20
1180	17	1	2	4	-	-	1	-	-	-	-	3	8	3
1181	38	-	-	14	-	-	-	-	4	-	-	12	14	16
1182	25	-	3	5	-	-	2	-	2	-	-	3	10	5
1183	72	2	1	15	-	-	-	-	11	-	76	3	18	90
1184	104	3	3	25	-	-	-	-	-	-	-	3	31	3
1185	85	3	1	19	-	-	-	-	4	-	-	3	23	7
1186	162	5	5	47	-	2	2	-	1	-	-	2	61	3
1187	83	1	3	3	-	-	-	-	27	-	-	2	7	29
1188	10	-	1	1	-	-	-	-	-	-	-	3	2	3
1189	835	22	76	93	-	5	5	-	11	-	-	13	201	24
1190	410	14	37	53	3	1	1	-	14	-	34	1	109	49
1191	33	-	4	4	-	-	-	13	33	3	5	194	8	248
1192	218	11	21	14	-	4	-	1	4	-	-	-	50	5
1193	2,114	87	184	209	84	46	11	8	33	-	67	51	621	159
1194	55	-	3	12	-	-	-	-	7	-	-	34	15	41
1195	36	1	3	6	-	1	2	-	-	-	-	14	13	14
1196	10	-	1	1	-	-	-	-	-	-	-	3	2	3
1197	105	2	7	16	1	2	4	-	-	-	-	5	32	5
1198	28	-	2	5	-	-	2	-	-	-	-	7	9	7
1199	20	1	1	5	-	1	-	-	-	-	-	4	8	4
1200	51	-	-	-	4	5	2	-	-	-	-	3	11	3
1201	23	-	1	2	-	-	-	-	-	-	-	22	3	22
1202	578	-	-	-	42	61	26	-	4	-	58	791	129	853
1203	15	-	1	2	-	-	-	-	-	-	-	2	3	2
1204	571	22	58	21	26	16	5	3	9	-	-	1	148	13
1205	453	34	71	16	-	-	1	1	10	-	-	27	122	38
1206	1,517	67	97	70	81	86	31	4	76	15	236	26	432	357
1207	210	13	23	15	-	1	-	1	5	-	-	3	52	9
1208	2,900	56	137	192	82	135	55	5	85	-	3	21	657	114
1209	794	45	83	49	-	9	9	5	18	-	45	2	195	70
1210	1,045	33	111	109	9	8	-	1	10	-	38	4	270	53
1211	1,075	97	126	88	-	-	-	3	9	71	-	4	311	87
1212	245	10	19	35	-	-	-	3	60	-	-	67	64	130
1213	64	-	-	2	-	-	-	19	41	-	-	100	2	160
1214	135	2	4	20	-	-	-	28	11	-	-	116	26	155
1215	-	-	-	-	-	-	-	22	102	-	-	330	-	454
1216	-	-	-	-	-	-	-	42	67	7	-	254	-	370
1217	26	-	2	7	-	-	-	-	-	-	-	29	9	29
1218	68	-	5	15	-	-	-	-	-	-	-	16	20	16
1219	140	1	10	31	-	3	2	2	2	-	-	18	47	22

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1220	78	-	5	16	-	2	-	3	1	-	66	6	23	76
1221	29	-	2	6	-	-	-	-	-	-	-	6	8	6
1222	160	1	8	26	1	2	1	-	8	-	-	6	39	14
1223	152	1	8	26	1	2	1	7	1	-	-	12	39	20
1224	-	-	-	-	-	-	-	-	-	-	-	8	-	8
1225	129	1	9	30	-	1	3	-	-	-	-	23	44	23
1226	23	1	1	4	-	1	-	-	-	-	-	3	7	3
1227	64	1	4	12	-	1	1	-	-	-	-	11	19	11
1228	61	-	14	3	-	-	-	-	-	-	-	4	17	4
1229	66	-	17	5	-	-	-	-	12	-	-	3	22	15
1230	46	-	8	6	-	-	-	-	3	-	-	6	14	9
1231	386	5	26	14	8	5	5	-	206	-	-	29	63	235
1232	149	4	14	8	4	4	3	-	4	-	-	4	37	8
1233	18	-	3	3	-	-	-	-	2	-	-	1,047	6	1,049
1234	1,189	35	154	104	20	38	14	3	112	-	-	21	365	136
1235	1,523	30	138	77	36	31	25	7	27	-	113	36	337	183
1236	21	-	1	3	-	-	-	-	-	-	-	6	4	6
1237	87	7	10	6	-	-	-	1	4	-	-	80	23	85
1238	64	-	2	8	-	-	1	3	2	-	-	37	11	42
1239	131	1	4	13	1	1	1	1	1	-	-	9	21	11
1240	10	-	-	-	-	-	-	60	43	-	-	592	-	695
1241	-	-	-	-	-	-	-	4	56	-	24	889	-	973
1242	222	2	11	34	2	2	3	1	-	-	40	3	54	44
1243	38	-	4	9	-	-	-	-	-	-	-	13	13	13
1244	17	-	1	4	-	-	-	-	-	-	-	6	5	6
1245	46	-	2	8	-	-	-	-	-	-	-	6	10	6
1246	102	-	5	18	-	-	1	9	-	-	-	13	24	22
1247	37	1	3	8	-	1	1	-	1	-	-	8	14	9
1248	36	1	3	10	-	1	1	-	-	-	-	6	16	6
1249	60	-	3	12	-	-	1	-	1	-	-	121	16	122
1250	99	1	6	20	1	1	2	1	10	-	-	6	31	17
1251	49	-	2	8	-	-	1	1	-	-	-	4	11	5
1252	206	2	10	37	2	2	3	-	41	-	-	7	56	48
1253	90	-	5	20	-	-	-	-	3	-	-	28	25	31
1254	558	12	29	119	-	14	2	29	30	-	40	126	176	225
1255	132	3	14	34	-	-	-	5	1	-	-	24	51	30
1256	382	7	33	82	-	-	-	42	52	-	7	15	122	116
1257	365	7	32	74	-	-	-	-	14	-	111	5	113	130
1258	575	-	39	116	-	3	3	1	2	8	-	23	161	34
1259	224	6	22	51	-	-	-	3	75	-	55	1	79	134
1260	136	1	11	28	-	-	-	20	6	-	-	1	40	27
1261	81	1	4	16	-	1	1	-	3	-	-	5	23	8
1262	115	-	3	4	16	7	-	2	17	-	-	8	30	27
1263	100	-	12	6	7	7	3	1	11	-	-	20	35	32
1264	3	-	-	-	-	-	-	2	3	-	-	-	-	5
1265	-	-	-	1	-	-	-	-	-	-	-	-	1	-
1266	3	-	-	-	-	-	-	11	-	-	-	9	-	20
1267	-	-	-	-	-	-	-	5	13	-	-	-	-	18
1268	72	2	4	8	-	-	-	1	-	-	-	-	14	1
1269	4	-	1	1	-	-	-	-	-	-	-	-	2	-
1270	-	-	-	-	-	-	-	-	-	-	-	127	-	127
1271	9	-	-	3	-	-	-	-	-	-	-	3	3	3
1272	-	-	-	-	-	-	-	-	24	-	-	53	-	77
1273	86	7	9	6	-	-	-	25	47	-	-	124	22	196
1274	-	-	-	-	-	-	-	2	27	-	-	352	-	381
1275	-	-	-	-	-	-	-	-	4	483	-	134	-	621
1276	-	-	-	-	-	-	-	56	238	15	-	29	-	337
1277	-	-	-	-	-	-	-	14	54	-	-	92	-	161
1278	-	-	-	-	-	-	-	7	82	-	-	30	-	119
1279	201	-	16	21	86	38	4	1	47	-	-	68	165	116
1280	195	-	-	7	2	1	11	12	323	-	-	41	21	376
1281	224	-	-	1	3	3	1	-	240	-	-	5	8	245
1282	-	-	-	-	-	-	-	-	6	-	161	-	-	167
1283	78	-	-	9	5	3	3	9	70	-	-	11	20	90
1284	46	-	-	-	6	6	3	43	29	-	-	97	15	169
1285	175	-	-	-	-	-	-	9	3,780	-	-	5	-	3,794
1286	131	-	4	14	18	33	5	47	450	-	47	3	74	547
1287	-	-	-	-	-	-	-	13	-	-	-	-	-	13
1288	1,197	-	15	30	123	118	50	8	19	-	-	-	336	27
1289	443	19	5	35	20	22	13	-	16	-	-	2	114	18
1290	290	-	10	13	15	15	14	-	8	-	-	-	67	8
1291	-	-	-	-	-	-	-	10	1,097	159	4	1,156	-	2,426
1292	-	-	-	-	-	-	-	-	49	-	-	24	-	73
1293	-	-	-	-	-	-	-	6	124	-	-	164	-	294
1294	-	-	-	-	-	-	-	9	1	-	-	1	-	11
1295	21	-	-	-	-	-	-	38	109	-	17	14	-	178
1296	-	-	-	-	-	-	-	8	84	-	-	236	-	328
1297	3	-	-	-	1	-	-	69	475	991	526	7	1	2,069
1298	-	-	-	-	-	-	-	-	78	229	-	42	-	349
1299	1,699	-	-	-	10	1	-	4	96	588	238	9	11	935

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1300	-	-	-	-	-	-	-	18	13	-	-	-	-	31
1301	51	-	-	15	6	4	2	2	154	48	-	3	27	207
1302	-	-	-	-	-	-	-	-	58	1,170	770	30	-	2,028
1303	16	-	-	8	3	1	1	-	177	-	7	4	13	188
1304	-	-	-	-	-	-	-	1	17	549	-	5	-	572
1305	16	-	-	-	-	-	-	5	369	5	-	98	-	476
1306	-	-	-	-	-	-	-	-	4	79	1	39	-	123
1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1308	-	-	-	-	-	-	-	1	-	491	-	162	-	654
1309	-	-	-	-	-	-	-	5	1	20	-	371	-	397
1310	-	-	-	-	-	-	-	1	44	-	-	-	-	45
1311	-	-	-	-	-	-	-	15	19	-	-	22	-	56
1312	652	-	16	59	68	131	21	-	-	-	-	-	295	-
1313	-	-	-	-	-	-	-	5	1	-	-	66	-	71
1314	460	-	6	12	53	51	21	1	5	-	-	-	143	6
1315	114	8	-	12	5	5	2	2	3	-	-	-	32	5
1316	1,423	99	27	134	25	35	25	3	100	-	45	4	345	152
1317	321	-	10	13	15	15	14	-	-	-	-	28	67	28
1318	-	-	-	-	-	-	-	73	38	121	-	6	-	238
1319	-	-	-	-	-	-	-	3	94	-	-	59	-	155
1320	-	-	-	-	-	-	-	22	136	-	-	51	-	210
1321	41	-	-	-	10	9	5	23	62	4	-	18	25	107
1322	-	-	-	-	-	-	-	2	10	-	-	13	-	25
1323	-	-	-	-	-	-	-	6	66	-	-	29	-	101
1324	7	-	-	-	2	2	1	9	29	1	-	34	4	72
1325	-	-	-	-	-	-	-	4	3	-	-	17	-	24
1326	-	-	-	-	-	-	-	-	-	246	-	31	-	277
1327	209	-	-	-	172	16	3	33	255	739	-	73	191	1,100
1328	-	-	-	-	-	-	-	30	204	425	226	3	-	887
1329	164	-	-	-	132	12	2	56	238	15	-	19	146	327
1330	-	-	-	-	-	-	-	9	6	-	-	33	-	48
1331	-	-	-	-	-	-	-	21	97	-	-	37	-	155
1332	633	-	-	-	-	-	-	-	-	3,406	690	-	-	4,096
1333	4	-	-	-	1	-	-	13	171	1,821	-	19	1	2,024
1334	2	-	-	-	-	-	-	63	345	-	-	-	-	408
1335	-	-	-	-	-	-	-	38	447	29	-	-	-	514
1336	16	-	-	-	-	-	-	5	-	15	-	878	-	897
1337	10	-	1	1	-	-	-	6	32	51	-	147	2	236
1338	-	-	-	-	-	-	-	-	-	67	-	-	-	67
1339	-	-	-	-	-	-	-	2	-	-	-	185	-	187
1340	-	-	-	-	-	-	-	4	3	-	-	12	-	19
1341	419	25	26	30	-	-	-	32	45	-	-	72	81	149
1342	138	10	10	12	-	-	-	2	-	-	-	3	32	5
1343	1,021	48	81	139	18	15	7	2	31	-	-	1	308	34
1344	2,051	90	202	104	106	70	37	8	265	42	84	8	609	407
1345	370	19	41	-	18	7	3	35	25	5	-	-	88	65
1346	164	2	15	10	-	3	3	-	8	-	-	-	33	8
1347	46	-	-	-	6	6	3	34	23	-	-	78	15	135
1348	122	1	12	8	-	2	1	1	114	-	-	8	24	123
1349	316	1	11	6	-	3	1	8	51	3	-	-	22	62
1350	188	0	5	3	-	1	1	3	39	1	-	-	9	43
1351	8	-	-	-	-	-	-	-	-	-	-	39	-	39
1352	-	-	-	-	-	-	-	26	13	-	-	35	-	74
1353	3	-	-	-	-	-	-	16	26	-	-	330	-	372
1354	3	-	-	-	-	-	-	16	23	-	-	26	-	65
1355	-	-	-	-	-	-	-	1	6	-	-	248	-	255
1356	7	-	2	1	-	-	-	44	12	-	-	38	3	94
1357	34	-	6	4	-	1	-	2	4	270	-	60	11	336
1358	25	-	3	2	-	1	-	4	17	-	-	80	6	101
1359	30	-	4	3	-	1	-	84	121	-	-	1,367	8	1,572
1360	-	-	-	-	-	-	-	-	-	-	-	37	-	37
1361	813	2	55	214	-	-	-	-	-	-	-	3	271	3
1362	129	1	5	4	4	13	13	-	-	-	-	3	40	3
1363	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1364	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1365	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1366	4	-	-	-	-	-	-	-	-	-	-	2	-	2
1367	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1368	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1369	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1370	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1371	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1372	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1373	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1374	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1375	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1376	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1377	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1378	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1379	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1380	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1381	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1382	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1385	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1386	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1387	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1388	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1389	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1390	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1391	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1392	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1393	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1394	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1395	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1396	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1397	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1398	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1399	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1400	1,867	24	183	273	-	28	-	54	25	-	92	13	508	184
1401	1,353	37	51	80	50	58	22	12	9	-	-	-	298	21
1402	3,411	-	88	78	148	329	160	17	72	-	124	6	803	219
1403	376	4	37	27	8	10	8	2	17	-	-	-	94	19
1404	371	5	32	23	6	8	7	-	-	-	-	-	81	-
1405	1,295	11	71	63	47	69	47	16	11	-	-	5	308	32
1406	287	2	17	10	10	13	10	-	3	-	-	4	62	7
1407	815	11	30	48	30	52	18	79	196	-	-	507	189	782
1408	630	5	22	44	16	37	16	9	41	-	-	325	140	375
1409	3,351	36	135	433	69	165	175	2	69	-	-	15	1,013	86
1410	317	8	15	30	6	19	10	105	45	-	-	14	88	164
1411	319	3	15	33	10	38	15	1	34	-	-	3	114	38
1412	-	-	-	-	-	-	-	65	371	70	7	933	-	1,446
1413	1,058	11	56	125	34	43	38	1	10	-	89	1	307	101
1414	1,076	4	6	31	66	150	65	-	-	-	-	-	322	-
1415	3	-	-	1	-	-	-	-	-	-	-	3	1	3
1416	-	-	-	-	-	-	-	-	-	-	-	73	-	73
1417	29	-	2	9	-	-	-	3	15	-	-	3	11	21
1418	179	-	5	53	-	1	1	-	-	-	-	3	60	3
1419	162	-	4	49	-	-	-	-	1	-	-	2	53	3
1420	2,869	27	154	288	48	68	55	35	81	-	127	32	640	275
1421	639	32	55	86	-	2	-	84	29	-	-	99	175	212
1422	792	19	77	118	-	2	1	9	29	-	-	1	217	39
1423	3,134	67	180	384	14	40	38	42	35	-	-	7	723	84
1424	1,001	18	94	106	13	17	17	-	-	-	116	1	265	117
1425	1,029	11	101	113	16	20	19	29	36	-	-	40	280	105
1426	2,311	61	170	337	12	17	18	64	123	12	-	38	615	237
1427	1,366	-	106	214	-	3	7	57	2,029	707	239	3	330	3,035
1428	1,967	57	84	387	3	10	2	34	64	-	120	11	543	229
1429	4,757	82	230	179	229	233	80	60	34	-	-	12	1,033	106
1430	1,559	17	96	215	23	40	29	5	48	-	13	27	420	93
1431	4,065	62	108	253	170	217	65	158	297	2	23	16	875	496
1432	1,112	-	40	225	3	34	40	1	36	-	83	13	342	133
1433	1,341	26	47	113	75	96	27	191	39	-	-	8	384	238
1434	1,078	-	145	186	-	2	7	-	40	2	102	70	340	214
1435	1,979	3	41	132	48	215	117	10	282	-	-	6	556	298
1436	1,079	4	80	162	28	90	28	9	46	-	4	34	392	93
1437	1,849	6	48	150	53	251	133	51	73	-	-	189	641	313
1438	645	-	36	130	-	12	20	-	3	-	-	8	198	11
1439	2,504	12	58	150	245	272	58	181	217	-	-	105	795	503
1440	127	1	3	15	7	11	4	-	2	-	-	2	41	4
1441	667	6	15	63	17	27	9	2	3	-	-	-	137	5
1442	56	1	2	8	4	6	2	-	-	-	-	37	23	37
1443	173	-	5	57	-	1	1	-	55	-	-	1	64	56
1444	2,009	62	143	240	1	1	8	11	34	-	-	4	455	49
1445	1,932	34	229	149	3	25	10	28	25	-	-	521	450	574
1446	2,670	19	202	282	21	57	23	46	59	275	163	6	604	549
1447	2,585	17	126	175	83	107	42	10	15	-	91	25	550	141
1448	959	16	72	139	7	16	11	20	173	83	-	24	261	300
1449	3,082	38	57	57	176	199	86	20	153	300	23	1	613	497
1450	2,468	85	92	310	18	22	15	48	40	1	87	17	542	193
1451	2,915	37	233	269	66	63	61	-	19	1	4	2	729	26
1452	474	-	-	-	25	53	27	240	65	-	40	29	105	374
1453	1,481	-	-	-	109	231	115	-	19	-	103	2	455	124
1454	1,602	-	19	37	140	282	88	51	42	-	-	2	566	95
1455	1,689	9	80	8	456	310	31	-	259	-	652	1	894	912
1456	759	-	67	160	6	41	7	1	4	-	-	2	281	7
1457	391	4	24	86	4	6	5	-	5	-	332	3	129	340
1458	432	3	29	111	4	9	6	-	10	-	-	3	162	13
1459	439	2	28	106	3	10	5	30	34	-	10	9	154	83

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1460	313	3	24	87	3	6	5	-	6	-	-	18	128	24
1461	702	3	57	136	11	40	18	1	10	-	-	7	265	18
1462	404	-	39	125	-	-	-	-	4	-	-	36	164	40
1463	640	-	67	186	-	-	-	4	26	-	21	3	253	54
1464	216	-	23	62	-	-	-	-	8	-	-	15	85	23
1465	197	-	22	52	-	-	-	-	5	-	-	2	74	7
1466	16	-	2	6	-	-	-	-	2	-	-	3	8	5
1467	22	-	-	5	-	1	1	-	-	-	-	5	7	5
1468	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1469	-	-	-	-	-	-	-	-	-	-	-	395	-	395
1470	-	-	-	-	-	-	-	-	14	-	-	272	-	286
1471	-	-	-	-	-	-	-	-	36	-	-	406	-	442
1472	42	1	2	11	-	-	-	-	3	-	-	271	14	274
1473	2,156	63	101	279	17	20	25	13	142	-	-	182	505	337
1474	482	7	14	71	4	3	1	2	14	-	36	336	100	388
1475	1,730	59	98	164	37	45	35	16	15	-	80	11	438	122
1476	1,440	26	48	186	10	55	28	-	7	-	79	53	353	139
1477	2,766	29	221	287	35	40	42	3	24	-	92	11	654	130
1478	1,331	42	77	78	38	36	114	4	13	-	87	3	385	107
1479	732	4	34	117	3	9	13	5	11	-	-	2	180	18
1480	1,247	6	52	183	6	15	22	1	8	-	-	5	284	14
1481	343	4	28	95	3	8	11	-	4	-	35	3	149	42
1482	329	-	19	65	-	1	2	-	5	-	-	11	87	16
1483	79	1	6	18	-	-	-	-	-	-	-	3	25	3
1484	49	-	1	16	-	2	2	-	-	-	-	3	21	3
1485	27	-	-	6	-	1	1	-	-	-	-	3	8	3
1486	56	-	1	16	-	2	3	-	3	-	-	14	22	17
1487	13	-	2	5	-	-	-	2	-	-	-	3	7	5
1488	16	-	1	4	-	-	-	-	-	-	-	3	5	3
1489	11	-	-	-	-	1	-	62	104	-	9	829	1	1,004
1490	4	-	-	-	-	-	-	85	60	-	-	242	-	387
1491	700	45	53	51	4	18	9	1	14	-	-	33	180	48
1492	-	-	-	-	-	-	-	23	40	-	9	1,180	-	1,252
1493	-	-	-	-	-	-	-	-	-	-	-	46	-	46
1494	-	-	-	-	-	-	-	13	139	6	-	635	-	793
1495	6	-	-	2	-	-	-	-	38	-	-	205	2	243
1496	96	-	8	16	-	-	1	8	-	-	-	69	25	77
1497	9	-	1	3	-	-	-	-	-	-	-	26	4	26
1498	96	-	2	4	-	-	-	-	86	-	-	16	6	102
1499	28	-	-	8	-	1	1	-	-	-	-	3	10	3
1500	1	-	-	1	-	-	-	-	8	-	43	3	1	54
1501	19	-	-	4	-	-	-	-	-	-	-	3	4	3
1502	13	-	2	2	-	-	-	-	-	-	-	3	4	3
1503	34	-	1	7	-	-	-	5	-	-	-	26	8	31
1504	132	-	11	33	-	-	1	-	7	-	-	108	45	115
1505	2	-	-	-	-	-	-	1	-	-	-	3	-	4
1506	8	-	-	-	1	1	-	-	-	-	-	3	2	3
1507	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1508	317	5	8	10	15	18	10	115	186	-	-	298	66	599
1509	-	-	-	-	-	-	-	1	4	-	-	53	-	58
1510	82	-	3	4	1	2	1	2	-	-	-	147	11	149
1511	35	-	3	6	-	-	-	132	69	-	-	1,744	9	1,945
1512	773	29	45	119	-	10	-	2	36	-	54	46	203	138
1513	90	-	10	20	-	-	-	-	-	-	-	14	30	14
1514	67	-	5	11	-	-	-	-	-	-	-	51	16	51
1515	69	-	6	12	-	-	-	-	-	-	-	36	18	36
1516	104	-	9	28	-	-	2	-	2	-	-	18	39	20
1517	100	-	8	25	-	-	-	-	-	-	-	59	33	59
1518	81	2	3	4	6	7	4	1	16	-	-	77	26	94
1519	53	2	2	4	5	6	4	-	11	-	-	6	23	17
1520	9	-	1	3	-	-	-	-	-	-	-	2	4	2
1521	16	-	2	5	-	-	-	12	40	-	-	145	7	197
1522	56	-	6	10	-	-	-	7	15	-	-	245	16	267
1523	45	-	5	11	-	-	-	11	9	-	-	116	16	136
1524	46	-	5	10	-	-	-	-	-	-	-	140	15	140
1525	1	-	-	1	-	-	-	-	-	-	-	16	1	16
1526	108	-	6	21	1	1	1	2	-	-	-	157	30	159
1527	146	-	8	31	-	1	1	-	25	-	-	56	41	81
1528	-	-	-	-	-	-	-	-	50	-	-	92	-	142
1529	-	-	-	-	-	-	-	248	3	-	-	9	-	260
1530	104	2	3	4	6	7	4	1	-	-	-	10	26	11
1531	147	6	10	12	18	22	12	-	2	-	-	-	80	2
1532	16	-	-	1	1	1	1	5	9	-	-	360	4	374
1533	12	-	1	3	-	-	-	10	-	-	-	22	4	32
1534	29	-	2	3	-	-	-	-	-	-	-	3	5	3
1535	549	-	7	20	54	77	33	13	199	6,585	-	1	191	6,798
1536	-	-	-	-	-	-	-	11	62	-	-	228	-	301
1537	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1538	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1539	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1540	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1541	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1542	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1543	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1544	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1545	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1546	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1547	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1548	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1549	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1550	984	5	82	242	-	-	-	10	30	-	-	3	329	43
1551	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1552	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1553	205	1	15	46	-	-	-	3	42	-	-	1	62	46
1554	184	1	17	51	-	-	1	7	7	-	-	10	70	24
1555	952	1	67	258	-	7	7	1	29	-	57	11	340	98
1556	374	2	27	107	-	6	4	2	1	-	-	2	146	5
1557	-	-	-	-	-	-	-	3	116	-	-	-	-	119
1558	79	-	4	18	-	1	2	1	7	-	-	8	25	16
1559	64	-	3	14	-	1	1	-	-	-	-	3	19	3
1560	3	-	-	1	-	-	-	-	2	-	-	2	1	4
1561	26	-	1	7	-	1	1	-	-	-	-	1	10	1
1562	50	-	4	4	1	3	2	8	10	-	-	1	14	19
1563	2	-	-	1	-	-	-	-	-	-	-	3	1	3
1564	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1565	-	-	-	-	-	-	-	-	2	-	-	1	-	3
1566	-	-	-	-	-	-	-	-	1	-	-	22	-	23
1567	144	-	7	32	-	2	6	-	-	-	-	2	47	2
1568	61	-	2	12	-	1	2	-	-	-	-	1	17	1
1569	99	-	7	24	-	2	-	-	-	-	-	3	33	3
1570	184	2	12	43	-	3	2	-	1	-	-	3	62	4
1571	27	-	2	4	2	1	1	1	5	-	-	79	10	85
1572	5	-	-	2	-	-	-	-	3	144	-	28	2	175
1573	62	1	3	6	-	1	2	-	-	-	-	3	13	3
1574	68	1	4	10	-	1	2	-	-	-	-	3	18	3
1575	89	2	5	11	-	1	3	-	1	-	-	55	22	56
1576	67	1	4	8	-	1	3	-	-	-	-	20	17	20
1577	523	10	30	65	2	6	17	3	8	-	-	16	130	27
1578	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1579	68	1	3	9	-	2	1	-	-	-	-	3	16	3
1580	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1581	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1582	-	-	-	-	-	-	-	6	273	-	535	173	-	987
1583	32	-	2	6	-	3	2	34	225	-	2	84	13	345
1584	-	-	-	-	-	-	-	2	9	-	-	177	-	188
1585	-	-	-	-	-	-	-	-	1	-	-	121	-	122
1586	197	1	10	32	-	2	4	3	8	-	-	73	49	84
1587	54	-	5	11	-	-	1	-	-	-	-	3	17	3
1588	2,617	-	20	22	236	383	256	196	969	3	18	64	917	1,250
1589	1,641	9	162	417	-	-	-	3	36	-	-	8	588	47
1590	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1591	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1592	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1593	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1594	1,116	1	67	277	5	55	39	1	11	-	59	8	444	79
1595	619	-	30	119	2	25	17	4	7	-	-	7	193	18
1596	-	-	-	-	-	-	-	184	124	-	-	324	-	632
1597	-	-	-	-	-	-	-	-	-	-	-	51	-	51
1598	11	-	-	-	-	1	-	21	-	-	-	92	1	113
1599	6	-	-	-	-	1	-	-	-	-	-	2	1	2
1600	98	3	3	4	6	8	4	-	1	-	-	30	28	31
1601	-	-	-	-	-	-	-	-	31	-	-	186	-	217
1602	3	-	-	-	-	1	-	-	-	-	-	9	1	9
1603	20	-	3	8	-	-	-	-	4	-	-	3	11	7
1604	44	-	2	6	-	-	1	-	19	-	-	1	9	20
1605	21	-	2	5	-	-	-	1	25	-	-	17	7	43
1606	303	7	30	16	8	7	5	4	43	-	-	27	73	74
1607	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1609	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1611	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1612	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1613	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1615	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1616	605	-	55	69	18	25	26	5	39	-	-	6	193	50
1617	1,809	-	71	151	71	177	120	54	75	-	31	43	590	203
1618	1,919	53	84	210	28	67	69	21	71	-	83	3	511	178
1619	852	9	9	71	15	32	15	19	80	-	24	589	151	712

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1620	-	-	-	-	-	-	-	150	323	232	9	2,098	-	2,812
1621	2	-	-	1	-	-	-	4	38	-	-	35	1	77
1622	3	-	-	1	-	-	-	-	1	-	-	3	1	4
1623	-	-	-	-	-	-	-	-	-	-	-	32	-	32
1624	6	-	-	1	-	-	-	-	-	-	-	163	1	163
1625	13	-	1	4	-	-	-	1	1	-	70	1	5	73
1626	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1627	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1628	762	4	56	120	14	49	22	104	117	-	-	28	265	249
1629	206	-	19	61	-	-	-	-	78	-	-	7	80	85
1630	174	1	13	37	-	-	-	-	-	-	-	3	51	3
1631	852	4	61	200	-	-	-	2	2	-	-	3	265	7
1632	711	7	49	151	-	-	-	16	7	122	-	2	207	147
1633	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1634	16	-	1	1	-	-	-	-	-	-	-	3	2	3
1635	23	-	3	6	-	-	-	-	-	-	-	64	9	64
1636	21	-	-	6	-	1	1	-	-	-	-	12	8	12
1637	12	-	-	5	-	1	1	1	-	-	-	3	7	4
1638	57	-	1	14	-	2	2	-	-	-	-	3	19	3
1639	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1640	126	1	8	26	-	2	3	2	3	-	-	30	40	35
1641	189	1	10	36	1	3	4	-	-	-	-	3	55	3
1642	201	2	11	40	2	3	5	-	1	12	100	3	63	116
1643	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1644	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1645	22	-	2	5	-	-	-	-	2	-	-	7	7	9
1646	40	-	-	9	-	1	1	-	-	-	-	265	11	265
1647	15	-	-	5	-	1	1	-	-	-	-	3	7	3
1648	23	-	-	8	-	1	1	-	190	-	-	4	10	194
1649	34	-	-	7	-	1	1	-	16	-	-	11	9	27
1650	65	-	1	9	3	5	1	-	-	-	-	5	19	5
1651	68	2	2	10	4	8	2	-	1	-	-	4	28	5
1652	119	1	2	14	5	11	4	2	-	-	-	2	37	4
1653	-	-	-	-	-	-	-	-	-	-	-	6	-	6
1654	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1655	-	-	-	-	-	-	-	-	-	-	-	23	-	23
1656	25	-	2	6	-	-	-	-	-	-	-	24	8	24
1657	36	-	2	8	-	-	1	1	-	-	-	3	11	4
1658	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1659	32	-	3	9	-	-	1	-	-	-	-	3	13	3
1660	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1661	44	-	2	8	-	-	1	1	-	-	-	3	11	4
1662	13	-	1	3	-	-	-	1	-	-	-	3	4	4
1663	24	-	2	5	-	-	-	-	24	-	-	5	7	29
1664	26	-	2	5	-	-	-	-	-	-	-	3	7	3
1665	3	-	-	1	-	-	-	-	-	-	-	3	1	3
1666	5	-	1	2	-	-	-	-	-	-	-	3	3	3
1667	85	-	2	27	-	-	-	-	-	-	-	2	29	2
1668	-	-	-	-	-	-	-	1	-	-	-	4	-	5
1669	78	-	2	23	-	-	-	-	-	-	-	3	25	3
1670	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1671	11	-	-	4	-	-	-	-	-	-	-	3	4	3
1672	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1673	7	-	-	3	-	-	-	-	-	-	-	3	3	3
1674	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1675	119	-	3	35	-	-	-	-	-	-	-	17	38	17
1676	43	-	1	13	-	-	-	1	3	-	-	-	14	4
1677	17	-	1	6	-	-	-	-	-	-	-	6	7	6
1678	9	-	-	2	-	-	-	-	-	-	-	3	2	3
1679	91	-	4	28	-	1	3	-	-	-	3	11	36	14
1680	153	-	6	41	-	3	3	-	25	-	74	15	53	114
1681	8	-	-	2	-	-	-	-	7	-	-	4	2	11
1682	47	-	2	12	-	1	1	2	1	-	-	15	16	18
1683	67	-	2	20	-	1	1	2	4	-	-	13	24	19
1684	39	-	2	12	-	1	1	-	9	-	-	8	16	17
1685	9	-	-	3	-	-	-	-	-	-	-	3	3	3
1686	7	-	-	2	-	-	-	-	-	-	-	3	2	3
1687	23	-	1	7	-	-	-	-	-	-	-	2	8	2
1688	23	-	-	6	-	-	-	-	-	-	-	2	6	2
1689	42	-	1	11	-	-	-	1	-	-	-	5	12	6
1690	50	-	2	17	-	-	-	-	-	-	-	3	19	3
1691	-	-	-	-	-	-	-	1	4	11	-	4	-	20
1692	210	-	5	58	-	1	1	-	-	-	-	2	65	2
1693	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1694	-	-	-	2	-	-	-	-	-	-	-	4	2	4
1695	6	-	-	1	-	-	-	-	-	-	-	8	1	8
1696	37	-	1	14	-	-	-	-	2	-	-	6	15	8
1697	17	-	-	5	-	-	-	-	-	-	-	2	5	2
1698	-	-	-	-	-	-	-	-	30	-	-	3	-	33
1699	62	-	1	19	-	-	-	-	3	-	-	85	20	88

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1700	121	-	3	35	-	-	-	-	6	-	-	4	38	10
1701	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1702	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1703	-	-	-	-	-	-	-	129	128	-	3	1,507	-	1,767
1704	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1705	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1706	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1707	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1708	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1709	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1710	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1711	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1712	861	-	-	-	-	-	-	13	69	-	3,402	60	-	3,544
1713	8	-	1	1	-	2	1	-	-	-	-	-	5	-
1714	375	-	24	93	-	3	2	2	20	-	-	8	122	30
1715	457	1	28	107	-	5	3	1	15	-	-	46	144	62
1716	794	3	52	202	-	10	6	-	5	-	-	-	273	5
1717	22	-	-	8	-	-	-	1	12	-	-	11	8	24
1718	43	-	-	12	-	-	-	2	7	-	-	5	12	14
1719	-	-	-	-	-	-	-	-	-	-	-	54	-	54
1720	24	-	1	3	-	-	1	-	6	-	-	3	5	9
1721	164	3	8	26	-	6	2	1	2	-	-	63	45	66
1722	1,030	5	37	259	-	-	-	2	1	-	-	2	301	5
1723	524	-	26	122	1	12	21	-	2	-	-	3	182	5
1724	42	-	2	8	-	1	1	3	-	-	-	2	12	5
1725	742	-	12	209	-	-	-	-	52	-	49	28	221	129
1726	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1727	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1728	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1729	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1730	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1731	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1733	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1734	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1735	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1736	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1737	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1738	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1739	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1740	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1741	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1742	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1743	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1744	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1745	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1746	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1747	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1748	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1749	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1750	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1751	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1752	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1753	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1754	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1755	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1756	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1757	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1759	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1760	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1761	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1762	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1763	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1764	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1765	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1766	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1767	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1768	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1769	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1770	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1771	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1772	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1773	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1774	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1775	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1776	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1777	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1778	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1779	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

BASE YEAR CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1780	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1781	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1782	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1783	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1784	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1785	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1786	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1787	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1788	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1789	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1790	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1791	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1792	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1793	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1794	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1795	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1796	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1797	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1798	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1799	393	4	4	106	-	-	3	2	3	-	-	32	117	37
1800	81	-	5	27	-	-	1	1	9	-	-	2	33	12
1801	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1802	20	-	2	8	-	-	-	-	4	-	-	4	10	8
1803	69	1	1	26	-	-	1	-	1	-	-	3	29	4
1804	37	-	1	12	-	-	-	2	-	-	-	15	13	17
1805	47	-	-	16	-	-	-	-	7	-	-	4	16	11
1806	-	-	-	-	-	-	-	-	-	-	-	6	-	6
1807	-	-	-	-	-	-	-	-	3	-	-	3	-	6
1808	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1809	40	1	1	15	-	-	-	-	-	-	-	3	17	3
1810	2	-	-	1	-	-	-	-	-	-	-	6	1	6
1811	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1812	45	1	1	17	-	-	-	2	7	-	-	4	19	13
1813	1,207	-	-	324	-	-	-	1	31	-	-	8	324	40
1814	1,670	-	52	473	-	-	-	-	7	-	-	3	525	10
1815	893	-	41	233	-	-	-	1	3	-	-	14	274	18
1816	392	-	19	109	-	-	-	-	8	-	-	1	128	9
1817	823	-	-	233	-	18	12	-	1	-	-	25	263	26
1818	163	-	3	57	-	-	3	1	5	-	-	35	63	41
1819	116	-	2	34	-	-	2	-	-	-	-	6	38	6
1820	1,353	-	-	451	-	-	-	-	7	-	-	1	451	8
1821	95	-	2	34	-	-	2	1	2	-	55	2	38	60
1822	273	-	13	71	-	-	-	-	2	-	74	7	84	83
1823	756	-	-	253	-	-	-	-	1	-	-	1	253	2
1824	293	-	-	97	-	-	-	-	-	-	-	1	97	1
1825	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1826	303	-	15	86	-	-	-	-	-	-	-	2	101	2
1827	1,074	-	54	304	-	-	-	-	-	-	-	-	358	-
1828	33	-	1	6	-	1	1	-	-	-	-	9	9	9
1829	74	1	3	23	-	1	-	1	4	-	-	17	28	22
1830	154	1	4	37	-	1	-	-	9	-	-	2	43	11
1831	-	-	-	1	-	-	-	-	4	-	-	1	1	5
1832	-	-	-	3	-	-	-	-	-	-	-	119	3	119
1833	109	1	2	16	-	1	-	-	-	-	-	5	20	5
1834	137	2	4	32	1	1	-	1	5	-	-	19	40	25
1835	111	2	5	35	1	1	-	-	-	-	-	8	44	8
1836	120	2	4	33	1	1	-	1	-	-	-	2	41	3
1837	245	2	12	63	-	1	1	-	2	-	-	54	79	56
1838	-	-	-	1	-	-	-	-	-	-	-	1	1	1
1839	-	-	-	2	-	-	-	-	-	-	-	2	2	2
1840	54	-	3	14	-	-	-	-	-	-	-	2	17	2
1841	68	-	3	14	-	-	-	-	-	-	-	11	17	11
1842	68	1	4	23	-	-	1	-	-	-	-	6	29	6
1843	199	1	10	50	-	-	1	-	10	-	-	4	62	14
1844	201	1	10	50	-	-	-	2	1	-	-	-	61	3
1845	18	-	1	6	-	-	-	-	3	-	-	2	7	5
1846	175	1	8	48	-	1	1	-	2	-	-	12	59	14
1847	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1848	271	2	13	70	-	1	2	-	1	-	-	9	88	10
1849	-	-	-	-	-	-	-	-	3	-	-	1	-	4
1850	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1851	21	-	1	7	-	-	-	-	-	-	-	3	8	3
1852	1,740	-	100	377	50	52	50	-	33	-	-	15	629	48
TOTAL	**852,949**	**8,584**	**49,556**	**131,511**	**15,762**	**38,547**	**23,960**	**34,656**	**107,584**	**30,852**	**37,961**	**121,312**	**267,920**	**332,365**

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
100	1,292	14	65	265	-	4	17	-	-	-	-	544	365	544
101	591	-	19	60	3	28	23	-	-	-	-	443	133	443
102	17	-	1	4	-	-	-	-	-	-	-	173	5	173
103	24	-	-	3	-	-	-	2	-	-	-	484	3	486
104	377	2	4	44	-	14	17	-	-	-	-	165	81	165
105	40	1	1	7	-	-	1	-	2	-	-	193	10	195
106	4	-	-	2	-	-	-	-	-	-	-	56	2	56
107	5	-	-	-	-	-	-	12	1	-	-	73	-	86
108	15	-	-	1	-	-	-	-	-	-	-	105	1	105
109	95	-	3	12	-	6	4	-	-	3	35	221	25	259
110	171	-	6	19	-	9	8	18	-	-	-	720	42	738
111	486	14	13	84	3	7	14	1	6	8	-	562	135	577
112	90	-	3	24	-	-	-	-	-	-	-	109	27	109
113	20	1	-	2	-	-	1	83	13	-	-	247	4	343
114	18	1	-	2	-	-	-	-	-	-	-	30	3	30
115	51	1	-	3	-	1	1	-	-	-	-	152	6	152
116	177	5	1	13	1	2	3	-	-	-	-	502	25	502
117	13	-	-	1	-	-	-	-	-	-	-	270	1	270
118	75	4	-	6	-	2	2	2	-	-	-	527	14	529
119	-	-	-	-	-	-	-	10	-	-	-	59	-	69
120	24	-	1	4	-	1	1	-	-	8	-	127	7	135
121	107	5	2	10	2	2	3	-	-	-	-	98	24	98
122	-	-	-	-	-	-	-	-	-	-	-	24	-	24
123	-	-	-	-	-	-	-	-	-	-	43	30	-	73
124	124	-	8	26	-	4	4	1	-	-	-	409	42	410
125	21	2	1	3	-	-	-	-	-	-	-	155	6	155
126	66	4	2	6	-	-	-	-	-	-	-	256	12	256
127	482	21	15	36	-	-	3	-	-	-	-	408	75	408
128	156	9	5	13	-	-	-	-	-	-	-	286	27	286
129	147	9	-	28	-	3	3	-	1	-	-	274	43	275
130	21	1	-	6	-	-	-	1	1	-	-	84	7	86
131	320	19	-	51	1	7	7	-	3	-	-	171	85	174
132	15	2	-	5	-	-	-	-	-	-	-	31	7	31
133	55	4	-	5	-	-	-	-	-	-	-	212	9	212
134	131	6	5	11	-	-	1	-	-	-	-	235	23	235
135	101	6	-	14	-	2	2	-	-	-	-	254	24	254
136	764	-	61	161	-	-	-	23	10	9	106	24	222	172
137	108	-	6	21	-	1	1	-	-	6	-	103	29	109
138	-	-	-	-	-	-	-	-	-	-	-	11	-	11
139	141	-	8	27	-	1	1	1	-	-	-	154	37	155
140	14	-	-	4	-	-	-	-	-	-	-	39	4	39
141	45	-	2	9	-	-	-	25	-	-	-	108	11	133
142	390	21	16	38	-	1	4	-	-	-	35	304	80	339
143	2	-	-	1	-	-	-	-	-	-	-	76	1	76
144	583	-	18	69	3	13	23	16	153	-	35	136	126	340
145	38	-	-	5	-	-	-	-	-	-	-	271	5	271
146	125	-	6	22	-	-	-	-	-	-	-	330	28	330
147	199	-	7	28	-	3	3	4	-	-	20	235	41	259
148	11	-	-	2	-	-	-	-	3	-	-	36	2	39
149	241	-	6	22	1	4	7	2	-	-	-	234	40	236
150	617	-	20	80	3	14	28	2	-	-	-	1,246	145	1,248
151	217	-	6	22	-	4	7	4	-	-	-	517	39	521
152	-	-	-	-	-	-	-	9	12	-	0	1,248	-	1,270
153	57	1	3	10	-	1	1	24	41	-	5	612	16	682
154	93	1	3	11	-	1	1	-	2	-	-	28	17	30
155	57	-	3	8	-	-	-	2	18	-	-	2	11	22
156	305	5	13	58	-	6	3	-	4	-	69	13	85	86
157	2,037	52	72	133	64	81	46	16	69	-	84	12	448	182
158	1,288	14	125	93	25	34	28	22	56	5	-	3	319	86
159	91	-	4	7	4	7	4	16	104	-	-	349	26	469
160	4,145	21	106	508	81	161	81	50	46	34	-	7	958	137
161	3	-	-	1	-	-	-	17	-	-	-	50	1	67
162	337	-	8	39	8	16	7	91	124	64	105	108	78	492
163	48	-	3	5	3	6	3	10	24	-	-	48	20	82
164	323	2	9	47	3	10	7	22	11	8	-	178	78	219
165	1,038	2	36	146	11	39	23	11	1	-	-	19	257	31
166	950	15	78	152	-	23	22	7	23	8	319	20	290	377
167	7	-	-	1	-	-	-	-	-	-	-	3	1	3
168	-	-	-	-	-	-	-	-	-	-	-	10	-	10
169	1,397	7	54	74	32	60	43	26	114	-	103	72	269	316
170	525	-	12	71	-	-	-	-	23	-	-	5	83	28
171	2,382	45	103	221	40	98	45	19	10	-	-	87	552	116
172	1,347	-	29	163	18	50	64	43	52	4	136	-	324	235
173	962	43	16	122	16	16	24	90	51	38	88	75	237	342
174	1,007	16	27	94	57	25	-	1	3	-	-	-	219	4
175	1,776	52	83	160	77	35	37	34	15	8	-	14	444	71
176	819	7	32	68	22	54	25	32	96	-	-	67	207	196
177	440	14	24	51	6	20	14	18	18	1	13	4	129	54
178	1,726	15	80	170	53	199	78	21	24	-	42	70	595	157
179	360	1	21	47	12	14	13	-	8	-	-	4	108	12
180	2,171	14	75	251	19	55	37	35	43	16	112	19	451	225
181	726	6	24	87	6	19	13	19	10	-	-	46	155	75
182	969	-	22	58	31	57	35	2	23	50	-	10	203	85
183	588	-	-	-	40	89	51	139	117	5	24	44	180	331
184	546	1	12	20	30	67	40	103	87	4	19	35	170	249
185	20	-	1	4	-	-	-	16	74	-	-	112	5	202
186	344	4	27	64	3	4	1	37	113	-	-	210	103	359
187	185	3	14	35	2	4	1	-	2	-	-	-	60	2
188	915	-	60	238	-	-	-	-	-	-	-	15	298	15
189	529	-	26	148	-	-	-	-	24	-	-	12	174	36
190	36	-	1	8	-	-	-	-	-	-	-	3	9	3
191	-	-	-	-	-	-	-	-	-	-	-	1	-	1

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
192	70	-	8	23	-	-	-	-	1	-	-	1	31	2
193	29	-	1	4	-	-	-	-	-	-	-	1	5	1
194	17	-	1	3	-	0	1	13	217	-	-	124	5	354
195	2,145	12	85	252	-	62	118	-	119	-	-	21	529	140
196	-	-	-	-	-	-	-	-	-	-	-	-	-	-
197	-	-	-	-	-	-	-	-	2	389	-	15	-	406
198	2,754	8	47	106	150	338	193	-	-	-	-	1	843	1
199	3,584	-	-	-	242	544	311	660	628	29	205	363	1,097	1,885
200	68	1	4	17	-	1	2	-	-	-	-	134	25	134
201	270	1	10	25	4	11	21	-	-	25	-	901	72	926
202	503	1	16	38	9	18	34	-	-	-	-	495	116	495
203	-	-	-	-	-	-	-	-	-	-	-	9	-	9
204	248	-	36	13	-	3	10	-	-	-	23	603	62	626
205	583	1	45	16	-	5	11	8	99	4	-	544	78	655
206	359	1	45	17	-	6	10	-	296	-	-	403	79	699
207	32	-	7	1	-	-	1	-	-	-	-	410	9	410
208	51	-	2	4	1	2	3	121	44	-	-	62	12	227
209	118	-	5	10	1	6	9	-	-	-	-	141	31	141
210	83	-	14	4	-	-	2	-	-	-	-	230	20	230
211	384	2	52	17	-	5	12	-	3	-	-	258	88	261
212	69	-	5	2	-	-	1	-	-	-	-	531	8	531
213	26	-	2	6	-	-	1	-	-	-	-	-	9	-
214	179	1	7	22	-	1	3	2	-	-	-	7	34	9
215	98	-	5	9	2	5	8	-	3	-	-	204	29	207
216	422	-	-	-	-	-	-	-	2	-	50	8	-	60
217	33	-	1	9	-	1	1	-	-	-	-	7	12	7
218	267	-	16	29	-	11	10	1	273	-	-	20	66	294
219	137	-	1	10	1	2	10	76	9	15	-	305	24	405
220	-	-	-	-	-	-	-	-	370	-	-	41	-	411
221	38	-	-	2	1	1	2	12	2	-	-	896	6	910
222	5	-	-	1	-	-	-	-	-	-	-	183	1	183
223	584	-	-	35	28	29	39	-	2	-	-	65	131	67
224	186	-	-	-	16	11	13	4	2	3	-	128	40	137
225	142	-	-	7	6	6	7	-	115	-	-	287	26	402
226	22	-	-	1	1	1	1	-	-	-	-	385	4	385
227	694	6	36	122	2	6	19	5	11	2	-	471	191	489
228	6	-	-	2	-	-	-	-	3	1,285	-	189	2	1,477
229	4,583	-	-	3	3	3	4	-	2	-	-	165	13	167
230	-	-	-	-	-	-	-	-	-	-	-	86	-	86
231	48	-	-	3	3	3	3	-	-	-	-	135	12	135
232	16	0	1	3	-	-	-	32	105	-	-	186	5	323
233	1,500	-	-	-	101	228	130	694	382	174	234	27	459	1,511
234	2,393	2	10	26	152	342	196	143	95	38	216	11	728	503
235	-	-	-	-	-	-	-	4	5	1	0	3	-	13
236	-	-	-	-	-	-	-	336	137	28	8	23	-	533
237	1,110	2	21	56	59	134	77	392	105	11	46	26	349	580
238	-	-	-	-	-	-	-	774	233	21	11	61	-	1,100
239	852	1	50	198	-	4	2	-	2	-	-	9	255	11
240	402	1	28	91	-	3	1	-	13	-	-	-	124	13
241	61	0	6	20	-	-	-	-	12	-	-	2	26	14
242	-	-	-	-	-	-	-	52	43	1	1	38	-	135
243	994	1	13	86	48	107	62	2	-	-	-	26	317	28
244	-	-	-	-	-	-	-	1	-	-	-	16	-	17
245	-	-	-	-	-	-	-	-	-	-	-	19	-	19
246	-	-	-	-	-	-	-	-	-	-	-	1	-	1
247	-	-	-	-	-	-	-	-	-	-	-	1	-	1
248	-	-	-	-	-	-	-	-	-	-	-	1	-	1
249	-	-	-	1	-	-	-	-	-	-	-	2	1	2
250	948	-	110	241	-	-	-	2	34	-	1	3	351	40
251	659	19	30	109	3	25	7	134	32	-	595	2	193	763
252	1,868	2	102	185	21	94	95	1	73	8	-	16	499	98
253	1,437	29	76	316	-	29	21	67	82	-	150	5	471	304
254	571	21	36	110	-	9	-	167	258	354	28	109	176	916
255	1,808	2	121	189	53	168	80	21	72	29	-	48	613	170
256	1,430	15	35	183	94	140	41	64	12	-	-	4	508	80
257	1,670	47	68	254	3	78	24	47	21	3	-	54	474	125
258	351	1	9	94	-	8	9	-	1	-	-	40	121	41
259	-	-	-	-	-	-	-	-	-	-	-	-	-	-
260	119	-	-	9	7	7	10	26	4	45	-	6	33	81
261	2,362	9	35	126	111	144	64	1	46	-	42	58	489	147
262	1,981	19	63	189	73	49	57	19	9	-	-	5	450	33
263	1,614	17	55	173	44	28	34	26	64	2	91	249	351	432
264	292	-	15	72	-	-	10	-	1	-	-	24	97	25
265	103	2	3	26	1	1	-	-	-	-	-	4	33	4
266	41	1	1	11	-	-	-	-	-	-	-	2	13	2
267	104	1	5	27	-	-	1	-	1	-	-	1	34	2
268	5	-	-	2	-	-	-	-	-	-	-	1	2	1
269	61	1	3	17	-	-	-	-	4	-	-	10	21	14
270	3	-	-	2	-	-	-	-	-	-	-	2	2	2
271	6	-	-	2	-	-	-	-	-	-	-	2	2	2
272	42	-	-	18	-	-	-	-	-	-	-	6	18	6
273	-	-	-	-	-	-	-	-	-	-	-	1	-	1
274	-	-	-	-	-	-	-	-	-	-	-	2	-	2
275	309	-	17	44	-	6	6	-	17	-	-	89	73	106
276	821	-	36	191	-	-	8	19	11	-	67	245	235	342
277	70	-	6	14	-	1	1	-	2	-	-	30	22	32
278	259	-	29	49	-	5	8	1	6	-	-	150	91	157
279	146	-	15	26	-	3	3	-	13	-	-	34	47	47
280	208	5	25	60	-	1	1	-	9	-	-	60	92	69
281	270	3	22	53	-	-	-	-	4	-	-	97	78	101
282	87	-	9	17	-	-	2	-	1	-	-	52	28	53
283	92	2	9	19	-	-	-	-	1	-	134	26	30	161

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
284	149	-	15	36	1	-	5	-	16	-	-	141	57	157
285	281	-	27	58	-	-	9	3	44	-	-	77	94	124
286	107	-	9	21	-	-	3	2	-	-	-	28	33	30
287	197	-	11	33	-	2	2	-	23	-	-	241	48	264
288	409	-	28	72	-	7	7	-	-	-	-	108	114	108
289	111	-	7	19	-	4	4	-	1	-	-	27	34	28
290	256	1	15	46	-	8	8	130	7	4	-	28	78	169
291	103	-	3	12	3	5	3	-	-	-	-	29	26	29
292	134	2	6	18	3	6	3	66	23	-	-	43	38	132
293	186	-	19	39	-	4	3	2	5	-	-	59	65	66
294	107	1	9	21	-	3	1	1	6	-	-	49	35	56
295	123	-	13	27	-	4	4	1	4	-	-	50	48	55
296	105	-	11	21	-	2	-	2	1	-	-	25	34	28
297	1,371	-	34	118	6	106	57	1	5	16	-	560	321	582
298	274	2	16	54	-	5	5	8	2	-	-	9	82	19
299	83	-	5	27	-	-	-	-	-	2	-	29	32	31
300	2,280	38	89	290	44	81	42	2	9	-	-	55	584	66
301	150	2	7	21	3	8	3	1	3	-	-	33	44	37
302	534	16	19	80	-	15	13	5	4	-	-	152	143	161
303	109	-	11	22	-	1	1	-	2	-	-	181	35	183
304	480	15	21	77	-	15	13	2	81	-	-	41	141	124
305	109	-	11	22	-	3	-	-	12	-	35	39	36	86
306	53	2	2	10	-	2	2	-	-	-	-	28	18	28
307	64	2	3	11	-	2	2	-	1	-	-	25	20	26
308	127	-	2	12	-	11	5	-	1	-	-	429	30	430
309	304	-	8	29	1	26	12	2	-	-	-	302	76	304
310	100	-	2	9	-	1	2	-	-	-	-	57	14	57
311	65	-	4	10	-	1	4	-	-	-	-	158	19	158
312	829	13	23	140	-	8	32	22	8	-	-	504	216	534
313	408	5	15	72	-	4	4	5	26	-	-	254	100	285
314	14	-	1	5	-	-	-	-	-	-	-	3	6	3
315	18	-	-	1	-	1	1	-	-	-	-	67	3	67
316	175	-	9	18	-	1	9	-	-	-	-	289	37	289
317	922	1	43	121	3	12	43	8	220	-	46	287	223	561
318	-	-	-	-	-	-	-	-	-	-	-	-	-	-
319	198	-	9	32	1	3	9	1	8	-	-	36	54	45
320	449	-	17	55	-	17	21	-	2	-	-	194	110	196
321	218	-	7	22	-	2	10	-	-	-	-	27	41	27
322	74	-	3	10	-	3	3	1	-	-	-	14	19	15
323	309	4	17	57	-	3	2	-	-	-	-	13	83	13
324	598	9	21	99	-	4	6	1	97	-	55	208	139	361
325	114	-	6	18	-	6	6	-	-	-	-	53	36	53
326	372	-	20	65	3	1	4	2	1	-	30	140	93	173
327	202	-	11	34	4	3	4	13	-	-	-	74	56	87
328	73	1	4	14	-	-	1	-	-	-	-	7	20	7
329	61	-	3	11	-	-	1	1	2	-	-	6	15	9
330	46	-	2	8	-	-	-	-	5	-	-	5	10	10
331	213	1	10	24	1	3	10	-	-	-	-	115	49	115
332	267	1	14	31	1	4	14	-	-	-	24	267	65	291
333	462	1	17	58	2	19	21	3	2	-	-	79	118	84
334	705	-	20	130	3	15	3	14	6	-	-	333	171	353
335	46	-	1	11	-	1	-	1	-	-	-	6	13	7
336	837	-	38	96	-	25	28	6	8	-	-	356	187	370
337	493	-	13	78	-	13	31	6	-	-	-	319	135	325
338	464	2	16	78	-	13	28	15	7	-	-	168	137	190
339	99	3	4	21	-	2	4	2	-	-	-	44	34	46
340	241	5	7	44	-	6	9	65	3	-	-	67	71	135
341	143	-	4	27	-	1	4	-	-	-	-	149	36	149
342	330	-	12	72	-	6	9	29	27	-	-	73	99	129
343	139	-	5	29	-	2	3	-	-	-	-	124	39	124
344	153	-	4	30	-	3	3	-	-	-	-	496	40	496
345	114	-	7	15	-	5	5	-	2	-	-	112	32	114
346	189	-	5	26	-	5	9	4	-	-	-	104	45	108
347	277	-	9	44	-	9	18	1	-	-	-	85	80	86
348	533	13	20	113	-	12	21	18	45	-	-	120	179	183
349	1,244	15	57	241	-	4	3	9	37	5	141	27	320	219
350	64	-	3	14	-	-	2	-	1	-	-	24	19	25
351	95	2	4	21	-	-	1	-	10	-	-	9	28	19
352	251	4	8	43	-	1	2	7	109	-	-	273	58	389
353	93	-	6	19	-	-	1	-	-	-	-	19	26	19
354	78	-	3	10	-	-	-	-	-	-	-	12	13	12
355	1,023	-	21	198	-	-	-	9	4	13	23	260	219	309
356	141	-	5	26	-	4	-	-	-	-	-	17	35	17
357	-	-	-	-	-	-	-	-	-	-	-	3	-	3
358	32	-	1	6	-	-	-	-	-	-	-	5	7	5
359	-	-	-	-	-	-	-	-	1	-	-	1	-	2
360	1,259	8	72	230	3	43	44	103	171	11	206	6	400	497
361	1,866	27	71	220	56	98	54	21	96	-	-	22	526	139
362	641	-	37	162	-	4	2	-	10	-	50	43	205	103
363	1,386	-	42	285	14	39	21	27	139	2	63	63	401	294
364	1,948	42	92	279	10	38	17	22	58	46	189	135	478	450
365	5	-	-	2	-	-	-	2	1	3	-	144	2	150
366	27	-	-	2	-	1	-	4	25	-	-	62	3	91
367	18	1	-	1	-	-	1	-	-	-	-	10	3	10
368	135	4	2	8	2	2	3	-	-	-	-	146	21	146
369	-	-	-	-	-	-	-	-	-	-	-	-	-	-
370	891	10	49	158	-	7	7	1	6	-	81	8	231	96
371	678	19	52	122	-	-	-	64	54	-	98	10	193	226
372	233	6	20	47	-	-	-	32	37	-	-	114	73	183
373	13	-	-	1	-	-	-	-	-	-	-	110	1	110
374	99	3	1	6	1	2	2	-	-	-	-	95	15	95
375	1,110	-	67	207	4	27	23	29	126	-	121	34	328	310

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
376	21	2	-	3	-	-	-	49	1	-	-	38	5	88
377	443	10	32	78	7	16	7	1	8	-	63	20	150	92
378	831	17	46	110	11	25	13	12	5	-	39	6	222	62
379	114	-	10	27	1	2	2	-	-	-	-	20	42	20
380	81	3	-	13	-	2	2	-	-	-	-	341	20	341
381	101	1	6	12	1	2	6	-	2	-	-	183	28	185
382	-	-	-	-	-	-	-	-	-	-	-	-	-	-
383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
385	416	8	27	52	-	12	21	1	3	-	-	60	120	64
386	897	17	64	122	-	23	52	16	50	-	1	232	278	299
387	13	-	1	3	-	-	1	25	106	-	-	316	5	447
388	93	-	5	19	1	1	1	2	-	-	-	19	27	21
389	584	3	29	112	9	5	5	4	6	-	-	25	163	35
390	64	-	5	5	-	3	3	8	-	-	-	2	16	10
391	2	-	-	-	-	-	-	-	-	-	-	1	-	1
392	644	1	40	157	9	9	9	2	4	-	66	44	225	116
393	137	-	7	30	2	2	2	-	-	-	-	26	43	26
394	309	-	11	44	-	1	2	1	134	-	-	81	58	216
395	253	3	12	57	-	3	6	33	15	48	-	261	81	357
396	1,223	5	62	285	-	6	18	8	10	-	-	194	376	212
397	306	-	21	26	2	18	17	9	5	-	-	18	84	32
398	690	1	63	127	-	21	21	49	81	48	36	247	233	461
399	1,502	22	45	217	32	64	39	1	130	-	152	289	419	572
400	280	-	28	32	2	20	19	53	20	-	-	788	101	861
401	28	-	3	3	-	2	2	-	2	-	-	30	10	32
402	81	1	4	17	1	5	3	-	-	-	-	47	31	47
403	231	-	13	47	-	1	3	-	7	-	-	106	64	113
404	204	5	10	34	-	2	3	5	62	-	29	88	54	184
405	91	-	2	21	-	2	2	-	-	-	-	25	27	25
406	865	23	41	141	-	6	9	123	149	7	70	207	220	556
407	66	1	-	14	-	2	2	110	2	-	-	13	19	125
408	752	-	24	143	-	16	23	1	5	-	74	215	206	295
409	876	14	-	195	-	18	19	7	14	-	24	166	246	211
410	7	-	-	3	-	-	-	14	-	-	-	386	3	400
411	1,757	40	55	332	9	15	12	4	25	-	-	211	463	240
412	177	2	12	8	4	16	8	526	40	-	4	466	50	1,036
413	293	11	8	70	-	-	2	377	1	-	-	40	91	418
414	3,848	56	137	571	27	25	38	444	109	14	66	25	854	658
415	498	13	36	100	-	3	14	-	27	-	57	155	166	239
416	486	10	27	79	-	1	9	5	479	-	-	55	126	539
417	427	16	13	66	-	8	7	35	77	66	-	307	110	485
418	103	-	6	28	-	-	-	-	10	-	-	24	34	34
419	453	-	30	106	-	-	-	-	22	-	27	143	136	192
420	416	-	4	42	-	6	6	-	-	6	-	61	58	67
421	934	-	16	173	-	28	28	17	8	-	-	318	245	343
422	820	-	10	167	-	9	17	23	28	-	-	192	203	243
423	228	-	2	53	-	2	3	4	7	-	-	72	60	83
424	695	9	14	116	-	17	37	20	6	-	-	365	193	391
425	124	3	3	23	-	4	7	5	-	-	-	26	40	31
426	5	-	-	1	-	-	-	-	-	-	-	857	1	857
427	113	-	8	26	-	-	-	-	2	-	-	75	34	77
428	322	1	19	74	-	1	-	-	1	-	-	67	95	68
429	4	-	-	1	-	-	-	-	-	-	-	3	1	3
430	2,844	-	129	471	2	6	62	-	8	-	-	36	670	44
431	1,522	7	86	373	8	5	22	2	35	-	76	1	501	114
432	837	8	91	143	9	5	16	-	19	-	223	4	272	246
433	2,241	12	159	172	57	291	141	53	133	88	98	92	832	464
434	1,413	9	95	293	-	11	23	3	9	-	13	5	431	30
435	1,052	18	73	83	26	102	47	227	142	-	21	24	349	414
436	1,684	-	69	169	49	116	72	123	347	49	3	537	475	1,059
437	1,307	14	62	324	2	20	18	99	35	39	202	6	440	381
438	1,745	32	110	241	8	20	9	58	2	-	32	1	420	93
439	1,531	15	86	227	21	43	27	29	66	59	6	53	419	213
440	-	-	-	-	-	-	-	-	-	-	-	-	-	-
441	-	-	-	-	-	-	-	-	-	-	-	-	-	-
442	-	-	-	-	-	-	-	-	-	-	-	-	-	-
443	-	-	-	-	-	-	-	-	-	-	-	-	-	-
444	-	-	-	-	-	-	-	-	-	-	-	-	-	-
445	676	2	19	113	7	29	15	141	36	-	-	31	185	208
446	18	-	1	5	-	1	-	44	14	-	-	14	7	72
447	31	-	1	5	1	1	-	64	1	-	-	8	8	73
448	1,151	2	39	229	14	58	32	1	1	-	74	27	374	103
449	1,054	18	50	204	19	94	44	4	113	-	-	2	429	119
450	377	1	15	85	7	25	12	-	2	-	-	10	145	12
451	754	7	46	179	-	-	2	1	3	-	-	6	234	10
452	686	9	46	182	-	1	1	-	11	-	11	-	239	22
453	51	1	4	15	-	-	-	-	-	-	-	8	20	8
454	686	-	53	121	15	17	9	-	2	-	-	42	215	44
455	1,917	2	165	361	65	74	43	88	43	-	-	2	710	133
456	768	11	25	115	26	6	34	1	24	-	71	291	217	387
457	785	-	59	128	19	20	12	18	2	11	-	16	238	47
458	45	1	2	5	1	3	1	61	36	-	-	69	13	166
459	366	11	19	63	6	43	18	165	523	139	61	244	160	1,132
460	500	-	62	122	-	17	1	-	31	-	174	22	202	227
461	274	-	25	56	-	6	1	1	28	-	-	-	88	29
462	-	-	-	-	-	-	-	-	-	-	-	-	-	-
463	-	-	-	-	-	-	-	-	-	-	-	-	-	-
464	-	-	-	-	-	-	-	-	-	-	-	-	-	-
465	-	-	-	-	-	-	-	-	-	-	-	-	-	-
466	-	-	-	-	-	-	-	-	-	-	-	-	-	-
467	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
468	-	-	-	-	-	-	-	-	-	-	-	-	-	-
469	-	-	-	-	-	-	-	-	-	-	-	-	-	-
470	-	-	-	-	-	-	-	-	-	-	-	-	-	-
471	-	-	-	-	-	-	-	-	-	-	-	-	-	-
472	-	-	-	-	-	-	-	-	-	-	-	-	-	-
473	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474	-	-	-	-	-	-	-	-	-	-	-	-	-	-
475	230	7	21	32	-	16	20	6	8	9	-	6	96	29
476	293	8	31	42	-	22	28	25	-	75	1	14	131	115
477	58	1	6	7	-	3	4	-	-	2	-	9	21	11
478	187	1	5	5	8	20	20	13	2	0	0	114	59	130
479	3,775	8	50	147	213	480	274	41	13	1	5	5	1,172	65
480	287	-	8	76	-	2	1	5	1	-	1	12	87	19
481	1,618	20	116	308	16	37	21	0	1	0	0	4	518	5
482	4	-	-	1	-	-	-	-	42	-	-	2	1	44
483	393	4	4	106	-	-	2	1	3	-	-	32	116	36
484	23	-	1	6	-	-	-	-	9	-	-	58	7	67
485	1,857	-	64	525	-	-	6	2	18	-	-	107	595	127
486	978	-	35	280	-	-	4	42	422	6	34	32	319	536
487	802	5	17	207	-	13	4	35	10	-	-	76	246	121
488	233	-	11	57	-	1	6	-	5	-	-	28	75	33
489	137	-	5	28	-	-	4	-	2	-	-	34	37	36
490	277	-	13	69	-	1	8	15	13	-	207	41	91	276
491	662	-	33	164	-	4	20	1	5	-	42	35	221	83
492	543	-	24	122	-	2	16	7	7	-	-	47	164	61
493	991	6	15	269	-	18	3	4	12	-	-	240	311	256
494	228	-	12	46	3	12	2	4	3	-	-	47	75	54
495	321	1	17	42	-	26	34	7	106	-	-	216	120	329
496	242	1	10	30	-	18	26	29	8	-	-	32	85	69
497	209	-	10	44	2	10	3	-	-	-	-	28	69	28
498	164	-	6	41	-	5	5	-	-	-	-	26	57	26
499	1,937	-	48	396	16	61	90	45	10	-	-	37	611	92
500	320	-	5	85	-	3	13	3	9	35	-	100	106	147
501	316	-	6	71	-	3	10	-	-	-	-	30	90	30
502	112	1	6	15	-	9	12	4	7	-	31	17	43	59
503	116	1	8	23	-	3	9	2	4	-	-	30	44	36
504	615	9	38	139	-	16	55	3	26	-	-	152	257	181
505	164	-	8	31	-	8	-	-	3	-	-	86	47	89
506	179	-	8	31	-	8	2	17	-	-	12	142	49	171
507	632	-	22	98	4	27	11	41	28	-	81	23	162	173
508	10	-	-	2	-	-	-	23	62	-	-	681	2	766
509	75	-	1	27	-	1	3	-	7	-	-	31	32	38
510	209	2	9	35	-	3	14	-	15	-	1	121	63	137
511	924	-	40	194	-	8	16	8	8	-	41	307	258	364
512	107	-	3	25	-	-	-	-	2	-	37	40	28	79
513	187	-	6	31	-	2	8	-	-	-	-	25	47	25
514	159	1	7	29	-	2	1	-	11	-	-	14	40	25
515	40	-	3	10	-	1	-	1	-	-	-	6	14	7
516	79	-	2	15	1	1	4	-	-	-	-	13	23	13
517	95	-	2	17	-	1	4	-	-	-	-	21	24	21
518	231	-	10	46	-	4	2	-	-	-	-	37	62	37
519	495	1	23	103	-	12	4	1	3	-	35	120	143	159
520	201	1	10	42	-	6	16	2	-	-	-	79	75	81
521	251	-	13	51	-	2	8	2	1	-	-	30	74	33
522	119	-	1	21	-	6	1	-	-	-	-	28	29	28
523	201	1	6	40	-	9	4	-	-	-	-	29	60	29
524	485	-	11	50	11	22	16	-	10	-	-	234	110	244
525	290	-	8	57	2	5	16	-	2	-	-	48	88	50
526	117	-	5	20	-	2	5	-	-	-	-	25	32	25
527	124	-	6	18	-	3	4	-	-	-	47	50	31	97
528	614	-	56	74	-	2	2	-	11	-	35	150	134	196
529	1,402	-	86	305	4	17	50	1	6	74	54	133	462	268
530	327	1	7	56	1	12	6	2	1	-	-	743	83	746
531	211	-	8	29	8	13	10	-	54	-	-	106	68	160
532	2,996	-	73	286	64	107	100	-	35	-	9	48	630	92
533	508	4	23	69	5	13	18	-	-	-	-	31	132	31
534	920	4	39	118	5	24	34	99	43	-	-	69	224	211
535	736	15	37	96	12	49	101	19	23	113	-	196	310	351
536	419	3	18	71	3	14	11	8	2	5	-	83	120	98
537	108	-	10	25	-	-	-	10	5	-	50	23	35	88
538	435	5	33	85	-	-	-	9	15	-	-	60	123	84
539	227	2	20	51	-	-	-	8	3	-	-	258	73	269
540	35	1	4	10	-	-	-	-	-	-	-	14	15	14
541	150	2	14	40	-	-	-	2	-	-	-	27	56	29
542	240	-	7	31	7	13	10	2	-	-	9	95	68	106
543	6	-	1	1	-	1	1	-	-	-	-	2	4	2
544	110	3	10	14	1	7	7	1	20	-	-	26	43	47
545	680	3	37	149	23	37	30	-	6	-	-	-	279	6
546	1,038	6	74	119	62	78	40	97	184	4	-	1	379	286
547	1,262	38	62	137	41	77	23	153	61	-	49	151	378	414
548	884	4	16	173	-	-	-	-	-	-	-	3	193	3
549	874	10	81	103	32	23	51	24	108	-	9	7	300	148
550	1,091	37	152	75	12	33	14	140	312	99	241	116	323	908
551	3,544	5	178	484	26	83	39	106	87	7	57	59	815	316
552	1,236	-	60	226	-	40	17	1	43	-	80	3	343	127
553	1,103	33	84	167	-	2	12	39	17	-	270	10	298	336
554	1,274	27	66	158	-	12	11	24	7	-	39	104	274	174
555	1,285	35	119	246	-	2	6	2	10	-	39	1	408	52
556	1,229	6	17	127	40	79	34	117	54	4	29	58	303	262
557	1,463	47	39	58	71	81	46	3	39	-	9	928	342	979
558	840	32	35	111	-	-	8	-	-	-	-	1	186	1
559	278	-	8	76	-	1	2	2	6	-	1	27	87	36

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
560	360	-	10	86	5	5	5	1	23	-	-	36	111	60
561	34	-	1	9	-	-	-	-	-	-	-	2	10	2
562	99	-	3	27	-	1	1	-	-	-	-	-	32	-
563	-	-	-	-	-	-	-	-	-	-	-	-	-	-
564	-	-	-	-	-	-	-	1	-	-	-	4	-	5
565	438	22	26	48	-	-	1	12	9	5	25	204	97	255
566	516	28	31	61	1	1	5	-	4	-	-	6	127	10
567	-	-	-	-	-	-	-	-	-	-	-	233	-	233
568	-	-	-	-	-	-	-	-	-	-	-	10	-	10
569	626	9	56	129	1	1	1	7	22	0	397	42	197	469
570	3,135	36	192	289	51	77	19	17	16	-	-	133	664	166
571	5,111	56	232	587	37	90	72	54	55	18	44	25	1,074	196
572	1,675	36	121	170	15	49	15	69	77	-	42	213	406	401
573	711	-	51	64	8	48	21	3	22	-	250	1	192	276
574	1,766	-	138	476	-	-	-	205	258	19	20	44	614	546
575	-	-	-	-	-	-	-	-	-	2	601	2	-	605
576	718	7	31	142	-	86	5	11	9	-	-	2	271	22
577	754	-	48	189	-	11	21	2	371	-	-	-	269	373
578	1,116	-	62	239	-	11	35	2	13	-	66	12	347	93
579	2,380	30	120	299	36	34	28	108	130	-	2	17	547	257
580	-	-	-	-	-	-	-	41	8	-	-	-	-	49
581	272	-	30	67	-	-	-	36	3	-	198	1	97	238
582	693	-	31	75	29	18	27	22	21	2	43	3	180	91
583	1,089	31	47	281	1	2	8	38	15	-	-	33	370	86
584	1,102	49	74	117	13	38	21	96	152	-	43	227	312	518
585	1,555	15	67	254	37	41	23	286	589	76	217	321	437	1,489
586	3,326	9	24	274	138	124	80	203	48	-	54	828	649	1,133
587	1,320	23	17	123	55	54	44	-	4	12	5	2	316	23
588	1,310	8	75	138	10	71	27	-	2	-	-	-	329	2
589	1,407	18	86	186	20	40	22	-	5	-	121	177	372	303
590	-	-	-	-	-	-	-	-	5	-	-	-	-	5
591	21	1	1	4	1	2	4	-	-	-	-	1	13	1
592	1,201	-	109	249	-	22	6	1	2	-	69	4	386	76
593	1,156	5	59	243	5	40	11	-	184	-	-	2	363	186
594	228	-	16	35	-	8	1	1	-	30	-	7	60	38
595	20	-	2	5	-	1	-	-	12	-	-	132	8	144
596	-	-	-	-	-	-	-	-	-	-	483	3	-	486
597	531	-	22	163	-	-	-	1	12	-	-	7	185	20
598	1,251	1	53	384	-	-	1	5	8	-	53	8	439	74
599	1,440	4	68	409	-	-	2	4	19	-	-	19	483	42
600	196	6	8	15	2	4	4	-	2	-	-	1	39	3
601	1,782	56	84	159	21	30	42	3	20	-	95	-	392	118
602	5	-	-	-	-	-	-	4	5	-	-	140	-	149
603	1,037	13	86	88	15	20	8	60	77	1	-	17	230	155
604	1,150	29	75	87	17	37	17	29	7	-	93	6	262	135
605	1,165	11	46	191	-	1	2	5	6	-	49	175	251	235
606	587	8	50	50	7	11	6	17	27	42	1	38	132	125
607	1,391	2	60	389	-	-	1	58	34	13	6	12	452	123
608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
609	-	-	-	-	-	-	-	-	-	-	-	-	-	-
610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
611	-	-	-	-	-	-	-	-	-	-	-	-	-	-
612	-	-	-	-	-	-	-	-	-	-	-	-	-	-
613	-	-	-	-	-	-	-	-	-	-	-	-	-	-
614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
615	1,266	2	43	279	3	49	57	4	93	-	60	79	433	236
616	312	-	25	74	-	-	-	4	532	-	18	14	99	568
617	1,283	3	90	218	18	63	35	53	224	58	94	122	427	551
618	898	7	53	235	13	14	14	6	164	13	22	21	336	226
619	223	-	6	72	-	8	6	98	69	13	2	34	92	216
620	137	2	11	47	-	-	-	16	72	5	1	45	60	139
621	274	-	21	94	-	-	5	2	2	-	-	22	120	26
622	1,265	2	67	230	-	37	122	17	1,468	9	66	37	458	1,597
623	932	9	47	182	12	31	42	4	8	-	-	26	323	38
624	76	-	-	35	-	-	-	-	48	33	-	5	35	86
625	18	-	-	7	-	-	-	1	8	-	-	-	7	9
626	1,095	2	55	196	-	33	103	132	33	6	65	22	389	258
627	1,559	23	58	335	16	33	89	31	68	-	166	24	554	289
628	229	-	-	89	-	-	-	-	6	-	-	21	89	27
629	285	1	9	77	-	6	8	3	7	-	-	-	101	10
630	751	4	19	194	-	14	17	-	8	-	-	20	248	28
631	20	-	-	5	-	-	-	-	-	-	-	6	5	6
632	368	1	10	103	-	8	10	-	7	-	-	88	132	95
633	1,014	17	34	101	4	66	112	16	8	25	3	323	334	375
634	38	-	2	6	-	3	6	-	-	-	-	16	17	16
635	778	5	40	183	-	48	15	14	69	16	-	78	291	177
636	82	-	2	18	-	6	2	-	1	-	-	74	28	75
637	80	-	4	16	-	5	1	-	-	-	-	70	26	70
638	973	2	40	205	8	82	17	4	24	5	5	81	354	119
639	500	3	26	122	-	31	7	3	14	66	-	13	189	96
640	479	1	18	99	4	40	7	8	14	5	-	5	169	32
641	2,171	13	63	301	88	139	206	14	37	8	52	46	810	157
642	359	-	-	96	-	28	35	4	167	-	22	3	159	196
643	-	-	-	-	-	-	-	-	-	-	-	-	-	-
644	133	-	10	39	-	-	2	2	4	-	-	-	51	6
645	123	-	-	45	-	-	-	47	30	-	-	24	45	101
646	1,672	-	157	254	28	150	47	118	168	2	138	29	636	455
647	1,926	7	21	18	54	540	327	1	106	103	-	4	967	214
648	7	-	-	1	-	1	1	1	195	-	-	34	3	230
649	595	-	-	37	104	185	35	13	53	-	-	3	361	69
650	326	7	17	83	18	42	14	2	7	-	-	7	181	16
651	12	-	-	1	-	-	-	61	22	-	-	10	1	93

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
652	76	-	3	14	-	3	3	13	-	-	-	2	23	15
653	482	-	19	93	1	10	16	1	7	-	-	8	139	16
654	28	-	1	5	-	1	1	102	17	-	-	19	8	138
655	2,032	-	64	575	-	-	-	1	1	-	-	7	639	9
656	-	-	-	-	-	-	-	-	91	-	530	-	-	621
657	1,534	-	-	470	-	-	-	-	-	-	61	-	470	61
658	694	-	33	190	-	-	-	-	-	-	-	-	223	-
659	473	-	22	126	2	2	2	-	-	-	-	2	154	2
660	1,316	-	60	336	24	2	8	2	102	-	3	16	430	123
661	559	-	9	152	-	-	4	7	155	-	-	14	165	176
662	1,650	-	90	416	-	-	-	33	7	-	-	4	506	44
663	352	-	7	102	-	1	3	40	155	20	163	312	113	690
664	1,552	9	44	372	-	-	-	1	54	-	-	18	425	73
665	1,159	-	49	230	-	53	44	15	31	-	-	92	376	138
666	367	-	17	79	-	9	14	-	5	-	-	24	119	29
667	594	-	26	125	1	12	20	-	8	-	-	4	184	12
668	44	-	1	7	-	1	1	-	1	-	-	1	10	2
669	23	-	1	7	-	-	-	-	4	-	-	145	8	149
670	30	-	1	8	-	-	-	-	889	-	-	2	9	891
671	192	3	6	52	1	2	-	1	11	-	-	4	64	16
672	915	-	81	212	-	-	-	22	14	-	-	19	293	55
673	1,738	5	92	292	10	117	114	-	32	-	65	14	630	111
674	461	-	41	110	-	-	-	-	34	-	-	1	151	35
675	390	1	20	64	2	23	23	2	6	-	-	22	133	30
676	200	1	4	17	4	9	3	4	64	-	-	74	38	142
677	250	-	-	10	27	49	10	1	5	-	-	-	96	6
678	1,165	16	46	229	49	114	39	157	489	-	79	115	493	840
679	1,163	8	133	280	-	-	-	126	85	-	-	33	421	244
680	581	19	66	133	-	7	16	11	25	-	-	41	241	77
681	218	5	22	47	-	3	4	37	102	819	64	16	81	1,038
682	5	-	-	-	-	-	-	245	211	63	872	528	-	1,919
683	668	-	65	69	7	119	50	10	24	2	-	68	310	104
684	864	13	129	96	-	-	-	1	33	-	-	3	238	37
685	128	-	-	55	-	-	-	16	26	-	-	1	55	43
686	1,183	5	72	310	-	-	-	-	12	-	-	12	387	24
687	1,568	4	69	418	-	-	9	8	27	-	-	18	500	53
688	1,463	25	64	361	-	-	-	5	17	-	3	6	450	31
689	55	-	3	14	-	-	-	-	-	-	-	3	17	3
690	67	1	3	16	-	-	-	1	-	-	-	1	20	2
691	-	-	-	-	-	-	-	-	-	-	-	3	-	3
692	-	-	-	-	-	-	-	-	-	-	-	2	-	2
693	-	-	-	-	-	-	-	249	54	-	-	-	-	303
694	295	2	5	7	11	64	20	-	14	-	-	3	109	17
695	-	-	-	-	-	-	-	-	-	-	-	-	-	-
696	668	15	39	20	-	159	162	209	64	-	-	7	395	280
697	616	-	-	-	47	222	104	22	134	-	-	1	373	157
698	884	-	-	-	-	145	178	1	7	-	-	-	323	8
699	916	12	61	12	64	302	43	99	128	-	-	43	494	270
700	1,381	29	65	229	34	58	58	116	418	71	21	132	473	758
701	1,532	7	130	153	20	139	47	146	410	-	61	79	496	696
702	1,598	34	72	151	14	81	92	54	124	-	132	291	444	601
703	929	-	-	27	34	187	129	231	248	-	-	1,017	377	1,496
704	1,666	-	77	433	-	-	-	-	19	-	-	10	510	29
705	1,413	-	136	318	-	-	3	22	39	-	68	75	457	204
706	806	-	18	236	-	-	-	1	7	-	298	13	254	319
707	1,250	25	87	323	-	-	-	92	200	-	-	39	435	331
708	1,875	3	104	465	-	-	-	1	31	-	-	15	572	47
709	1,805	5	128	442	-	-	-	1	10	-	-	14	575	25
710	382	1	18	103	-	-	-	-	4	-	-	14	122	18
711	56	-	2	13	-	-	-	-	3	-	-	4	15	7
712	1,144	1	4	6	54	194	194	132	67	-	1	5	453	205
713	1,165	11	142	120	21	95	81	1	16	-	-	8	470	25
714	2,692	32	98	273	88	423	185	19	104	-	-	40	1,099	163
715	1,575	-	10	-	208	416	82	168	157	-	-	19	716	344
716	487	-	13	110	6	13	13	-	7	-	82	6	155	95
717	1,962	11	169	369	17	47	35	5	12	-	-	8	648	25
718	490	-	23	-	23	120	45	144	245	-	9	69	211	467
719	1,134	18	84	190	-	44	9	6	36	-	-	25	345	67
720	856	1	87	219	-	-	-	3	28	-	3	8	307	42
721	2	-	-	1	-	-	-	527	196	-	31	50	1	804
722	1,125	2	162	202	-	-	-	36	238	-	-	505	366	779
723	1,782	-	112	417	-	-	-	36	11	-	-	2	529	49
724	973	-	30	307	4	17	8	103	83	-	-	17	366	203
725	872	-	23	223	2	12	6	20	46	-	59	6	266	131
726	739	-	17	184	3	8	4	1	20	-	-	-	216	21
727	664	-	18	170	4	7	5	1	19	-	-	28	204	48
728	1,151	-	46	322	-	-	-	21	2	-	-	4	368	27
729	19	-	1	6	-	-	-	2	-	-	-	3	7	5
730	1,230	9	52	331	-	-	-	-	13	-	2	3	392	18
731	404	-	16	74	-	16	14	-	1	-	-	2	120	3
732	384	3	16	88	-	1	2	-	5	-	50	3	110	58
733	316	3	25	80	-	-	-	-	-	-	-	24	108	24
734	2,269	4	145	613	-	1	2	-	3	-	-	3	765	6
735	1,759	6	105	456	-	2	2	1	14	-	53	16	571	84
736	1,022	-	60	241	-	-	-	-	2	-	72	2	301	76
737	510	-	40	166	-	-	-	-	4	-	-	11	206	15
738	1,295	-	65	368	2	2	-	-	-	-	61	-	437	61
739	1,059	2	91	263	-	-	-	102	143	13	99	50	356	406
740	615	-	52	152	-	-	-	2	3	-	-	7	204	12
741	91	1	3	22	-	1	-	1	-	-	-	31	27	32
742	-	-	2	6	-	-	-	-	2	-	-	-	8	2
743	56	-	3	13	-	-	-	-	2	-	-	7	16	9

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
744	104	-	5	27	-	-	-	2	1	-	-	19	32	22
745	27	-	2	10	-	-	-	-	-	-	-	3	12	3
746	-	-	-	-	-	-	-	-	-	-	459	-	-	459
747	18	-	1	3	-	-	-	-	-	-	-	1	4	1
748	-	-	-	-	-	-	-	-	-	-	-	1	-	1
749	9	-	-	2	-	-	-	-	-	-	-	3	2	3
750	36	0	2	5	-	-	-	-	-	-	-	1	7	1
751	715	2	62	185	-	-	-	69	93	4	4	45	249	215
752	553	1	38	145	-	6	4	1	7	-	-	10	194	18
753	83	0	8	23	-	-	-	242	191	18	130	45	31	627
754	303	2	22	79	-	4	2	149	45	4	16	31	108	245
755	942	5	73	260	-	11	8	8	246	14	125	179	357	573
756	1,200	3	63	379	-	-	-	3	102	-	-	10	445	115
757	1,000	3	77	268	9	12	28	9	100	-	2	18	397	129
758	579	2	23	64	28	61	43	126	796	63	592	118	221	1,694
759	726	10	45	222	-	-	-	31	323	-	-	93	277	447
760	821	14	49	229	-	-	-	2	28	-	-	2	292	32
761	1,416	0	142	261	13	132	44	73	167	-	5	20	592	265
762	1,727	7	51	217	38	265	201	78	37	2	9	21	779	146
763	2,372	11	69	310	33	361	289	36	121	-	-	47	1,073	204
764	6	-	1	2	-	-	-	60	356	3	3	131	3	552
765	1,057	56	26	75	38	211	129	521	1,656	0	4	1,497	535	3,679
766	185	1	20	31	-	3	5	288	881	2	2	820	60	1,994
767	1,368	38	24	70	15	117	71	6	22	-	-	11	335	39
768	1,811	80	100	146	24	64	43	109	123	1	65	34	457	332
769	350	5	20	17	17	52	55	6	7	-	-	4	166	17
770	19	-	-	2	-	2	2	-	-	-	-	-	6	-
771	-	-	-	-	-	-	-	200	1,519	50	63	114	-	1,946
772	-	-	-	-	-	-	-	33	1,547	124	156	259	-	2,118
773	-	-	-	-	-	-	-	5	529	6	26	13	-	580
774	1,106	-	125	224	20	37	55	-	7	-	-	1	461	8
775	129	-	-	1	8	18	10	831	253	0	9	40	37	1,133
776	-	-	-	-	-	-	-	12	549	39	50	82	-	731
777	738	8	43	24	27	163	96	1	153	-	-	16	361	170
778	2,143	21	110	63	71	423	251	172	424	-	-	49	939	645
779	109	-	-	-	7	16	9	264	110	0	1	17	33	392
780	19	2	2	3	-	1	1	19	529	17	22	36	9	622
781	151	1	7	4	4	28	17	314	2,769	88	79	331	61	3,582
782	98	-	4	22	-	2	2	1	2	-	-	17	30	20
783	233	-	12	39	5	12	7	72	20	2	7	5	75	107
784	-	-	-	-	-	-	-	64	20	2	1	58	-	145
785	1,616	8	53	124	68	154	88	0	14	0	0	13	495	27
786	1,292	4	118	291	6	13	8	74	30	2	8	12	440	126
787	13	-	-	3	-	-	-	171	146	4	2	712	3	1,035
788	1,589	10	128	335	6	17	45	5	136	13	174	28	541	357
789	1,903	9	175	430	-	-	5	24	65	5	41	14	619	149
790	1,705	19	153	390	-	-	-	1	3	-	-	7	562	11
791	2,695	20	183	482	31	86	131	84	45	0	4	22	933	154
792	1,341	9	75	208	11	88	83	29	967	94	824	177	474	2,092
793	1,138	14	80	229	16	110	103	243	114	7	4	27	552	394
794	150	-	-	-	10	23	13	-	-	-	-	1	46	1
795	346	0	22	5	21	87	11	1	49	5	110	9	146	174
796	8	-	1	2	-	-	-	54	13	1	0	12	3	81
797	1,217	15	63	363	-	-	-	157	61	4	17	47	441	287
798	1,785	18	120	408	-	2	25	-	23	-	-	3	573	26
799	36	-	3	11	-	-	-	-	4	-	-	-	14	4
800	938	-	88	260	-	-	-	5	22	-	1	13	348	41
801	1,267	6	86	285	97	7	7	9	214	-	-	61	489	284
802	950	11	159	275	-	-	-	-	41	-	-	4	445	45
803	888	27	77	202	-	46	16	1	15	-	-	27	368	43
804	717	1	58	170	-	-	3	6	54	-	-	2	231	62
805	700	3	70	193	-	-	2	64	61	-	-	-	268	125
806	1,171	31	62	302	-	-	4	3	749	-	63	22	399	837
807	923	-	77	295	-	2	6	66	112	-	-	15	380	193
808	1,315	-	71	333	1	74	40	48	491	-	-	172	519	711
809	929	2	64	155	36	81	50	16	255	-	115	80	388	466
810	1,088	-	54	257	9	78	42	2	15	-	46	5	440	68
811	1,708	4	143	356	65	144	93	26	104	0	0	14	805	144
812	1,770	37	125	106	89	370	104	169	563	1	4	87	831	823
813	1,807	18	114	238	36	217	60	56	321	1	5	37	683	420
814	1,653	9	18	29	81	217	181	202	305	3	15	71	535	597
815	1,780	13	27	43	88	250	224	562	298	4	18	82	645	964
816	96	1	2	3	1	6	9	2	88	1	1	2	22	95
817	-	-	-	-	-	-	-	16	1,899	-	106	-	-	2,021
818	1,847	38	147	388	11	70	114	52	471	31	44	91	768	689
819	1,834	0	165	251	22	132	123	16	849	4	89	17	693	974
820	5	-	-	2	-	-	-	-	-	-	-	3	2	3
821	1,569	1	29	109	73	165	95	215	195	9	41	77	473	537
822	1,324	1	76	233	17	76	28	1	16	-	-	4	431	21
823	489	6	41	55	9	20	14	160	150	8	31	57	145	406
824	8	-	1	3	-	-	-	97	1,136	165	11	995	4	2,404
825	3,502	7	153	446	88	253	123	3	83	7	65	25	1,070	184
826	1,078	-	-	-	73	164	94	431	280	28	55	97	330	891
827	7	-	1	3	-	-	-	315	99	9	5	23	4	451
828	1,320	-	33	272	-	52	45	2	11	-	53	16	402	82
829	576	-	1	12	37	86	50	117	110	4	28	53	187	313
830	1,191	-	37	11	51	256	148	63	25	2	7	9	504	106
831	1,214	-	71	21	27	365	212	2	15	-	-	11	696	28
832	1,656	-	19	5	88	275	159	550	410	9	62	151	546	1,182
833	2,653	-	168	321	76	269	162	2	31	0	0	71	996	104
834	342	-	19	6	7	88	51	1	10	-	-	-	171	11
835	1,589	-	25	7	89	295	170	651	265	9	61	134	586	1,119

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
836	801	11	19	253	-	-	-	42	211	-	12	13	283	278
837	860	0	92	245	10	8	7	2	101	-	-	12	362	115
838	1,051	8	44	192	29	65	37	32	603	8	23	72	376	738
839	59	-	-	-	4	9	5	58	35	0	1	9	18	104
840	533	1	78	155	-	5	2	93	316	-	45	47	242	501
841	935	9	73	198	29	56	37	69	72	1	38	110	402	290
842	846	0	75	254	-	7	-	49	43	-	-	3	336	95
843	1,251	16	97	199	48	88	60	126	585	19	6	85	507	821
844	537	-	88	149	-	-	11	55	88	-	235	40	248	418
845	1,176	-	105	182	30	67	51	70	695	1	7	60	435	833
846	1,130	5	129	150	14	126	48	18	429	-	43	57	472	547
847	961	9	146	177	19	144	57	476	1,488	23	1	120	553	2,108
848	1,431	4	61	132	66	162	103	397	315	5	182	74	527	973
849	1,981	4	96	207	88	219	139	327	327	6	40	130	753	830
850	1,357	-	3	1	102	233	124	791	307	9	92	142	463	1,342
851	1,234	-	-	-	83	188	107	425	490	186	65	200	378	1,366
852	964	-	19	4	110	258	87	5	592	-	-	-	478	597
853	1,234	-	16	3	108	252	90	69	445	-	6	7	470	527
854	1,821	6	113	253	41	248	98	49	247	-	60	22	759	378
855	1,591	9	98	255	32	107	51	110	1,183	37	51	73	552	1,454
856	6	-	-	2	-	-	-	-	-	-	-	3	2	3
857	18	-	1	4	-	-	1	-	-	-	-	9	6	9
858	3,152	2	15	42	199	449	258	-	-	-	-	2	964	2
859	13	-	-	-	1	2	1	-	-	-	-	3	4	3
860	6,051	11	89	171	345	784	451	1	-	-	-	50	1,851	51
861	5,004	21	126	293	239	540	309	-	-	-	-	7	1,529	7
862	2,245	33	202	449	-	2	2	91	24	3	10	8	688	136
863	3,280	28	177	382	90	207	120	-	-	-	-	3	1,004	3
864	2,734	6	62	70	135	309	179	20	22	1	480	33	761	556
865	2,158	14	109	316	39	89	51	-	7	-	6	7	618	20
866	3,320	17	101	240	144	324	185	2	1	-	-	4	1,011	7
867	3,102	18	105	243	129	292	167	-	2	-	-	49	955	51
868	57	-	4	5	1	3	2	14	33	1	1	13	15	62
869	1,767	16	145	196	33	88	57	1	30	0	0	0	535	31
870	1,883	19	120	364	5	12	8	135	47	4	15	11	529	211
871	1,511	10	86	262	15	33	19	-	28	-	304	3	424	335
872	1,354	14	87	274	-	16	9	347	91	10	38	83	400	568
873	46	-	5	6	1	3	3	134	197	3	8	288	18	629
874	2,084	4	161	342	32	45	58	74	115	3	3	57	642	252
875	1,531	13	110	263	14	32	21	39	66	1	77	3	453	187
876	2,421	23	113	322	64	145	83	4	2	-	-	4	750	10
877	-	-	-	-	-	-	-	173	689	14	-	1,709	-	2,585
878	-	-	-	-	-	-	-	198	602	30	20	665	-	1,516
879	2,467	10	85	199	100	223	127	316	89	9	35	32	745	481
880	2,068	33	109	452	-	-	-	203	53	5	20	14	594	295
881	242	-	-	-	16	37	21	85	108	2	12	57	74	264
882	5	-	-	-	-	1	-	89	115	-	-	445	1	649
883	-	-	-	-	-	-	-	11	36	-	-	114	-	162
884	-	-	-	-	-	-	-	-	2	-	-	4	-	6
885	565	0	40	104	12	25	16	29	17	0	3	14	197	64
886	2,455	3	115	236	30	206	137	82	152	5	43	41	727	323
887	2,132	14	61	186	71	231	131	375	182	5	35	93	694	690
888	3,534	41	145	379	63	387	167	34	28	-	-	296	1,182	358
889	1,139	15	75	58	9	179	82	127	157	-	3	513	418	800
890	-	-	-	-	-	-	-	9	4	-	-	48	-	61
891	5	-	-	-	-	1	-	5	64	-	3	115	1	187
892	1,052	2	45	91	29	121	77	20	37	1	6	13	364	76
893	3,589	30	192	496	43	187	145	86	292	1	94	29	1,093	502
894	1,836	5	145	286	63	158	111	309	849	9	51	121	768	1,338
895	1,793	15	73	219	16	128	110	31	49	0	0	24	561	104
896	760	2	51	16	44	195	61	28	18	0	10	6	369	63
897	778	3	57	18	50	218	68	14	38	61	-	2	414	115
898	1,915	42	119	282	26	113	47	2	98	-	164	55	629	319
899	2,140	31	166	387	14	47	27	2	49	-	-	2	672	53
900	2,943	23	131	223	107	201	90	46	68	126	30	160	775	430
901	2,350	60	218	230	75	172	73	16	49	-	-	93	828	158
902	1,040	2	152	215	7	17	10	13	220	0	2	40	403	275
903	684	0	71	140	-	15	20	-	7	-	-	9	246	16
904	479	-	3	31	25	51	22	-	1	-	-	-	132	1
905	2,056	8	39	169	129	257	116	108	35	0	1	5	718	149
906	1,696	15	189	341	9	58	38	28	38	-	101	25	650	192
907	1,149	8	122	191	19	74	68	17	408	7	82	398	482	912
908	487	0	27	142	2	3	2	9	23	8	250	4	176	294
909	1,207	-	92	176	18	66	24	-	21	-	-	18	376	39
910	2,198	5	19	148	127	247	105	-	26	-	-	-	652	26
911	1,600	16	164	265	55	91	41	6	218	-	22	56	632	302
912	641	6	94	155	-	-	-	8	467	-	7	52	256	534
913	605	1	47	185	-	-	-	2	12	5	3	6	233	28
914	702	3	78	204	-	2	1	2	12	-	-	26	288	40
915	769	6	85	153	2	85	35	3	16	-	-	12	366	31
916	744	14	69	114	9	21	12	33	49	-	-	13	239	95
917	981	11	91	158	26	92	65	136	689	1	5	108	443	940
918	1,019	25	62	97	44	143	69	120	150	1	4	39	439	313
919	2,111	30	121	158	104	246	103	172	342	4	97	126	762	741
920	2,037	73	116	222	48	127	79	110	312	3	117	40	665	582
921	1,053	2	58	102	38	85	48	169	519	58	8	171	333	926
922	1,721	3	67	60	97	189	117	216	267	252	16	160	532	912
923	2,749	6	23	47	248	452	187	419	790	74	67	153	963	1,502
924	646	7	23	46	60	79	28	416	1,049	650	104	17	244	2,236
925	617	2	69	122	-	-	-	166	46	-	-	11	193	223
926	881	4	73	64	27	27	25	24	88	-	-	16	220	128
927	265	6	37	52	1	5	10	3	241	1	59	14	111	319

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
928	515	13	29	85	10	30	16	-	7	-	-	7	183	14
929	591	8	50	61	36	33	29	1,097	1,076	-	85	84	217	2,342
930	2,161	39	252	323	-	2	2	65	73	-	-	69	618	207
931	1,338	19	147	229	7	26	38	18	18	-	87	7	466	130
932	1,301	23	125	276	19	58	42	31	307	-	30	27	543	395
933	163	-	7	33	-	2	6	31	13	-	67	12	48	123
934	3,732	35	216	480	89	201	116	2	1	-	-	2	1,137	5
935	680	8	68	124	-	6	7	2	-	-	-	2	212	4
936	3,692	26	165	362	126	285	164	149	40	4	16	16	1,127	226
937	732	9	74	139	-	6	6	2	3	-	-	49	234	54
938	2,971	31	180	415	63	142	82	1	1	-	-	18	912	20
939	1,360	20	119	283	-	3	2	-	4	-	45	13	427	62
940	1,723	11	65	154	65	148	85	-	-	-	-	12	528	12
941	699	9	59	147	-	2	1	-	14	-	-	7	218	21
942	1,721	31	137	319	-	-	-	-	5	-	-	2	487	7
943	1,798	2	128	397	-	-	-	36	117	11	232	27	527	422
944	2,324	54	182	440	-	1	1	4	6	-	-	104	678	114
945	1,426	11	116	312	-	-	-	112	31	0	2	2	439	147
946	2,054	6	170	312	30	49	91	28	24	1	15	11	658	79
947	1,134	6	82	210	9	5	32	-	3	-	-	28	343	31
948	2,985	4	41	86	187	438	240	187	204	7	52	95	997	545
949	1,598	14	123	300	8	8	27	69	123	3	20	37	479	253
950	1,303	-	45	107	61	89	17	4	16	-	-	67	319	87
951	15	-	-	-	2	5	3	70	171	1	1	81	10	325
952	2,114	8	23	27	111	259	140	86	575	-	-	290	568	951
953	263	2	3	-	23	53	27	10	171	-	-	562	108	743
954	1,822	27	139	176	88	176	33	56	60	0	109	9	639	235
955	1,223	31	52	126	3	98	33	29	49	-	-	95	343	173
956	1,593	35	239	237	16	73	23	9	75	0	0	13	623	97
957	2,148	44	121	336	43	116	37	23	43	8	118	4	697	196
958	1,477	27	164	317	-	68	44	25	58	0	44	23	620	150
959	1,411	56	222	262	-	6	4	8	37	-	80	6	551	131
960	1,506	19	128	343	26	86	71	88	225	3	1	108	673	426
961	1,230	52	209	219	7	49	23	4	129	-	271	6	559	410
962	2,071	48	179	235	53	92	71	185	139	28	28	38	678	418
963	250	3	45	44	-	13	6	-	12	-	1,575	12	111	1,599
964	1,081	6	33	61	78	102	59	99	64	1	183	12	338	359
965	920	30	93	118	25	43	32	52	125	0	2	24	341	203
966	1,042	23	72	139	32	54	27	70	154	145	52	162	347	583
967	428	8	54	47	19	24	15	4	55	-	-	3	167	62
968	151	4	9	21	-	2	1	5	54	-	-	3	37	62
969	1,514	12	159	227	53	67	38	42	1,154	16	246	62	556	1,520
970	2,281	0	45	135	213	209	44	28	325	5	24	24	646	406
971	1,285	6	44	119	48	111	66	-	5	-	72	3	394	80
972	2,068	18	105	243	58	132	76	230	66	7	25	22	632	349
973	871	11	70	182	-	3	5	-	17	-	-	13	271	30
974	2,931	39	231	523	23	51	29	273	118	9	36	41	897	478
975	2,232	5	198	274	16	199	104	111	1,143	75	147	287	796	1,762
976	-	-	-	-	-	-	-	22	66	-	-	155	-	243
977	-	-	-	-	-	-	-	-	-	-	-	-	-	-
978	2	-	-	-	-	1	-	19	78	17	1	13	1	128
979	1,158	4	49	105	53	103	48	1	19	-	-	22	362	42
980	405	0	58	74	-	-	-	2	19	-	1	12	132	34
981	857	2	52	98	20	60	19	1	10	-	-	5	251	16
982	542	8	39	109	-	-	-	-	-	-	-	1	156	1
983	291	4	21	58	-	-	-	-	-	-	73	1	83	74
984	626	10	62	163	-	-	-	-	-	-	-	5	235	5
985	112	0	4	19	-	4	3	1	64	-	-	-	30	65
986	-	-	2	12	-	-	-	322	103	9	5	25	14	464
987	725	5	33	85	20	46	26	16	52	-	-	278	217	346
988	360	-	10	30	11	28	19	1,201	683	305	411	88	97	2,688
989	1,468	6	74	307	-	21	24	1	61	5	43	11	432	122
990	827	12	74	167	1	2	1	19	5	1	75	3	257	103
991	160	2	14	32	-	-	-	-	-	-	-	2	49	2
992	616	10	39	105	13	19	6	64	202	-	-	355	191	621
993	872	13	78	176	-	-	-	0	0	-	-	1	267	1
994	1,230	23	87	237	-	1	-	-	158	-	-	1	347	159
995	-	-	-	-	-	-	-	39	161	-	-	274	-	474
996	3	0	0	1	-	-	-	239	62	7	26	14	1	348
997	366	6	33	74	-	-	-	75	29	2	8	4	112	119
998	-	-	-	-	-	-	-	-	-	-	-	-	-	-
999	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1000	1,263	4	113	293	-	-	-	103	85	6	42	18	410	254
1001	407	-	21	84	-	18	13	1	6	-	-	7	136	14
1002	272	2	36	91	-	-	-	18	58	1	49	7	129	133
1003	2,552	2	160	647	10	133	93	81	74	-	-	25	1,045	180
1004	1,060	1	79	326	4	67	45	108	85	-	-	28	522	221
1005	2,087	-	87	355	17	133	91	20	444	40	347	76	684	926
1006	996	-	20	322	-	-	-	2	30	-	-	13	342	45
1007	299	2	17	81	-	-	-	1	8	-	-	-	100	9
1008	2,284	8	92	443	41	92	52	207	305	6	121	89	728	727
1009	980	4	75	210	9	40	52	92	135	101	605	10	389	943
1010	2,519	2	107	399	66	170	126	23	27	-	-	16	871	66
1011	2,168	6	143	411	20	85	107	3	14	-	1	10	773	28
1012	1,479	0	91	328	-	16	35	48	189	-	-	21	470	258
1013	1,379	2	65	377	-	-	-	55	31	-	-	9	444	95
1014	1,477	0	113	356	-	13	-	1	42	-	79	14	482	136
1015	69	1	25	182	-	-	-	3	5	-	-	4	208	12
1016	1,572	-	52	196	59	134	77	-	5	-	-	12	518	17
1017	698	-	98	174	-	-	-	74	47	-	186	412	272	719
1018	1,839	-	79	268	102	112	79	12	330	19	165	39	640	565
1019	1,728	9	97	231	47	154	109	-	17	-	-	9	647	26

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1020	1,404	9	121	320	-	-	-	25	136	-	89	277	450	527
1021	816	5	59	143	15	33	19	52	51	1	4	6	273	115
1022	790	10	37	224	-	-	-	3	25	-	-	17	271	45
1023	839	-	16	70	16	175	145	2	634	80	-	2	422	718
1024	277	-	33	116	28	14	14	22	2,963	56	78	121	205	3,240
1025	1,683	14	115	269	53	180	123	264	515	-	60	27	754	866
1026	1,501	0	85	322	16	62	93	9	307	14	123	33	578	486
1027	1,290	4	36	98	54	127	81	667	399	19	74	41	401	1,200
1028	938	18	72	224	-	8	35	140	3,624	-	33	37	357	3,834
1029	1,744	-	217	374	-	-	-	36	96	-	-	13	591	145
1030	1,282	25	123	282	-	-	-	124	130	-	24	9	430	287
1031	2,044	14	55	439	15	113	147	5	22	-	1	17	783	45
1032	1,205	-	143	271	-	24	24	79	73	0	99	12	462	263
1033	1,235	16	75	355	-	-	-	1	196	24	38	21	446	280
1034	-	-	-	-	-	-	-	-	-	-	-	6	-	6
1035	825	5	38	95	39	122	55	101	99	0	659	33	354	893
1036	2,766	-	31	206	135	274	190	117	973	387	104	87	836	1,668
1037	-	-	-	-	-	-	-	-	7	-	-	5	-	12
1038	2,595	24	147	222	143	254	184	113	878	8	171	235	974	1,404
1039	2,862	18	111	256	117	395	264	199	605	24	11	41	1,161	880
1040	1,702	0	52	188	79	282	77	68	153	1	40	26	678	288
1041	3,563	-	137	239	155	561	373	104	216	3	1,082	36	1,466	1,441
1042	1,141	-	52	91	32	153	107	4	53	-	-	4	435	61
1043	1,464	7	197	288	28	91	41	73	140	36	65	15	652	329
1044	1,815	35	138	250	34	86	63	153	136	2	75	100	606	466
1045	1,643	31	111	386	-	-	-	1	85	2	15	23	528	126
1046	359	4	10	52	7	13	17	-	1	-	-	-	103	1
1047	1,011	12	35	155	26	43	52	1	3	-	-	6	323	10
1048	833	7	27	119	22	39	44	-	35	-	76	3	257	114
1049	1,694	8	162	278	51	91	20	67	233	15	0	12	610	327
1050	2,318	26	168	278	92	143	80	4	104	-	93	5	787	206
1051	178	2	7	18	9	16	4	255	297	58	23	98	56	732
1052	17	-	1	2	1	2	-	6	22	-	-	59	6	86
1053	1,840	-	20	32	77	544	252	62	237	-	-	671	925	970
1054	832	-	117	175	-	-	-	23	54	-	-	66	292	143
1055	1,133	9	82	258	-	-	-	32	10	-	-	5	349	47
1056	3,636	22	262	592	1	86	54	9	40	-	-	92	1,017	141
1057	26	-	1	8	-	-	-	15	-	-	-	-	9	15
1058	1,541	6	36	88	75	169	98	-	3	-	-	2	472	5
1059	443	-	11	113	2	6	4	1	5	-	2	9	136	17
1060	582	8	49	122	-	1	2	-	-	-	-	1	182	1
1061	1,056	-	60	266	-	-	1	-	5	-	-	14	327	19
1062	1,161	17	103	237	-	-	-	0	0	0	0	4	357	5
1063	31	-	1	8	-	-	-	-	-	-	-	3	9	3
1064	3,032	46	270	615	-	-	-	-	-	-	-	7	930	7
1065	75	-	3	17	-	-	-	-	-	-	-	2	20	2
1066	1,937	20	128	158	110	209	97	93	790	1	55	31	722	970
1067	2,370	52	153	272	69	173	42	5	284	514	6	51	761	860
1068	2,583	20	226	190	176	187	117	32	23	0	0	10	916	65
1069	2,055	20	142	190	126	203	100	70	180	-	-	240	781	490
1070	1,094	7	99	246	-	-	7	33	120	11	296	16	359	476
1071	1,890	46	232	298	1	26	7	5	23	-	17	17	610	62
1072	1,150	10	57	125	62	119	46	28	55	-	88	-	419	171
1073	658	13	78	129	-	-	9	68	78	-	-	6	229	152
1074	686	5	40	137	5	44	10	25	31	0	21	22	241	100
1075	1,176	9	44	105	49	96	31	2	18	-	222	66	334	308
1076	2,453	11	223	285	71	92	115	4	46	-	-	26	797	76
1077	1,837	-	96	147	62	151	80	23	28	-	208	6	536	265
1078	-	-	-	-	-	-	-	41	378	563	48	785	-	1,816
1079	-	-	-	-	-	-	-	24	261	232	3	531	-	1,051
1080	1	-	-	-	-	1	-	216	2,667	312	271	1,709	1	5,174
1081	-	-	-	-	-	-	-	-	34	-	-	-	-	34
1082	-	-	-	-	-	-	-	133	381	-	-	1,929	-	2,443
1083	1,414	14	85	195	31	69	40	132	285	1	5	483	434	906
1084	1,784	26	155	366	-	-	-	1	-	-	-	4	547	5
1085	467	6	39	98	-	-	-	-	-	-	-	9	144	9
1086	8,653	17	106	274	498	1,121	642	134	119	6	26	51	2,658	335
1087	718	21	101	106	-	30	22	121	22	-	-	6	280	149
1088	1,021	-	101	137	9	64	90	20	198	-	-	18	401	236
1089	152	-	20	28	-	-	-	25	13	6	-	1	48	45
1090	1,042	12	77	254	-	-	-	107	177	-	-	585	343	869
1091	1,277	2	66	269	-	15	6	2	7	-	64	13	358	86
1092	511	-	23	139	-	-	-	-	-	-	-	6	162	6
1093	3,926	16	95	236	190	428	244	116	131	5	22	56	1,209	330
1094	2,266	34	202	457	-	-	-	-	7	-	-	4	693	11
1095	5,936	17	100	229	324	730	417	121	106	5	23	46	1,817	302
1096	1,958	24	161	450	-	1	-	-	18	-	-	29	637	47
1097	1,477	-	70	284	3	57	43	13	21	-	-	16	457	50
1098	1,326	-	67	281	2	60	39	1	11	-	59	12	449	83
1099	2,726	18	118	288	142	452	204	39	91	-	-	8	1,222	138
1100	133	-	8	33	-	3	7	1	19	-	-	13	51	33
1101	2,392	36	213	484	-	-	-	-	15	-	-	4	734	19
1102	951	11	75	191	-	4	8	-	-	-	-	3	288	3
1103	2,347	22	173	481	-	1	1	8	272	26	228	48	678	582
1104	2,238	34	200	451	-	-	-	2	1	-	-	-	685	3
1105	854	22	61	162	-	9	4	2	2	-	-	4	258	8
1106	2,980	48	261	599	-	2	1	-	-	-	-	3	911	3
1107	1,744	31	149	347	-	3	2	3	9	-	-	1	531	13
1108	1,305	29	105	263	-	8	5	1	2	-	-	10	410	13
1109	864	10	57	137	15	35	11	-	4	-	-	15	266	19
1110	1,127	13	93	211	14	8	6	-	4	-	-	3	345	7
1111	1,771	21	126	304	39	92	28	38	35	3	8	132	610	215

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1112	1,445	10	80	179	51	85	51	19	26	-	-	107	457	151
1113	2,263	12	106	149	169	179	122	7	10	-	102	24	737	143
1114	1,134	28	65	147	4	30	49	18	143	0	1	202	322	364
1115	580	1	20	53	22	36	34	88	510	-	-	103	165	702
1116	158	-	4	2	10	10	4	2	99	595	-	711	30	1,407
1117	1,807	-	194	302	125	97	37	55	197	1	7	534	755	794
1118	1,884	0	81	127	48	142	62	152	753	-	37	74	460	1,015
1119	16	-	1	1	3	2	1	31	111	-	-	-	8	142
1120	64	1	7	11	-	1	1	-	-	-	-	-	21	-
1121	1,727	69	314	172	63	56	26	38	64	-	-	32	700	134
1122	2,010	64	220	251	-	30	28	58	79	1	4	94	593	235
1123	2,062	38	138	315	83	237	107	252	215	0	74	89	918	631
1124	1,515	35	95	198	30	71	13	63	79	0	103	8	442	253
1125	535	11	42	78	22	45	13	63	130	5	11	10	211	221
1126	295	5	26	33	17	33	17	47	273	-	-	27	131	347
1127	1,963	81	217	184	46	95	66	83	259	1	110	52	688	506
1128	874	19	67	87	32	63	27	28	157	-	-	223	295	408
1129	706	20	53	60	15	31	18	11	108	51	115	38	198	323
1130	290	1	7	5	17	38	22	86	107	1	27	193	90	414
1131	941	0	75	105	27	34	16	80	339	2	15	450	257	886
1132	129	-	3	-	8	18	10	32	41	0	2	13	39	89
1133	1,787	28	59	88	73	95	62	38	93	1	72	55	405	259
1134	760	21	15	67	32	26	22	26	64	-	-	38	183	128
1135	482	21	28	58	11	26	12	19	184	1	31	110	156	344
1136	515	7	10	43	19	42	11	20	51	0	113	9	133	193
1137	186	2	4	19	10	16	3	11	180	-	91	1	54	284
1138	564	20	29	56	11	23	14	13	30	0	1	23	153	68
1139	119	3	4	18	7	14	3	5	7	-	-	-	49	12
1140	209	3	6	22	5	14	5	3	81	-	-	4	56	88
1141	12	-	1	3	-	-	1	-	-	-	-	5	5	5
1142	23	-	-	10	-	-	-	-	-	-	-	9	10	9
1143	25	-	1	4	-	-	1	-	-	-	-	3	6	3
1144	32	-	-	9	-	-	-	-	-	-	-	9	9	9
1145	87	-	3	10	-	1	-	-	58	-	-	5	14	63
1146	52	-	-	18	-	-	-	-	-	-	-	13	18	13
1147	15	1	1	2	-	-	-	-	-	-	-	4	4	4
1148	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1149	104	5	5	20	-	2	1	69	214	-	-	487	33	771
1150	-	-	-	-	-	-	-	76	245	-	-	572	-	893
1151	53	-	4	10	4	2	2	19	50	-	-	258	22	327
1152	21	-	-	5	-	-	-	78	235	-	-	555	5	868
1153	56	1	1	9	-	-	-	132	400	-	-	991	11	1,522
1154	14	-	-	5	-	-	-	43	156	-	92	328	5	620
1155	-	-	-	-	-	-	-	7	5	-	1	115	-	128
1156	-	-	-	-	-	-	-	-	-	-	-	12	-	12
1157	92	4	13	16	-	-	-	44	162	-	-	427	33	633
1158	119	-	4	20	1	2	1	4	51	2	-	75	28	132
1159	-	-	-	-	-	-	-	1	35	41	-	30	-	107
1160	52	1	6	8	-	-	-	169	366	2	2	871	15	1,410
1161	263	-	7	34	5	14	10	68	648	-	-	-	71	716
1162	1,096	-	31	146	16	48	25	24	374	-	-	1,532	266	1,930
1163	-	-	-	-	-	-	-	7	13	38	-	5	-	63
1164	-	-	-	-	-	-	-	-	-	-	-	39	-	39
1165	12	-	-	-	-	6	-	13	25	-	-	441	6	479
1166	15	-	-	-	1	2	-	1	43	-	-	153	4	198
1167	674	0	61	37	36	39	12	21	93	0	1	105	186	220
1168	480	-	23	28	45	30	10	11	193	14	-	20	137	238
1169	354	-	18	24	28	25	12	5	42	-	-	12	107	59
1170	1,907	10	75	73	157	135	41	5	89	-	65	2	491	161
1171	2,238	25	69	68	184	189	53	18	69	-	-	21	589	108
1172	42	-	0	5	2	2	2	88	62	-	-	46	11	196
1173	2,858	24	128	175	151	132	71	73	493	-	52	45	681	663
1174	1,775	17	118	55	75	78	59	35	196	-	53	68	403	352
1175	1,490	31	68	98	55	73	18	27	89	-	-	7	343	123
1176	19	-	-	5	-	-	-	-	-	-	-	6	5	6
1177	11	-	-	4	-	-	-	-	10	-	-	6	4	16
1178	12	-	-	6	-	-	-	-	17	-	-	9	6	26
1179	22	-	1	6	-	-	-	-	-	9	-	11	7	20
1180	17	1	2	4	-	-	1	-	-	-	-	3	8	3
1181	38	-	-	14	-	-	-	-	4	-	-	12	14	16
1182	25	-	3	5	-	-	2	-	2	-	-	3	10	5
1183	2,307	29	158	370	32	72	41	-	11	-	76	3	702	90
1184	672	12	54	140	-	-	-	-	-	-	-	3	205	3
1185	2,852	30	160	380	66	149	85	160	46	5	18	13	870	240
1186	930	17	74	202	-	2	2	-	1	-	-	2	296	3
1187	2,282	30	176	393	18	40	23	-	27	-	-	2	680	29
1188	1,301	8	47	105	52	118	67	309	80	9	34	21	397	454
1189	1,407	31	127	208	-	5	5	31	113	-	-	191	376	335
1190	2,190	23	89	170	84	183	105	238	225	10	80	84	654	638
1191	68	-	4	4	3	6	-	13	82	3	5	426	17	529
1192	539	11	31	53	-	14	19	1	4	-	-	-	128	5
1193	2,431	88	192	227	99	80	31	27	50	1	71	58	718	206
1194	55	-	3	12	-	-	-	-	7	-	-	34	15	41
1195	36	1	3	6	-	1	2	-	-	-	-	14	13	14
1196	10	-	1	1	-	-	-	-	-	-	-	3	2	3
1197	105	2	7	16	1	2	4	-	-	-	-	5	32	5
1198	28	-	2	5	-	-	2	-	-	-	-	7	9	7
1199	1,725	7	39	90	87	196	111	-	-	-	-	4	530	4
1200	2,260	8	48	109	117	259	147	302	336	11	52	265	687	967
1201	3,352	38	223	503	57	129	73	-	-	-	-	22	1,022	22
1202	843	-	-	-	60	101	49	-	4	-	58	791	210	853
1203	1,962	15	90	202	64	145	83	237	240	5	20	351	599	853

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1204	2,426	23	106	204	53	118	112	89	222	2	10	87	616	410
1205	1,508	41	111	106	41	93	54	21	77	0	1	143	445	242
1206	1,872	67	108	113	81	97	52	4	76	15	236	26	518	357
1207	3,833	20	64	108	213	481	274	688	337	137	196	32	1,161	1,390
1208	3,464	56	143	215	110	197	72	119	989	-	3	21	794	1,132
1209	2,130	57	155	211	36	90	55	5	18	-	45	2	604	70
1210	1,129	33	112	114	11	14	5	32	307	-	38	4	290	381
1211	1,108	97	129	95	-	-	-	4	61	76	45	13	321	199
1212	289	10	19	35	4	7	-	3	121	-	-	358	75	482
1213	84	-	-	2	2	3	-	19	69	-	-	231	7	319
1214	179	2	4	20	4	7	-	28	71	-	-	400	37	499
1215	-	-	-	-	-	-	-	22	103	-	0	341	-	466
1216	-	-	-	-	-	-	-	46	74	7	1	363	-	492
1217	26	-	2	7	-	-	-	-	-	-	-	29	9	29
1218	68	-	5	15	-	-	-	-	-	-	-	16	20	16
1219	140	1	10	31	-	3	2	2	2	-	-	18	47	22
1220	78	-	5	16	-	2	-	3	1	-	66	6	23	76
1221	29	-	2	6	-	-	-	-	-	-	-	6	8	6
1222	167	1	9	27	1	2	1	-	8	-	-	6	41	14
1223	152	1	8	26	1	2	1	7	1	-	-	12	39	20
1224	2,558	20	119	270	82	186	106	75	19	2	8	12	783	117
1225	129	1	9	30	-	1	3	-	-	-	-	23	44	23
1226	3,669	29	166	377	121	274	156	-	-	-	-	3	1,123	3
1227	64	1	4	12	-	1	1	-	-	-	-	11	19	11
1228	2,678	34	212	451	27	61	35	173	45	5	19	14	818	256
1229	3,673	21	139	282	151	339	194	-	12	-	-	3	1,126	15
1230	46	-	8	6	-	-	-	-	3	-	-	6	14	9
1231	3,117	27	156	307	94	199	116	-	206	-	-	29	899	235
1232	3,697	43	245	531	68	149	86	-	4	-	-	4	1,123	8
1233	18	-	3	3	-	-	-	-	2	-	-	1,047	6	1,049
1234	2,777	36	160	118	122	269	146	25	118	1	2	23	851	169
1235	1,569	31	142	86	36	31	25	25	87	-	113	141	351	367
1236	21	-	1	3	-	-	-	240	961	-	-	1,687	4	2,888
1237	87	7	10	6	-	-	-	128	45	4	2	90	23	269
1238	64	-	2	8	-	-	1	6	15	-	-	60	11	81
1239	131	1	4	13	1	1	1	32	125	-	-	226	21	383
1240	10	-	-	-	-	-	-	76	70	-	4	1,004	-	1,154
1241	-	-	-	-	-	-	-	14	72	-	26	1,141	-	1,253
1242	222	2	11	34	2	2	3	33	53	-	47	815	54	948
1243	38	-	4	9	-	-	-	-	-	-	-	13	13	13
1244	17	-	1	4	-	-	-	-	-	-	-	6	5	6
1245	46	-	2	8	-	-	-	-	-	-	-	6	10	6
1246	102	-	5	18	-	-	1	9	-	-	-	13	24	22
1247	37	1	3	8	-	1	1	-	1	-	-	8	14	9
1248	36	1	3	10	-	1	1	-	-	-	-	6	16	6
1249	60	-	3	12	-	-	1	-	1	-	-	121	16	122
1250	99	1	6	20	1	1	2	1	10	-	-	6	31	17
1251	49	-	2	8	-	-	1	1	-	-	-	4	11	5
1252	206	2	10	37	2	2	3	-	41	-	-	7	56	48
1253	90	-	5	20	-	-	-	-	3	-	-	28	25	31
1254	558	12	29	119	-	14	2	29	30	-	40	126	176	225
1255	132	3	14	34	-	-	-	5	1	-	-	24	51	30
1256	382	7	33	82	-	-	-	42	52	-	7	15	122	116
1257	365	7	32	74	-	-	-	-	14	-	111	5	113	130
1258	575	-	39	116	-	3	3	1	2	8	-	23	161	34
1259	224	6	22	51	-	-	-	3	75	-	55	1	79	134
1260	136	1	11	28	-	-	-	20	6	-	-	1	40	27
1261	81	1	4	16	-	1	1	-	3	-	-	5	23	8
1262	155	-	3	4	18	12	2	34	322	-	-	8	40	363
1263	100	-	12	6	7	7	3	10	22	0	0	25	35	58
1264	3	-	-	-	-	-	-	10	12	0	0	3	-	25
1265	-	-	-	1	-	-	-	6	7	0	0	3	1	16
1266	9	-	-	-	0	1	0	16	46	-	-	9	1	71
1267	41	-	1	5	-	1	2	5	13	-	-	-	10	18
1268	72	2	4	8	-	-	-	1	-	-	-	-	14	1
1269	13	-	1	1	1	1	-	-	12	-	-	56	4	68
1270	-	-	-	-	-	-	-	-	-	-	-	127	-	127
1271	9	-	-	3	-	-	-	56	224	-	-	395	3	675
1272	-	-	-	-	-	-	-	23	117	-	-	216	-	357
1273	86	7	9	6	-	-	-	29	58	-	-	150	22	237
1274	-	-	-	-	-	-	-	4	30	-	0	406	-	441
1275	-	-	-	-	-	-	-	-	4	483	-	134	-	621
1276	252	-	-	-	33	66	33	188	751	15	-	29	132	983
1277	1,021	-	-	-	134	269	134	125	1,832	732	-	92	537	2,781
1278	293	-	-	-	39	77	39	145	293	-	-	7	154	445
1279	441	-	16	21	118	101	36	127	107	-	-	68	291	303
1280	618	-	15	66	28	68	67	98	452	-	-	41	244	591
1281	399	-	1	6	11	21	12	13	330	-	-	5	50	348
1282	-	-	-	-	-	-	-	-	6	-	161	-	-	167
1283	181	-	2	16	8	11	9	11	96	-	-	11	45	118
1284	275	-	-	-	36	66	33	79	191	-	-	93	135	363
1285	175	-	-	-	-	-	-	9	3,780	-	-	5	-	3,794
1286	196	-	6	22	18	35	9	47	450	-	47	3	90	547
1287	-	-	-	-	-	-	-	13	-	-	-	-	-	13
1288	1,301	-	15	30	131	135	50	24	99	-	-	-	361	122
1289	696	19	12	63	22	32	27	3	34	-	-	2	175	39
1290	596	-	19	50	15	24	32	-	8	-	-	-	141	8
1291	22	-	-	-	2	4	-	10	1,132	159	4	1,304	7	2,609
1292	-	-	-	-	-	-	-	-	49	-	-	24	-	73
1293	218	-	-	-	29	57	29	121	291	-	-	137	115	549
1294	1,227	-	-	-	161	323	161	35	2,201	926	-	1	646	3,162
1295	716	-	-	-	91	183	91	372	593	-	17	14	366	996

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1296	270	-	-	-	35	71	35	150	590	-	-	236	142	976
1297	3	-	-	-	1	-	-	69	475	991	526	7	1	2,069
1298	358	-	9	37	28	66	47	113	126	229	-	42	188	511
1299	2,046	-	13	53	29	53	46	57	119	588	357	9	193	1,129
1300	-	-	-	-	-	-	-	18	13	-	-	-	-	31
1301	219	-	1	21	25	44	24	2	90	123	-	3	116	218
1302	-	-	-	-	-	-	-	-	58	1,170	770	30	-	2,028
1303	118	-	2	15	5	8	7	-	199	5	7	4	38	214
1304	-	-	-	-	-	-	-	1	17	549	-	5	-	572
1305	16	-	-	-	-	-	-	5	369	5	-	98	-	476
1306	-	-	-	-	-	-	-	-	4	79	1	39	-	123
1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1308	-	-	-	-	-	-	-	1	-	491	-	162	-	654
1309	-	-	-	-	-	-	-	5	1	20	-	371	-	397
1310	51	-	2	6	-	2	3	1	44	-	-	-	12	45
1311	95	-	-	-	6	12	6	18	70	-	-	22	23	110
1312	652	-	16	59	68	131	21	-	-	-	-	-	295	-
1313	-	-	-	-	-	-	-	5	1	-	-	66	-	71
1314	460	-	6	12	53	51	21	1	5	-	-	-	143	6
1315	243	8	3	23	8	14	8	8	37	-	-	-	63	45
1316	1,622	99	33	158	25	41	37	3	100	-	45	4	393	152
1317	541	-	17	40	15	22	27	-	-	-	-	28	120	28
1318	-	-	-	-	-	-	-	73	38	121	-	6	-	238
1319	341	-	-	-	45	90	45	20	344	-	-	59	179	422
1320	1,088	-	-	-	143	286	143	123	993	-	-	1	572	1,117
1321	480	-	-	-	68	125	63	148	359	4	-	1	256	512
1322	135	-	-	-	18	36	18	35	124	-	-	1	71	159
1323	206	-	-	-	27	54	27	56	229	-	-	1	108	286
1324	416	-	-	-	56	109	55	224	863	1	-	34	219	1,122
1325	164	-	-	-	22	43	22	35	119	-	-	17	86	171
1326	129	-	-	-	17	34	17	68	263	246	-	31	68	609
1327	653	-	-	-	230	133	61	207	892	739	-	73	425	1,911
1328	262	-	-	-	34	69	34	167	738	425	226	3	138	1,558
1329	385	-	-	-	161	70	31	160	680	15	-	19	262	873
1330	113	-	-	-	15	30	15	14	92	-	-	33	59	139
1331	453	-	-	-	60	119	60	143	461	-	-	37	238	642
1332	633	-	-	-	-	-	-	-	-	3,406	690	-	-	4,096
1333	336	-	-	-	45	87	44	31	171	2,367	-	19	176	2,588
1334	343	-	-	-	45	90	45	74	345	334	-	-	179	752
1335	203	-	-	-	27	53	27	53	447	226	-	-	107	726
1336	16	-	-	-	-	-	-	5	-	15	-	878	-	897
1337	130	-	1	1	7	15	7	6	96	64	-	147	31	313
1338	-	-	-	-	-	-	-	-	-	67	-	-	-	67
1339	10	-	-	-	1	2	-	2	14	-	-	253	3	269
1340	-	-	-	-	-	-	-	4	49	-	-	60	-	113
1341	493	25	28	39	0	3	4	32	49	-	-	92	99	173
1342	176	10	11	17	-	1	2	2	-	-	-	3	41	5
1343	1,051	48	82	141	19	17	9	9	100	-	-	1	315	110
1344	2,548	90	216	162	107	87	67	23	413	42	84	8	729	570
1345	817	19	53	47	23	29	26	44	73	5	-	-	196	122
1346	479	2	22	39	6	22	18	15	109	-	-	-	109	125
1347	46	-	-	-	6	6	3	0	153	-	-	211	15	364
1348	122	1	12	8	-	2	1	1	114	-	-	8	24	123
1349	316	1	11	6	-	3	1	(0)	202	3	-	156	22	361
1350	188	0	5	3	-	1	1	3	85	1	-	47	9	137
1351	8	-	-	-	-	-	-	-	-	-	-	39	-	39
1352	128	-	-	-	17	34	17	44	111	-	-	35	67	190
1353	6	-	-	-	0	1	-	16	30	-	-	350	1	397
1354	383	-	-	-	50	100	50	84	320	-	-	26	200	430
1355	-	-	-	-	-	-	-	1	6	-	-	248	-	255
1356	259	-	2	1	33	66	33	47	12	247	-	38	136	344
1357	215	-	6	4	23	48	23	44	167	270	-	91	104	572
1358	26	-	3	2	0	1	-	4	19	-	-	89	6	112
1359	44	-	4	3	1	3	-	84	140	-	-	1,457	11	1,680
1360	69	1	6	14	-	-	-	195	51	6	22	49	21	322
1361	2,309	12	116	352	55	123	70	185	48	5	21	14	729	274
1362	2,628	26	151	334	62	144	88	71	54	3	18	32	805	178
1363	2,274	18	104	235	75	168	96	-	-	-	-	2	696	2
1364	428	0	0	1	29	65	37	388	101	11	43	24	131	568
1365	997	9	52	119	28	62	35	-	-	-	-	1	305	1
1366	1,592	18	107	243	26	59	33	-	-	-	-	2	486	2
1367	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1368	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1369	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1370	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1371	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1372	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1373	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1374	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1375	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1376	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1377	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1378	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1379	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1380	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1381	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1382	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1385	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1386	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1387	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1388	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1389	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1390	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1391	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1392	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1393	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1394	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1395	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1396	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1397	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1398	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1399	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1400	1,870	24	183	274	-	28	-	63	33	0	95	18	509	209
1401	1,356	37	51	80	50	58	22	14	11	0	1	1	299	27
1402	3,545	2	100	105	148	329	160	17	72	-	124	6	844	219
1403	386	4	38	29	8	10	8	2	17	-	-	-	97	19
1404	388	5	33	26	6	8	7	5	1	0	1	0	86	7
1405	1,312	11	72	66	47	69	47	19	20	1	4	14	313	59
1406	287	2	17	10	10	13	10	1	29	2	3	8	62	43
1407	828	11	30	48	31	54	19	81	201	-	-	518	193	800
1408	640	5	22	44	17	38	17	34	52	1	3	338	143	427
1409	3,351	36	135	433	69	165	175	60	137	3	3	53	1,013	255
1410	392	9	22	45	6	19	10	105	45	-	-	14	111	164
1411	319	3	15	33	10	38	15	117	71	3	2	11	114	205
1412	-	-	-	-	-	-	-	73	394	70	7	987	-	1,532
1413	1,090	11	59	132	34	43	38	1	10	-	89	1	317	101
1414	2,559	4	6	31	166	375	194	338	299	14	65	118	776	833
1415	3	-	-	1	-	-	-	19	58	-	-	138	1	215
1416	-	-	-	-	-	-	-	5	8	-	1	199	-	213
1417	32	0	2	10	-	-	-	124	409	-	-	693	12	1,226
1418	1,930	26	161	406	-	1	1	-	-	-	-	3	596	3
1419	708	8	53	159	-	-	-	-	1	-	-	2	220	3
1420	3,094	27	157	302	57	89	62	53	195	-	127	32	694	407
1421	639	32	55	86	-	2	-	84	29	-	-	99	175	212
1422	833	19	77	118	3	9	1	15	66	-	-	1	227	82
1423	3,254	67	181	388	21	55	40	55	114	-	-	7	752	176
1424	1,001	18	94	106	13	17	17	-	-	-	116	1	265	117
1425	1,071	11	101	113	19	26	20	29	156	46	-	40	290	271
1426	2,369	61	171	339	15	24	20	79	254	12	-	38	629	383
1427	1,373	-	106	214	0	4	7	57	2,079	724	239	3	332	3,101
1428	1,975	57	84	387	3	11	2	40	124	-	120	11	545	295
1429	4,899	82	233	192	231	240	89	85	273	-	-	12	1,067	370
1430	1,566	17	97	216	23	40	29	9	52	0	14	29	422	105
1431	4,728	63	114	266	211	308	117	200	334	4	31	31	1,078	599
1432	1,236	2	51	250	3	34	40	1	36	-	83	13	380	133
1433	2,262	29	67	158	122	202	87	291	123	4	19	41	666	478
1434	1,176	1	154	206	-	2	7	-	40	2	102	70	370	214
1435	2,485	4	48	147	77	280	154	51	318	2	8	20	711	400
1436	1,785	5	88	180	69	183	81	93	121	4	20	63	608	301
1437	2,303	7	51	158	81	314	169	99	116	2	9	206	780	432
1438	645	-	36	130	-	12	20	31	25	8	2	9	198	75
1439	4,027	12	61	157	345	498	187	316	336	6	26	152	1,261	836
1440	147	1	5	19	7	11	4	-	2	-	-	2	47	4
1441	909	10	37	112	17	27	9	2	3	-	-	-	211	5
1442	641	10	54	126	4	6	2	-	-	-	-	37	202	37
1443	1,709	0	7	62	102	231	132	57	105	2	11	21	534	197
1444	2,201	62	146	250	10	21	13	30	158	-	-	4	502	191
1445	2,060	34	233	164	3	29	18	33	84	2	3	526	481	648
1446	2,942	19	210	313	22	67	39	46	177	315	163	6	670	707
1447	2,627	17	128	179	85	110	44	10	15	-	91	25	563	141
1448	1,009	16	73	145	7	18	14	22	197	83	-	24	273	326
1449	3,471	40	67	80	195	241	110	87	170	302	30	5	732	595
1450	2,798	87	102	333	33	55	34	61	51	2	89	22	643	225
1451	2,915	37	233	269	66	63	61	-	19	1	4	2	729	26
1452	1,219	-	-	-	75	166	92	294	113	2	50	48	333	508
1453	2,438	-	-	-	174	376	198	97	105	4	122	36	748	364
1454	1,883	-	19	37	159	325	112	51	42	-	-	2	652	95
1455	1,699	9	81	10	456	310	31	-	259	-	652	1	897	912
1456	3,490	-	67	160	190	456	244	1	4	-	-	2	1,117	7
1457	878	4	25	89	36	78	46	13	16	1	334	7	278	371
1458	549	5	39	135	4	9	6	-	10	-	-	3	198	13
1459	517	3	32	116	5	14	8	37	40	0	11	11	178	99
1460	401	4	32	105	3	6	5	-	6	-	-	18	155	24
1461	728	3	57	137	13	43	20	1	10	-	-	7	273	18
1462	404	-	39	125	-	-	-	-	4	-	-	36	164	40
1463	833	3	84	225	-	-	-	4	26	-	21	3	312	54
1464	396	3	39	98	-	-	-	-	8	-	-	15	140	23
1465	517	5	51	117	-	-	-	8	290	28	245	50	172	620
1466	1,284	19	115	262	-	-	-	-	2	-	-	3	396	5
1467	5,181	-	-	5	348	784	449	517	765	50	398	328	1,586	2,057
1468	4,960	0	0	1	334	753	430	152	976	89	773	216	1,518	2,206
1469	-	-	-	-	-	-	-	-	-	-	-	395	-	395
1470	-	-	-	-	-	-	-	1	15	-	0	286	-	302
1471	-	-	-	-	-	-	-	0	37	-	0	417	-	454
1472	42	1	2	11	-	-	-	3	13	-	-	294	14	310
1473	2,205	64	105	289	17	20	25	44	164	1	3	216	520	428
1474	482	7	14	71	4	3	1	44	141	-	36	632	100	853
1475	1,903	62	113	199	37	45	35	16	15	-	80	11	491	122
1476	2,081	36	105	315	10	55	28	-	7	-	79	53	549	139
1477	2,933	29	222	288	46	64	56	66	56	2	98	56	705	278
1478	2,546	60	185	321	39	37	115	8	17	0	88	5	757	118
1479	1,748	12	84	230	34	78	53	8	12	0	0	2	491	22

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1480	2,560	26	169	448	6	15	22	1	8	-	-	5	686	14
1481	2,133	29	178	435	10	24	20	-	4	-	35	3	697	42
1482	2,456	11	87	218	92	209	121	293	512	51	404	101	738	1,360
1483	964	10	57	133	21	48	27	316	82	9	35	22	296	464
1484	2,732	26	157	369	63	144	83	-	-	-	-	3	842	3
1485	2,948	44	261	595	-	1	1	-	-	-	-	3	902	3
1486	4,006	-	1	16	266	602	346	186	278	6	27	327	1,231	824
1487	1,650	5	34	77	86	195	111	66	210	-	-	370	508	646
1488	5,606	19	112	256	293	659	377	111	98	5	21	42	1,716	276
1489	11	-	-	-	-	1	-	74	124	-	12	1,132	1	1,341
1490	4	-	-	-	-	-	-	87	63	0	0	250	-	401
1491	706	45	54	52	4	18	9	1	14	-	-	33	182	48
1492	-	-	-	-	-	-	-	37	63	-	12	1,534	-	1,646
1493	-	-	-	-	-	-	-	-	-	-	-	46	-	46
1494	-	-	-	-	-	-	-	20	151	6	2	813	-	991
1495	6	-	-	2	-	-	-	35	109	-	6	907	2	1,056
1496	96	-	8	16	-	-	1	45	62	-	8	1,013	25	1,128
1497	4,204	32	192	435	139	312	178	10	26	-	-	86	1,288	121
1498	4,608	32	189	427	163	367	209	8	105	-	-	61	1,387	174
1499	6,775	15	88	206	389	876	501	70	136	2	7	196	2,075	410
1500	488	-	-	1	33	74	42	217	697	0	44	1,199	150	2,157
1501	19	-	-	4	-	-	-	217	867	-	-	1,520	4	2,604
1502	13	-	2	2	-	-	-	185	741	-	-	1,300	4	2,227
1503	34	-	1	7	-	-	-	5	-	-	-	26	8	31
1504	132	-	11	33	-	-	1	-	7	-	-	108	45	115
1505	2	-	-	-	-	-	-	59	97	-	13	1,493	-	1,663
1506	8	-	-	-	1	1	-	42	70	-	9	1,080	2	1,202
1507	-	-	-	-	-	-	-	4	7	-	1	113	-	126
1508	317	5	8	10	15	18	10	115	186	-	-	298	66	599
1509	-	-	-	-	-	-	-	8	15	-	1	219	-	243
1510	82	-	3	4	1	2	1	2	-	-	-	147	11	149
1511	35	-	3	6	-	-	-	132	69	-	-	1,744	9	1,945
1512	773	29	45	119	-	10	-	2	36	-	54	46	203	138
1513	90	-	10	20	-	-	-	-	-	-	-	14	30	14
1514	67	-	5	11	-	-	-	-	-	-	-	51	16	51
1515	69	-	6	12	-	-	-	-	-	-	-	36	18	36
1516	104	-	9	28	-	-	2	-	2	-	-	18	39	20
1517	100	-	8	25	-	-	-	-	-	-	-	59	33	59
1518	81	2	3	4	6	7	4	1	16	-	-	77	26	94
1519	53	2	2	4	5	6	4	37	73	-	8	956	23	1,075
1520	9	-	1	3	-	-	-	-	-	-	-	2	4	2
1521	16	-	2	5	-	-	-	12	40	-	-	145	7	197
1522	56	-	6	10	-	-	-	7	15	-	-	245	16	267
1523	45	-	5	11	-	-	-	11	9	-	-	116	16	136
1524	46	-	5	10	-	-	-	-	-	-	-	140	15	140
1525	1	-	-	1	-	-	-	-	-	-	-	16	1	16
1526	108	-	6	21	1	1	1	2	-	-	-	157	30	159
1527	146	-	8	31	-	1	1	-	25	-	-	56	41	81
1528	-	-	-	-	-	-	-	7	62	-	2	280	-	351
1529	-	-	-	-	-	-	-	248	3	-	-	9	-	260
1530	104	2	3	4	6	7	4	58	96	-	13	1,476	26	1,643
1531	147	6	10	12	18	22	12	2	6	-	1	61	80	70
1532	16	-	-	1	1	1	1	5	9	-	-	360	4	374
1533	6,347	34	203	459	275	619	353	55	39	2	9	38	1,943	142
1534	2,894	-	2	3	193	435	249	48	43	2	9	20	882	122
1535	549	-	7	20	54	77	33	13	199	6,585	-	1	191	6,798
1536	-	-	-	-	-	-	-	16	70	-	1	354	-	441
1537	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1538	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1539	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1540	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1541	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1542	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1543	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1544	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1545	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1546	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1547	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1548	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1549	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1550	1,154	8	97	276	-	-	-	90	53	3	11	8	381	165
1551	1,277	-	-	-	86	194	111	0	0	0	0	1	391	2
1552	555	8	50	112	-	-	-	352	115	28	57	20	170	574
1553	1,202	16	104	247	-	-	-	3	42	-	-	1	367	46
1554	266	1	17	51	6	12	8	9	12	-	-	21	95	41
1555	955	1	67	259	-	7	7	2	74	4	96	19	341	196
1556	374	2	27	107	-	6	4	2	1	-	-	2	146	5
1557	-	-	-	-	-	-	-	12	553	35	44	73	-	718
1558	1,059	15	91	216	-	1	2	1	7	-	-	8	325	16
1559	1,688	11	69	164	59	134	77	-	-	-	-	3	516	3
1560	304	2	13	31	10	23	13	52	173	-	-	301	93	526
1561	26	-	1	7	-	1	1	0	0	0	0	1	10	1
1562	1,096	-	4	4	72	162	93	1,058	436	33	137	136	334	1,800
1563	4,027	32	187	423	130	293	168	11	10	0	2	7	1,233	31
1564	3,022	46	270	610	-	-	-	174	45	5	19	13	925	256
1565	6,577	10	59	134	399	898	513	-	2	-	-	1	2,013	3
1566	2,780	27	159	360	67	151	86	-	1	-	-	22	851	23
1567	1,961	27	169	398	-	2	6	-	-	-	-	2	603	2
1568	805	11	68	162	-	1	2	-	-	-	-	1	245	1
1569	1,331	19	117	272	-	2	-	91	24	3	10	8	410	135
1570	3,095	46	272	630	-	3	2	-	1	-	-	3	953	4
1571	27	-	2	4	2	1	1	40	123	-	-	354	10	516

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1572	5	-	-	2	-	-	-	11	35	144	-	102	2	291
1573	62	1	3	6	-	1	2	-	-	-	-	3	13	3
1574	68	1	4	10	-	1	2	-	-	-	-	3	18	3
1575	89	2	5	11	-	1	3	-	1	-	-	55	22	56
1576	67	1	4	8	-	1	3	-	-	-	-	20	17	20
1577	523	10	30	65	2	6	17	3	8	-	-	16	130	27
1578	1,127	17	101	227	-	-	-	-	-	-	-	1	345	1
1579	2,783	27	157	357	67	152	87	-	-	-	-	3	847	3
1580	7	0	1	1	-	-	-	-	-	-	-	-	2	-
1581	3,061	18	106	240	126	284	162	-	-	-	-	3	937	3
1582	454	-	-	-	31	69	39	83	347	3	559	217	139	1,208
1583	614	-	2	6	39	91	52	133	319	4	33	137	191	627
1584	-	-	-	-	-	-	-	2	9	-	-	177	-	188
1585	-	-	-	-	-	-	-	16	27	-	3	520	-	566
1586	197	1	10	32	-	2	4	150	526	-	-	1,099	49	1,775
1587	54	-	5	11	-	-	1	172	571	-	-	1,205	17	1,947
1588	3,836	-	20	22	318	568	362	278	1,042	6	34	93	1,290	1,453
1589	1,641	9	162	417	-	-	-	3	36	-	-	8	588	47
1590	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1591	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1592	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1593	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1594	1,116	1	67	277	5	55	39	1	11	-	59	8	444	79
1595	622	0	30	120	2	25	17	4	7	-	-	7	194	18
1596	-	-	-	-	-	-	-	184	124	-	-	324	-	632
1597	-	-	-	-	-	-	-	0	0	-	0	57	-	57
1598	11	-	-	-	-	1	-	37	26	-	4	495	1	562
1599	6	-	-	-	-	1	-	38	64	-	8	976	1	1,087
1600	98	3	3	4	6	8	4	52	88	-	12	1,358	28	1,509
1601	-	-	-	-	-	-	-	13	53	-	3	523	-	593
1602	3	-	-	-	-	1	-	37	61	-	8	946	1	1,052
1603	20	-	3	8	-	-	-	43	75	-	9	1,089	11	1,216
1604	44	-	2	6	-	-	1	20	52	-	4	499	9	575
1605	21	-	2	5	-	-	-	21	104	-	-	155	7	279
1606	411	9	40	38	8	7	5	123	429	-	-	703	106	1,255
1607	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1609	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1611	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1612	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1613	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1615	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1616	631	0	57	74	18	25	26	6	43	-	-	15	201	64
1617	1,809	-	71	151	71	177	120	54	75	-	31	43	590	203
1618	1,919	53	84	210	28	67	69	21	71	-	83	3	511	178
1619	852	9	9	71	15	32	15	102	165	5	29	666	151	967
1620	-	-	-	-	-	-	-	153	331	232	9	2,116	-	2,841
1621	2	-	-	1	-	-	-	47	167	-	-	336	1	550
1622	3	-	-	1	-	-	-	188	564	-	-	1,318	1	2,070
1623	-	-	-	-	-	-	-	6	11	-	1	196	-	214
1624	6	-	-	1	-	-	-	0	0	-	0	167	1	167
1625	1,039	-	1	4	69	156	89	233	207	10	119	146	319	715
1626	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1627	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1628	1,928	5	62	133	88	217	118	306	296	9	39	99	622	749
1629	213	0	20	62	-	-	-	0	78	0	0	7	82	85
1630	2,174	16	104	243	66	148	85	-	-	-	-	3	663	3
1631	1,126	4	64	206	17	37	21	2	2	0	0	3	349	7
1632	783	8	55	166	-	-	-	22	9	122	1	2	229	156
1633	4,061	34	203	460	120	270	154	35	33	1	7	20	1,243	96
1634	297	-	1	1	19	43	24	223	2,411	193	1,684	1,088	88	5,599
1635	193	-	3	6	11	26	15	247	745	1	5	1,338	61	2,335
1636	436	-	-	6	28	64	37	258	697	3	12	1,158	135	2,127
1637	407	0	0	6	26	61	35	1	-	-	-	3	128	4
1638	1,988	29	173	404	-	2	2	-	-	-	-	3	610	3
1639	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1640	482	6	40	98	-	2	3	2	3	-	-	30	149	35
1641	640	8	50	127	1	3	4	109	28	3	12	9	193	162
1642	1,805	3	18	55	105	235	138	-	1	12	100	3	554	116
1643	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1644	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1645	22	-	2	5	-	-	-	247	992	-	-	1,739	7	2,979
1646	40	-	-	9	-	1	1	230	921	-	-	1,876	11	3,027
1647	9,039	-	-	5	609	1,371	784	18	51	0	1	88	2,769	157
1648	1,813	-	-	8	121	273	156	90	484	-	-	518	558	1,092
1649	4,928	-	-	7	330	744	426	169	1,267	111	960	365	1,507	2,871
1650	4,508	5	32	78	280	628	357	-	-	-	-	5	1,379	5
1651	552	9	45	108	4	8	2	5	178	17	152	34	176	387
1652	560	8	41	103	5	11	4	2	-	-	-	2	172	4
1653	1,317	20	117	266	-	-	-	-	-	-	-	6	403	6
1654	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1655	-	-	-	-	-	-	-	-	-	-	-	23	-	23
1656	5,622	37	220	499	213	479	274	-	-	-	-	24	1,721	24
1657	2,130	32	189	430	-	-	1	1	-	-	-	3	652	4
1658	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1659	32	-	3	9	-	-	1	-	-	-	-	3	13	3
1660	1,264	19	113	255	-	-	-	-	-	-	-	3	387	3
1661	44	-	2	8	-	-	1	1	-	-	-	3	11	4
1662	13	-	1	3	-	-	-	1	-	-	-	3	4	4
1663	5,382	20	121	273	272	612	349	2	26	0	0	6	1,647	35

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1664	1,124	17	100	226	-	-	-	-	-	-	-	3	343	3
1665	3	-	-	1	-	-	-	-	-	-	-	3	1	3
1666	5	-	1	2	-	-	-	-	-	-	-	3	3	3
1667	317	4	23	74	-	-	-	-	-	-	-	2	100	2
1668	-	-	-	-	-	-	-	1	-	-	-	4	-	5
1669	78	-	2	23	-	-	-	-	-	-	-	3	25	3
1670	6,502	1	4	10	435	980	560	164	145	7	32	60	1,990	409
1671	1,070	16	94	218	-	-	-	-	-	-	-	3	328	3
1672	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1673	7	-	-	3	-	-	-	-	-	-	-	3	3	3
1674	2,330	35	208	470	-	-	-	-	-	-	-	2	713	2
1675	2,854	2	18	68	173	391	223	195	172	8	37	85	875	498
1676	500	7	42	105	-	-	-	1	3	-	-	-	154	4
1677	259	4	23	55	-	-	-	-	-	-	-	6	81	6
1678	1,721	26	153	347	-	-	-	-	-	-	-	3	526	3
1679	1,316	19	113	275	-	1	3	-	-	-	3	11	411	14
1680	473	5	35	106	-	3	3	56	207	-	74	333	151	669
1681	8	-	-	2	-	-	-	79	322	-	-	556	2	957
1682	903	13	78	185	-	1	1	2	1	-	-	15	278	18
1683	1,021	14	87	212	-	1	1	2	4	-	-	13	316	19
1684	3,871	37	223	512	91	206	118	0	9	-	-	9	1,189	18
1685	1,633	25	145	331	-	-	-	-	-	-	-	3	500	3
1686	1,209	13	77	177	23	51	29	-	-	-	-	3	370	3
1687	2,009	30	178	408	-	-	-	-	-	-	-	2	616	2
1688	307	4	25	63	-	-	-	-	-	-	-	2	93	2
1689	2,123	31	187	431	-	-	-	1	-	-	-	5	649	6
1690	1,445	21	126	298	-	-	-	-	-	-	-	3	446	3
1691	-	-	-	-	-	-	-	1	4	11	-	4	-	20
1692	210	-	5	58	-	1	1	-	-	-	-	2	65	2
1693	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1694	2,078	31	185	421	-	-	-	-	-	-	-	4	638	4
1695	4,126	35	206	466	122	275	157	79	70	3	15	36	1,262	202
1696	302	4	25	67	-	-	-	-	2	-	-	6	96	8
1697	17	-	-	5	-	-	-	-	-	-	-	2	5	2
1698	-	-	-	-	-	-	-	-	30	-	-	3	-	33
1699	271	3	19	60	0	1	1	0	3	0	0	85	84	88
1700	396	4	27	90	-	-	-	-	6	-	-	4	122	10
1701	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1702	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1703	-	-	-	-	-	-	-	129	128	-	3	1,507	-	1,767
1704	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1705	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1706	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1707	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1708	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1709	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1710	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1711	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1712	861	-	-	-	-	-	-	13	69	-	5,284	60	-	5,426
1713	34	-	1	1	2	6	3	4	4	0	1	2	13	12
1714	375	-	24	93	-	3	2	2	20	-	-	8	122	30
1715	457	1	28	107	-	5	3	1	15	-	-	46	144	62
1716	794	3	52	202	-	10	6	-	5	-	-	-	273	5
1717	22	-	-	8	-	-	-	1	13	-	-	13	8	28
1718	43	-	-	12	-	-	-	167	501	-	-	1,158	12	1,826
1719	-	-	-	-	-	-	-	-	-	-	-	54	-	54
1720	24	-	1	3	-	-	1	-	6	-	-	3	5	9
1721	2,686	30	167	386	50	118	66	12	37	-	-	124	817	173
1722	1,030	5	37	259	-	-	-	2	1	-	-	2	301	5
1723	524	-	26	122	1	12	21	-	2	-	-	3	182	5
1724	42	-	2	8	-	1	1	3	-	-	-	2	12	5
1725	742	-	12	209	-	-	-	-	52	-	49	28	221	129
1726	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1727	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1728	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1729	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1730	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1731	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1733	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1734	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1735	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1736	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1737	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1738	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1739	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1740	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1741	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1742	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1743	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1744	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1745	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1746	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1747	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1748	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1749	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1750	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1751	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1752	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1753	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1754	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1755	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1756	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1757	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1759	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1760	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1761	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1762	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1763	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1764	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1765	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1766	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1767	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1768	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1769	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1770	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1771	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1772	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1773	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1774	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1775	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1776	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1777	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1778	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1779	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1780	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1781	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1782	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1783	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1784	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1785	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1786	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1787	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1788	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1789	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1790	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1791	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1792	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1793	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1794	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1795	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1796	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1797	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1798	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1799	393	4	4	106	-	-	3	2	3	-	-	32	117	37
1800	81	-	5	27	-	-	1	1	9	-	-	2	33	12
1801	261	4	23	53	-	-	-	-	-	-	-	2	80	2
1802	386	6	35	82	-	-	-	-	4	-	-	4	122	8
1803	69	1	1	26	-	-	1	-	1	-	-	3	29	4
1804	37	-	1	12	-	-	-	2	-	-	-	15	13	17
1805	47	-	-	16	-	-	-	-	7	-	-	4	16	11
1806	-	-	-	-	-	-	-	-	-	-	-	6	-	6
1807	-	-	-	-	-	-	-	-	3	-	-	3	-	6
1808	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1809	40	1	1	15	-	-	-	-	-	-	-	3	17	3
1810	2	-	-	1	-	-	-	-	-	-	-	6	1	6
1811	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1812	45	1	1	17	-	-	-	2	7	-	-	4	19	13
1813	1,207	-	-	324	-	-	-	1	31	-	-	8	324	40
1814	1,670	-	52	473	-	-	-	-	7	-	-	3	525	10
1815	893	-	41	233	-	-	-	1	3	-	-	14	274	18
1816	392	-	19	109	-	-	-	-	8	-	-	1	128	9
1817	823	-	-	233	-	18	12	-	1	-	-	25	263	26
1818	163	-	3	57	-	-	3	1	5	-	-	35	63	41
1819	116	-	2	34	-	-	2	-	-	-	-	6	38	6
1820	1,353	-	-	451	-	-	-	-	7	-	-	1	451	8
1821	95	-	2	34	-	-	2	1	2	-	55	2	38	60
1822	273	-	13	71	-	-	-	-	2	-	74	7	84	83
1823	756	-	-	253	-	-	-	-	1	-	-	1	253	2
1824	293	-	-	97	-	-	-	-	-	-	-	1	97	1
1825	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1826	303	-	15	86	-	-	-	-	-	-	-	2	101	2
1827	1,074	-	54	304	-	-	-	-	-	-	-	-	358	-
1828	33	-	1	6	-	1	1	-	-	-	-	9	9	9
1829	74	1	3	23	-	1	-	1	4	-	-	17	28	22
1830	154	1	4	37	-	1	-	-	9	-	-	2	43	11
1831	-	-	-	1	-	-	-	-	4	-	-	1	1	5
1832	-	-	-	3	-	-	-	-	-	-	-	119	3	119
1833	109	1	2	16	-	1	-	-	-	-	-	5	20	5
1834	137	2	4	32	1	1	-	1	5	-	-	19	40	25
1835	111	2	5	35	1	1	-	-	-	-	-	8	44	8
1836	120	2	4	33	1	1	-	1	-	-	-	2	41	3
1837	245	2	12	63	-	1	1	-	2	-	-	54	79	56
1838	-	-	-	1	-	-	-	-	-	-	-	1	1	1
1839	-	-	-	2	-	-	-	-	-	-	-	2	2	2
1840	54	-	3	14	-	-	-	-	-	-	-	2	17	2
1841	68	-	3	14	-	-	-	-	-	-	-	11	17	11
1842	68	1	4	23	-	-	1	-	-	-	-	6	29	6
1843	199	1	10	50	-	-	1	-	10	-	-	4	62	14
1844	201	1	10	50	-	-	-	2	1	-	-	-	61	3
1845	18	-	1	6	-	-	-	-	3	-	-	2	7	5
1846	175	1	8	48	-	1	1	-	2	-	-	12	59	14
1847	-	-	-	-	-	-	-	-	-	-	-	2	-	2

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ)

EXISTING PLUS PROJECT CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1848	271	2	13	70	-	1	2	-	1	-	-	9	88	10
1849	-	-	-	-	-	-	-	-	3	-	-	1	-	4
1850	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1851	21	-	1	7	-	-	-	-	-	-	-	3	8	3
1852	1,740	-	100	377	50	52	50	-	33	-	-	15	629	48
TOTAL	**1,325,318**	**11,567**	**67,566**	**172,901**	**34,242**	**80,097**	**47,783**	**68,751**	**174,643**	**36,950**	**53,423**	**182,149**	**414,155**	**515,917**

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
100	1,292	14	65	265	-	4	17	-	-	-	-	544	365	544
101	591	-	19	60	3	28	23	-	-	-	-	443	133	443
102	17	-	1	4	-	-	-	-	-	-	-	173	5	173
103	24	-	-	3	-	-	-	2	-	-	-	484	3	486
104	2,142	6	91	365	19	116	82	31	72	41	62	186	679	393
105	40	1	1	7	-	-	1	5	39	18	21	229	10	313
106	4	-	-	2	-	-	-	-	-	-	-	56	2	56
107	5	-	-	-	-	-	-	12	1	-	-	73	-	86
108	15	-	-	1	-	-	-	-	-	-	-	105	1	105
109	95	-	3	12	-	6	4	-	-	3	81	221	25	305
110	171	-	6	19	-	9	8	18	-	-	-	720	42	738
111	486	14	13	84	3	7	14	8	22	8	4	691	135	734
112	90	-	3	24	-	-	-	-	-	-	-	109	27	109
113	20	1	-	2	-	-	1	83	13	-	-	247	4	343
114	18	1	-	2	-	-	-	-	-	-	-	30	3	30
115	51	1	-	3	-	1	1	-	-	-	-	152	6	152
116	177	5	1	13	1	2	3	-	-	-	-	502	25	502
117	13	-	-	1	-	-	-	-	-	-	-	270	1	270
118	75	4	-	6	-	2	2	2	-	-	-	527	14	529
119	-	-	-	-	-	-	-	10	-	-	-	59	-	69
120	1,597	25	127	358	0	3	2	22	45	437	1	136	515	640
121	107	5	2	10	2	2	3	-	-	-	-	98	24	98
122	3,475	7	36	102	58	633	461	167	351	208	15	276	1,297	1,017
123	-	-	-	-	-	-	-	22	98	10	52	310	-	491
124	124	-	8	26	-	4	4	1	-	-	-	409	42	410
125	21	2	1	3	-	-	-	-	-	-	-	155	6	155
126	66	4	2	6	-	-	-	-	-	-	-	256	12	256
127	482	21	15	36	-	-	3	-	-	-	-	408	75	408
128	156	9	5	13	-	-	-	-	-	-	-	286	27	286
129	147	9	-	28	-	3	3	-	1	-	-	274	43	275
130	21	1	-	6	-	-	-	1	1	-	-	84	7	86
131	320	19	-	51	1	7	7	-	3	-	-	171	85	174
132	15	2	-	5	-	-	-	-	-	-	-	31	7	31
133	55	4	-	5	-	-	-	-	-	-	-	212	9	212
134	131	6	5	11	-	-	1	-	-	-	-	235	23	235
135	101	6	-	14	-	2	2	-	-	-	-	254	24	254
136	764	-	61	161	-	-	-	23	10	9	199	24	222	265
137	108	-	6	21	-	1	1	-	-	6	-	103	29	109
138	-	-	-	-	-	-	-	-	-	-	-	11	-	11
139	141	-	8	27	-	1	1	1	-	-	-	154	37	155
140	14	-	-	4	-	-	-	0	0	-	-	39	4	40
141	45	-	2	9	-	-	-	25	-	-	-	108	11	133
142	390	21	16	38	-	1	4	-	-	-	35	304	80	339
143	2	-	-	1	-	-	-	-	-	-	-	76	1	76
144	583	-	18	69	3	13	23	16	153	-	93	136	126	398
145	38	-	-	5	-	-	-	-	-	-	-	271	5	271
146	125	-	6	22	-	-	-	-	-	-	-	330	28	330
147	199	-	7	28	-	3	3	6	12	2	20	247	41	287
148	11	-	-	2	-	-	-	-	3	-	-	36	2	39
149	241	-	6	22	1	4	7	2	-	-	-	234	40	236
150	617	-	20	80	3	14	28	2	-	-	-	1,246	145	1,248
151	217	-	6	22	-	4	7	4	-	-	-	517	39	521
152	-	-	-	-	-	-	-	9	12	-	0	1,248	-	1,270
153	57	1	3	10	-	1	1	24	41	-	5	612	16	682
154	93	1	3	11	-	1	1	-	2	-	-	28	17	30
155	57	-	3	8	-	-	-	2	18	-	-	2	11	22
156	305	5	13	58	-	6	3	-	4	-	69	13	85	86
157	2,037	52	72	133	64	81	46	16	69	-	84	12	448	182
158	1,288	14	125	93	25	34	28	22	56	5	-	3	319	86
159	91	-	4	7	4	7	4	16	104	-	-	349	26	469
160	4,205	21	108	520	82	164	83	50	48	40	9	8	978	154
161	3	-	-	1	-	-	-	33	114	84	109	158	1	499
162	337	-	8	39	8	16	7	91	124	67	105	108	78	495
163	48	-	3	5	3	6	3	10	24	-	-	48	20	82
164	323	2	9	47	3	10	7	46	160	28	6	322	78	562
165	1,038	2	36	146	11	39	23	11	1	-	-	19	257	31
166	1,206	15	95	218	-	23	22	11	44	123	493	29	373	699
167	7	-	-	1	-	-	-	6	12	0	2	92	1	113
168	541	-	35	140	-	-	-	10	26	1	1	18	175	56
169	1,397	7	54	74	32	60	43	26	114	-	103	72	269	316
170	1,528	4	45	181	18	115	76	35	58	22	1	13	439	130
171	2,660	49	124	281	40	101	47	55	37	378	1	91	642	562
172	1,641	4	47	212	19	66	76	82	73	6	137	3	423	301
173	1,023	43	16	122	18	29	33	93	62	87	88	83	260	414
174	1,038	16	27	94	58	32	5	1	3	-	-	0	231	4
175	1,798	52	83	160	78	40	40	38	28	9	1	23	452	98
176	819	7	32	68	22	54	25	32	96	-	-	67	207	196
177	440	14	24	51	6	20	14	18	18	1	13	4	129	54
178	1,726	15	80	170	53	199	78	21	24	-	42	70	595	157
179	360	1	21	47	12	14	13	-	8	-	-	4	108	12
180	3,038	28	145	447	19	55	37	68	97	18	141	31	731	355
181	772	7	28	97	6	19	13	20	16	1	0	52	170	88
182	1,069	2	30	81	31	57	35	8	62	55	1	48	235	175
183	588	-	-	-	40	89	51	139	117	5	24	44	180	331
184	546	1	12	20	30	67	40	103	87	4	19	35	170	249
185	20	-	1	4	-	-	-	16	74	-	-	112	5	202
186	344	4	27	64	3	4	1	37	113	-	-	210	103	359
187	185	3	14	35	2	4	1	-	2	-	-	-	60	2
188	1,101	7	79	273	-	-	-	3	46	-	-	28	359	77
189	938	-	61	248	-	-	-	7	93	104	128	47	309	379
190	951	-	60	244	-	-	-	3	44	-	-	17	304	65
191	9	-	-	3	-	-	-	-	2	-	-	3	3	5
192	70	-	8	23	-	-	-	-	1	-	-	1	31	2
193	29	-	1	4	-	-	-	-	-	-	-	1	5	1
194	17	-	1	3	-	0	1	13	217	-	-	124	5	354
195	2,145	12	85	252	-	62	118	-	119	-	-	21	529	140

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
196	-	-	-	-	-	-	-	-	-	-	-	-	-	-
197	-	-	-	-	-	-	-	-	2	389	-	15	-	406
198	2,754	8	47	106	150	338	193	-	-	-	-	1	843	1
199	3,584	-	-	-	242	544	311	660	628	29	205	363	1,097	1,885
200	68	1	4	17	-	1	2	-	-	-	-	134	25	134
201	270	1	10	25	4	11	21	-	-	25	-	901	72	926
202	503	1	16	38	9	18	34	-	-	-	-	495	116	495
203	-	-	-	-	-	-	-	-	-	-	-	9	-	9
204	248	-	36	13	-	3	10	-	-	-	23	603	62	626
205	583	1	45	16	-	5	11	8	99	4	-	544	78	655
206	359	1	45	17	-	6	10	-	296	-	-	403	79	699
207	32	-	7	1	-	-	1	-	-	-	-	410	9	410
208	51	-	2	4	1	2	3	121	44	-	-	62	12	227
209	118	-	5	10	1	6	9	-	-	-	-	141	31	141
210	83	-	14	4	-	-	2	-	-	-	-	230	20	230
211	384	2	52	17	-	5	12	-	3	-	-	258	88	261
212	69	-	5	2	-	-	1	-	-	-	-	531	8	531
213	26	-	2	6	-	-	1	-	-	-	-	-	9	-
214	179	1	7	22	-	1	3	4	20	-	-	9	34	33
215	98	-	5	9	2	5	8	-	3	-	-	204	29	207
216	427	-	-	-	0	1	1	403	1,593	633	56	1,238	2	3,922
217	122	-	7	32	-	1	1	2	6	18	-	17	41	42
218	2,452	23	130	350	21	172	121	38	414	647	2	52	816	1,152
219	5,571	74	369	1,039	18	186	144	342	1,018	867	5	930	1,829	3,162
220	-	-	-	-	-	-	-	-	370	-	-	41	-	411
221	151	-	7	31	1	1	2	62	76	3	3	912	43	1,055
222	5	-	-	1	-	-	-	-	-	-	-	183	1	183
223	1,149	7	43	168	28	29	39	1	10	-	-	68	313	79
224	365	1	7	25	19	27	23	26	39	185	1	136	102	387
225	142	-	-	7	6	6	7	-	115	-	-	287	26	402
226	22	-	-	1	1	1	1	-	-	-	-	385	4	385
227	2,994	30	156	459	33	175	127	234	454	276	9	599	981	1,571
228	6	-	-	2	-	-	-	-	3	1,285	-	189	2	1,477
229	4,583	-	-	3	3	3	4	-	2	-	-	165	13	167
230	-	-	-	-	-	-	-	-	-	-	-	86	-	86
231	48	-	-	3	3	3	3	-	-	-	-	135	12	135
232	16	0	1	3	-	-	-	32	105	-	-	186	5	323
233	1,500	-	-	-	101	228	130	694	382	174	234	27	459	1,511
234	2,393	2	10	26	152	342	196	143	95	38	216	11	728	503
235	-	-	-	-	-	-	-	4	5	1	0	3	-	13
236	-	-	-	-	-	-	-	336	137	28	8	23	-	533
237	1,110	2	21	56	59	134	77	392	105	11	46	26	349	580
238	-	-	-	-	-	-	-	774	233	21	11	61	-	1,100
239	852	1	50	198	-	4	2	-	2	-	-	9	255	11
240	402	1	28	91	-	3	1	-	13	-	-	-	124	13
241	61	0	6	20	-	-	-	-	12	-	-	2	26	14
242	-	-	-	-	-	-	-	52	43	1	1	38	-	135
243	994	1	13	86	48	107	62	2	-	-	-	26	317	28
244	18	-	-	6	-	-	-	1	3	-	-	19	6	23
245	-	-	-	-	-	-	-	5	16	2	5	60	-	88
246	17	-	1	5	-	-	-	-	-	-	-	1	6	1
247	519	-	33	134	-	-	-	-	0	-	-	0	168	1
248	-	-	-	-	-	-	-	-	-	-	-	1	-	1
249	-	-	-	1	-	-	-	-	-	-	-	2	1	2
250	1,210	4	131	300	-	-	-	3	45	-	1	6	436	55
251	675	19	30	109	4	28	9	152	42	1	595	10	199	800
252	4,688	15	167	366	81	517	381	41	181	47	-	47	1,527	316
253	1,437	29	76	316	-	29	21	67	82	-	224	5	471	378
254	585	21	36	110	0	12	2	178	267	355	74	114	181	988
255	2,371	4	132	219	63	258	144	31	100	79	0	55	820	266
256	1,703	15	53	254	94	140	41	64	18	-	-	10	596	93
257	5,111	94	304	915	22	186	93	85	246	4	1	157	1,615	493
258	351	1	9	94	-	8	9	-	1	-	-	40	121	41
259	-	-	-	-	-	-	-	-	-	-	-	-	-	-
260	169	-	3	22	7	7	10	51	75	57	3	53	49	239
261	2,785	12	55	186	117	179	86	8	66	1	59	69	635	204
262	2,191	21	79	239	73	49	57	24	24	24	0	15	518	88
263	1,966	17	78	264	44	28	34	42	137	16	94	346	465	635
264	994	8	54	167	11	64	43	114	409	103	110	335	348	1,072
265	103	2	3	26	1	1	-	-	-	-	-	4	33	4
266	41	1	1	11	-	-	-	-	-	-	-	2	13	2
267	104	1	5	27	-	-	1	-	1	-	-	1	34	2
268	68	-	4	19	-	-	-	3	18	141	169	13	22	344
269	143	2	10	36	-	-	-	0	7	-	-	11	47	17
270	420	-	27	109	-	-	-	2	23	-	54	9	137	88
271	755	-	49	195	-	-	-	3	37	-	-	14	244	53
272	42	-	-	18	-	-	-	-	-	-	-	6	18	6
273	-	-	-	-	-	-	-	5	39	3	42	12	-	102
274	607	10	49	137	-	-	-	10	16	2	4	38	196	70
275	309	-	17	44	-	6	6	-	17	-	-	89	73	106
276	821	-	36	191	-	-	8	19	11	-	88	245	235	363
277	70	-	6	14	-	1	1	-	2	-	-	30	22	32
278	259	-	29	49	-	5	8	1	6	-	-	150	91	157
279	146	-	15	26	-	3	3	-	13	-	-	34	47	47
280	208	5	25	60	-	1	1	-	9	-	-	60	92	69
281	270	3	22	53	-	-	-	-	4	-	-	97	78	101
282	87	-	9	17	-	-	2	-	1	-	-	52	28	53
283	92	2	9	19	-	-	-	-	1	-	152	26	30	179
284	149	-	15	36	1	-	5	-	16	-	-	141	57	157
285	281	-	27	58	-	-	9	3	44	-	-	77	94	124
286	107	-	9	21	-	-	3	2	-	-	-	28	33	30
287	197	-	11	33	-	2	2	-	23	-	-	241	48	264
288	409	-	28	72	-	7	7	-	-	-	-	108	114	108
289	111	-	7	19	-	4	4	-	1	-	-	27	34	28
290	2,537	38	199	562	-	8	8	222	184	27	63	79	814	575
291	103	-	3	12	3	5	3	-	-	-	-	29	26	29

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
292	1,288	21	99	279	3	6	3	177	208	7	9	93	411	495
293	186	-	19	39	-	4	3	2	5	-	-	59	65	66
294	107	1	9	21	-	3	1	1	6	-	-	49	35	56
295	123	-	13	27	-	4	4	1	4	-	-	50	48	55
296	105	-	11	21	-	2	-	2	1	-	-	25	34	28
297	1,371	-	34	118	6	106	57	1	5	16	-	560	321	582
298	3,296	48	244	693	7	46	31	20	65	0	0	25	1,069	111
299	1,200	15	80	238	4	39	28	138	387	693	18	380	403	1,616
300	4,072	67	234	695	44	81	42	42	100	46	94	81	1,163	363
301	160	2	7	24	3	8	3	197	469	41	19	308	47	1,034
302	534	16	19	80	-	15	13	5	4	-	-	152	143	161
303	109	-	11	22	-	1	1	-	2	-	-	181	35	183
304	480	15	21	77	-	15	13	2	81	-	-	41	141	124
305	109	-	11	22	-	3	-	-	12	-	36	39	36	87
306	53	2	2	10	-	2	2	-	-	-	-	28	18	28
307	64	2	3	11	-	2	2	-	1	-	-	25	20	26
308	127	-	2	12	-	11	5	-	1	-	-	429	30	430
309	304	-	8	29	1	26	12	2	-	-	-	302	76	304
310	100	-	2	9	-	1	2	-	-	-	-	57	14	57
311	65	-	4	10	-	1	4	-	-	-	-	158	19	158
312	829	13	23	140	-	8	32	22	8	-	-	504	216	534
313	408	5	15	72	-	4	4	5	26	-	-	254	100	285
314	14	-	1	5	-	-	-	-	-	-	-	3	6	3
315	18	-	-	1	-	1	1	-	-	-	-	67	3	67
316	175	-	9	18	-	1	9	-	-	-	-	289	37	289
317	922	1	43	121	3	12	43	8	220	-	54	287	223	569
318	-	-	-	-	-	-	-	-	-	-	-	-	-	-
319	198	-	9	32	1	3	9	1	8	-	-	36	54	45
320	449	-	17	55	-	17	21	-	2	-	-	194	110	196
321	218	-	7	22	-	2	10	-	-	-	-	27	41	27
322	74	-	3	10	-	3	3	1	-	-	-	14	19	15
323	309	4	17	57	-	3	2	-	-	-	-	13	83	13
324	598	9	21	99	-	4	6	1	97	-	55	208	139	361
325	114	-	6	18	-	6	6	-	-	-	-	53	36	53
326	372	-	20	65	3	1	4	2	1	-	31	140	93	174
327	202	-	11	34	4	3	4	13	-	-	-	74	56	87
328	73	1	4	14	-	-	1	-	-	-	-	7	20	7
329	61	-	3	11	-	-	1	1	2	-	-	6	15	9
330	46	-	2	8	-	-	-	-	5	-	-	5	10	10
331	213	1	10	24	1	3	10	-	-	-	-	115	49	115
332	267	1	14	31	1	4	14	-	-	-	27	267	65	294
333	462	1	17	58	2	19	21	3	2	-	-	79	118	84
334	705	-	20	130	3	15	3	14	6	-	-	333	171	353
335	46	-	1	11	-	1	-	1	-	-	-	6	13	7
336	837	-	38	96	-	25	28	6	8	-	-	356	187	370
337	493	-	13	78	-	13	31	6	-	-	-	319	135	325
338	464	2	16	78	-	13	28	15	7	-	-	168	137	190
339	99	3	4	21	-	2	4	2	-	-	-	44	34	46
340	241	5	7	44	-	6	9	65	3	-	-	67	71	135
341	143	-	4	27	-	1	4	-	-	-	-	149	36	149
342	330	-	12	72	-	6	9	29	27	-	-	73	99	129
343	139	-	5	29	-	2	3	-	-	-	-	124	39	124
344	153	-	4	30	-	3	3	-	-	-	-	496	40	496
345	114	-	7	15	-	5	5	-	2	-	-	112	32	114
346	189	-	5	26	-	5	9	4	-	-	-	104	45	108
347	277	-	9	44	-	9	18	1	-	-	-	85	80	86
348	533	13	20	113	-	12	21	18	45	-	-	120	179	183
349	1,244	15	57	241	-	4	3	9	37	5	141	27	320	219
350	64	-	3	14	-	-	2	-	1	-	-	24	19	25
351	95	2	4	21	-	-	1	-	10	-	-	9	28	19
352	251	4	8	43	-	1	2	7	109	-	-	273	58	389
353	93	-	6	19	-	-	1	-	-	-	-	19	26	19
354	78	-	3	10	-	-	-	-	-	-	-	12	13	12
355	1,023	-	21	198	-	-	-	9	4	13	23	260	219	309
356	141	-	5	26	-	4	-	-	-	-	-	17	35	17
357	143	-	9	37	-	-	-	-	-	-	-	-	46	-
358	1,077	15	73	206	3	35	25	22	17	0	51	5	358	95
359	-	-	-	-	-	-	-	-	1	-	-	1	-	2
360	1,259	8	72	230	3	43	44	103	171	11	210	6	400	501
361	2,078	27	72	223	60	140	85	34	116	1	1	26	606	178
362	1,796	14	108	362	5	60	43	2	29	-	67	48	593	145
363	1,386	-	42	285	14	39	21	27	139	2	63	63	401	294
364	1,953	42	92	280	10	38	17	22	58	91	189	135	480	495
365	5	-	-	2	-	-	-	58	233	31	10	338	2	670
366	27	-	-	2	-	1	-	25	156	18	5	186	3	390
367	18	1	-	1	-	-	1	-	-	-	-	10	3	10
368	135	4	2	8	2	2	3	-	-	-	-	146	21	146
369	-	-	-	-	-	-	-	-	-	-	-	-	-	-
370	891	10	49	158	-	7	7	1	6	-	106	8	231	121
371	678	19	52	122	-	-	-	64	54	-	98	10	193	226
372	233	6	20	47	-	-	-	32	37	-	-	114	73	183
373	13	-	-	1	-	-	-	-	-	-	-	110	1	110
374	99	3	1	6	1	2	2	-	-	-	-	95	15	95
375	1,110	-	67	207	4	27	23	29	126	-	124	34	328	313
376	721	13	57	161	-	-	-	53	15	0	0	42	231	110
377	443	10	32	78	7	16	7	1	8	-	82	20	150	111
378	831	17	46	110	11	25	13	12	5	-	40	6	222	63
379	114	-	10	27	1	2	2	-	-	-	-	20	42	20
380	81	3	-	13	-	2	2	-	-	-	-	341	20	341
381	101	1	6	12	1	2	6	-	2	-	-	183	28	185
382	-	-	-	-	-	-	-	-	-	-	-	-	-	-
383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
385	416	8	27	52	-	12	21	1	3	-	-	60	120	64
386	897	17	64	122	-	23	52	43	92	2	3	244	278	384
387	13	-	1	3	-	-	1	47	154	-	9	691	5	900

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
388	93	-	5	19	1	1	1	24	49	-	9	403	27	485
389	1,154	12	75	241	9	5	5	37	160	14	10	397	347	618
390	64	-	5	5	-	3	3	38	198	26	8	257	16	528
391	2	-	-	-	-	-	-	16	24	1	1	8	-	50
392	2,471	19	162	539	17	53	37	12	83	-	116	79	827	290
393	432	-	26	106	2	2	2	2	25	-	-	40	138	68
394	309	-	11	44	-	1	2	1	134	-	-	81	58	216
395	253	3	12	57	-	3	6	33	15	48	-	261	81	357
396	5,583	73	411	1,275	-	6	18	36	153	244	0	237	1,784	671
397	306	-	21	26	2	18	17	91	77	8	4	56	84	235
398	690	1	63	127	-	21	21	49	81	48	86	247	233	511
399	3,113	48	175	581	32	64	39	12	194	296	154	396	939	1,052
400	280	-	28	32	2	20	19	148	205	10	12	1,040	101	1,416
401	631	10	52	139	-	2	2	3	20	-	-	37	205	60
402	1,547	25	122	348	1	5	3	18	65	-	5	247	504	334
403	231	-	13	47	-	1	3	0	7	0	0	106	64	113
404	204	5	10	34	-	2	3	5	62	-	29	88	54	184
405	91	-	2	21	-	2	2	-	-	-	-	25	27	25
406	865	23	41	141	-	6	9	123	149	7	73	207	220	559
407	66	1	-	14	-	2	2	110	2	-	-	13	19	125
408	752	-	24	143	-	16	23	1	5	-	74	215	206	295
409	876	14	-	195	-	18	19	186	915	102	57	977	246	2,237
410	7	-	-	3	-	-	-	23	20	-	4	540	3	586
411	9,914	172	713	2,175	9	15	12	75	348	28	45	433	3,096	929
412	177	2	12	8	4	16	8	545	79	7	8	546	50	1,186
413	2,969	54	224	675	-	-	2	576	381	83	21	240	955	1,301
414	5,674	85	284	984	27	25	38	456	142	79	67	34	1,444	777
415	8,090	72	460	1,442	52	408	294	70	163	2	89	200	2,729	524
416	1,385	16	76	238	7	51	43	33	636	17	6	242	430	935
417	427	16	13	66	-	8	7	69	131	68	4	365	110	637
418	103	-	6	28	-	-	-	-	10	-	-	24	34	34
419	453	-	30	106	-	-	-	-	22	-	32	143	136	197
420	416	-	4	42	-	6	6	-	-	6	-	61	58	67
421	934	-	16	173	-	28	28	17	8	-	-	318	245	343
422	820	-	10	167	-	9	17	23	28	-	-	192	203	243
423	228	-	2	53	-	2	3	4	7	-	-	72	60	83
424	695	9	14	116	-	17	37	130	175	7	10	415	193	736
425	124	3	3	23	-	4	7	48	109	10	6	96	40	268
426	5	-	-	1	-	-	-	4	9	-	2	924	1	938
427	1,002	14	80	227	-	-	-	27	200	54	51	260	321	591
428	1,277	1	81	321	-	1	-	2	33	19	29	81	403	165
429	4	-	-	1	-	-	-	-	-	-	-	3	1	3
430	3,463	9	172	591	4	25	76	4	38	3	1	61	875	107
431	1,577	8	90	385	8	5	22	2	36	-	76	1	519	115
432	837	8	91	143	9	5	16	-	20	48	223	4	272	295
433	2,449	13	173	225	57	291	141	60	148	106	98	96	899	508
434	1,413	9	95	293	-	11	23	3	9	26	48	5	431	91
435	1,052	18	73	83	26	102	47	242	148	1	22	25	349	437
436	1,780	-	69	169	51	136	87	127	349	51	3	537	512	1,067
437	1,307	14	62	324	2	20	18	99	35	55	202	6	440	397
438	1,745	32	110	241	8	20	9	58	2	-	32	1	420	93
439	1,531	15	86	227	21	43	27	29	66	96	6	53	419	250
440	-	-	-	-	-	-	-	-	-	-	-	-	-	-
441	-	-	-	-	-	-	-	-	-	-	-	-	-	-
442	-	-	-	-	-	-	-	-	-	-	-	-	-	-
443	-	-	-	-	-	-	-	-	-	-	-	-	-	-
444	-	-	-	-	-	-	-	-	-	-	-	-	-	-
445	1,661	12	93	347	7	29	15	157	157	14	4	139	503	472
446	18	-	1	5	-	1	-	57	64	6	2	54	7	183
447	1,037	16	82	232	1	1	-	122	98	4	5	37	333	266
448	1,295	3	50	264	14	58	32	1	4	-	99	28	421	132
449	1,054	18	50	204	19	94	44	4	113	-	-	2	429	119
450	377	1	15	85	7	25	12	-	2	-	-	10	145	12
451	905	7	56	218	-	-	2	1	8	-	-	8	283	17
452	728	9	49	193	-	1	1	0	12	-	71	1	253	84
453	51	1	4	15	-	-	-	0	0	-	-	9	20	9
454	1,291	2	94	273	15	17	9	1	18	-	-	50	410	69
455	2,202	4	186	430	65	74	43	88	49	-	-	4	802	142
456	768	11	25	115	26	6	34	1	24	-	71	291	217	387
457	966	3	74	169	19	20	12	20	9	12	0	20	296	61
458	45	1	2	5	1	3	1	61	36	-	-	69	13	166
459	366	11	19	63	6	43	18	172	534	204	102	247	160	1,259
460	500	-	62	122	-	17	1	-	31	-	174	22	202	227
461	399	2	35	85	-	6	1	1	30	-	-	1	128	31
462	-	-	-	-	-	-	-	-	-	-	-	-	-	-
463	-	-	-	-	-	-	-	-	-	-	-	-	-	-
464	-	-	-	-	-	-	-	-	-	-	-	-	-	-
465	-	-	-	-	-	-	-	-	-	-	-	-	-	-
466	-	-	-	-	-	-	-	-	-	-	-	-	-	-
467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
468	-	-	-	-	-	-	-	-	-	-	-	-	-	-
469	-	-	-	-	-	-	-	-	-	-	-	-	-	-
470	-	-	-	-	-	-	-	-	-	-	-	-	-	-
471	-	-	-	-	-	-	-	-	-	-	-	-	-	-
472	-	-	-	-	-	-	-	-	-	-	-	-	-	-
473	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474	-	-	-	-	-	-	-	-	-	-	-	-	-	-
475	230	7	21	32	-	16	20	6	8	9	-	6	96	29
476	860	8	31	42	16	260	40	176	257	75	1	517	397	1,026
477	1,173	1	100	54	13	163	101	50	22	4	-	39	431	116
478	187	1	5	5	8	20	20	13	2	0	0	114	59	130
479	3,775	8	50	147	213	480	274	41	13	1	5	5	1,172	65
480	252	-	7	66	-	1	1	5	1	-	1	12	75	19
481	1,618	20	116	308	16	37	21	0	1	0	0	4	518	5
482	1,347	-	61	247	16	84	54	115	770	188	-	736	461	1,809
483	393	4	4	106	-	-	2	1	4	-	-	32	116	37

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
484	7,056	6	324	1,259	59	447	306	19	13	-	1	40	2,402	73
485	1,857	-	64	525	-	-	6	2	18	-	-	107	595	127
486	978	-	35	280	-	-	4	42	422	6	34	32	319	536
487	802	5	17	207	-	13	4	35	10	-	-	76	246	121
488	233	-	11	57	-	1	6	-	5	-	-	28	75	33
489	137	-	5	28	-	-	4	-	2	-	-	34	37	36
490	277	-	13	69	-	1	8	15	13	-	207	41	91	276
491	662	-	33	164	-	4	20	1	5	-	42	35	221	83
492	543	-	24	122	-	2	16	7	7	-	-	47	164	61
493	991	6	15	269	-	18	3	4	12	-	-	240	311	256
494	447	4	30	96	3	12	2	44	842	68	131	131	146	1,217
495	326	1	17	43	-	26	34	14	118	0	1	221	122	354
496	242	1	10	30	-	18	26	29	8	-	-	32	85	69
497	1,252	5	69	249	6	54	35	27	98	1	19	62	418	207
498	1,395	17	93	284	3	37	29	5	41	-	-	38	463	84
499	6,287	58	339	1,211	30	217	203	198	756	45	301	155	2,059	1,455
500	3,822	52	266	816	5	59	54	71	256	49	86	158	1,252	619
501	316	-	6	71	-	3	10	0	0	-	-	31	90	31
502	112	1	6	15	-	9	12	4	7	-	36	17	43	64
503	116	1	8	23	-	3	9	2	4	-	-	30	44	36
504	615	9	38	139	-	16	55	3	26	-	-	152	257	181
505	164	-	8	31	-	8	-	-	3	-	-	86	47	89
506	3,781	57	291	822	2	29	17	48	156	1	15	191	1,218	411
507	2,679	33	187	561	4	27	11	61	187	12	88	126	823	473
508	10	-	-	2	-	-	-	65	289	69	15	1,127	2	1,565
509	186	0	8	56	-	1	3	1	68	2,569	-	38	68	2,676
510	209	2	9	35	-	3	14	-	15	-	1	121	63	137
511	924	-	40	194	-	8	16	8	8	-	52	307	258	375
512	107	-	3	25	-	-	-	-	2	-	37	40	28	79
513	187	-	6	31	-	2	8	-	-	-	-	25	47	25
514	159	1	7	29	-	2	1	-	11	-	-	14	40	25
515	40	-	3	10	-	1	-	3	5	-	1	47	14	56
516	79	-	2	15	1	1	4	-	-	-	-	13	23	13
517	95	-	2	17	-	1	4	-	-	-	-	21	24	21
518	231	-	10	46	-	4	2	-	-	-	-	37	62	37
519	495	1	23	103	-	12	4	1	3	-	35	120	143	159
520	201	1	10	42	-	6	16	8	13	-	290	79	75	390
521	251	-	13	51	-	2	8	2	1	-	-	30	74	33
522	119	-	1	21	-	6	1	-	-	-	-	28	29	28
523	201	1	6	40	-	9	4	-	-	-	-	29	60	29
524	1,849	22	121	358	11	22	16	3	38	370	-	242	550	653
525	290	-	8	57	2	5	16	-	2	-	-	48	88	50
526	117	-	5	20	-	2	5	46	71	3	4	46	32	170
527	3,233	37	219	650	14	82	54	7	58	-	53	70	1,057	189
528	1,654	13	136	317	-	2	2	9	43	0	148	161	470	361
529	6,470	78	474	1,393	14	70	84	24	164	74	54	175	2,113	492
530	327	1	7	56	1	12	6	2	1	-	-	743	83	746
531	1,921	28	146	415	8	13	10	54	162	3	4	133	620	356
532	7,296	50	323	985	110	360	261	67	390	66	219	308	2,088	1,051
533	508	4	23	69	5	13	18	50	166	18	8	158	132	399
534	4,365	60	317	897	5	24	34	378	427	31	19	266	1,336	1,121
535	1,512	27	98	270	12	51	102	44	342	124	3	308	561	820
536	427	3	19	73	3	14	11	8	2	5	-	83	123	98
537	1,373	18	99	276	6	33	21	14	41	-	50	32	452	137
538	4,237	62	320	890	9	50	32	22	129	-	106	90	1,364	346
539	242	2	20	55	-	-	-	8	8	-	-	262	78	277
540	35	1	4	10	-	-	-	-	-	-	-	14	15	14
541	150	2	14	40	-	-	-	2	-	-	-	27	56	29
542	240	-	7	31	7	13	10	2	-	-	9	95	68	106
543	6	-	1	1	-	1	1	-	-	-	-	2	4	2
544	110	3	10	14	1	7	7	1	20	-	-	26	43	47
545	731	4	41	160	23	37	30	0	8	-	-	1	295	9
546	1,137	6	75	120	64	97	54	97	189	4	0	2	417	293
547	1,326	39	67	152	41	77	23	184	110	2	86	165	399	547
548	2,254	26	127	483	-	-	-	42	107	2	4	33	635	188
549	874	10	81	103	32	23	51	24	108	-	9	7	300	148
550	1,091	37	152	75	12	33	14	140	312	196	241	116	323	1,005
551	3,962	12	212	578	26	83	39	108	106	8	57	67	950	347
552	1,264	-	62	232	0	41	18	1	46	0	84	4	353	136
553	1,103	33	84	167	-	2	12	39	17	-	290	10	298	356
554	1,900	37	114	293	1	18	15	29	49	3	71	130	478	282
555	1,434	37	131	280	-	2	6	3	16	-	72	3	456	94
556	1,229	6	17	127	40	79	34	129	72	5	30	63	303	299
557	1,463	47	39	58	71	81	46	3	39	-	9	928	342	979
558	1,040	35	51	156	-	-	8	1	7	-	-	3	251	11
559	241	-	7	65	-	1	1	2	6	-	1	27	74	36
560	1,495	-	83	402	5	5	5	1	23	-	-	34	500	59
561	1,533	-	96	399	-	-	-	-	6	-	-	5	495	12
562	99	-	3	27	-	1	1	-	3	-	-	2	32	6
563	-	-	-	-	-	-	-	5	16	2	5	41	-	69
564	-	-	-	-	-	-	-	1	-	-	-	4	-	5
565	438	22	26	48	-	-	1	12	9	5	43	204	97	273
566	516	28	31	61	1	1	5	-	4	-	-	6	127	10
567	-	-	-	-	-	-	-	-	-	-	-	233	-	233
568	1,259	-	81	325	-	-	-	-	5	-	4	7	406	16
569	626	9	56	129	1	1	1	7	22	0	397	42	197	469
570	3,320	37	198	306	55	100	33	32	40	1	1	139	730	213
571	5,939	65	277	714	47	146	107	125	106	25	51	34	1,357	341
572	1,677	36	121	170	15	49	15	72	81	0	54	214	407	421
573	1,053	6	79	141	8	48	21	40	49	2	283	10	303	384
574	1,766	-	138	476	-	-	-	205	258	19	20	44	614	546
575	-	-	-	-	-	-	-	6	13	2	889	2	-	912
576	766	7	33	148	1	90	8	11	10	-	-	2	288	24
577	754	-	48	189	-	11	21	2	371	-	-	-	269	373
578	1,407	5	86	305	-	11	35	4	25	-	132	14	441	175
579	2,688	34	142	362	37	40	32	109	139	0	2	19	648	270

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
580	0	-	0	0	-	-	-	81	26	2	1	2	0	111
581	277	0	30	68	-	-	-	36	4	-	329	1	99	370
582	693	-	31	75	29	18	27	22	21	2	54	3	180	102
583	1,739	40	98	431	1	2	8	80	93	2	3	56	580	234
584	1,102	49	74	117	13	38	21	97	153	-	84	227	312	561
585	1,555	15	67	254	37	41	23	286	589	333	217	321	437	1,746
586	3,691	15	53	356	138	124	80	204	59	-	70	831	767	1,164
587	1,320	23	17	123	55	54	44	-	4	12	5	2	316	23
588	1,310	8	75	138	10	71	27	-	2	-	-	-	329	2
589	1,530	20	96	214	20	40	22	0	9	-	121	178	412	308
590	5	0	0	1	-	-	-	0	5	-	-	0	2	5
591	400	7	32	90	1	2	4	1	11	-	-	4	135	17
592	1,363	3	122	286	-	22	6	2	7	-	72	5	438	86
593	2,229	22	145	484	5	41	12	4	218	-	91	11	710	324
594	2,009	28	159	439	-	8	1	173	315	40	14	101	635	643
595	24	-	2	6	-	1	-	388	611	24	32	308	9	1,363
596	1,124	18	91	254	-	-	-	7	42	-	714	16	363	779
597	531	-	22	163	-	-	-	1	12	-	-	7	185	20
598	1,251	1	53	384	-	-	1	5	8	-	53	8	439	74
599	1,440	4	68	409	-	-	2	4	19	-	-	19	483	42
600	1,129	21	83	226	2	4	4	2	20	2	-	6	340	30
601	1,801	56	85	164	21	30	42	3	21	25	104	0	398	155
602	5	-	-	-	-	-	-	19	30	11	1	148	-	209
603	1,037	13	86	88	15	20	8	60	78	37	0	17	230	193
604	1,166	29	75	87	18	40	19	31	10	0	93	7	268	141
605	1,237	12	52	207	-	1	2	20	53	5	56	209	274	342
606	596	8	50	50	7	13	7	21	38	162	1	43	135	265
607	1,391	2	60	389	-	-	1	58	34	13	6	12	452	123
608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
609	-	-	-	-	-	-	-	-	-	-	-	-	-	-
610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
611	-	-	-	-	-	-	-	-	-	-	-	-	-	-
612	-	-	-	-	-	-	-	-	-	-	-	-	-	-
613	-	-	-	-	-	-	-	-	-	-	-	-	-	-
614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
615	1,266	2	43	279	3	49	57	4	93	-	60	79	433	236
616	312	-	25	74	-	-	-	4	532	-	29	14	99	579
617	1,283	3	90	218	18	63	35	53	224	58	94	122	427	551
618	898	7	53	235	13	14	14	6	164	13	30	21	336	234
619	223	-	6	72	-	8	6	98	69	13	2	34	92	216
620	137	2	11	47	-	-	-	16	72	5	1	45	60	139
621	274	-	21	94	-	-	5	2	2	-	-	22	120	26
622	1,265	2	67	230	-	37	122	17	1,468	9	91	37	458	1,622
623	932	9	47	182	12	31	42	4	8	-	-	26	323	38
624	76	-	-	35	-	-	-	-	48	33	-	5	35	86
625	18	-	-	7	-	-	-	1	8	-	-	-	7	9
626	1,095	2	55	196	-	33	103	132	33	6	65	22	389	258
627	1,559	23	58	335	16	33	89	31	68	-	166	24	554	289
628	229	-	-	89	-	-	-	-	6	-	-	21	89	27
629	285	1	9	77	-	6	8	3	7	-	-	-	101	10
630	751	4	19	194	-	14	17	-	8	-	-	20	248	28
631	20	-	-	5	-	-	-	-	-	-	-	6	5	6
632	368	1	10	103	-	8	10	-	7	-	-	88	132	95
633	1,014	17	34	101	4	66	112	16	8	25	3	323	334	375
634	38	-	2	6	-	3	6	-	-	-	-	16	17	16
635	778	5	40	183	-	48	15	14	69	16	-	78	291	177
636	82	-	2	18	-	6	2	-	1	-	-	74	28	75
637	80	-	4	16	-	5	1	-	-	-	-	70	26	70
638	973	2	40	205	8	82	17	4	24	5	5	81	354	119
639	500	3	26	122	-	31	7	3	14	66	-	13	189	96
640	479	1	18	99	4	40	7	8	14	5	-	5	169	32
641	2,171	13	63	301	88	139	206	14	37	8	53	46	810	158
642	359	-	-	96	-	28	35	4	167	-	22	3	159	196
643	-	-	-	-	-	-	-	-	-	-	-	-	-	-
644	133	-	10	39	-	-	2	2	4	-	-	-	51	6
645	123	-	-	45	-	-	-	47	30	-	-	24	45	101
646	1,677	-	157	254	28	151	48	120	169	2	138	29	638	458
647	1,984	7	21	18	56	552	336	3	118	194	90	13	989	418
648	152	-	-	1	6	32	20	3	224	-	-	38	59	265
649	595	-	-	37	104	185	35	13	53	-	-	3	361	69
650	946	7	17	90	30	174	109	222	1,198	224	131	302	427	2,077
651	12	-	-	1	-	-	-	92	138	9	-	58	1	298
652	76	-	3	14	-	3	3	13	-	-	-	2	23	15
653	482	-	19	93	1	10	16	98	72	12	-	63	139	245
654	61	-	1	5	1	8	6	117	118	27	-	120	21	383
655	3,341	4	61	366	40	438	319	9	89	-	-	30	1,226	128
656	-	-	-	-	-	-	-	-	91	-	656	-	-	747
657	2,706	14	187	663	1	14	9	18	172	-	59	84	888	333
658	880	-	41	239	-	-	1	0	15	-	-	29	281	45
659	1,492	-	92	385	2	2	2	5	62	-	-	37	483	104
660	1,578	-	77	405	24	2	8	198	240	0	15	47	515	499
661	1,178	-	10	155	11	129	98	1,881	434	-	-	280	403	2,595
662	1,774	-	98	448	-	-	-	33	15	-	1	7	546	57
663	361	-	8	104	-	1	3	67	230	28	182	554	116	1,061
664	1,682	9	53	405	-	-	-	1	60	-	-	20	467	81
665	1,476	-	51	238	11	113	82	35	233	44	7	330	495	649
666	867	-	33	146	5	61	51	2	26	-	-	33	295	62
667	965	-	30	208	15	88	68	123	749	46	103	253	409	1,273
668	298	-	1	7	10	54	35	66	142	23	-	177	107	409
669	72	-	1	7	2	10	7	14	23	2	-	164	27	203
670	36	-	1	10	-	-	-	14	1,246	97	7	362	11	1,726
671	192	3	6	52	1	2	-	1	11	-	-	4	64	16
672	2,515	20	206	591	-	-	-	187	1,065	0	9	183	816	1,443
673	1,844	5	93	294	12	137	129	-	34	-	149	14	670	197
674	485	-	43	116	-	-	-	-	35	-	-	1	159	36
675	402	1	21	67	2	23	23	2	7	-	-	22	137	31

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
676	529	2	26	101	4	9	3	76	146	2	12	149	145	385
677	250	-	-	10	27	49	10	1	5	-	-	-	96	6
678	1,173	16	46	230	49	115	40	162	493	1	140	117	496	912
679	1,176	8	133	281	-	2	2	148	118	3	-	47	426	317
680	683	19	67	136	4	26	28	61	52	4	-	62	279	180
681	221	5	22	48	-	3	4	38	103	819	64	16	82	1,040
682	23	-	2	5	-	-	-	266	226	301	875	557	7	2,225
683	668	-	65	69	7	119	50	46	54	3	5	77	310	185
684	1,004	15	140	129	-	-	-	8	44	-	1	5	284	58
685	258	2	13	90	-	-	-	167	57	-	-	21	105	246
686	2,479	5	96	405	36	198	125	63	304	65	-	273	865	705
687	1,568	4	69	418	-	-	9	8	27	-	-	18	500	53
688	1,643	25	76	408	-	-	-	6	28	-	3	11	509	47
689	55	-	3	14	-	-	-	-	-	-	-	3	17	3
690	67	1	3	16	-	-	-	1	-	-	-	1	20	2
691	-	-	-	-	-	-	-	-	-	-	-	3	-	3
692	-	-	-	-	-	-	-	-	-	-	-	2	-	2
693	-	-	-	-	-	-	-	249	54	-	-	-	-	303
694	400	2	5	7	15	86	34	4	24	-	228	4	149	260
695	-	-	-	-	-	-	-	1	1	-	-	-	-	2
696	668	15	39	20	-	159	162	211	66	-	-	7	395	284
697	817	-	-	-	55	265	131	23	139	0	0	2	451	165
698	884	-	-	-	-	145	178	1	7	-	-	-	323	8
699	919	12	61	12	64	303	43	102	129	-	-	44	495	275
700	1,496	30	68	237	37	75	69	154	449	118	61	158	515	940
701	1,691	7	130	154	23	172	70	158	420	1	144	84	556	807
702	1,601	34	72	152	14	81	92	58	143	172	276	310	445	960
703	929	-	-	27	34	187	129	278	296	2	61	1,057	377	1,694
704	1,684	-	78	438	-	-	-	-	20	-	-	10	516	30
705	1,421	-	136	319	-	1	4	23	72	9	96	108	460	308
706	809	-	18	237	-	-	-	1	7	-	503	13	255	524
707	1,255	25	87	323	0	1	1	99	347	39	-	236	438	721
708	1,881	3	104	467	-	-	-	1	32	-	-	15	574	48
709	1,959	5	139	482	-	-	-	2	24	-	-	23	626	50
710	983	1	62	251	-	-	-	3	49	-	1	28	314	82
711	887	3	58	223	-	-	-	2	37	-	1	17	284	57
712	1,283	1	4	6	59	223	213	133	151	-	1	7	506	292
713	1,208	11	146	130	21	95	81	1	18	-	-	9	484	28
714	2,712	32	99	277	88	424	186	19	105	-	-	40	1,106	164
715	1,575	-	10	-	208	416	82	171	159	-	-	19	716	349
716	526	1	16	119	6	13	13	-	9	-	88	6	168	103
717	1,962	11	169	369	17	47	35	12	17	-	1	9	648	38
718	490	-	23	-	23	120	45	217	302	-	17	75	211	611
719	1,134	18	84	190	-	44	9	10	39	-	1	25	345	75
720	859	1	87	220	-	-	-	3	28	-	3	8	308	42
721	1,844	-	-	1	71	389	247	1,154	871	136	38	847	708	3,046
722	1,128	2	162	203	-	-	-	50	273	4	9	640	367	976
723	1,785	0	112	418	-	-	-	144	75	0	6	15	530	240
724	1,045	-	34	325	4	18	9	115	171	21	1	98	390	405
725	1,366	-	48	324	4	35	23	65	136	0	104	32	434	337
726	1,127	-	42	286	3	8	4	4	49	8	8	16	343	84
727	831	-	29	214	4	7	5	2	32	-	-	35	259	68
728	1,476	5	99	375	-	-	-	30	93	-	-	48	479	171
729	1,294	2	55	209	9	99	72	16	52	-	1	16	446	85
730	1,321	9	58	354	-	-	-	0	18	-	2	4	421	24
731	404	-	16	74	-	16	14	-	1	-	-	2	120	3
732	740	3	18	98	6	68	51	1	34	-	50	6	244	91
733	1,052	8	57	187	5	59	43	5	47	-	1	42	360	94
734	2,269	4	145	613	-	1	2	10	104	-	-	59	765	172
735	1,759	6	105	456	-	2	2	8	91	-	73	57	571	228
736	1,987	7	129	479	-	-	-	8	59	-	147	23	615	237
737	2,078	4	146	569	0	0	0	11	117	-	0	71	720	199
738	1,521	-	96	404	2	2	2	4	51	-	843	29	506	928
739	1,059	2	91	263	-	-	-	102	143	13	99	50	356	406
740	615	-	52	152	-	-	-	2	3	-	-	7	204	12
741	91	1	3	22	-	1	-	1	-	-	-	31	27	32
742	-	-	2	6	-	-	-	-	2	-	-	-	8	2
743	524	-	33	134	-	-	-	5	38	90	166	22	167	320
744	1,169	-	5	27	34	223	148	106	88	10	3	69	438	276
745	1,059	-	2	10	38	216	138	34	801	249	122	792	405	1,999
746	-	-	-	-	-	-	-	1	2	-	500	0	-	504
747	694	11	55	157	-	-	-	2	22	-	-	6	222	30
748	520	-	33	135	-	-	-	2	26	-	-	10	168	38
749	1,145	-	73	295	-	-	-	21	69	-	2	22	369	113
750	36	0	2	5	-	-	-	-	-	-	-	1	7	1
751	715	2	62	185	-	-	-	69	93	4	4	45	249	215
752	553	1	38	145	-	6	4	1	7	-	-	10	194	18
753	83	0	8	23	-	-	-	242	191	18	130	45	31	627
754	303	2	22	79	-	4	2	149	45	4	16	31	108	245
755	942	5	73	260	-	11	8	8	246	14	125	179	357	573
756	1,200	3	63	379	-	-	-	3	102	-	-	10	445	115
757	1,000	3	77	268	9	12	28	9	100	-	2	18	397	129
758	579	2	23	64	28	61	43	126	796	63	592	118	221	1,694
759	726	10	45	222	-	-	-	31	323	-	-	93	277	447
760	821	14	49	229	-	-	-	2	28	-	-	2	292	32
761	1,416	0	142	261	13	132	44	73	167	-	5	20	592	265
762	1,727	7	51	217	38	265	201	78	37	2	9	21	779	146
763	2,372	11	69	310	33	361	289	36	121	-	-	47	1,073	204
764	6	-	1	2	-	-	-	60	356	3	3	131	3	552
765	1,057	56	26	75	38	211	129	521	1,656	0	4	1,497	535	3,679
766	185	1	20	31	-	3	5	288	881	2	2	820	60	1,994
767	1,368	38	24	70	15	117	71	6	22	-	-	11	335	39
768	1,811	80	100	146	24	64	43	109	123	1	65	34	457	332
769	350	5	20	17	17	52	55	6	7	-	-	4	166	17
770	19	-	-	2	-	2	2	-	-	-	-	-	6	-
771	-	-	-	-	-	-	-	200	1,519	50	63	114	-	1,946

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
772	-	-	-	-	-	-	-	33	1,547	124	156	259	-	2,118
773	-	-	-	-	-	-	-	5	529	6	26	13	-	580
774	1,106	-	125	224	20	37	55	-	7	-	-	1	461	8
775	129	-	-	1	8	18	10	831	253	0	9	40	37	1,133
776	-	-	-	-	-	-	-	12	549	39	50	82	-	731
777	738	8	43	24	27	163	96	1	153	-	-	16	361	170
778	2,143	21	110	63	71	423	251	172	424	-	-	49	939	645
779	109	-	-	-	7	16	9	264	110	0	1	17	33	392
780	19	2	2	3	-	1	1	19	529	17	22	36	9	622
781	151	1	7	4	4	28	17	314	2,769	88	79	331	61	3,582
782	98	-	4	22	-	2	2	1	2	-	-	17	30	20
783	233	-	12	39	5	12	7	72	20	2	7	5	75	107
784	-	-	-	-	-	-	-	64	20	2	1	58	-	145
785	1,616	8	53	124	68	154	88	0	14	0	0	13	495	27
786	1,292	4	118	291	6	13	8	74	30	2	8	12	440	126
787	13	-	-	3	-	-	-	171	146	4	2	712	3	1,035
788	1,589	10	128	335	6	17	45	5	136	13	174	28	541	357
789	1,903	9	175	430	-	-	5	24	65	5	41	14	619	149
790	1,705	19	153	390	-	-	-	1	3	-	-	7	562	11
791	2,695	20	183	482	31	86	131	84	45	0	4	22	933	154
792	1,341	9	75	208	11	88	83	29	967	94	824	177	474	2,092
793	1,138	14	80	229	16	110	103	243	114	7	4	27	552	394
794	150	-	-	-	10	23	13	-	-	-	-	1	46	1
795	346	0	22	5	21	87	11	1	49	5	110	9	146	174
796	8	-	1	2	-	-	-	54	13	1	0	12	3	81
797	1,217	15	63	363	-	-	-	157	61	4	17	47	441	287
798	1,785	18	120	408	-	2	25	-	23	-	-	3	573	26
799	36	-	3	11	-	-	-	-	4	-	-	-	14	4
800	938	-	88	260	-	-	-	5	22	-	1	13	348	41
801	1,267	6	86	285	97	7	7	9	214	-	-	61	489	284
802	950	11	159	275	-	-	-	-	41	-	-	4	445	45
803	898	27	78	204	-	46	16	1	16	-	-	27	371	44
804	717	1	58	170	-	-	3	6	54	-	-	2	231	62
805	700	3	70	193	-	-	2	64	61	-	-	-	268	125
806	1,171	31	62	302	-	-	4	3	749	-	63	22	399	837
807	923	-	77	295	-	2	6	66	112	-	-	15	380	193
808	1,315	-	71	333	1	74	40	48	491	-	-	172	519	711
809	929	2	64	155	36	81	50	16	255	-	115	80	388	466
810	1,088	-	54	257	9	78	42	2	15	-	46	5	440	68
811	1,708	4	143	356	65	144	93	26	104	0	0	14	805	144
812	1,770	37	125	106	89	370	104	169	563	1	4	87	831	823
813	1,807	18	114	238	36	217	60	56	321	1	5	37	683	420
814	1,653	9	18	29	81	217	181	202	305	3	15	71	535	597
815	1,780	13	27	43	88	250	224	562	298	4	18	82	645	964
816	96	1	2	3	1	6	9	2	88	1	1	2	22	95
817	-	-	-	-	-	-	-	16	1,899	-	106	-	-	2,021
818	1,847	38	147	388	11	70	114	52	471	31	44	91	768	689
819	1,834	0	165	251	22	132	123	16	849	4	89	17	693	974
820	5	-	-	2	-	-	-	-	-	-	-	3	2	3
821	1,569	1	29	109	73	165	95	215	195	9	41	77	473	537
822	1,324	1	76	233	17	76	28	1	16	-	-	4	431	21
823	489	6	41	55	9	20	14	160	150	8	31	57	145	406
824	8	-	1	3	-	-	-	97	1,136	165	11	995	4	2,404
825	3,502	7	153	446	88	253	123	3	83	7	65	25	1,070	184
826	1,078	-	-	-	73	164	94	431	280	28	55	97	330	891
827	7	-	1	3	-	-	-	315	99	9	5	23	4	451
828	1,320	-	33	272	-	52	45	2	11	-	53	16	402	82
829	576	-	1	12	37	86	50	117	110	4	28	53	187	313
830	1,191	-	37	11	51	256	148	63	25	2	7	9	504	106
831	1,214	-	71	21	27	365	212	2	15	-	-	11	696	28
832	1,656	-	19	5	88	275	159	550	410	9	62	151	546	1,182
833	2,653	-	168	321	76	269	162	2	31	0	0	71	996	104
834	342	-	19	6	7	88	51	1	10	-	-	-	171	11
835	1,589	-	25	7	89	295	170	651	265	9	61	134	586	1,119
836	801	11	19	253	-	-	-	42	211	-	12	13	283	278
837	860	0	92	245	10	8	7	2	101	-	-	12	362	115
838	1,051	8	44	192	29	65	37	32	603	8	23	72	376	738
839	59	-	-	-	4	9	5	58	35	0	1	9	18	104
840	533	1	78	155	-	5	2	93	316	-	45	47	242	501
841	935	9	73	198	29	56	37	69	72	1	38	110	402	290
842	846	0	75	254	-	7	-	49	43	-	-	3	336	95
843	1,251	16	97	199	48	88	60	126	585	19	6	85	507	821
844	537	-	88	149	-	-	11	55	88	-	808	40	248	991
845	1,176	-	105	182	30	67	51	70	695	1	7	60	435	833
846	1,130	5	129	150	14	126	48	18	429	-	43	57	472	547
847	961	9	146	177	19	144	57	476	1,488	23	1	120	553	2,108
848	1,431	4	61	132	66	162	103	397	315	5	182	74	527	973
849	1,981	4	96	207	88	219	139	327	327	6	40	130	753	830
850	1,357	-	3	1	102	233	124	791	307	9	92	142	463	1,342
851	1,234	-	-	-	83	188	107	425	490	186	65	200	378	1,366
852	964	-	19	4	110	258	87	5	592	-	-	-	478	597
853	1,234	-	16	3	108	252	90	69	445	-	6	7	470	527
854	1,821	6	113	253	41	248	98	49	247	-	60	22	759	378
855	1,591	9	98	255	32	107	51	110	1,183	37	51	73	552	1,454
856	6	-	-	2	-	-	-	-	-	-	-	3	2	3
857	18	-	1	4	-	-	1	-	-	-	-	9	6	9
858	3,152	2	15	42	199	449	258	-	-	-	-	2	964	2
859	13	-	-	-	1	2	1	-	-	-	-	3	4	3
860	6,051	11	89	171	345	784	451	1	-	-	-	50	1,851	51
861	5,004	21	126	293	239	540	309	-	-	-	-	7	1,529	7
862	2,245	33	202	449	-	2	2	91	24	3	10	8	688	136
863	3,280	28	177	382	90	207	120	-	-	-	-	3	1,004	3
864	2,734	6	62	70	135	309	179	20	22	1	480	33	761	556
865	2,158	14	109	316	39	89	51	-	7	-	6	7	618	20
866	3,320	17	101	240	144	324	185	2	1	-	-	4	1,011	7
867	3,102	18	105	243	129	292	167	-	2	-	-	49	955	51

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
868	57	-	4	5	1	3	2	14	33	1	1	13	15	62
869	1,767	16	145	196	33	88	57	1	30	0	0	0	535	31
870	1,883	19	120	364	5	12	8	135	47	4	15	11	529	211
871	1,511	10	86	262	15	33	19	-	28	-	304	3	424	335
872	1,354	14	87	274	-	16	9	347	91	10	38	83	400	568
873	46	-	5	6	1	3	3	134	197	3	8	288	18	629
874	2,084	4	161	342	32	45	58	74	115	3	3	57	642	252
875	1,531	13	110	263	14	32	21	39	66	1	77	3	453	187
876	2,421	23	113	322	64	145	83	4	2	-	-	4	750	10
877	-	-	-	-	-	-	-	173	689	14	-	1,709	-	2,585
878	-	-	-	-	-	-	-	198	602	30	20	665	-	1,516
879	2,467	10	85	199	100	223	127	316	89	9	35	32	745	481
880	2,068	33	109	452	-	-	-	203	53	5	20	14	594	295
881	242	-	-	-	16	37	21	85	108	2	12	57	74	264
882	5	-	-	-	-	1	-	89	115	-	-	445	1	649
883	-	-	-	-	-	-	-	11	36	-	-	114	-	162
884	-	-	-	-	-	-	-	-	2	-	-	4	-	6
885	565	0	40	104	12	25	16	29	17	0	3	14	197	64
886	2,455	3	115	236	30	206	137	82	152	5	43	41	727	323
887	2,132	14	61	186	71	231	131	375	182	5	35	93	694	690
888	3,534	41	145	379	63	387	167	34	28	-	-	296	1,182	358
889	1,139	15	75	58	9	179	82	127	157	-	3	513	418	800
890	-	-	-	-	-	-	-	9	4	-	-	48	-	61
891	5	-	-	-	-	1	-	5	64	-	3	115	1	187
892	1,052	2	45	91	29	121	77	20	37	1	6	13	364	76
893	3,589	30	192	496	43	187	145	86	292	1	94	29	1,093	502
894	1,836	5	145	286	63	158	111	309	849	9	51	121	768	1,338
895	1,793	15	73	219	16	128	110	31	49	0	0	24	561	104
896	760	2	51	16	44	195	61	28	18	0	10	6	369	63
897	778	3	57	18	50	218	68	14	38	61	-	2	414	115
898	1,915	42	119	282	26	113	47	2	98	-	164	55	629	319
899	2,140	31	166	387	14	47	27	2	49	-	-	2	672	53
900	2,943	23	131	223	107	201	90	46	68	126	30	160	775	430
901	2,350	60	218	230	75	172	73	16	49	-	-	93	828	158
902	1,040	2	152	215	7	17	10	13	220	0	2	40	403	275
903	684	0	71	140	-	15	20	-	7	-	-	9	246	16
904	479	-	3	31	25	51	22	-	1	-	-	-	132	1
905	2,056	8	39	169	129	257	116	108	35	0	1	5	718	149
906	1,696	15	189	341	9	58	38	28	38	-	101	25	650	192
907	1,149	8	122	191	19	74	68	17	408	7	82	398	482	912
908	487	0	27	142	2	3	2	9	23	8	250	4	176	294
909	1,207	-	92	176	18	66	24	-	21	-	-	18	376	39
910	2,198	5	19	148	127	247	105	-	26	-	-	-	652	26
911	1,600	16	164	265	55	91	41	6	218	-	22	56	632	302
912	641	6	94	155	-	-	-	8	467	-	7	52	256	534
913	605	1	47	185	-	-	-	2	12	5	3	6	233	28
914	702	3	78	204	-	2	1	2	12	-	-	26	288	40
915	769	6	85	153	2	85	35	3	16	-	-	12	366	31
916	744	14	69	114	9	21	12	33	49	-	-	13	239	95
917	981	11	91	158	26	92	65	136	689	1	5	108	443	940
918	1,019	25	62	97	44	143	69	120	150	1	4	39	439	313
919	2,111	30	121	158	104	246	103	172	342	4	97	126	762	741
920	2,037	73	116	222	48	127	79	110	312	3	117	40	665	582
921	1,053	2	58	102	38	85	48	169	519	58	8	171	333	926
922	1,721	3	67	60	97	189	117	216	267	252	16	160	532	912
923	2,749	6	23	47	248	452	187	419	790	74	67	153	963	1,502
924	646	7	23	46	60	79	28	416	1,049	650	104	17	244	2,236
925	617	2	69	122	-	-	-	166	46	-	-	11	193	223
926	881	4	73	64	27	27	25	24	88	-	-	16	220	128
927	265	6	37	52	1	5	10	3	241	1	59	14	111	319
928	515	13	29	85	10	30	16	-	7	-	-	7	183	14
929	591	8	50	61	36	33	29	1,097	1,076	-	85	84	217	2,342
930	2,161	39	252	323	-	2	2	65	73	-	-	69	618	207
931	1,338	19	147	229	7	26	38	18	18	-	87	7	466	130
932	1,301	23	125	276	19	58	42	31	307	-	30	27	543	395
933	163	-	7	33	-	2	6	31	13	-	72	12	48	128
934	3,732	35	216	480	89	201	116	2	1	-	-	2	1,137	5
935	680	8	68	124	-	6	7	2	-	-	-	2	212	4
936	3,692	26	165	362	126	285	164	149	40	4	16	16	1,127	226
937	732	9	74	139	-	6	6	2	3	-	-	49	234	54
938	2,971	31	180	415	63	142	82	1	1	-	-	18	912	20
939	1,360	20	119	283	-	3	2	-	4	-	45	13	427	62
940	1,723	11	65	154	65	148	85	-	-	-	-	12	528	12
941	699	9	59	147	-	2	1	-	14	-	-	7	218	21
942	1,721	31	137	319	-	-	-	-	5	-	-	2	487	7
943	1,798	2	128	397	-	-	-	36	117	11	232	27	527	422
944	2,324	54	182	440	-	1	1	4	6	-	-	104	678	114
945	1,426	11	116	312	-	-	-	112	31	0	2	2	439	147
946	2,054	6	170	312	30	49	91	28	24	1	15	11	658	79
947	1,134	6	82	210	9	5	32	-	3	-	-	28	343	31
948	2,985	4	41	86	187	438	240	187	204	7	52	95	997	545
949	1,598	14	123	300	8	8	27	69	123	3	20	37	479	253
950	1,303	-	45	107	61	89	17	4	16	-	-	67	319	87
951	15	-	-	-	2	5	3	70	171	1	1	81	10	325
952	2,114	8	23	27	111	259	140	86	575	-	-	290	568	951
953	263	2	3	-	23	53	27	10	171	-	-	562	108	743
954	1,822	27	139	176	88	176	33	56	60	0	109	9	639	235
955	1,223	31	52	126	3	98	33	29	49	-	-	95	343	173
956	1,593	35	239	237	16	73	23	9	75	0	0	13	623	97
957	2,148	44	121	336	43	116	37	23	43	8	118	4	697	196
958	1,477	27	164	317	-	68	44	25	58	0	44	23	620	150
959	1,411	56	222	262	-	6	4	8	37	-	80	6	551	131
960	1,506	19	128	343	26	86	71	88	225	3	1	108	673	426
961	1,230	52	209	219	7	49	23	4	129	-	271	6	559	410
962	2,071	48	179	235	53	92	71	185	139	28	28	38	678	418
963	250	3	45	44	-	13	6	-	12	-	1,575	12	111	1,599

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
964	1,081	6	33	61	78	102	59	99	64	1	183	12	338	359
965	920	30	93	118	25	43	32	52	125	0	2	24	341	203
966	1,042	23	72	139	32	54	27	70	154	145	52	162	347	583
967	428	8	54	47	19	24	15	4	55	-	-	3	167	62
968	151	4	9	21	-	2	1	5	54	-	-	3	37	62
969	1,514	12	159	227	53	67	38	42	1,154	16	246	62	556	1,520
970	2,281	0	45	135	213	209	44	28	325	5	24	24	646	406
971	1,285	6	44	119	48	111	66	-	5	-	72	3	394	80
972	2,068	18	105	243	58	132	76	230	66	7	25	22	632	349
973	871	11	70	182	-	3	5	-	17	-	-	13	271	30
974	2,931	39	231	523	23	51	29	273	118	9	36	41	897	478
975	2,232	5	198	274	16	199	104	111	1,143	75	147	287	796	1,762
976	-	-	-	-	-	-	-	22	66	-	-	155	-	243
977	-	-	-	-	-	-	-	-	-	-	-	-	-	-
978	2	-	-	-	-	1	-	19	78	17	1	13	1	128
979	1,158	4	49	105	53	103	48	1	19	-	-	22	362	42
980	405	0	58	74	-	-	-	2	19	-	1	12	132	34
981	857	2	52	98	20	60	19	1	10	-	-	5	251	16
982	542	8	39	109	-	-	-	-	-	-	-	1	156	1
983	291	4	21	58	-	-	-	-	-	-	73	1	83	74
984	626	10	62	163	-	-	-	-	-	-	-	5	235	5
985	112	0	4	19	-	4	3	1	64	-	-	-	30	65
986	-	-	2	12	-	-	-	322	103	9	5	25	14	464
987	725	5	33	85	20	46	26	16	52	-	-	278	217	346
988	360	-	10	30	11	28	19	1,201	683	305	411	88	97	2,688
989	1,468	6	74	307	-	21	24	1	61	5	43	11	432	122
990	827	12	74	167	1	2	1	19	5	1	75	3	257	103
991	160	2	14	32	-	-	-	-	-	-	-	2	49	2
992	616	10	39	105	13	19	6	64	202	-	-	355	191	621
993	872	13	78	176	-	-	-	0	0	-	-	1	267	1
994	1,230	23	87	237	-	1	-	-	158	-	-	1	347	159
995	-	-	-	-	-	-	-	39	161	-	-	274	-	474
996	3	0	0	1	-	-	-	239	62	7	26	14	1	348
997	366	6	33	74	-	-	-	75	29	2	8	4	112	119
998	-	-	-	-	-	-	-	-	-	-	-	-	-	-
999	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1000	1,263	4	113	293	-	-	-	103	85	6	42	18	410	254
1001	407	-	21	84	-	18	13	1	6	-	-	7	136	14
1002	272	2	36	91	-	-	-	18	58	1	49	7	129	133
1003	2,552	2	160	647	10	133	93	81	74	-	-	25	1,045	180
1004	1,060	1	79	326	4	67	45	108	85	-	-	28	522	221
1005	2,087	-	87	355	17	133	91	20	444	40	347	76	684	926
1006	996	-	20	322	-	-	-	2	30	-	-	13	342	45
1007	299	2	17	81	-	-	-	1	8	-	-	-	100	9
1008	2,284	8	92	443	41	92	52	207	305	6	121	89	728	727
1009	980	4	75	210	9	40	52	92	135	101	605	10	389	943
1010	2,519	2	107	399	66	170	126	23	27	-	-	16	871	66
1011	2,168	6	143	411	20	85	107	3	14	-	1	10	773	28
1012	1,479	0	91	328	-	16	35	48	189	-	-	21	470	258
1013	1,379	2	65	377	-	-	-	55	31	-	-	9	444	95
1014	1,477	0	113	356	-	13	-	1	42	-	79	14	482	136
1015	69	1	25	182	-	-	-	3	5	-	-	4	208	12
1016	1,572	-	52	196	59	134	77	-	5	-	-	12	518	17
1017	698	-	98	174	-	-	-	74	47	-	186	412	272	719
1018	1,839	-	79	268	102	112	79	12	330	19	165	39	640	565
1019	1,728	9	97	231	47	154	109	-	17	-	-	9	647	26
1020	1,404	9	121	320	-	-	-	25	136	-	89	277	450	527
1021	816	5	59	143	15	33	19	52	51	1	4	6	273	115
1022	790	10	37	224	-	-	-	3	25	-	-	17	271	45
1023	839	-	16	70	16	175	145	2	634	80	-	2	422	718
1024	277	-	33	116	28	14	14	22	2,963	56	78	121	205	3,240
1025	1,683	14	115	269	53	180	123	264	515	-	60	27	754	866
1026	1,501	0	85	322	16	62	93	9	307	14	123	33	578	486
1027	1,290	4	36	98	54	127	81	667	399	19	74	41	401	1,200
1028	938	18	72	224	-	8	35	140	3,624	-	33	37	357	3,834
1029	1,744	-	217	374	-	-	-	36	96	-	-	13	591	145
1030	1,282	25	123	282	-	-	-	124	130	-	24	9	430	287
1031	2,044	14	55	439	15	113	147	5	22	-	1	17	783	45
1032	1,205	-	143	271	-	24	24	79	73	0	99	12	462	263
1033	1,235	16	75	355	-	-	-	1	196	24	38	21	446	280
1034	-	-	-	-	-	-	-	-	-	-	-	6	-	6
1035	825	5	38	95	39	122	55	101	99	0	659	33	354	893
1036	2,766	-	31	206	135	274	190	117	973	387	104	87	836	1,668
1037	-	-	-	-	-	-	-	-	7	-	-	5	-	12
1038	2,595	24	147	222	143	254	184	113	878	8	171	235	974	1,404
1039	2,862	18	111	256	117	395	264	199	605	24	11	41	1,161	880
1040	1,702	0	52	188	79	282	77	68	153	1	40	26	678	288
1041	3,563	-	137	239	155	561	373	104	216	3	1,082	36	1,466	1,441
1042	1,141	-	52	91	32	153	107	4	53	-	-	4	435	61
1043	1,464	7	197	288	28	91	41	73	140	36	65	15	652	329
1044	1,815	35	138	250	34	86	63	153	136	2	75	100	606	466
1045	1,643	31	111	386	-	-	-	1	85	2	15	23	528	126
1046	359	4	10	52	7	13	17	-	1	-	-	-	103	1
1047	1,011	12	35	155	26	43	52	1	3	-	-	6	323	10
1048	833	7	27	119	22	39	44	-	35	-	76	3	257	114
1049	1,694	8	162	278	51	91	20	67	233	15	0	12	610	327
1050	2,318	26	168	278	92	143	80	4	104	-	93	5	787	206
1051	178	2	7	18	9	16	4	255	297	58	23	98	56	732
1052	17	-	1	2	1	2	-	6	22	-	-	59	6	86
1053	1,840	-	20	32	77	544	252	62	237	-	-	671	925	970
1054	835	-	117	176	-	-	-	29	90	5	1	124	293	249
1055	1,133	9	82	258	-	-	-	563	238	55	-	228	349	1,085
1056	3,636	22	262	592	1	86	54	9	40	-	-	92	1,017	141
1057	29	-	1	9	-	-	-	25	8	-	1	1	10	35
1058	1,541	6	36	88	75	169	98	-	3	-	-	2	472	5
1059	449	-	11	115	2	6	4	1	6	-	2	9	138	18

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
1060	582	8	49	122	-	1	2	-	-	-	-	1	182	1
1061	1,432	-	84	364	-	-	1	2	31	-	0	27	449	60
1062	1,161	17	103	237	-	-	-	0	0	0	0	4	357	5
1063	1,278	-	60	243	7	70	52	4	49	-	-	18	431	71
1064	3,032	46	270	615	-	-	-	-	-	-	-	7	930	7
1065	643	-	40	163	-	-	-	2	29	-	1	11	203	43
1066	1,937	20	128	158	110	209	97	93	790	1	55	31	722	970
1067	2,370	52	153	272	69	173	42	5	284	514	6	51	761	860
1068	2,583	20	226	190	176	187	117	32	23	0	0	10	916	65
1069	2,055	20	142	190	126	203	100	70	180	-	-	240	781	490
1070	1,094	7	99	246	-	-	7	33	120	11	296	16	359	476
1071	1,890	46	232	298	1	26	7	5	23	-	17	17	610	62
1072	1,150	10	57	125	62	119	46	28	55	-	88	-	419	171
1073	658	13	78	129	-	-	9	68	78	-	-	6	229	152
1074	686	5	40	137	5	44	10	25	31	0	21	22	241	100
1075	1,176	9	44	105	49	96	31	2	18	-	222	66	334	308
1076	2,453	11	223	285	71	92	115	4	46	-	-	26	797	76
1077	1,837	-	96	147	62	151	80	23	28	-	208	6	536	265
1078	-	-	-	-	-	-	-	41	378	563	48	785	-	1,816
1079	-	-	-	-	-	-	-	24	261	232	3	531	-	1,051
1080	1	-	-	-	-	1	-	216	2,667	312	271	1,709	1	5,174
1081	-	-	-	-	-	-	-	-	34	-	-	-	-	34
1082	-	-	-	-	-	-	-	133	381	-	-	1,929	-	2,443
1083	1,414	14	85	195	31	69	40	132	285	1	5	483	434	906
1084	1,784	26	155	366	-	-	-	1	-	-	-	4	547	5
1085	467	6	39	98	-	-	-	-	-	-	-	9	144	9
1086	8,653	17	106	274	498	1,121	642	134	119	6	26	51	2,658	335
1087	990	21	101	106	6	88	64	137	37	2	2	9	385	187
1088	1,021	-	101	137	9	64	90	21	216	-	-	20	401	256
1089	152	-	20	28	-	-	-	25	13	6	-	1	48	45
1090	1,042	12	77	254	-	-	-	107	177	-	-	585	343	869
1091	1,310	3	69	276	-	15	6	2	8	-	121	13	369	144
1092	968	-	39	162	14	75	48	3	36	-	-	19	337	59
1093	3,926	16	95	236	190	428	244	116	131	5	22	56	1,209	330
1094	2,266	34	202	457	-	-	-	-	7	-	-	4	693	11
1095	5,936	17	100	229	324	730	417	121	106	5	23	46	1,817	302
1096	1,958	24	161	450	-	1	-	-	18	-	-	29	637	47
1097	1,477	-	70	284	3	57	43	13	21	-	-	16	457	50
1098	1,326	-	67	281	2	60	39	1	11	-	59	12	449	83
1099	2,726	18	118	288	142	452	204	39	91	-	-	8	1,222	138
1100	133	-	8	33	-	3	7	1	19	-	-	13	51	33
1101	2,392	36	213	484	-	-	-	-	15	-	-	4	734	19
1102	951	11	75	191	-	4	8	-	-	-	-	3	288	3
1103	2,347	22	173	481	-	1	1	8	272	26	228	48	678	582
1104	2,238	34	200	451	-	-	-	2	1	-	-	-	685	3
1105	854	22	61	162	-	9	4	2	2	-	-	4	258	8
1106	2,980	48	261	599	-	2	1	-	-	-	-	3	911	3
1107	1,744	31	149	347	-	3	2	3	9	-	-	1	531	13
1108	1,305	29	105	263	-	8	5	1	2	-	-	10	410	13
1109	864	10	57	137	15	35	11	-	4	-	-	15	266	19
1110	1,127	13	93	211	14	8	6	-	4	-	-	3	345	7
1111	1,771	21	126	304	39	92	28	38	35	3	8	132	610	215
1112	1,445	10	80	179	51	85	51	19	26	-	-	107	457	151
1113	2,263	12	106	149	169	179	122	7	10	-	102	24	737	143
1114	1,134	28	65	147	4	30	49	18	143	0	1	202	322	364
1115	580	1	20	53	22	36	34	88	510	-	-	103	165	702
1116	158	-	4	2	10	10	4	2	99	595	-	711	30	1,407
1117	1,807	-	194	302	125	97	37	55	197	1	7	534	755	794
1118	1,884	0	81	127	48	142	62	152	753	-	37	74	460	1,015
1119	16	-	1	1	3	2	1	31	111	-	-	-	8	142
1120	64	1	7	11	-	1	1	-	-	-	-	-	21	-
1121	1,727	69	314	172	63	56	26	38	64	-	-	32	700	134
1122	2,010	64	220	251	-	30	28	58	79	1	4	94	593	235
1123	2,062	38	138	315	83	237	107	252	215	0	74	89	918	631
1124	1,515	35	95	198	30	71	13	63	79	0	103	8	442	253
1125	535	11	42	78	22	45	13	63	130	5	11	10	211	221
1126	295	5	26	33	17	33	17	47	273	-	-	27	131	347
1127	1,963	81	217	184	46	95	66	83	259	1	110	52	688	506
1128	874	19	67	87	32	63	27	28	157	-	-	223	295	408
1129	706	20	53	60	15	31	18	11	108	51	115	38	198	323
1130	290	1	7	5	17	38	22	86	107	1	27	193	90	414
1131	941	0	75	105	27	34	16	80	339	2	15	450	257	886
1132	129	-	3	-	8	18	10	32	41	0	2	13	39	89
1133	1,787	28	59	88	73	95	62	38	93	1	72	55	405	259
1134	760	21	15	67	32	26	22	26	64	-	-	38	183	128
1135	482	21	28	58	11	26	12	19	184	1	31	110	156	344
1136	515	7	10	43	19	42	11	20	51	0	113	9	133	193
1137	186	2	4	19	10	16	3	11	180	-	91	1	54	284
1138	564	20	29	56	11	23	14	13	30	0	1	23	153	68
1139	119	3	4	18	7	14	3	5	7	-	-	-	49	12
1140	209	3	6	22	5	14	5	3	81	-	-	4	56	88
1141	12	-	1	3	-	-	1	-	-	-	-	5	5	5
1142	23	-	-	10	-	-	-	-	-	-	-	9	10	9
1143	25	-	1	4	-	-	1	-	-	-	-	3	6	3
1144	32	-	-	9	-	-	-	-	-	-	-	9	9	9
1145	87	-	3	10	-	1	-	-	58	-	-	5	14	63
1146	52	-	-	18	-	-	-	-	-	-	-	13	18	13
1147	15	1	1	2	-	-	-	-	-	-	-	4	4	4
1148	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1149	104	5	5	20	-	2	1	69	214	-	-	487	33	771
1150	-	-	-	-	-	-	-	76	245	-	-	572	-	893
1151	53	-	4	10	4	2	2	19	50	-	-	258	22	327
1152	21	-	-	5	-	-	-	78	235	-	-	555	5	868
1153	56	1	1	9	-	-	-	132	400	-	-	991	11	1,522
1154	14	-	-	5	-	-	-	43	156	-	92	328	5	620
1155	-	-	-	-	-	-	-	7	5	-	1	115	-	128

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
1156	-	-	-	-	-	-	-	-	-	-	-	12	-	12
1157	92	4	13	16	-	-	-	44	162	-	-	427	33	633
1158	119	-	4	20	1	2	1	4	51	2	-	75	28	132
1159	-	-	-	-	-	-	-	1	35	41	-	30	-	107
1160	52	1	6	8	-	-	-	169	366	2	2	871	15	1,410
1161	263	-	7	34	5	14	10	68	648	-	-	-	71	716
1162	1,096	-	31	146	16	48	25	24	374	-	-	1,532	266	1,930
1163	-	-	-	-	-	-	-	7	13	38	-	5	-	63
1164	-	-	-	-	-	-	-	-	-	-	-	39	-	39
1165	12	-	-	-	-	6	-	13	25	-	-	441	6	479
1166	15	-	-	-	1	2	-	1	43	-	-	153	4	198
1167	674	0	61	37	36	39	12	21	93	0	1	105	186	220
1168	480	-	23	28	45	30	10	11	193	14	-	20	137	238
1169	354	-	18	24	28	25	12	5	42	-	-	12	107	59
1170	1,907	10	75	73	157	135	41	5	89	-	65	2	491	161
1171	2,238	25	69	68	184	189	53	18	69	-	-	21	589	108
1172	42	-	0	5	2	2	2	88	62	-	-	46	11	196
1173	2,858	24	128	175	151	132	71	73	493	-	52	45	681	663
1174	1,775	17	118	55	75	78	59	35	196	-	53	68	403	352
1175	1,490	31	68	98	55	73	18	27	89	-	-	7	343	123
1176	19	-	-	5	-	-	-	-	-	-	-	6	5	6
1177	11	-	-	4	-	-	-	-	10	-	-	6	4	16
1178	12	-	-	6	-	-	-	-	17	-	-	9	6	26
1179	22	-	1	6	-	-	-	-	-	9	-	11	7	20
1180	17	1	2	4	-	-	1	-	-	-	-	3	8	3
1181	38	-	-	14	-	-	-	-	4	-	-	12	14	16
1182	25	-	3	5	-	-	2	-	2	-	-	3	10	5
1183	2,307	29	158	370	32	72	41	-	11	-	76	3	702	90
1184	672	12	54	140	-	-	-	-	-	-	-	3	205	3
1185	2,852	30	160	380	66	149	85	160	46	5	18	13	870	240
1186	930	17	74	202	-	2	2	-	1	-	-	2	296	3
1187	2,282	30	176	393	18	40	23	-	27	-	-	2	680	29
1188	1,301	8	47	105	52	118	67	309	80	9	34	21	397	454
1189	1,407	31	127	208	-	5	5	31	113	-	-	191	376	335
1190	2,190	23	89	170	84	183	105	238	225	10	80	84	654	638
1191	68	-	4	4	3	6	-	13	82	3	5	426	17	529
1192	539	11	31	53	-	14	19	1	4	-	-	-	128	5
1193	2,431	88	192	227	99	80	31	27	50	1	71	58	718	206
1194	55	-	3	12	-	-	-	-	7	-	-	34	15	41
1195	36	1	3	6	-	1	2	-	-	-	-	14	13	14
1196	10	-	1	1	-	-	-	-	-	-	-	3	2	3
1197	105	2	7	16	1	2	4	-	-	-	-	5	32	5
1198	28	-	2	5	-	-	2	-	-	-	-	7	9	7
1199	1,725	7	39	90	87	196	111	-	-	-	-	4	530	4
1200	2,260	8	48	109	117	259	147	302	336	11	52	265	687	967
1201	3,352	38	223	503	57	129	73	-	-	-	-	22	1,022	22
1202	843	-	-	-	60	101	49	-	4	-	58	791	210	853
1203	1,962	15	90	202	64	145	83	237	240	5	20	351	599	853
1204	2,426	23	106	204	53	118	112	89	222	2	10	87	616	410
1205	1,508	41	111	106	41	93	54	21	77	0	1	143	445	242
1206	1,872	67	108	113	81	97	52	4	76	15	236	26	518	357
1207	3,833	20	64	108	213	481	274	688	337	137	196	32	1,161	1,390
1208	3,464	56	143	215	110	197	72	119	989	-	3	21	794	1,132
1209	2,130	57	155	211	36	90	55	5	18	-	45	2	604	70
1210	1,129	33	112	114	11	14	5	32	307	-	38	4	290	381
1211	1,108	97	129	95	-	-	-	4	61	76	45	13	321	199
1212	289	10	19	35	4	7	-	3	121	-	-	358	75	482
1213	84	-	-	2	2	3	-	19	69	-	-	231	7	319
1214	179	2	4	20	4	7	-	28	71	-	-	400	37	499
1215	-	-	-	-	-	-	-	22	103	-	0	341	-	466
1216	-	-	-	-	-	-	-	46	74	7	1	363	-	492
1217	26	-	2	7	-	-	-	-	-	-	-	29	9	29
1218	68	-	5	15	-	-	-	-	-	-	-	16	20	16
1219	140	1	10	31	-	3	2	2	2	-	-	18	47	22
1220	78	-	5	16	-	2	-	3	1	-	66	6	23	76
1221	29	-	2	6	-	-	-	-	-	-	-	6	8	6
1222	167	1	9	27	1	2	1	-	8	-	-	6	41	14
1223	152	1	8	26	1	2	1	7	1	-	-	12	39	20
1224	2,558	20	119	270	82	186	106	75	19	2	8	12	783	117
1225	129	1	9	30	-	1	3	-	-	-	-	23	44	23
1226	3,669	29	166	377	121	274	156	-	-	-	-	3	1,123	3
1227	64	1	4	12	-	1	1	-	-	-	-	11	19	11
1228	2,678	34	212	451	27	61	35	173	45	5	19	14	818	256
1229	3,673	21	139	282	151	339	194	-	12	-	-	3	1,126	15
1230	46	-	8	6	-	-	-	-	3	-	-	6	14	9
1231	3,117	27	156	307	94	199	116	-	206	-	-	29	899	235
1232	3,697	43	245	531	68	149	86	-	4	-	-	4	1,123	8
1233	18	-	3	3	-	-	-	-	2	-	-	1,047	6	1,049
1234	2,777	36	160	118	122	269	146	25	118	1	2	23	851	169
1235	1,569	31	142	86	36	31	25	25	87	-	113	141	351	367
1236	21	-	1	3	-	-	-	240	961	-	-	1,687	4	2,888
1237	87	7	10	6	-	-	-	128	45	4	2	90	23	269
1238	64	-	2	8	-	-	1	6	15	-	-	60	11	81
1239	131	1	4	13	1	1	1	32	125	-	-	226	21	383
1240	10	-	-	-	-	-	-	76	70	-	4	1,004	-	1,154
1241	-	-	-	-	-	-	-	14	72	-	26	1,141	-	1,253
1242	222	2	11	34	2	2	3	33	53	-	47	815	54	948
1243	38	-	4	9	-	-	-	-	-	-	-	13	13	13
1244	17	-	1	4	-	-	-	-	-	-	-	6	5	6
1245	46	-	2	8	-	-	-	-	-	-	-	6	10	6
1246	102	-	5	18	-	-	1	9	-	-	-	13	24	22
1247	37	1	3	8	-	1	1	-	1	-	-	8	14	9
1248	36	1	3	10	-	1	1	-	-	-	-	6	16	6
1249	60	-	3	12	-	-	1	-	1	-	-	121	16	122
1250	99	1	6	20	1	1	2	1	10	-	-	6	31	17
1251	49	-	2	8	-	-	1	1	-	-	-	4	11	5

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
1252	206	2	10	37	2	2	3	-	41	-	-	7	56	48
1253	90	-	5	20	-	-	-	-	3	-	-	28	25	31
1254	558	12	29	119	-	14	2	29	30	-	50	126	176	235
1255	132	3	14	34	-	-	-	5	1	-	-	24	51	30
1256	382	7	33	82	-	-	-	42	52	-	7	15	122	116
1257	365	7	32	74	-	-	-	-	14	-	124	5	113	143
1258	575	-	39	116	-	3	3	1	2	8	-	23	161	34
1259	224	6	22	51	-	-	-	3	75	-	57	1	79	136
1260	136	1	11	28	-	-	-	20	6	-	-	1	40	27
1261	81	1	4	16	-	1	1	-	3	-	-	5	23	8
1262	155	-	3	4	18	12	2	34	322	-	-	8	40	363
1263	100	-	12	6	7	7	3	10	22	0	0	25	35	58
1264	3	-	-	-	-	-	-	10	12	0	0	3	-	25
1265	-	-	-	1	-	-	-	6	7	0	0	3	1	16
1266	9	-	-	-	0	1	0	16	46	-	-	9	1	71
1267	41	-	1	5	-	1	2	5	13	-	-	-	10	18
1268	72	2	4	8	-	-	-	1	-	-	-	-	14	1
1269	13	-	1	1	1	1	-	-	12	-	-	56	4	68
1270	-	-	-	-	-	-	-	4	24	3	1	150	-	183
1271	9	-	-	3	-	-	-	56	224	-	-	395	3	675
1272	-	-	-	-	-	-	-	23	117	-	-	216	-	357
1273	86	7	9	6	-	-	-	29	58	-	-	150	22	237
1274	-	-	-	-	-	-	-	4	30	-	0	406	-	441
1275	-	-	-	-	-	-	-	-	4	483	-	134	-	621
1276	252	-	-	-	33	66	33	188	751	15	-	29	132	983
1277	1,021	-	-	-	134	269	134	125	1,832	732	-	92	537	2,781
1278	293	-	-	-	39	77	39	145	293	-	-	7	154	445
1279	441	-	16	21	118	101	36	127	107	-	-	68	291	303
1280	618	-	15	66	28	68	67	98	452	-	-	41	244	591
1281	399	-	1	6	11	21	12	13	330	-	-	5	50	348
1282	-	-	-	-	-	-	-	-	6	-	161	-	-	167
1283	181	-	2	16	8	11	9	11	96	-	-	11	45	118
1284	275	-	-	-	36	66	33	79	191	-	-	93	135	363
1285	175	-	-	-	-	-	-	9	3,780	-	-	5	-	3,794
1286	196	-	6	22	18	35	9	47	450	-	47	3	90	547
1287	-	-	-	-	-	-	-	13	-	-	-	-	-	13
1288	1,301	-	15	30	131	135	50	24	99	-	-	-	361	122
1289	696	19	12	63	22	32	27	3	34	-	-	2	175	39
1290	596	-	19	50	15	24	32	-	8	-	-	-	141	8
1291	22	-	-	-	2	4	-	10	1,132	159	4	1,304	7	2,609
1292	-	-	-	-	-	-	-	-	49	-	-	24	-	73
1293	218	-	-	-	29	57	29	121	291	-	-	137	115	549
1294	1,227	-	-	-	161	323	161	35	2,201	926	-	1	646	3,162
1295	716	-	-	-	91	183	91	372	593	-	17	14	366	996
1296	270	-	-	-	35	71	35	150	590	-	-	236	142	976
1297	3	-	-	-	1	-	-	69	475	991	526	7	1	2,069
1298	358	-	9	37	28	66	47	113	126	229	-	42	188	511
1299	2,046	-	13	53	29	53	46	57	119	588	357	9	193	1,129
1300	-	-	-	-	-	-	-	18	13	-	-	-	-	31
1301	219	-	1	21	25	44	24	2	90	123	-	3	116	218
1302	-	-	-	-	-	-	-	-	58	1,170	770	30	-	2,028
1303	118	-	2	15	5	8	7	-	199	5	7	4	38	214
1304	-	-	-	-	-	-	-	1	17	549	-	5	-	572
1305	16	-	-	-	-	-	-	5	369	5	-	98	-	476
1306	-	-	-	-	-	-	-	-	4	79	1	39	-	123
1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1308	-	-	-	-	-	-	-	1	-	491	-	162	-	654
1309	-	-	-	-	-	-	-	5	1	20	-	371	-	397
1310	51	-	2	6	-	2	3	1	44	-	-	-	12	45
1311	95	-	-	-	6	12	6	18	70	-	-	22	23	110
1312	652	-	16	59	68	131	21	-	-	-	-	-	295	-
1313	-	-	-	-	-	-	-	5	1	-	-	66	-	71
1314	460	-	6	12	53	51	21	1	5	-	-	-	143	6
1315	243	8	3	23	8	14	8	8	37	-	-	-	63	45
1316	1,622	99	33	158	25	41	37	3	100	-	45	4	393	152
1317	541	-	17	40	15	22	27	-	-	-	-	28	120	28
1318	-	-	-	-	-	-	-	73	38	121	-	6	-	238
1319	341	-	-	-	45	90	45	20	344	-	-	59	179	422
1320	1,088	-	-	-	143	286	143	123	993	-	-	1	572	1,117
1321	480	-	-	-	68	125	63	148	359	4	-	1	256	512
1322	135	-	-	-	18	36	18	35	124	-	-	1	71	159
1323	206	-	-	-	27	54	27	56	229	-	-	1	108	286
1324	416	-	-	-	56	109	55	224	863	1	-	34	219	1,122
1325	164	-	-	-	22	43	22	35	119	-	-	17	86	171
1326	129	-	-	-	17	34	17	68	263	246	-	31	68	609
1327	653	-	-	-	230	133	61	207	892	739	-	73	425	1,911
1328	262	-	-	-	34	69	34	167	738	425	226	3	138	1,558
1329	385	-	-	-	161	70	31	160	680	15	-	19	262	873
1330	113	-	-	-	15	30	15	14	92	-	-	33	59	139
1331	453	-	-	-	60	119	60	143	461	-	-	37	238	642
1332	633	-	-	-	-	-	-	-	-	3,406	690	-	-	4,096
1333	336	-	-	-	45	87	44	31	171	2,367	-	19	176	2,588
1334	343	-	-	-	45	90	45	74	345	334	-	-	179	752
1335	203	-	-	-	27	53	27	53	447	226	-	-	107	726
1336	16	-	-	-	-	-	-	5	-	15	-	878	-	897
1337	130	-	1	1	7	15	7	6	96	64	-	147	31	313
1338	-	-	-	-	-	-	-	-	-	67	-	-	-	67
1339	10	-	-	-	1	2	-	2	14	-	-	253	3	269
1340	-	-	-	-	-	-	-	4	49	-	-	60	-	113
1341	493	25	28	39	0	3	4	32	49	-	-	92	99	173
1342	176	10	11	17	-	1	2	2	-	-	-	3	41	5
1343	1,051	48	82	141	19	17	9	9	100	-	-	1	315	110
1344	2,548	90	216	162	107	87	67	23	413	42	84	8	729	570
1345	817	19	53	47	23	29	26	44	73	5	-	-	196	122
1346	479	2	22	39	6	22	18	15	109	-	-	-	109	125
1347	46	-	-	-	6	6	3	0	153	-	-	211	15	364

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
TAZ	Population Persons	SF Detached 0 Auto Dwelling Units	SF Detached 1 Auto Dwelling Units	SF Detached 2+ Auto Dwelling Units	MF Attached 0 Auto Dwelling Units	MF Attached 1 Auto Dwelling Units	MF Attached 2+ Auto Dwelling Units	Retail Employees	Services Employees	Government Employees	Education Employees	Other Employees	TOTAL Housing Units	TOTAL Employees
1348	122	1	12	8	-	2	1	1	114	-	-	8	24	123
1349	316	1	11	6	-	3	1	(0)	202	3	-	156	22	361
1350	188	0	5	3	-	1	1	3	85	1	-	47	9	137
1351	8	-	-	-	-	-	-	-	-	-	-	39	-	39
1352	128	-	-	-	17	34	17	44	111	-	-	35	67	190
1353	6	-	-	-	0	1	-	16	30	-	-	350	1	397
1354	383	-	-	-	50	100	50	84	320	-	-	26	200	430
1355	-	-	-	-	-	-	-	1	6	-	-	248	-	255
1356	259	-	2	1	33	66	33	47	12	247	-	38	136	344
1357	215	-	6	4	23	48	23	44	167	270	-	91	104	572
1358	26	-	3	2	0	1	-	4	19	-	-	89	6	112
1359	44	-	4	3	1	3	-	84	140	-	-	1,457	11	1,680
1360	69	1	6	14	-	-	-	195	51	6	22	49	21	322
1361	2,309	12	116	352	55	123	70	185	48	5	21	14	729	274
1362	2,628	26	151	334	62	144	88	71	54	3	18	32	805	178
1363	2,274	18	104	235	75	168	96	-	-	-	-	2	696	2
1364	428	0	0	1	29	65	37	388	101	11	43	24	131	568
1365	997	9	52	119	28	62	35	-	-	-	-	1	305	1
1366	1,592	18	107	243	26	59	33	-	-	-	-	2	486	2
1367	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1368	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1369	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1370	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1371	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1372	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1373	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1374	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1375	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1376	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1377	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1378	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1379	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1380	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1381	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1382	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1383	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1384	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1385	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1386	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1387	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1388	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1389	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1390	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1391	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1392	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1393	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1394	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1395	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1396	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1397	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1398	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1399	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1400	1,870	24	183	274	-	28	-	63	33	0	95	18	509	209
1401	1,356	37	51	80	50	58	22	14	11	0	1	1	299	27
1402	3,545	2	100	105	148	329	160	17	72	-	124	6	844	219
1403	386	4	38	29	8	10	8	2	17	-	-	-	97	19
1404	388	5	33	26	6	8	7	5	1	0	1	0	86	7
1405	1,312	11	72	66	47	69	47	19	20	1	4	14	313	59
1406	287	2	17	10	10	13	10	1	29	2	3	8	62	43
1407	828	11	30	48	31	54	19	81	201	-	-	518	193	800
1408	640	5	22	44	17	38	17	34	52	1	3	338	143	427
1409	3,351	36	135	433	69	165	175	60	137	3	3	53	1,013	255
1410	392	9	22	45	6	19	10	105	45	-	-	14	111	164
1411	319	3	15	33	10	38	15	117	71	3	2	11	114	205
1412	-	-	-	-	-	-	-	73	394	70	7	987	-	1,532
1413	1,090	11	59	132	34	43	38	1	10	-	89	1	317	101
1414	2,559	4	6	31	166	375	194	338	299	14	65	118	776	833
1415	3	-	-	1	-	-	-	19	58	-	-	138	1	215
1416	-	-	-	-	-	-	-	5	8	-	1	199	-	213
1417	32	0	2	10	-	-	-	124	409	-	-	693	12	1,226
1418	1,930	26	161	406	-	1	1	-	-	-	-	3	596	3
1419	708	8	53	159	-	-	-	-	1	-	-	2	220	3
1420	3,094	27	157	302	57	89	62	53	195	-	127	32	694	407
1421	639	32	55	86	-	2	-	84	29	-	-	99	175	212
1422	833	19	77	118	3	9	1	15	66	-	-	1	227	82
1423	3,254	67	181	388	21	55	40	55	114	-	-	7	752	176
1424	1,001	18	94	106	13	17	17	-	-	-	116	1	265	117
1425	1,071	11	101	113	19	26	20	29	156	46	-	40	290	271
1426	2,369	61	171	339	15	24	20	79	254	12	-	38	629	383
1427	1,373	-	106	214	0	4	7	57	2,079	724	239	3	332	3,101
1428	1,975	57	84	387	3	11	2	40	124	-	120	11	545	295
1429	4,899	82	233	192	231	240	89	85	273	-	-	12	1,067	370
1430	1,566	17	97	216	23	40	29	9	52	0	14	29	422	105
1431	4,728	63	114	266	211	308	117	200	334	4	31	31	1,078	599
1432	1,236	2	51	250	3	34	40	1	36	-	83	13	380	133
1433	2,262	29	67	158	122	202	87	291	123	4	19	41	666	478
1434	1,176	1	154	206	-	2	7	-	40	2	102	70	370	214
1435	2,485	4	48	147	77	280	154	51	318	2	8	20	711	400
1436	1,785	5	88	180	69	183	81	93	121	4	20	63	608	301
1437	2,303	7	51	158	81	314	169	99	116	2	9	206	780	432
1438	645	-	36	130	-	12	20	31	25	8	2	9	198	75
1439	4,027	12	61	157	345	498	187	316	336	6	26	152	1,261	836
1440	147	1	5	19	7	11	4	-	2	-	-	2	47	4
1441	909	10	37	112	17	27	9	2	3	-	-	-	211	5
1442	641	10	54	126	4	6	2	-	-	-	-	37	202	37
1443	1,709	0	7	62	102	231	132	57	105	2	11	21	534	197

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1444	2,201	62	146	250	10	21	13	30	158	-	-	4	502	191
1445	2,060	34	233	164	3	29	18	33	84	2	3	526	481	648
1446	2,942	19	210	313	22	67	39	46	177	315	163	6	670	707
1447	2,627	17	128	179	85	110	44	10	15	-	91	25	563	141
1448	1,009	16	73	145	7	18	14	22	197	83	-	24	273	326
1449	3,471	40	67	80	195	241	110	87	170	302	30	5	732	595
1450	2,798	87	102	333	33	55	34	61	51	2	89	22	643	225
1451	2,915	37	233	269	66	63	61	-	19	1	4	2	729	26
1452	1,219	-	-	-	75	166	92	294	113	2	50	48	333	508
1453	2,438	-	-	-	174	376	198	97	105	4	122	36	748	364
1454	1,883	-	19	37	159	325	112	51	42	-	-	2	652	95
1455	1,699	9	81	10	456	310	31	-	259	-	652	1	897	912
1456	3,490	-	67	160	190	456	244	1	4	-	-	2	1,117	7
1457	878	4	25	89	36	78	46	13	16	1	334	7	278	371
1458	549	5	39	135	4	9	6	-	10	-	-	3	198	13
1459	517	3	32	116	5	14	8	37	40	0	11	11	178	99
1460	401	4	32	105	3	6	5	-	6	-	-	18	155	24
1461	728	3	57	137	13	43	20	1	10	-	-	7	273	18
1462	435	0	41	132	-	-	-	0	6	73	-	36	173	116
1463	833	3	84	225	-	-	-	4	26	-	21	3	312	54
1464	396	3	39	98	-	-	-	-	8	-	-	15	140	23
1465	517	5	51	117	-	-	-	8	290	28	245	50	172	620
1466	1,284	19	115	262	-	-	-	-	2	-	-	3	396	5
1467	5,181	-	-	5	348	784	449	517	765	50	398	328	1,586	2,057
1468	4,960	0	0	1	334	753	430	152	976	89	773	216	1,518	2,206
1469	-	-	-	-	-	-	-	-	-	-	-	395	-	395
1470	-	-	-	-	-	-	-	1	15	-	0	286	-	302
1471	-	-	-	-	-	-	-	0	37	-	0	417	-	454
1472	42	1	2	11	-	-	-	3	13	-	-	294	14	310
1473	2,205	64	105	289	17	20	25	44	164	1	3	216	520	428
1474	482	7	14	71	4	3	1	44	141	-	36	632	100	853
1475	1,903	62	113	199	37	45	35	16	15	-	80	11	491	122
1476	2,081	36	105	315	10	55	28	-	7	-	79	53	549	139
1477	2,933	29	222	288	46	64	56	66	56	2	98	56	705	278
1478	2,546	60	185	321	39	37	115	8	17	0	88	5	757	118
1479	1,748	12	84	230	34	78	53	8	12	0	0	2	491	22
1480	2,560	26	169	448	6	15	22	1	8	-	-	5	686	14
1481	2,133	29	178	435	10	24	20	-	4	-	35	3	697	42
1482	2,456	11	87	218	92	209	121	293	512	51	404	101	738	1,360
1483	964	10	57	133	21	48	27	316	82	9	35	22	296	464
1484	2,732	26	157	369	63	144	83	-	-	-	-	3	842	3
1485	2,948	44	261	595	-	1	1	-	-	-	-	3	902	3
1486	4,006	-	1	16	266	602	346	186	278	6	27	327	1,231	824
1487	1,650	5	34	77	86	195	111	66	210	-	-	370	508	646
1488	5,606	19	112	256	293	659	377	111	98	5	21	42	1,716	276
1489	11	-	-	-	-	1	-	74	124	-	12	1,132	1	1,341
1490	4	-	-	-	-	-	-	87	63	0	0	250	-	401
1491	706	45	54	52	4	18	9	1	14	-	-	33	182	48
1492	-	-	-	-	-	-	-	37	63	-	12	1,534	-	1,646
1493	-	-	-	-	-	-	-	-	-	-	-	46	-	46
1494	-	-	-	-	-	-	-	20	151	6	2	813	-	991
1495	6	-	-	2	-	-	-	35	109	-	6	907	2	1,056
1496	96	-	8	16	-	-	1	45	62	-	8	1,013	25	1,128
1497	4,204	32	192	435	139	312	178	10	26	-	-	86	1,288	121
1498	4,608	32	189	427	163	367	209	8	105	-	-	61	1,387	174
1499	6,775	15	88	206	389	876	501	70	136	2	7	196	2,075	410
1500	488	-	-	1	33	74	42	217	697	0	44	1,199	150	2,157
1501	19	-	-	4	-	-	-	217	867	-	-	1,520	4	2,604
1502	13	-	2	2	-	-	-	185	741	-	-	1,300	4	2,227
1503	34	-	1	7	-	-	-	5	-	-	-	26	8	31
1504	132	-	11	33	-	-	1	-	7	-	-	108	45	115
1505	2	-	-	-	-	-	-	59	97	-	13	1,493	-	1,663
1506	8	-	-	-	1	1	-	42	70	-	9	1,080	2	1,202
1507	-	-	-	-	-	-	-	4	7	-	1	113	-	126
1508	317	5	8	10	15	18	10	115	186	-	-	298	66	599
1509	-	-	-	-	-	-	-	8	15	-	1	219	-	243
1510	82	-	3	4	1	2	1	2	-	-	-	147	11	149
1511	35	-	3	6	-	-	-	132	69	-	-	1,744	9	1,945
1512	773	29	45	119	-	10	-	2	36	-	65	46	203	149
1513	90	-	10	20	-	-	-	-	-	-	-	14	30	14
1514	67	-	5	11	-	-	-	-	-	-	-	51	16	51
1515	69	-	6	12	-	-	-	-	-	-	-	36	18	36
1516	104	-	9	28	-	-	2	-	2	-	-	18	39	20
1517	100	-	8	25	-	-	-	-	-	-	-	59	33	59
1518	81	2	3	4	6	7	4	1	16	-	-	77	26	94
1519	53	2	2	4	5	6	4	37	73	-	8	956	23	1,075
1520	9	-	1	3	-	-	-	-	-	-	-	2	4	2
1521	16	-	2	5	-	-	-	12	40	-	-	145	7	197
1522	56	-	6	10	-	-	-	7	15	-	-	245	16	267
1523	45	-	5	11	-	-	-	11	9	-	-	116	16	136
1524	46	-	5	10	-	-	-	-	-	-	-	140	15	140
1525	1	-	-	1	-	-	-	-	-	-	-	16	1	16
1526	108	-	6	21	1	1	1	2	-	-	-	157	30	159
1527	146	-	8	31	-	1	1	-	25	-	-	56	41	81
1528	-	-	-	-	-	-	-	7	62	-	2	280	-	351
1529	-	-	-	-	-	-	-	248	3	-	-	9	-	260
1530	104	2	3	4	6	7	4	58	96	-	13	1,476	26	1,643
1531	147	6	10	12	18	22	12	2	6	-	1	61	80	70
1532	16	-	-	1	1	1	1	5	9	-	-	360	4	374
1533	6,347	34	203	459	275	619	353	55	39	2	9	38	1,943	142
1534	2,894	-	2	3	193	435	249	48	43	2	9	20	882	122
1535	549	-	7	20	54	77	33	13	199	6,585	-	1	191	6,798
1536	-	-	-	-	-	-	-	16	70	-	1	354	-	441
1537	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1538	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1539	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1540	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1541	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1542	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1543	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1544	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1545	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1546	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1547	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1548	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1549	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1550	1,154	8	97	276	-	-	-	90	53	3	11	8	381	165
1551	1,277	-	-	-	86	194	111	0	0	0	0	1	391	2
1552	555	8	50	112	-	-	-	352	115	28	57	20	170	574
1553	1,202	16	104	247	-	-	-	3	42	-	-	1	367	46
1554	266	1	17	51	6	12	8	9	12	-	-	21	95	41
1555	955	1	67	259	-	7	7	2	74	4	96	19	341	196
1556	374	2	27	107	-	6	4	2	1	-	-	2	146	5
1557	-	-	-	-	-	-	-	12	553	35	44	73	-	718
1558	1,059	15	91	216	-	1	2	1	7	-	-	8	325	16
1559	1,688	11	69	164	59	134	77	-	-	-	-	3	516	3
1560	304	2	13	31	10	23	13	52	173	-	-	301	93	526
1561	26	-	1	7	-	1	1	0	0	0	0	1	10	1
1562	1,096	-	4	4	72	162	93	1,058	436	33	137	136	334	1,800
1563	4,027	32	187	423	130	293	168	11	10	0	2	7	1,233	31
1564	3,022	46	270	610	-	-	-	174	45	5	19	13	925	256
1565	6,577	10	59	134	399	898	513	-	2	-	-	1	2,013	3
1566	2,780	27	159	360	67	151	86	-	1	-	-	22	851	23
1567	1,961	27	169	398	-	2	6	-	-	-	-	2	603	2
1568	805	11	68	162	-	1	2	-	-	-	-	1	245	1
1569	1,331	19	117	272	-	2	-	91	24	3	10	8	410	135
1570	3,095	46	272	630	-	3	2	-	1	-	-	3	953	4
1571	27	-	2	4	2	1	1	40	123	-	-	354	10	516
1572	5	-	-	2	-	-	-	11	35	144	-	102	2	291
1573	62	1	3	6	-	1	2	-	-	-	-	3	13	3
1574	68	1	4	10	-	1	2	-	-	-	-	3	18	3
1575	89	2	5	11	-	1	3	-	1	-	-	55	22	56
1576	67	1	4	8	-	1	3	-	-	-	-	20	17	20
1577	523	10	30	65	2	6	17	3	8	-	-	16	130	27
1578	1,127	17	101	227	-	-	-	-	-	-	-	1	345	1
1579	2,783	27	157	357	67	152	87	-	-	-	-	3	847	3
1580	7	0	1	1	-	-	-	-	-	-	-	-	2	-
1581	3,061	18	106	240	126	284	162	-	-	-	-	3	937	3
1582	454	-	-	-	31	69	39	83	347	3	559	217	139	1,208
1583	614	-	2	6	39	91	52	133	319	4	33	137	191	627
1584	-	-	-	-	-	-	-	12	40	3	2	366	-	423
1585	-	-	-	-	-	-	-	16	27	-	3	520	-	566
1586	197	1	10	32	-	2	4	150	526	-	-	1,099	49	1,775
1587	54	-	5	11	-	-	1	172	571	-	-	1,205	17	1,947
1588	3,836	-	20	22	318	568	362	278	1,042	6	34	93	1,290	1,453
1589	1,641	9	162	417	-	-	-	3	36	-	-	8	588	47
1590	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1591	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1592	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1593	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1594	1,116	1	67	277	5	55	39	1	11	-	59	8	444	79
1595	622	0	30	120	2	25	17	4	7	-	-	7	194	18
1596	-	-	-	-	-	-	-	184	124	-	-	324	-	632
1597	-	-	-	-	-	-	-	0	0	-	0	57	-	57
1598	11	-	-	-	-	1	-	37	26	-	4	495	1	562
1599	6	-	-	-	-	1	-	38	64	-	8	976	1	1,087
1600	98	3	3	4	6	8	4	52	88	-	12	1,358	28	1,509
1601	-	-	-	-	-	-	-	13	53	-	3	523	-	593
1602	3	-	-	-	-	1	-	37	61	-	8	946	1	1,052
1603	20	-	3	8	-	-	-	43	75	-	9	1,089	11	1,216
1604	44	-	2	6	-	-	1	20	52	-	4	499	9	575
1605	21	-	2	5	-	-	-	21	104	-	-	155	7	279
1606	411	9	40	38	8	7	5	123	429	-	-	703	106	1,255
1607	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1609	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1610	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1611	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1612	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1613	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1614	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1615	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1616	631	0	57	74	18	25	26	6	43	-	-	15	201	64
1617	1,809	-	71	151	71	177	120	54	75	-	31	43	590	203
1618	1,919	53	84	210	28	67	69	21	71	-	83	3	511	178
1619	852	9	9	71	15	32	15	102	165	5	29	666	151	967
1620	-	-	-	-	-	-	-	153	331	232	9	2,116	-	2,841
1621	2	-	-	1	-	-	-	47	167	-	-	336	1	550
1622	3	-	-	1	-	-	-	188	564	-	-	1,318	1	2,070
1623	-	-	-	-	-	-	-	6	11	-	1	196	-	214
1624	6	-	-	1	-	-	-	0	0	-	0	167	1	167
1625	1,039	-	1	4	69	156	89	233	207	10	119	146	319	715
1626	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1627	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1628	1,928	5	62	133	88	217	118	306	296	9	39	99	622	749
1629	213	0	20	62	-	-	-	0	78	0	0	7	82	85
1630	2,174	16	104	243	66	148	85	-	-	-	-	3	663	3
1631	1,126	4	64	206	17	37	21	2	2	0	0	3	349	7
1632	783	8	55	166	-	-	-	22	9	122	1	2	229	156
1633	4,061	34	203	460	120	270	154	35	33	1	7	20	1,243	96
1634	297	-	1	1	19	43	24	223	2,411	193	1,684	1,088	88	5,599
1635	193	-	3	6	11	26	15	247	745	1	5	1,338	61	2,335

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1636	436	-	-	6	28	64	37	258	697	3	12	1,158	135	2,127
1637	407	0	0	6	26	61	35	1	-	-	-	3	128	4
1638	1,988	29	173	404	-	2	2	-	-	-	-	3	610	3
1639	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1640	482	6	40	98	-	2	3	2	3	-	-	30	149	35
1641	640	8	50	127	1	3	4	109	28	3	12	9	193	162
1642	1,805	3	18	55	105	235	138	-	1	12	100	3	554	116
1643	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1644	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1645	22	-	2	5	-	-	-	247	992	-	-	1,739	7	2,979
1646	40	-	-	9	-	1	1	230	921	-	-	1,876	11	3,027
1647	9,039	-	-	5	609	1,371	784	18	51	0	1	88	2,769	157
1648	1,813	-	-	8	121	273	156	90	484	-	-	518	558	1,092
1649	4,928	-	-	7	330	744	426	169	1,267	111	960	365	1,507	2,871
1650	4,508	5	32	78	280	628	357	-	-	-	-	5	1,379	5
1651	552	9	45	108	4	8	2	5	178	17	152	34	176	387
1652	560	8	41	103	5	11	4	2	-	-	-	2	172	4
1653	1,317	20	117	266	-	-	-	-	-	-	-	6	403	6
1654	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1655	-	-	-	-	-	-	-	-	-	-	-	23	-	23
1656	5,622	37	220	499	213	479	274	-	-	-	-	24	1,721	24
1657	2,130	32	189	430	-	-	1	1	-	-	-	3	652	4
1658	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1659	32	-	3	9	-	-	1	-	-	-	-	3	13	3
1660	1,264	19	113	255	-	-	-	-	-	-	-	3	387	3
1661	44	-	2	8	-	-	1	1	-	-	-	3	11	4
1662	13	-	1	3	-	-	-	1	-	-	-	3	4	4
1663	5,382	20	121	273	272	612	349	2	26	0	0	6	1,647	35
1664	1,124	17	100	226	-	-	-	-	-	-	-	3	343	3
1665	3	-	-	1	-	-	-	-	-	-	-	3	1	3
1666	5	-	1	2	-	-	-	-	-	-	-	3	3	3
1667	317	4	23	74	-	-	-	-	-	-	-	2	100	2
1668	-	-	-	-	-	-	-	1	-	-	-	4	-	5
1669	78	-	2	23	-	-	-	-	-	-	-	3	25	3
1670	6,502	1	4	10	435	980	560	164	145	7	32	60	1,990	409
1671	1,070	16	94	218	-	-	-	-	-	-	-	3	328	3
1672	-	-	-	-	-	-	-	-	-	-	-	3	-	3
1673	7	-	-	3	-	-	-	-	-	-	-	3	3	3
1674	2,330	35	208	470	-	-	-	-	-	-	-	2	713	2
1675	2,854	2	18	68	173	391	223	195	172	8	37	85	875	498
1676	500	7	42	105	-	-	-	1	3	-	-	-	154	4
1677	259	4	23	55	-	-	-	-	-	-	-	6	81	6
1678	1,721	26	153	347	-	-	-	-	-	-	-	3	526	3
1679	1,316	19	113	275	-	1	3	-	-	-	3	11	411	14
1680	473	5	35	106	-	3	3	56	207	-	74	333	151	669
1681	8	-	-	2	-	-	-	79	322	-	-	556	2	957
1682	903	13	78	185	-	1	1	2	1	-	-	15	278	18
1683	1,021	14	87	212	-	1	1	2	4	-	-	13	316	19
1684	3,871	37	223	512	91	206	118	0	9	-	-	9	1,189	18
1685	1,633	25	145	331	-	-	-	-	-	-	-	3	500	3
1686	1,209	13	77	177	23	51	29	-	-	-	-	3	370	3
1687	2,009	30	178	408	-	-	-	-	-	-	-	2	616	2
1688	307	4	25	63	-	-	-	-	-	-	-	2	93	2
1689	2,123	31	187	431	-	-	-	1	-	-	-	5	649	6
1690	1,445	21	126	298	-	-	-	-	-	-	-	3	446	3
1691	-	-	-	-	-	-	-	1	4	11	-	4	-	20
1692	210	-	5	58	-	1	1	-	-	-	-	2	65	2
1693	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1694	2,078	31	185	421	-	-	-	-	-	-	-	4	638	4
1695	4,126	35	206	466	122	275	157	79	70	3	15	36	1,262	202
1696	302	4	25	67	-	-	-	-	2	-	-	6	96	8
1697	17	-	-	5	-	-	-	-	-	-	-	2	5	2
1698	-	-	-	-	-	-	-	-	30	-	-	3	-	33
1699	271	3	19	60	0	1	1	0	3	0	0	85	84	88
1700	396	4	27	90	-	-	-	-	6	-	-	4	122	10
1701	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1702	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1703	-	-	-	-	-	-	-	243	221	191	108	1,716	-	2,479
1704	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1705	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1706	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1707	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1708	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1709	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1710	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1711	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1712	861	-	-	-	-	-	-	13	69	-	5,284	60	-	5,426
1713	34	-	1	1	2	6	3	4	4	0	1	2	13	12
1714	375	-	24	93	-	3	2	2	20	-	-	8	122	30
1715	457	1	28	107	-	5	3	1	15	-	-	46	144	62
1716	794	3	52	202	-	10	6	-	5	-	-	-	273	5
1717	22	-	-	8	-	-	-	1	13	-	-	13	8	28
1718	43	-	-	12	-	-	-	167	501	-	-	1,158	12	1,826
1719	-	-	-	-	-	-	-	-	-	-	-	54	-	54
1720	24	-	1	3	-	-	1	-	6	-	-	3	5	9
1721	2,686	30	167	386	50	118	66	12	37	-	-	124	817	173
1722	1,109	5	42	279	-	-	-	39	34	-	4	6	326	83
1723	777	-	28	131	5	56	53	22	246	53	79	142	274	541
1724	259	-	2	8	8	47	31	117	156	19	-	280	96	571
1725	811	1	18	225	-	-	-	0	54	-	142	29	243	225
1726	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1727	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1728	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1729	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1730	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1731	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1733	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1734	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1735	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1736	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1737	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1738	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1739	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1740	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1741	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1742	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1743	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1744	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1745	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1746	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1747	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1748	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1749	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1750	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1751	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1752	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1753	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1754	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1755	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1756	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1757	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1759	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1760	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1761	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1762	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1763	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1764	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1765	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1766	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1767	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1768	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1769	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1770	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1771	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1772	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1773	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1774	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1775	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1776	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1777	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1778	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1779	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1780	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1781	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1782	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1783	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1784	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1785	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1786	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1787	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1788	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1789	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1790	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1791	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1792	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1793	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1794	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1795	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1796	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1797	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1798	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1799	393	4	4	106	-	-	3	2	3	-	-	32	117	37
1800	280	-	18	79	-	-	1	2	20	-	29	5	97	56
1801	261	4	23	53	-	-	-	-	-	-	-	2	80	2
1802	386	6	35	82	-	-	-	-	4	-	-	4	122	8
1803	921	1	56	246	-	-	1	2	24	-	-	14	304	39
1804	559	-	35	147	-	-	-	5	35	308	129	27	182	505
1805	835	-	51	220	-	-	-	3	45	-	-	16	270	65
1806	656	4	18	51	8	91	66	16	62	5	17	121	237	221
1807	2,108	24	121	340	12	127	92	5	61	-	-	13	716	79
1808	33	-	2	9	-	-	-	52	157	17	48	391	11	665
1809	967	1	60	255	-	-	-	9	62	2	7	56	316	135
1810	413	-	25	108	-	-	-	1	15	-	-	13	134	29
1811	679	11	55	154	-	-	-	2	25	-	-	10	219	37
1812	737	1	45	196	-	-	-	5	43	-	-	16	242	63
1813	1,555	2	25	410	-	-	-	174	161	0	13	33	438	381
1814	2,054	11	61	464	25	278	202	7	74	-	-	19	1,042	101
1815	1,851	7	71	243	17	184	134	9	79	-	1	42	656	131
1816	285	-	5	60	2	16	12	188	46	-	-	38	95	272
1817	1,581	-	63	357	4	64	45	8	83	-	-	71	532	162
1818	196	-	4	67	-	-	3	1	7	-	-	39	74	46
1819	167	-	4	49	-	-	2	0	2	-	-	12	55	14
1820	1,732	-	25	550	-	-	-	-	12	-	-	9	576	21
1821	155	-	4	52	-	-	2	1	5	-	55	9	58	70
1822	440	-	20	118	-	-	-	2	25	-	125	21	138	173
1823	1,111	-	73	291	-	-	-	6	69	-	-	40	364	115
1824	410	-	26	105	-	-	-	1	16	-	-	7	132	23
1825	836	-	43	172	7	36	22	1	16	-	-	8	280	26
1826	-	-	-	-	-	-	-	-	-	-	-	2	-	2
1827	4,887	-	304	1,215	52	284	181	54	153	24	-	314	2,037	545

CITY OF FRESNO GENERAL PLAN UPDATE
TRAVEL DEMAND FORECASTING MODEL INPUTS BY TRAFFIC ANALYSIS ZONE (TAZ

CUMULATIVE CONDITIONS

	1	2	3	4	5	6	7	8	9	10	11	12		
	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Government	Education	Other	TOTAL	TOTAL
TAZ	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
1828	916	-	13	56	26	145	93	76	307	68	102	186	334	739
1829	101	1	4	31	-	1	-	1	5	-	-	20	37	26
1830	166	1	4	41	-	1	-	-	10	-	-	3	47	13
1831	-	-	-	1	-	-	-	-	4	-	-	1	1	5
1832	-	-	-	3	-	-	-	-	-	-	-	119	3	119
1833	109	1	2	16	-	1	-	-	-	-	-	5	20	5
1834	137	2	4	32	1	1	-	1	5	-	-	19	40	25
1835	111	2	5	35	1	1	-	-	-	-	-	8	44	8
1836	120	2	4	33	1	1	-	1	-	-	-	2	41	3
1837	245	2	12	63	-	1	1	-	2	-	-	54	79	56
1838	-	-	-	1	-	-	-	-	-	-	-	1	1	1
1839	-	-	-	2	-	-	-	-	-	-	-	2	2	2
1840	54	-	3	14	-	-	-	-	-	-	-	2	17	2
1841	68	-	3	14	-	-	-	-	-	-	-	11	17	11
1842	68	1	4	23	-	-	1	-	-	-	-	6	29	6
1843	199	1	10	50	-	-	1	-	10	-	-	4	62	14
1844	201	1	10	50	-	-	-	2	1	-	-	-	61	3
1845	18	-	1	6	-	-	-	-	3	-	-	2	7	5
1846	175	1	8	48	-	1	1	-	2	-	-	12	59	14
1847	685	3	48	171	-	-	-	2	32	-	2	11	221	47
1848	271	2	13	70	-	1	2	-	1	-	-	9	88	10
1849	-	-	-	-	-	-	-	-	3	-	-	1	-	4
1850	3,482	3	16	43	122	689	443	1,313	311	-	-	159	1,315	1,783
1851	3,144	-	1	7	119	654	416	1,716	383	-	-	204	1,198	2,302
1852	1,750	-	100	377	50	54	52	6	154	32	-	199	633	390
TOTAL	**1,532,743**	**13,458**	**80,338**	**210,898**	**35,627**	**90,157**	**54,433**	**83,983**	**205,476**	**50,212**	**62,405**	**204,008**	**484,911**	**606,084**

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
1	A	N/O	STANISLAUS	5186	5190	05186-05190	160	183	0.87	0.60	Yes	-23	529
2	ABBY	S/O	180	4404	2040	04404-02040	983	290	3.39	0.60	No	693	480,249
3	ABBY	N/O	DIVISADERO	2093	2092	02093-02092	1,055	371	2.84	0.60	No	684	467,856
4	ABBY	S/O	OLIVE	2087	2086	02087-02086	908	854	1.06	0.60	Yes	54	2,916
5	AIRWAYS	W/O	CLOVIS	2540	8220	02540-08220	1,338	1,135	1.18	0.35	Yes	203	41,209
6	ALLUVIAL	E/O	CEDAR	3093	3105	03093-03105	483	912	0.53	0.60	Yes	-429	184,041
7	ALLUVIAL	E/O	CHESTNUT	3100	3110	03100-03110	130	1,013	0.13	0.37	No	-883	779,689
8	ALLUVIAL	E/O	INGRAM	6540	6542	06540-06542	739	840	0.88	0.60	Yes	-101	10,201
9	ALLUVIAL	E/O	MAPLE	3096	3108	03096-03108	350	1,020	0.34	0.37	No	-670	448,900
10	ALLUVIAL	E/O	MARKS	3165	5047	03165-05047	97	162	0.60	0.60	Yes	-65	4,225
11	ALLUVIAL	W/O	MILBURN	5784	5791	05784-05791	790	436	1.81	0.60	No	354	125,316
12	ALLUVIAL	E/O	VAN NESS	3166	5048	03166-05048	8	104	0.08	0.60	No	-96	9,216
13	ALLUVIAL	E/O	WEST	3168	5049	03168-05049	1	53	0.02	0.60	No	-52	2,704
14	ANNADALE	E/O	CEDAR	8434	9236	08434-09236	0	66	0.00	0.60	No	-66	4,356
15	ANNADALE	W/O	ELM	2134	2779	02134-02779	307	206	1.49	0.60	Yes	101	10,201
16	ANNADALE	W/O	MARTIN LUTHER KING JR	2914	2934	02914-02934	17	19	0.89	0.60	Yes	-2	4
17	ANNADALE	W/O	WALNUT	2934	3036	02934-03036	0	9	0.00	0.60	No	-9	81
18	ARMSTRONG	N/O	BELMONT	3559	12146	03559-12146	294	239	1.23	0.60	Yes	55	3,025
19	ARMSTRONG	N/O	BUTLER	5627	6684	05627-06684	16	118	0.14	0.60	No	-102	10,404
20	ARMSTRONG	S/O	CHURCH	6685	12142	06685-12142	11	121	0.09	0.60	No	-110	12,100
21	ARMSTRONG	S/O	DAKOTA	5021	8378	05021-08378	118	360	0.33	0.60	No	-242	58,564
22	ARMSTRONG	S/O	KINGS CANYON	3560	6684	03560-06684	15	252	0.06	0.60	No	-237	56,169
23	ASHLAN	W/O	41	3128	4336	03128-04336	2,411	2,210	1.09	0.27	Yes	201	40,401
24	ASHLAN	E/O	BLACKSTONE	2077	3128	02077-03128	1,911	2,312	0.83	0.27	Yes	-401	160,801
25	ASHLAN	W/O	BRYAN	3330	5072	03330-05072	138	155	0.89	0.60	Yes	-17	289
26	ASHLAN	E/O	CEDAR	2450	2451	02450-02451	2,522	2,091	1.21	0.28	Yes	431	185,761
27	ASHLAN	E/O	CHESTNUT	5034	6812	05034-06812	1,425	1,863	0.76	0.29	Yes	-438	191,844
28	ASHLAN	E/O	DEL MAR	2077	2444	02077-02444	1,171	1,598	0.73	0.31	Yes	-427	182,329
29	ASHLAN	E/O	FRESNO	2445	2446	02445-02446	1,850	1,805	1.02	0.29	Yes	45	2,025
30	ASHLAN	W/O	FRUIT	2440	5428	02440-05428	1,611	1,375	1.17	0.32	Yes	236	55,696
31	ASHLAN	W/O	HAYES	3330	5072	03330-05072	138	208	0.66	0.60	Yes	-70	4,900
32	ASHLAN	E/O	MILLBROOK	2449	5007	02449-05007	1,960	1,931	1.02	0.28	Yes	29	841
33	ASHLAN	W/O	SANTA FE	2440	5428	02440-05428	1,611	1,359	1.19	0.32	Yes	252	63,504
34	ASHLAN	E/O	WEBER	3119	5084	03119-05084	3,093	3,111	0.99	0.25	Yes	-18	324
35	ASHLAN	W/O	WEST	2438	5431	02438-05431	1,801	1,495	1.20	0.31	Yes	306	93,636
36	ASHLAN	W/O	WINERY	5034	6288	05034-06288	1,425	2,657	0.54	0.26	No	-1,232	1,517,824
37	AUDUBON	E/O	BLACKSTONE	3173	3174	03173-03174	729	1,465	0.50	0.31	No	-736	541,696
38	AUDUBON	N/O	COLE	3175	3176	03175-03176	772	1,028	0.75	0.37	Yes	-256	65,536
39	AUDUBON	W/O	DEL MAR	2060	12117	02060-12117	434	1,237	0.35	0.33	No	-803	644,809
40	AUDUBON	W/O	FRIANT	3173	5584	03173-05584	575	1,519	0.38	0.31	No	-944	891,136
41	AUDUBON	N/O	LEXINGTON	3272	3274	03272-03274	499	1,244	0.40	0.33	No	-745	555,025
42	AUDUBON	N/O	NEES	3272	6560	03272-06560	437	1,126	0.39	0.35	No	-689	474,721
43	B	N/O	STANISLAUS	3493	4438	03493-04438	214	213	1.00	0.60	Yes	1	1
44	B	N/O	TUOLUMNE	2180	3493	02180-03493	94	180	0.52	0.60	Yes	-86	7,396
45	BARSTOW	E/O	BLACKSTONE	2072	2347	02072-02347	1,660	1,542	1.08	0.31	Yes	118	13,924
46	BARSTOW	E/O	BRAWLEY	2337	3562	02337-03562	33	354	0.09	0.60	No	-321	103,041
47	BARSTOW	E/O	CEDAR	2354	12314	02354-12314	1,569	1,073	1.46	0.36	No	496	246,016
48	BARSTOW	W/O	CEDAR	2354	5442	02354-05442	1,451	987	1.47	0.60	Yes	464	215,296
49	BARSTOW	E/O	FRUIT	2342	2343	02342-02343	358	1,009	0.35	0.37	No	-651	423,801
50	BARSTOW	E/O	GRANTLAND	3295	6744	03295-06744	32	79	0.41	0.60	Yes	-47	2,209
51	BARSTOW	E/O	PALM	2311	2344	02311-02344	684	903	0.76	0.60	Yes	-219	47,961
52	BARSTOW	E/O	THORNE	2344	3195	02344-03195	358	1,084	0.33	0.36	No	-726	527,076
53	BARSTOW	W/O	VALENTINE	3562	3563	03562-03563	30	133	0.23	0.60	No	-103	10,609
54	BARSTOW	E/O	WEST	2341	3194	02341-03194	156	770	0.20	0.60	No	-614	376,996
55	BEHYMER	E/O	CHANCE	5513	5517	05513-05517	16	427	0.04	0.60	No	-411	168,921
56	BEHYMER	E/O	MAPLE	5513	6648	05513-06648	474	332	1.43	0.60	Yes	142	20,164
57	BEHYMER	W/O	MAPLE	5513	5517	05513-05517	16	378	0.04	0.60	No	-362	131,044
58	BELMONT	W/O	99	4368	4369	04368-04369	428	420	1.02	0.60	Yes	8	64
59	BELMONT	E/O	ABBY	2090	2728	02090-02728	809	573	1.41	0.60	Yes	236	55,696
60	BELMONT	W/O	BLACKSTONE	4402	4403	04402-04403	530	168	3.15	0.60	No	362	131,044
61	BELMONT	E/O	CEDAR	2737	2738	02737-02738	1,167	1,070	1.09	0.36	Yes	97	9,409
62	BELMONT	W/O	CHESTNUT	2741	2742	02741-02742	698	884	0.79	0.60	Yes	-186	34,596
63	BELMONT	W/O	CLOVIS	2746	2747	02746-02747	289	534	0.54	0.60	Yes	-245	60,025
64	BELMONT	E/O	FIRST	2733	2734	02733-02734	762	1,388	0.55	0.32	No	-626	391,876
65	BELMONT	W/O	FRESNO	2729	2730	02729-02730	771	659	1.17	0.60	Yes	112	12,544
66	BELMONT	W/O	FULTON	4382	5178	04382-05178	1,031	878	1.17	0.60	Yes	153	23,409
67	BELMONT	W/O	H	2723	6650	02723-06650	651	634	1.03	0.60	Yes	17	289
68	BELMONT	W/O	MAPLE	2739	2740	02739-02740	923	1,160	0.80	0.34	Yes	-237	56,169
69	BELMONT	W/O	MARKS	3363	3473	03363-03473	179	409	0.44	0.60	Yes	-230	52,900
70	BELMONT	W/O	PEACH	2745	5505	02745-05505	442	904	0.49	0.60	Yes	-462	213,444
71	BLACKSTONE	N/O	ALLUVIAL	6539	9180	06539-09180	2,657	2,821	0.94	0.26	Yes	-164	26,896
72	BLACKSTONE	N/O	BREMER	5438	4400	05438-04400	802	685	1.17	0.60	Yes	117	13,689
73	BLACKSTONE	N/O	BULLARD	2071	2130	02071-02130	2,566	1,259	2.04	0.33	No	1,307	1,708,249
74	BLACKSTONE	N/O	CLINTON	2082	3253	02082-03253	1,789	1,177	1.52	0.34	No	612	374,544
75	BLACKSTONE	S/O	DAKOTA	2078	2079	02078-02079	1,632	835	1.95	0.60	No	797	635,209
76	BLACKSTONE	N/O	DIVISADERO	4413	4412	04413-04412	479	421	1.14	0.60	Yes	58	3,364
77	BLACKSTONE	N/O	GETTYSBURG	2075	2076	02075-02076	1,953	1,098	1.78	0.36	No	855	731,025
78	BLACKSTONE	S/O	HERNDON	2068	3223	02068-03223	2,225	968	2.30	0.60	No	1,257	1,580,049
79	BLACKSTONE	S/O	OLIVE	2086	4361	02086-04361	491	637	0.77	0.60	Yes	-146	21,316
80	BLACKSTONE	N/O	SHAW	2073	2074	02073-02074	1,942	1,241	1.56	0.33	No	701	491,401

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
81	BLACKSTONE	N/O	SHIELDS	2079	2080	02079-02080	1,877	835	2.25	0.60	No	1,042	1,085,764
82	BLACKSTONE	N/O	SIERRA	2069	3223	02069-03223	2,285	605	3.78	0.60	No	1,680	2,822,400
83	BRAWLEY	N/O	BARSTOW	2337	5487	02337-05487	1,249	1,798	0.69	0.30	No	-549	301,401
84	BRAWLEY	S/O	CALIFORNIA	5136	8062	05136-08062	104	106	0.98	0.60	Yes	-2	4
85	BRAWLEY	N/O	CLINTON	2562	3429	02562-03429	213	860	0.25	0.60	No	-647	418,609
86	BRAWLEY	N/O	DAKOTA	3339	3340	03339-03340	579	537	1.08	0.60	Yes	42	1,764
87	BRAWLEY	N/O	GETTYSBURG	3118	3585	03118-03585	1,290	1,218	1.06	0.33	Yes	72	5,184
88	BRAWLEY	S/O	HERNDON	3281	5107	03281-05107	1,280	793	1.61	0.60	No	487	237,169
89	BRAWLEY	N/O	NIELSEN	5120	5440	05120-05440	152	384	0.40	0.60	No	-232	53,824
90	BRAWLEY	N/O	SHAW	2374	3571	02374-03571	1,436	3,053	0.47	0.25	No	-1,617	2,614,689
91	BRAWLEY	N/O	WEBER	3118	3585	03118-03585	1,290	608	2.12	0.60	No	682	465,124
92	BROADWAY	N/O	41	6145	6187	06145-06187	436	522	0.84	0.60	Yes	-86	7,396
93	BROADWAY	N/O	DIVISADERO	4385	5400	04385-05400	186	87	2.14	0.60	No	99	9,801
94	BROADWAY	N/O	FRESNO	9226	9227	09226-09227	297	202	1.47	0.60	Yes	95	9,025
95	BROADWAY	S/O	VENTURA	4457	5222	04457-05222	25	238	0.11	0.60	No	-213	45,369
96	BRYAN	S/O	ASHLAN	3326	5632	03326-05632	162	62	2.61	0.60	No	100	10,000
97	BULLARD	E/O	41	3675	4327	03675-04327	2,646	2,601	1.02	0.26	Yes	45	2,025
98	BULLARD	W/O	BLACKSTONE	2071	3126	02071-03126	2,177	1,983	1.10	0.28	Yes	194	37,636
99	BULLARD	E/O	CARNEGIE	5806	5808	05806-05808	292	808	0.36	0.60	No	-516	266,256
100	BULLARD	E/O	CEDAR	2316	5001	02316-05001	1,850	2,114	0.88	0.27	Yes	-264	69,696
101	BULLARD	W/O	CEDAR	2313	2314	02313-02314	2,006	2,055	0.98	0.28	Yes	-49	2,401
102	BULLARD	W/O	CHESTNUT	2316	5001	02316-05001	1,850	2,029	0.91	0.28	Yes	-179	32,041
103	BULLARD	W/O	FIRST	2309	3245	02309-03245	2,044	2,467	0.83	0.26	Yes	-423	178,929
104	BULLARD	W/O	FRESNO	3675	4327	03675-04327	2,646	2,563	1.03	0.26	Yes	83	6,889
105	BULLARD	E/O	GRANTLAND	2294	6740	02294-06740	14	104	0.13	0.60	No	-90	8,100
106	BULLARD	W/O	JEANNE	3291	5052	03291-05052	34	91	0.37	0.60	No	-57	3,249
107	BULLARD	W/O	MAPLE	2316	5001	02316-05001	1,850	1,900	0.97	0.28	Yes	-50	2,500
108	BULLARD	E/O	MAROA	2306	3126	02306-03126	2,350	2,328	1.01	0.27	Yes	22	484
109	BULLARD	W/O	MILLBROOK	2312	3244	02312-03244	2,084	2,514	0.83	0.26	Yes	-430	184,900
110	BULLARD	W/O	PALM	2303	3201	02303-03201	2,230	1,869	1.19	0.29	Yes	361	130,321
111	BULLARD	E/O	VALENTINE	6062	12301	06062-12301	40	358	0.11	0.60	No	-318	101,124
112	BULLARD	E/O	WEST	2301	3193	02301-03193	1,940	1,668	1.16	0.30	Yes	272	73,984
113	BUTLER	E/O	ARMSTRONG	2850	5627	02850-05627	24	16	1.50	0.60	Yes	8	64
114	BUTLER	E/O	CHESTNUT	2842	2843	02842-02843	661	684	0.97	0.60	Yes	-23	529
115	BUTLER	W/O	CLOVIS	2846	2847	02846-02847	157	410	0.38	0.60	No	-253	64,009
116	CALAVERAS	E/O	N	3008	6084	03008-06084	213	148	1.44	0.60	Yes	65	4,225
117	CALIFORNIA	E/O	BRAWLEY	3068	3113	03068-03113	15	95	0.16	0.60	No	-80	6,400
118	CALIFORNIA	W/O	CEDAR	2879	3505	02879-03505	148	88	1.68	0.60	No	60	3,600
119	CALIFORNIA	E/O	CHERRY	5405	6188	05405-06188	11	59	0.19	0.60	No	-48	2,304
120	CALIFORNIA	E/O	MARKS	2863	2966	02863-02966	94	154	0.61	0.60	Yes	-60	3,600
121	CALIFORNIA	E/O	ORANGE	2878	3505	02878-03505	203	127	1.60	0.60	Yes	76	5,776
122	CALIFORNIA	W/O	TUPMAN	2872	6089	02872-06089	409	455	0.90	0.60	Yes	-46	2,116
123	CALIFORNIA	W/O	WALNUT	3586	6750	03586-06750	185	304	0.61	0.60	Yes	-119	14,161
124	CALIFORNIA	E/O	WEST	2865	2866	02865-02866	58	496	0.12	0.60	No	-438	191,844
125	CECELIA	N/O	BULLARD	2929	5411	02929-05411	1,388	468	2.97	0.60	No	920	846,400
126	CEDAR	N/O	BULLDOG	2354	3129	02354-03129	1,693	2,100	0.81	0.27	Yes	-407	165,649
127	CEDAR	S/O	CALIFORNIA	2879	3146	02879-03146	528	605	0.87	0.60	Yes	-77	5,929
128	CEDAR	N/O	CENTRAL	2962	12353	02962-12353	98	126	0.78	0.60	Yes	-28	784
129	CEDAR	S/O	CENTRAL	5169	8106	05169-08106	105	129	0.81	0.60	Yes	-24	576
130	CEDAR	N/O	CHURCH	2897	3146	02897-03146	461	714	0.65	0.60	Yes	-253	64,009
131	CEDAR	N/O	CLINTON	2557	2586	02557-02586	1,315	941	1.40	0.60	Yes	374	139,876
132	CEDAR	N/O	COPPER	3053	12318	03053-12318	283	80	3.54	0.60	No	203	41,209
133	CEDAR	S/O	DAKOTA	2491	2508	02491-02508	938	1,450	0.65	0.31	No	-512	262,144
134	CEDAR	S/O	HERNDON	2252	2283	02252-02283	1,962	1,686	1.16	0.30	Yes	276	76,176
135	CEDAR	N/O	JENSEN	3150	4614	03150-04614	401	417	0.96	0.60	Yes	-16	256
136	CEDAR	S/O	MCKINLEY	2634	2651	02634-02651	1,684	1,611	1.05	0.30	Yes	73	5,329
137	CEDAR	N/O	NEES	2230	3112	02230-03112	879	1,839	0.48	0.29	No	-960	921,600
138	CEDAR	N/O	NORTH	2952	5296	02952-05296	225	387	0.58	0.60	Yes	-162	26,244
139	CEDAR	S/O	PARKWAY	2962	3693	02962-03693	114	148	0.77	0.60	Yes	-34	1,156
140	CEDAR	S/O	SHAW	2140	2399	02140-02399	1,836	1,401	1.31	0.31	No	435	189,225
141	CEDAR	S/O	SHEPHERD	2222	3067	02222-03067	422	1,716	0.25	0.30	No	-1,294	1,674,436
142	CEDAR	N/O	TEAGUE	3067	3161	03067-03161	630	1,685	0.37	0.30	No	-1,055	1,113,025
143	CEDAR	N/O	TULARE	2767	2787	02767-02787	761	1,322	0.58	0.32	No	-561	314,721
144	CEDAR	N/O	VENTURA	2189	2813	02189-02813	893	1,390	0.64	0.32	No	-497	247,009
145	CENTRAL	W/O	MAPLE	5176	6202	05176-06202	89	136	0.65	0.60	Yes	-47	2,209
146	CHAMPLAIN	E/O	FRIANT	3305	5464	03305-05464	5	386	0.01	0.60	No	-381	145,161
147	CHERRY	N/O	ANNADALE	2938	5177	02938-05177	508	256	1.98	0.60	No	252	63,504
148	CHESTNUT	S/O	BELMONT	2742	3545	02742-03545	2,223	2,173	1.02	0.27	Yes	50	2,500
149	CHESTNUT	S/O	BUTLER	2842	2856	02842-02856	1,197	743	1.61	0.60	No	454	206,116
150	CHESTNUT	S/O	CALIFORNIA	2856	5278	02856-05278	1,474	1,429	1.03	0.31	Yes	45	2,025
151	CHESTNUT	S/O	CHURCH	2900	3541	02900-03541	1,096	921	1.19	0.60	Yes	175	30,625
152	CHESTNUT	N/O	HERNDON	2253	6107	02253-06107	1,414	505	2.80	0.60	No	909	826,281
153	CHESTNUT	S/O	JENSEN	2927	5291	02927-05291	1,197	1,126	1.06	0.35	Yes	71	5,041
154	CHESTNUT	N/O	NEES	2231	4996	02231-04996	1,055	887	1.19	0.60	Yes	168	28,224
155	CHESTNUT	N/O	OLIVE	2653	2687	02653-02687	2,028	1,332	1.52	0.32	No	696	484,416
156	CHESTNUT	N/O	SHIELDS	2539	5011	02539-05011	1,749	1,204	1.45	0.33	No	545	297,025
157	CHESTNUT	N/O	TEAGUE	3071	5467	03071-05467	845	978	0.86	0.60	Yes	-133	17,689
158	CHURCH	E/O	ARMSTRONG	3317	3557	03317-03557	11	32	0.34	0.60	No	-21	441
159	CHURCH	E/O	BLYTHE	4263	4407	04263-04407	11	34	0.32	0.60	No	-23	529
160	CHURCH	E/O	CHESTNUT	3239	5277	03239-05277	132	323	0.41	0.60	Yes	-191	36,481

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
161	CHURCH	E/O	ELM	2108	5729	02108-05729	225	342	0.66	0.60	Yes	-117	13,689
162	CHURCH	E/O	FOWLER	3317	3557	03317-03557	11	94	0.12	0.60	No	-83	6,889
163	CHURCH	W/O	FRUIT	2885	2992	02885-02992	23	120	0.19	0.60	No	-97	9,409
164	CHURCH	E/O	PEACH	6527	8264	06527-08264	0	157	0.00	0.60	No	-157	24,649
165	CHURCH	W/O	PEACH	2901	3533	02901-03533	137	236	0.58	0.60	Yes	-99	9,801
166	CLINTON	E/O	ANGUS	2580	2581	02580-02581	1,315	1,048	1.25	0.37	Yes	267	71,289
167	CLINTON	E/O	BLACKSTONE	2082	2577	02082-02577	1,552	1,245	1.25	0.33	Yes	307	94,249
168	CLINTON	E/O	CEDAR	2586	5710	02586-05710	851	840	1.01	0.60	Yes	11	121
169	CLINTON	E/O	FIRST	2581	2582	02581-02582	1,258	1,095	1.15	0.36	Yes	163	26,569
170	CLINTON	E/O	FOWLER	12148	12154	12148-12154	57	180	0.32	0.60	No	-123	15,129
171	CLINTON	E/O	FRUIT	2571	2572	02571-02572	1,425	1,467	0.97	0.31	Yes	-42	1,764
172	CLINTON	E/O	MARKS	2564	2565	02564-02565	1,790	1,793	1.00	0.30	Yes	-3	9
173	CLINTON	N/O	MCKINLEY	5783	6119	05783-06119	577	571	1.01	0.60	Yes	6	36
174	CLINTON	E/O	SUNNYSIDE	6633	8228	06633-08228	629	293	2.15	0.60	No	336	112,896
175	CLINTON	E/O	TEMPERANCE	12148	12154	12148-12154	57	69	0.83	0.60	Yes	-12	144
176	CLINTON	W/O	WEST	2568	2569	02568-02569	1,588	1,735	0.92	0.30	Yes	-147	21,609
177	CLOVIS	S/O	CALIFORNIA	3316	5591	03316-05591	1,315	915	1.44	0.60	Yes	400	160,000
178	CLOVIS	N/O	CLINTON	2541	5394	02541-05394	2,308	1,991	1.16	0.28	Yes	317	100,489
179	CLOVIS	S/O	KINGS CANYON	2199	2822	02199-02822	1,357	2,169	0.63	0.27	No	-812	659,344
180	CLOVIS	N/O	MCKINLEY	6631	8232	06631-08232	4,071	2,360	1.73	0.27	No	1,711	2,927,521
181	CLOVIS	N/O	TULARE	3547	7051	03547-07051	2,813	2,331	1.21	0.27	Yes	482	232,324
182	COLE	E/O	AUDUBON	3176	3208	03176-03208	483	423	1.14	0.60	Yes	60	3,600
183	COPPER	E/O	CEDAR	5773	3053	05773-03053	673	603	1.12	0.60	Yes	70	4,900
184	CORNELIA	N/O	DAKOTA	2472	3410	02472-03410	123	803	0.15	0.60	No	-680	462,400
185	DAKOTA	E/O	BLACKSTONE	2078	2485	02078-02485	335	1,032	0.32	0.37	No	-697	485,809
186	DAKOTA	E/O	CEDAR	2492	5708	02492-05708	763	843	0.91	0.60	Yes	-80	6,400
187	DAKOTA	E/O	CHESTNUT	2495	5015	02495-05015	321	976	0.33	0.60	No	-655	429,025
188	DAKOTA	E/O	FOWLER	5016	12157	05016-12157	24	120	0.20	0.60	No	-96	9,216
189	DAKOTA	E/O	MAPLE	2493	2494	02493-02494	510	953	0.54	0.60	Yes	-443	196,249
190	DAKOTA	W/O	MAPLE	2493	5713	02493-05713	707	1,263	0.56	0.33	No	-556	309,136
191	DAKOTA	W/O	PEACH	2495	5015	02495-05015	321	806	0.40	0.60	No	-485	235,225
193	DAKOTA	E/O	WEST	2478	2479	02478-02479	576	574	1.00	0.60	Yes	2	4
194	DIVISADERO	W/O	41	4637	6180	04637-06180	1,771	1,757	1.01	0.30	Yes	14	196
195	DIVISADERO	E/O	FRESNO	2781	5263	02781-05263	1,839	1,475	1.25	0.31	Yes	364	132,496
196	DIVISADERO	E/O	VAN NESS	2778	5237	02778-05237	227	520	0.44	0.60	Yes	-293	85,849
197	E	N/O	STANISLAUS	5413	5501	05413-05501	49	604	0.08	0.60	No	-555	308,025
198	EAST	S/O	CALIFORNIA	2876	2884	02876-02884	281	255	1.10	0.60	Yes	26	676
199	EL DORADO	E/O	E	3489	5413	03489-05413	246	359	0.69	0.60	Yes	-113	12,769
200	EMERSON	W/O	WEST	3214	12297	03214-12297	359	367	0.98	0.60	Yes	-8	64
201	F	N/O	FRESNO	5418	5500	05418-05500	35	101	0.35	0.60	No	-66	4,356
202	FIG	S/O	NORTH	2946	8094	02946-08094	39	189	0.21	0.60	No	-150	22,500
203	FIGARDEN	E/O	BRAWLEY	4628	5060	04628-05060	790	380	2.08	0.60	No	410	168,100
206	FIRST	N/O	ALLUVIAL	3087	3088	03087-03088	846	938	0.90	0.60	Yes	-92	8,464
207	FIRST	N/O	BARSTOW	2351	5006	02351-05006	746	1,742	0.43	0.30	No	-996	992,016
208	FIRST	N/O	BULLARD	2309	2310	02309-02310	1,205	1,654	0.73	0.30	Yes	-449	201,601
209	FIRST	N/O	CLINTON	2555	2581	02555-02581	1,710	1,063	1.61	0.36	No	647	418,609
210	FIRST	N/O	DAKOTA	2467	2488	02467-02488	1,361	899	1.51	0.60	Yes	462	213,444
211	FIRST	N/O	GETTYSBURG	2411	3234	02411-03234	1,454	1,688	0.86	0.30	Yes	-234	54,756
212	FIRST	N/O	HERNDON	2250	6102	02250-06102	1,220	1,029	1.19	0.37	Yes	191	36,481
213	FIRST	N/O	MCKINLEY	2602	2630	02602-02630	1,633	1,261	1.30	0.33	Yes	372	138,384
214	FIRST	N/O	NEES	3073	3178	03073-03178	601	1,145	0.52	0.35	No	-544	295,936
215	FIRST	N/O	SAN JOSE	2351	2364	02351-02364	990	1,626	0.61	0.30	No	-636	404,496
216	FIRST	S/O	SHAW	2138	2397	02138-02397	959	1,806	0.53	0.29	No	-847	717,409
217	FIRST	N/O	SIERRA	2281	5471	02281-05471	1,072	1,879	0.57	0.29	No	-807	651,249
218	FIRST	N/O	TULARE	2764	2783	02764-02783	1,037	896	1.16	0.60	Yes	141	19,881
219	FOWLER	N/O	CHURCH	5304	5592	05304-05592	196	369	0.53	0.60	Yes	-173	29,929
220	FOWLER	N/O	CLINTON	2593	8462	02593-08462	906	376	2.41	0.60	No	530	280,900
221	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	487	1.90	0.60	No	439	192,721
222	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	526	1.76	0.60	No	400	160,000
223	FOWLER	S/O	CLINTON	6839	8238	06839-08238	926	400	2.32	0.60	No	526	276,676
224	FOWLER	N/O	DAKOTA	5016	8376	05016-08376	953	1,187	0.80	0.34	Yes	-234	54,756
225	FOWLER	N/O	JENSEN	2906	3317	02906-03317	193	501	0.39	0.60	No	-308	94,864
226	FOWLER	N/O	KINGS CANYON	7056	7082	07056-07082	564	1,149	0.49	0.35	No	-585	342,225
227	FRESNO	E/O	99	4440	5870	04440-05870	1,592	1,637	0.97	0.30	Yes	-45	2,025
228	FRESNO	N/O	CLINTON	2554	2578	02554-02578	984	1,021	0.96	0.37	Yes	-37	1,369
229	FRESNO	N/O	DIVISADERO	2763	6092	02763-06092	881	899	0.98	0.60	Yes	-18	324
230	FRESNO	E/O	E	5418	5870	05418-05870	1,516	1,148	1.32	0.35	Yes	368	135,424
232	FRESNO	N/O	GETTYSBURG	2409	3232	02409-03232	1,484	696	2.13	0.60	No	788	620,944
233	FRESNO	N/O	HERNDON	2249	6100	02249-06100	2,287	2,478	0.92	0.26	Yes	-191	36,481
234	FRESNO	S/O	HERNDON	2249	2280	02249-02280	1,181	1,536	0.77	0.31	Yes	-355	126,025
235	FRESNO	S/O	MCKINLEY	2629	2646	02629-02646	724	893	0.81	0.60	Yes	-169	28,561
236	FRESNO	N/O	NEES	5461	6099	05461-06099	309	1,422	0.22	0.31	No	-1,113	1,238,769
237	FRESNO	S/O	SHAW	2339	3232	02339-03232	1,484	1,582	0.94	0.31	Yes	-98	9,604
238	FRESNO	N/O	SHIELDS	2502	2527	02502-02527	1,022	956	1.07	0.60	Yes	66	4,356
239	FRESNO	E/O	VAN NESS	3015	3016	03015-03016	847	915	0.93	0.60	Yes	-68	4,624
240	FRIANT	N/O	AUDUBON	2221	5036	02221-05036	4,487	4,202	1.07	0.23	Yes	285	81,225
241	FRIANT	N/O	CHAMPLAIN	3304	8116	03304-08116	1,966	1,423	1.38	0.31	No	543	294,849
242	FRIANT	N/O	SHEPHERD	2220	2221	02220-02221	2,852	2,347	1.22	0.27	Yes	505	255,025
244	FRUIT	S/O	ASHLAN	5429	5430	05429-05430	565	690	0.82	0.60	Yes	-125	15,625
245	FRUIT	S/O	CALIFORNIA	2867	2880	02867-02880	195	127	1.54	0.60	Yes	68	4,624

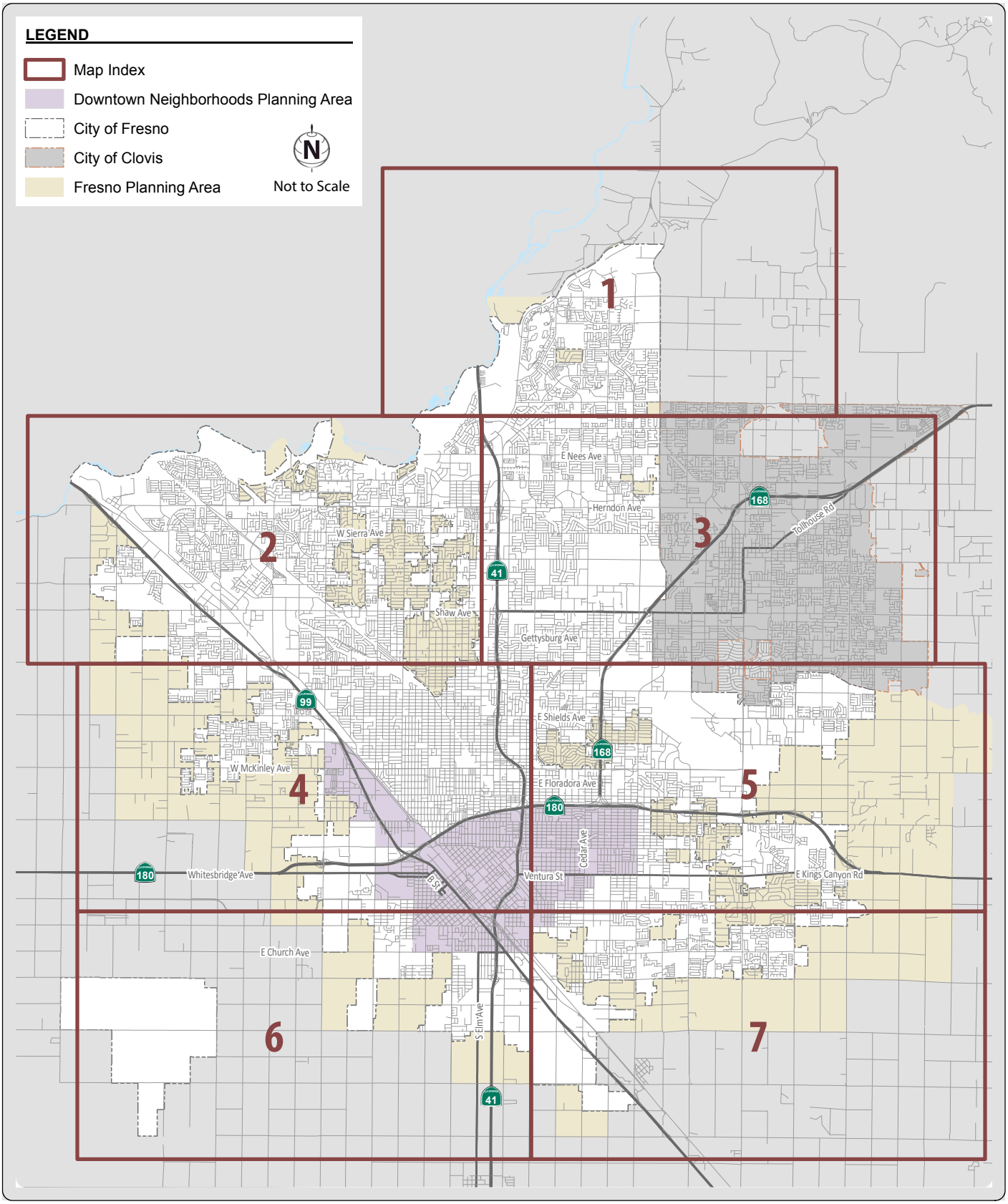
Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
246	FRUIT	N/O	CLINTON	2571	3261	02571-03261	369	853	0.43	0.60	Yes	-484	234,256
247	FRUIT	S/O	HERNDON	2245	5058	02245-05058	827	728	1.14	0.60	Yes	99	9,801
248	FRUIT	S/O	SHAW	2380	3270	02380-03270	890	309	2.88	0.60	No	581	337,561
249	FULTON	N/O	DIVISADERO	4386	4384	04386-04384	301	322	0.93	0.60	Yes	-21	441
250	FULTON	N/O	SAN JOAQUIN	5857	5861	05857-05861	86	120	0.72	0.60	Yes	-34	1,156
251	G	N/O	EL DORADO	2775	2776	02775-02776	177	108	1.64	0.60	No	69	4,761
252	G	S/O	STANISLAUS	4392	5191	04392-05191	205	371	0.55	0.60	Yes	-166	27,556
253	G	S/O	STANISLAUS	4392	5191	04392-05191	205	741	0.28	0.60	No	-536	287,296
254	G	N/O	TUOLUMNE	4392	5191	04392-05191	205	371	0.55	0.60	Yes	-166	27,556
255	G	S/O	VENTURA	2105	5879	02105-05879	309	338	0.91	0.60	Yes	-29	841
256	GARFIELD	S/O	BARSTOW	6725	6756	06725-06756	11	52	0.21	0.60	No	-41	1,681
257	GATES	N/O	BLYTHE	3297	4632	03297-04632	1,167	946	1.23	0.60	Yes	221	48,841
258	GATES	N/O	SAN JOSE	3564	4632	03564-04632	1,147	1,056	1.09	0.36	Yes	91	8,281
259	GATES	S/O	SAN JOSE	3297	4632	03297-04632	1,167	760	1.54	0.60	Yes	407	165,649
260	GETTYSBURG	E/O	BLACKSTONE	2076	2408	02076-02408	872	1,105	0.79	0.35	Yes	-233	54,289
261	GETTYSBURG	E/O	CEDAR	2413	2414	02413-02414	1,230	1,401	0.88	0.31	Yes	-171	29,241
262	GETTYSBURG	E/O	WEST	2401	3205	02401-03205	84	128	0.66	0.60	Yes	-44	1,936
263	GOLDEN STATE	N/O	ASHLAN	4635	12254	04635-12254	1,485	1,732	0.86	0.30	Yes	-247	61,009
264	GOLDEN STATE	N/O	BUCKINGHAM	4635	12254	04635-12254	1,485	1,541	0.96	0.31	Yes	-56	3,136
265	GOLDEN STATE	S/O	CHURCH	2892	5406	02892-05406	302	346	0.87	0.60	Yes	-44	1,936
266	GOLDEN STATE	S/O	JENSEN	2892	5406	02892-05406	302	385	0.78	0.60	Yes	-83	6,889
267	GOLDEN STATE	N/O	SHAW	3723	4847	03723-04847	147	822	0.18	0.60	No	-675	455,625
268	GRANTLAND	N/O	BARSTOW	3293	5388	03293-05388	315	350	0.90	0.60	Yes	-35	1,225
269	GRANTLAND	N/O	BULLARD	2294	6165	02294-06165	348	502	0.69	0.60	Yes	-154	23,716
271	H	N/O	DIVISADERO	2761	6182	02761-06182	1,024	1,015	1.01	0.37	Yes	9	81
272	H	S/O	DIVISADERO	2777	3007	02777-03007	565	130	4.35	0.60	No	435	189,225
273	H	N/O	MERCED	4419	5207	04419-05207	581	166	3.50	0.60	No	415	172,225
274	HAYES	N/O	ASHLAN	3402	5633	03402-05633	84	119	0.71	0.60	Yes	-35	1,225
275	HAZELWOOD	N/O	BUTLER	2816	2834	02816-02834	598	257	2.33	0.60	No	341	116,281
276	HERNDON	E/O	BLACKSTONE	2068	4321	02068-04321	5,061	4,169	1.21	0.23	Yes	892	795,664
277	HERNDON	W/O	BRAWLEY	3281	5106	03281-05106	2,783	2,631	1.06	0.26	Yes	152	23,104
280	HERNDON	E/O	CEDAR	2252	4999	02252-04999	3,997	4,235	0.94	0.23	Yes	-238	56,644
281	HERNDON	E/O	CHESTNUT	2253	5002	02253-05002	4,404	3,301	1.33	0.24	No	1,103	1,216,609
282	HERNDON	E/O	FIRST	2251	5004	02251-05004	4,171	5,023	0.83	0.21	Yes	-852	725,904
283	HERNDON	E/O	FRUIT	2246	5037	02246-05037	5,432	5,673	0.96	0.20	Yes	-241	58,081
284	HERNDON	W/O	MARKS	3055	5041	03055-05041	3,334	3,191	1.04	0.25	Yes	143	20,449
285	HERNDON	E/O	MAROA	2068	2248	02068-02248	4,660	3,973	1.17	0.23	Yes	687	471,969
286	HERNDON	E/O	MILLBROOK	2251	5003	02251-05003	4,769	4,208	1.13	0.23	Yes	561	314,721
287	HERNDON	W/O	PALM	2246	5037	02246-05037	5,432	5,673	0.96	0.20	Yes	-241	58,081
289	HUGHES	N/O	KEARNEY	2815	2827	02815-02827	20	14	1.43	0.60	Yes	6	36
290	HUGHES	N/O	NIELSEN	3474	5326	03474-05326	329	116	2.84	0.60	No	213	45,369
291	HUGHES	S/O	SHIELDS	2517	2549	02517-02549	706	599	1.18	0.60	Yes	107	11,449
292	HUNTINGTON	E/O	R	3034	3155	03034-03155	78	214	0.36	0.60	No	-136	18,496
293	INGRAM	N/O	HERNDON	2247	3302	02247-03302	1,188	1,102	1.08	0.35	Yes	86	7,396
294	INYO	E/O	L	3160	5219	03160-05219	428	117	3.66	0.60	No	311	96,721
295	INYO	E/O	VAN NESS	3159	5219	03159-05219	62	176	0.35	0.60	No	-114	12,996
296	ISLAND WATERPARK	N/O	SHAW	6820	5596	06820-05596	2,747	530	5.18	0.60	No	2,217	4,915,089
297	JENNIFER	E/O	GATES	6063	6064	06063-06064	1,091	680	1.60	0.60	No	411	168,921
298	JENSEN	E/O	CEDAR	2925	6296	02925-06296	1,704	1,528	1.12	0.31	Yes	176	30,976
299	JENSEN	E/O	CLOVIS	2929	5411	02929-05411	1,388	993	1.40	0.60	Yes	395	156,025
300	JENSEN	W/O	CORNELIA	2908	5135	02908-05135	208	251	0.83	0.60	Yes	-43	1,849
301	JENSEN	E/O	ELM	2109	5730	02109-05730	899	1,568	0.57	0.31	No	-669	447,561
302	JENSEN	W/O	FRUIT	2913	5146	02913-05146	256	292	0.88	0.60	Yes	-36	1,296
303	JENSEN	E/O	GOLDEN STATE	2923	8440	02923-08440	2,024	2,041	0.99	0.28	Yes	-17	289
304	JENSEN	E/O	MAPLE	2926	3531	02926-03531	1,927	1,459	1.32	0.31	No	468	219,024
305	JENSEN	E/O	PEACH	2928	6200	02928-06200	1,376	1,634	0.84	0.30	Yes	-258	66,564
306	JENSEN	W/O	WILLOW	2927	5276	02927-05276	1,326	1,207	1.10	0.33	Yes	119	14,161
307	KEARNEY	W/O	FRESNO	2833	8410	02833-08410	605	328	1.84	0.60	No	277	76,729
308	KEARNEY	E/O	HUGHES	2827	2828	02827-02828	54	136	0.40	0.60	No	-82	6,724
309	KEARNEY	E/O	MARKS	2826	5329	02826-05329	95	100	0.95	0.60	Yes	-5	25
310	KEARNEY	E/O	WEST	2829	8418	02829-08418	205	148	1.39	0.60	Yes	57	3,249
312	KINGS CANYON	E/O	CEDAR	2189	2190	02189-02190	806	1,379	0.58	0.32	No	-573	328,329
313	KINGS CANYON	W/O	CLOVIS	2198	2199	02198-02199	1,535	1,684	0.91	0.30	Yes	-149	22,201
314	KINGS CANYON	E/O	MAPLE	2193	2194	02193-02194	736	1,273	0.58	0.33	No	-537	288,369
315	LANE	E/O	CHESTNUT	2820	5317	02820-05317	574	405	1.42	0.60	Yes	169	28,561
316	LANE	W/O	PEACH	2821	3555	02821-03555	1,640	304	5.39	0.60	No	1,336	1,784,896
317	LOS ANGELES	E/O	L	3042	3263	03042-03263	195	286	0.68	0.60	Yes	-91	8,281
318	M	N/O	CALAVERAS	4416	5240	04416-05240	86	96	0.90	0.60	Yes	-10	100
321	M	N/O	MERCED	2183	5225	02183-05225	36	139	0.26	0.60	No	-103	10,609
322	M	S/O	VENTURA	2102	3039	02102-03039	929	690	1.35	0.60	Yes	239	57,121
323	MAPLE	S/O	CALIFORNIA	3506	12170	03506-12170	785	801	0.98	0.60	Yes	-16	256
324	MAPLE	N/O	CLINTON	2537	2559	02537-02559	624	536	1.16	0.60	Yes	88	7,744
325	MAPLE	N/O	GETTYSBURG	2416	3143	02416-03143	603	297	2.03	0.60	No	306	93,636
326	MAPLE	S/O	MCKINLEY	2685	2695	02685-02695	887	1,056	0.84	0.36	Yes	-169	28,561
328	MAPLE	N/O	TEAGUE	3070	4598	03070-04598	340	648	0.52	0.60	Yes	-308	94,864
329	MAPLE	N/O	TULARE	2789	3488	02789-03488	1,736	1,228	1.41	0.33	No	508	258,064
330	MARKS	S/O	CALIFORNIA	2863	2903	02863-02903	253	131	1.93	0.60	No	122	14,884
331	MARKS	N/O	CLINTON	4276	12241	04276-12241	688	876	0.79	0.60	Yes	-188	35,344
332	MARKS	S/O	HERNDON	3055	6060	03055-06060	347	1,088	0.32	0.36	No	-741	549,081
333	MARKS	N/O	KEARNEY	2826	5129	02826-05129	305	265	1.15	0.60	Yes	40	1,600

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
334	MARKS	N/O	NIELSEN	5132	5133	05132-05133	234	529	0.44	0.60	Yes	-295	87,025
335	MARKS	S/O	SHAW	2375	2394	02375-02394	1,370	1,699	0.81	0.30	Yes	-329	108,241
336	MAROA	S/O	BULLARD	2306	2332	02306-02332	245	919	0.27	0.60	No	-674	454,276
337	MAROA	N/O	CLINTON	2576	2552	02576-02552	463	461	1.00	0.60	Yes	2	4
338	MAROA	S/O	HERNDON	2248	2275	02248-02275	336	694	0.48	0.60	Yes	-358	128,164
339	MAROA	S/O	SHAW	2384	2396	02384-02396	495	590	0.84	0.60	Yes	-95	9,025
340	MAROA	N/O	SIERRA	2274	2275	02274-02275	301	693	0.43	0.60	Yes	-392	153,664
341	MARTIN LUTHER KING JR	S/O	CALIFORNIA	2704	2872	02704-02872	67	360	0.19	0.60	No	-293	85,849
342	MCKINLEY	E/O	BLACKSTONE	2084	3249	02084-03249	1,788	1,798	0.99	0.30	Yes	-10	100
343	MCKINLEY	E/O	CEDAR	2634	5711	02634-05711	2,121	1,707	1.24	0.30	Yes	414	171,396
344	MCKINLEY	E/O	CHESTNUT	2636	8226	02636-08226	1,581	1,204	1.31	0.33	Yes	377	142,129
345	MCKINLEY	W/O	CLOVIS	2637	2638	02637-02638	1,317	838	1.57	0.60	Yes	479	229,441
346	MCKINLEY	E/O	FIRST	2630	2631	02630-02631	1,759	1,430	1.23	0.31	Yes	329	108,241
347	MCKINLEY	E/O	MARKS	2612	2613	02612-02613	982	215	4.57	0.60	No	767	588,289
348	MCKINLEY	E/O	PALM	2606	2621	02606-02621	1,167	979	1.19	0.60	Yes	188	35,344
349	MCKINLEY	E/O	VAN NESS	2624	2625	02624-02625	1,965	1,281	1.53	0.33	No	684	467,856
350	MCKINLEY	E/O	WEST	2617	2618	02617-02618	1,184	1,128	1.05	0.35	Yes	56	3,136
351	MILBURN	S/O	HERNDON	6058	12269	06058-12269	672	1,211	0.55	0.33	No	-539	290,521
352	MILBURN	N/O	SPRUCE	5526	5831	05526-05831	827	1,236	0.67	0.33	No	-409	167,281
353	MILBURN	S/O	SPRUCE	5526	8043	05526-08043	606	723	0.84	0.60	Yes	-117	13,689
354	MILLBROOK	S/O	ASHLAN	2449	2468	02449-02468	510	597	0.85	0.60	Yes	-87	7,569
355	MILLBROOK	N/O	CLINTON	2583	6192	02583-06192	6	168	0.04	0.60	No	-162	26,244
356	MILLBROOK	N/O	NEES	3074	3076	03074-03076	647	792	0.82	0.60	Yes	-145	21,025
357	MILLBROOK	S/O	SHAW	2975	8112	02975-08112	477	373	1.28	0.60	Yes	104	10,816
358	MINARETS	E/O	BLACKSTONE	2066	4597	02066-04597	561	1,459	0.38	0.31	No	-898	806,404
359	NEES	E/O	AUDUBON	6528	6560	06528-06560	2,224	1,983	1.12	0.28	Yes	241	58,081
360	NEES	E/O	CEDAR	2230	3078	02230-03078	1,813	1,699	1.07	0.30	Yes	114	12,996
361	NEES	E/O	FIRST	2229	3084	02229-03084	1,494	2,388	0.63	0.27	No	-894	799,236
362	NEES	E/O	FRESNO	3114	3115	03114-03115	1,603	2,160	0.74	0.27	Yes	-557	310,249
363	NEES	W/O	FRESNO	2228	5835	02228-05835	1,496	2,322	0.64	0.27	No	-826	682,276
364	NEES	E/O	MAPLE	3080	3097	03080-03097	1,321	1,729	0.76	0.30	Yes	-408	166,464
365	NEES	E/O	WILLOW	2232	4929	02232-04929	1,113	1,198	0.93	0.34	Yes	-85	7,225
366	NIELSEN	E/O	WEST	2772	2773	02772-02773	239	120	1.99	0.60	No	119	14,161
367	NORTH	W/O	CEDAR	3690	5321	03690-05321	716	551	1.30	0.60	Yes	165	27,225
368	NORTH	W/O	CHERRY	2948	5733	02948-05733	221	283	0.78	0.60	Yes	-62	3,844
369	NORTH	E/O	EAST	2951	3152	02951-03152	222	514	0.43	0.60	Yes	-292	85,264
370	NORTH	E/O	ELM	2948	5733	02948-05733	221	521	0.42	0.60	Yes	-300	90,000
371	NORTH	W/O	ELM	2110	2947	02110-02947	206	754	0.27	0.60	No	-548	300,304
372	NORTH	W/O	GOLDEN STATE	2953	2954	02953-02954	568	444	1.28	0.60	Yes	124	15,376
373	NORTH	E/O	MARTIN LUTHER KING JR	2946	2947	02946-02947	206	312	0.66	0.60	Yes	-106	11,236
374	NORTH	E/O	PEACH	2956	8086	02956-08086	215	169	1.27	0.60	Yes	46	2,116
375	NORTH	W/O	WALNUT	2945	3019	02945-03019	65	172	0.38	0.60	No	-107	11,449
376	NORTH	W/O	WEST	3318	8078	03318-08078	60	101	0.59	0.60	Yes	-41	1,681
377	O	S/O	TULARE	4610	5234	04610-05234	275	243	1.13	0.60	Yes	32	1,024
378	O	S/O	VENTURA	4612	6184	04612-06184	230	457	0.50	0.60	Yes	-227	51,529
379	OLIVE	W/O	99	4364	4366	04364-04366	95	724	0.13	0.60	No	-629	395,641
380	OLIVE	E/O	CEDAR	2683	2684	02683-02684	313	841	0.37	0.60	No	-528	278,784
381	OLIVE	W/O	CLOVIS	2692	5491	02692-05491	303	401	0.76	0.60	Yes	-98	9,604
382	OLIVE	E/O	FIRST	2679	2680	02679-02680	489	948	0.52	0.60	Yes	-459	210,681
383	OLIVE	E/O	GOLDEN STATE	2642	2667	02642-02667	483	435	1.11	0.60	Yes	48	2,304
385	OLIVE	W/O	WEBER	2642	2667	02642-02667	483	498	0.97	0.60	Yes	-15	225
386	ORANGE	N/O	CALIFORNIA	2854	2878	02854-02878	111	328	0.34	0.60	No	-217	47,089
387	ORANGE	S/O	CALIFORNIA	2878	3147	02878-03147	310	279	1.11	0.60	Yes	31	961
388	ORANGE	S/O	NORTH	3528	8102	03528-08102	100	45	2.22	0.60	No	55	3,025
389	P	S/O	TULARE	2133	5236	02133-05236	55	379	0.15	0.60	No	-324	104,976
390	P	S/O	VENTURA	6184	4461	06184-04461	88	147	0.60	0.60	Yes	-59	3,481
391	PALM	S/O	BELMONT	2724	5185	02724-05185	607	423	1.43	0.60	Yes	184	33,856
393	PALM	N/O	BULLARD	2303	2304	02303-02304	1,627	1,691	0.96	0.30	Yes	-64	4,096
394	PALM	N/O	CLINTON	2551	2573	02551-02573	1,333	970	1.37	0.60	Yes	363	131,769
395	PALM	N/O	DAKOTA	2463	2482	02463-02482	1,477	1,045	1.41	0.37	No	432	186,624
396	PALM	N/O	HERNDON	2246	6536	02246-06536	2,933	3,138	0.93	0.25	Yes	-205	42,025
397	PALM	S/O	HERNDON	2246	5065	02246-05065	1,471	1,631	0.90	0.30	Yes	-160	25,600
398	PALM	N/O	MCKINLEY	2606	2621	02606-02621	1,167	984	1.19	0.60	Yes	183	33,489
399	PALM	S/O	SHAW	2984	5159	02984-05159	18	1,153	0.02	0.34	No	-1,135	1,288,225
400	PEACH	S/O	ASHLAN	2454	5014	02454-05014	992	1,187	0.84	0.34	Yes	-195	38,025
401	PEACH	N/O	BELMONT	2745	5609	02745-05609	1,808	2,324	0.78	0.27	Yes	-516	266,256
402	PEACH	S/O	CALIFORNIA	3321	3537	03321-03537	734	964	0.76	0.60	Yes	-230	52,900
403	PEACH	N/O	CHURCH	2901	3535	02901-03535	642	631	1.02	0.60	Yes	11	121
404	PEACH	S/O	OLIVE	2690	5700	02690-05700	1,324	1,437	0.92	0.31	Yes	-113	12,769
405	PEACH	N/O	TULARE	2793	3546	02793-03546	1,331	1,355	0.98	0.32	Yes	-24	576
406	PERRIN	W/O	MAPLE	4595	5515	04595-05515	650	771	0.84	0.60	Yes	-121	14,641
407	PERRIN	N/O	SHEPHERD	3309	3310	03309-03310	1,356	1,626	0.83	0.30	Yes	-270	72,900
408	POLK	S/O	HERNDON	3164	6625	03164-06625	463	849	0.55	0.60	Yes	-386	148,996
409	POLK	S/O	SHAW	2370	6295	02370-06295	1,199	275	4.36	0.60	No	924	853,776
410	R	N/O	HUNTINGTON	3034	5258	03034-05258	194	524	0.37	0.60	No	-330	108,900
411	R	N/O	INYO	3034	3155	03034-03155	78	483	0.16	0.60	No	-405	164,025
412	R	N/O	TULARE	3022	3031	03022-03031	114	582	0.20	0.60	No	-468	219,024
413	SAN JOSE	E/O	GATES	3397	4633	03397-04633	21	200	0.11	0.60	No	-179	32,041
414	SAN PABLO	N/O	DIVISADERO	4388	4389	04388-04389	128	84	1.52	0.60	Yes	44	1,936
415	SANTA FE	S/O	PALO ALTO	6058	12269	06058-12269	672	1,089	0.62	0.36	No	-417	173,889

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes														
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
416	SHAW	E/O	ANGUS	2137	2138	02137-02138	2,957	1,356	2.18	0.32	No	1,601	2,563,201
417	SHAW	W/O	ANGUS	2136	2137	02136-02137	3,227	3,164	1.02	0.25	Yes	63	3,969
418	SHAW	E/O	BLACKSTONE	2074	2135	02074-02135	3,816	3,486	1.09	0.24	Yes	330	108,900
419	SHAW	W/O	BRAWLEY	3117	3574	03117-03574	2,154	2,199	0.98	0.27	Yes	-45	2,025
420	SHAW	E/O	CEDAR	2140	2141	02140-02141	2,723	3,411	0.80	0.24	Yes	-688	473,344
421	SHAW	W/O	GOLDEN STATE	2371	2372	02371-02372	1,768	2,543	0.70	0.26	No	-775	600,625
422	SHAW	W/O	HAYES	3301	3398	03301-03398	609	1,004	0.61	0.37	No	-395	156,025
423	SHAW	W/O	LOLA	3399	12245	03399-12245	662	1,008	0.66	0.37	Yes	-346	119,716
424	SHAW	E/O	MARKS	2375	5426	02375-05426	2,584	2,939	0.88	0.26	Yes	-355	126,025
425	SHAW	W/O	VAN NESS	2377	4559	02377-04559	3,070	3,160	0.97	0.25	Yes	-90	8,100
426	SHAW	E/O	WEST	2378	2379	02378-02379	3,142	2,961	1.06	0.26	Yes	181	32,761
427	SHEPHERD	E/O	CEDAR	2222	3062	02222-03062	649	1,268	0.51	0.33	No	-619	383,161
428	SHEPHERD	E/O	FRIANT	2221	3059	02221-03059	1,681	2,316	0.73	0.27	No	-635	403,225
429	SHEPHERD	W/O	MAPLE	3062	3063	03062-03063	649	1,182	0.55	0.34	No	-533	284,089
430	SHIELDS	E/O	BLACKSTONE	2080	2526	02080-02526	3,039	2,481	1.22	0.26	Yes	558	311,364
431	SHIELDS	E/O	BLYTHE	2547	3346	02547-03346	286	418	0.68	0.60	Yes	-132	17,424
432	SHIELDS	E/O	CEDAR	2534	5709	02534-05709	1,998	1,553	1.29	0.31	Yes	445	198,025
433	SHIELDS	E/O	FOWLER	3142	5024	03142-05024	473	838	0.56	0.60	Yes	-365	133,225
434	SHIELDS	W/O	SUNNYSIDE	2542	9221	02542-09221	1,188	937	1.27	0.60	Yes	251	63,001
435	SHIELDS	E/O	TEMPERANCE	2544	5018	02544-05018	207	131	1.58	0.60	Yes	76	5,776
436	SHIELDS	E/O	VALENTINE	6171	6173	06171-06173	623	686	0.91	0.60	Yes	-63	3,969
437	SHIELDS	E/O	WEBER	2516	5104	02516-05104	359	393	0.91	0.60	Yes	-34	1,156
438	SHIELDS	E/O	WEST	2519	2520	02519-02520	1,365	826	1.65	0.60	No	539	290,521
439	SIERRA	E/O	BLACKSTONE	2277	12210	02277-12210	592	1,223	0.48	0.33	No	-631	398,161
440	SIERRA	E/O	CEDAR	5474	5481	05474-05481	2	139	0.01	0.60	No	-137	18,769
441	SIERRA	W/O	POLK	5631	6245	05631-06245	0	259	0.00	0.60	No	-259	67,081
442	SIERRA	E/O	WEST	2269	2270	02269-02270	88	605	0.15	0.60	No	-517	267,289
443	SIXTH	N/O	TULARE	2766	2785	02766-02785	67	189	0.35	0.60	No	-122	14,884
444	SPRUCE	W/O	BLYTHE	5039	6057	05039-06057	545	156	3.49	0.60	No	389	151,321
447	TEAGUE	E/O	MAPLE	3070	5469	03070-05469	276	877	0.31	0.60	No	-601	361,201
448	TEILMAN	N/O	NIELSEN	2754	2773	02754-02773	197	135	1.46	0.60	Yes	62	3,844
449	TEMPERANCE	S/O	BUTLER	5303	12198	05303-12198	653	545	1.20	0.60	Yes	108	11,664
450	TEMPERANCE	N/O	CLINTON	2544	8360	02544-08360	663	663	1.00	0.60	Yes	0	0
451	TEMPERANCE	N/O	SHIELDS	2544	8386	02544-08386	1,125	214	5.26	0.60	No	911	829,921
452	THORNE	N/O	KEARNEY	2177	2831	02177-02831	128	176	0.73	0.60	Yes	-48	2,304
453	TRINITY	N/O	STANISLAUS	8412	8428	08412-08428	183	83	2.20	0.60	No	100	10,000
456	TULARE	E/O	41	4408	4640	04408-04640	1,509	2,410	0.63	0.26	No	-901	811,801
457	TULARE	E/O	CEDAR	2787	2788	02787-02788	1,521	1,023	1.49	0.37	No	498	248,004
458	TULARE	E/O	CHESTNUT	2791	5315	02791-05315	747	578	1.29	0.60	Yes	169	28,561
459	TULARE	E/O	E	5419	5421	05419-05421	214	244	0.88	0.60	Yes	-30	900
460	TULARE	E/O	N	3510	4610	03510-04610	1,340	769	1.74	0.60	No	571	326,041
461	TULARE	W/O	R	5253	5254	05253-05254	1,827	1,111	1.64	0.35	No	716	512,656
462	TULARE	E/O	U	4409	4638	04409-04638	2,150	1,737	1.24	0.30	Yes	413	170,569
464	U	S/O	MARIPOSA	4409	5250	04409-05250	505	284	1.78	0.60	No	221	48,841
465	U	N/O	TULARE	4409	5250	04409-05250	505	430	1.17	0.60	Yes	75	5,625
466	VALENTINE	S/O	ASHLAN	3254	12176	03254-12176	249	231	1.08	0.60	Yes	18	324
467	VALENTINE	S/O	BARSTOW	3563	3566	03563-03566	30	245	0.12	0.60	No	-215	46,225
468	VALENTINE	S/O	CALIFORNIA	2862	5137	02862-05137	181	48	3.77	0.60	No	133	17,689
469	VALENTINE	S/O	CLINTON	2563	3442	02563-03442	39	151	0.26	0.60	No	-112	12,544
470	VALENTINE	S/O	MCKINLEY	2660	3467	02660-03467	7	106	0.07	0.60	No	-99	9,801
471	VAN NESS	N/O	41	4467	6186	04467-06186	935	476	1.96	0.60	No	459	210,681
472	VAN NESS	S/O	CALIFORNIA	2875	2882	02875-02882	182	192	0.95	0.60	Yes	-10	100
474	VAN NESS	N/O	DIVISADERO	2778	2762	02778-02762	483	201	2.40	0.60	No	282	79,524
475	VAN NESS	S/O	FRESNO	3026	3494	03026-03494	473	673	0.70	0.60	Yes	-200	40,000
476	VAN NESS	N/O	HERNDON	2243	5043	02243-05043	591	303	1.95	0.60	No	288	82,944
477	VAN NESS	S/O	MCKINLEY	2645	2624	02645-02624	180	542	0.33	0.60	No	-362	131,044
478	VAN NESS	N/O	SAN JOAQUIN	3010	8406	03010-08406	459	503	0.91	0.60	Yes	-44	1,936
479	VAN NESS	N/O	SHAW	2988	4852	02988-04852	335	406	0.83	0.60	Yes	-71	5,041
480	VAN NESS	N/O	SIERRA	2268	3182	02268-03182	756	414	1.83	0.60	No	342	116,964
481	VAN NESS	N/O	STANISLAUS	3010	4393	03010-04393	427	543	0.79	0.60	Yes	-116	13,456
482	VAN NESS	N/O	STANISLAUS	3010	4393	03010-04393	427	526	0.81	0.60	Yes	-99	9,801
483	VAN NESS	S/O	VENTURA	2104	3037	02104-03037	888	674	1.32	0.60	Yes	214	45,796
484	VENTURA	W/O	41	2184	5256	02184-05256	1,523	1,215	1.25	0.33	Yes	308	94,864
485	VENTURA	E/O	E	2106	5424	02106-05424	1,303	965	1.35	0.60	Yes	338	114,244
487	VENTURA	E/O	H	5223	8554	05223-08554	1,660	1,087	1.53	0.36	No	573	328,329
489	VENTURA	E/O	MAYOR	3500	5497	03500-05497	409	367	1.11	0.60	Yes	42	1,764
490	VENTURA	E/O	P	2100	5255	02100-05255	1,520	1,076	1.41	0.36	No	444	197,136
491	VENTURA	E/O	VAN NESS	2103	2104	02103-02104	1,046	930	1.12	0.60	Yes	116	13,456
492	WALNUT	S/O	CALIFORNIA	3586	6751	03586-06751	160	275	0.58	0.60	Yes	-115	13,225
493	WALNUT	S/O	CHURCH	2886	5166	02886-05166	81	111	0.73	0.60	Yes	-30	900
495	WALNUT	S/O	GROVE	2915	5166	02915-05166	49	110	0.45	0.60	Yes	-61	3,721
497	WALNUT	N/O	JENSEN	2915	5166	02915-05166	49	174	0.28	0.60	No	-125	15,625
498	WALNUT	N/O	NORTH	2945	3027	02945-03027	27	16	1.69	0.60	No	11	121
500	WEBER	N/O	OLIVE	2667	2698	02667-02698	886	806	1.10	0.60	Yes	80	6,400
501	WEBER	E/O	VALENTINE	3268	5111	03268-05111	1,010	918	1.10	0.60	Yes	92	8,464
502	WEST	N/O	ASHLAN	2438	3214	02438-03214	1,933	1,418	1.36	0.31	No	515	265,225
504	WEST	S/O	CALIFORNIA	2865	3029	02865-03029	134	82	1.63	0.60	No	52	2,704
505	WEST	N/O	CLINTON	2569	3260	02569-03260	1,671	957	1.75	0.60	No	714	509,796
506	WEST	S/O	DAKOTA	2478	2499	02478-02499	1,495	1,388	1.08	0.32	Yes	107	11,449
507	WEST	N/O	GETTYSBURG	2401	3123	02401-03123	1,771	1,714	1.03	0.30	Yes	57	3,249

Fresno COG Traffic Model GIS Validation Results: PM Peak Two-Way Total Traffic Volumes													
ID	Name	Location	Cross Street	A Node	B Node	Model A-B Node	Model Volume	Traffic Count	Model /Count	Target Deviation	Within Deviation	Model - Count	Difference Squared
508	WEST	S/O	HERNDON	2244	3145	02244-03145	620	1,079	0.57	0.36	No	-459	210,681
509	WEST	S/O	KEARNEY	2095	2829	02095-02829	81	148	0.55	0.60	Yes	-67	4,489
510	WEST	N/O	MCKINLEY	2596	2617	02596-02617	1,387	981	1.41	0.60	Yes	406	164,836
511	WEST	N/O	SANTA FE	2401	12298	02401-12298	1,766	1,418	1.25	0.31	Yes	348	121,104
512	WEST	N/O	SHAW	4534	2010	04534-02010	3,451	1,481	2.33	0.31	No	1,970	3,880,900
513	WEST	N/O	SIERRA	2269	3145	02269-03145	680	944	0.72	0.60	Yes	-264	69,696
514	WEST	S/O	SIERRA	2269	3187	02269-03187	742	1,068	0.69	0.36	Yes	-326	106,276
515	WHITES BRIDGE	E/O	WEST	2176	5754	02176-05754	131	240	0.55	0.60	Yes	-109	11,881
516	WILLOW	S/O	CALIFORNIA	3534	3536	03534-03536	238	286	0.83	0.60	Yes	-48	2,304
517	WILLOW	S/O	HERNDON	2254	5511	02254-05511	2,298	2,240	1.03	0.27	Yes	58	3,364
518	WILLOW	N/O	SPRUCE	3100	3111	03100-03111	1,572	1,963	0.80	0.28	Yes	-391	152,881
519	WILLOW	N/O	TEAGUE	3072	5468	03072-05468	848	1,687	0.50	0.30	No	-839	703,921
520	WISHON	N/O	CLINTON	4352	4354	04352-04354	174	624	0.28	0.60	No	-450	202,500
521	WISHON	N/O	FLORADORA	4355	4356	04355-04356	207	1,074	0.19	0.36	No	-867	751,689
522	ELM AVE	S/O	CALIFORNIA	2120	6090	02120-06090	325	466	0.70	0.60	Yes	-141	19,881
						Subtotal	**463,732**	**476,825**			**Model/Count Ratio =**	**0.97**	Targets
											Percent Within Target Deviation =	**60%**	>75%
											Percent Root Mean Square Error =	**46%**	<40%
											Correlation Coefficient =	**0.88**	>0.88

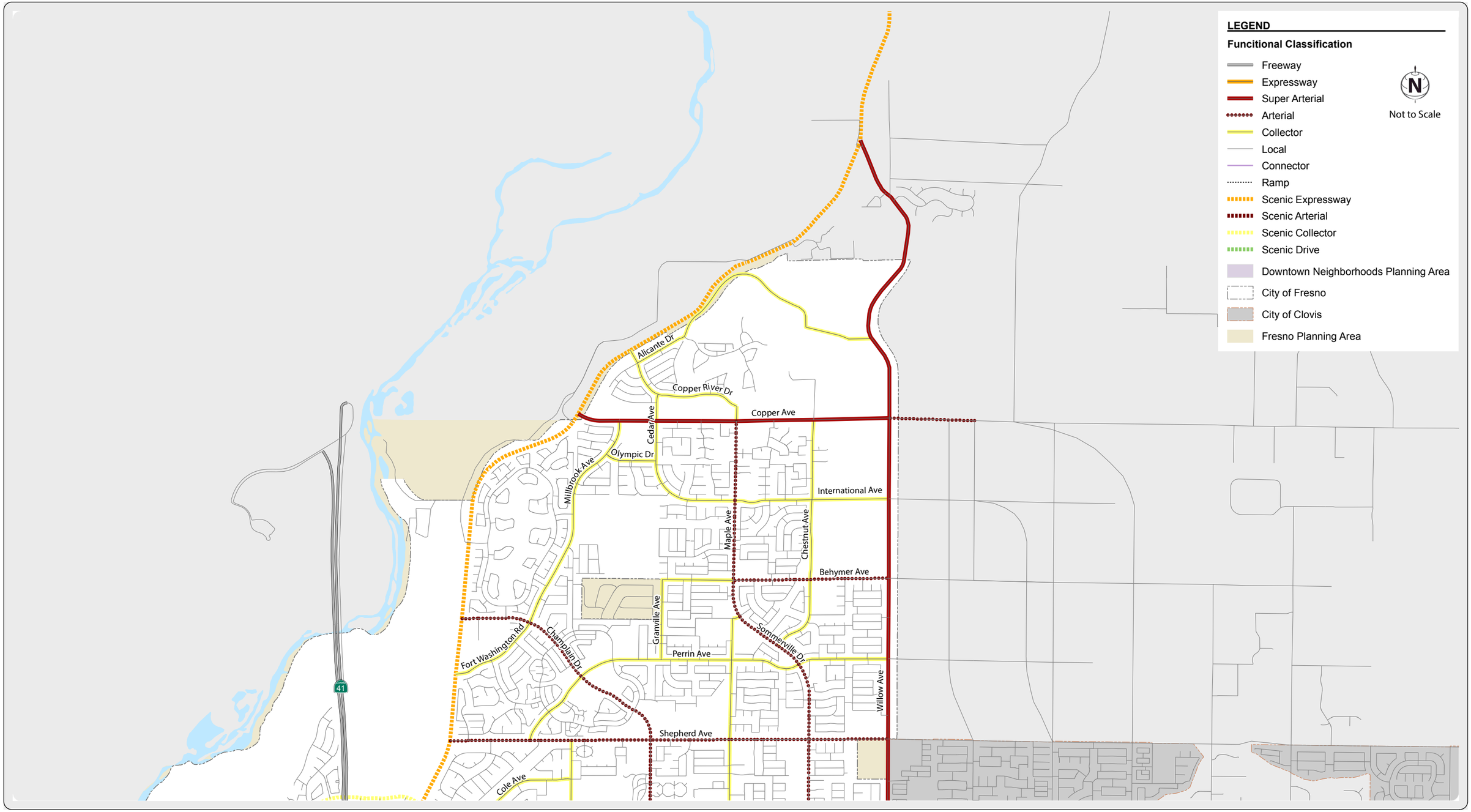
H.6 - Planning Area Exhibits – Roadway Functional Classifications



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.1

LEGEND

Funcitional Classification

- Freeway
- Expressway
- Super Arterial
- Arterial
- Collector
- Local
- Connector
- Ramp
- Scenic Expressway
- Scenic Arterial
- Scenic Collector
- Scenic Drive
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

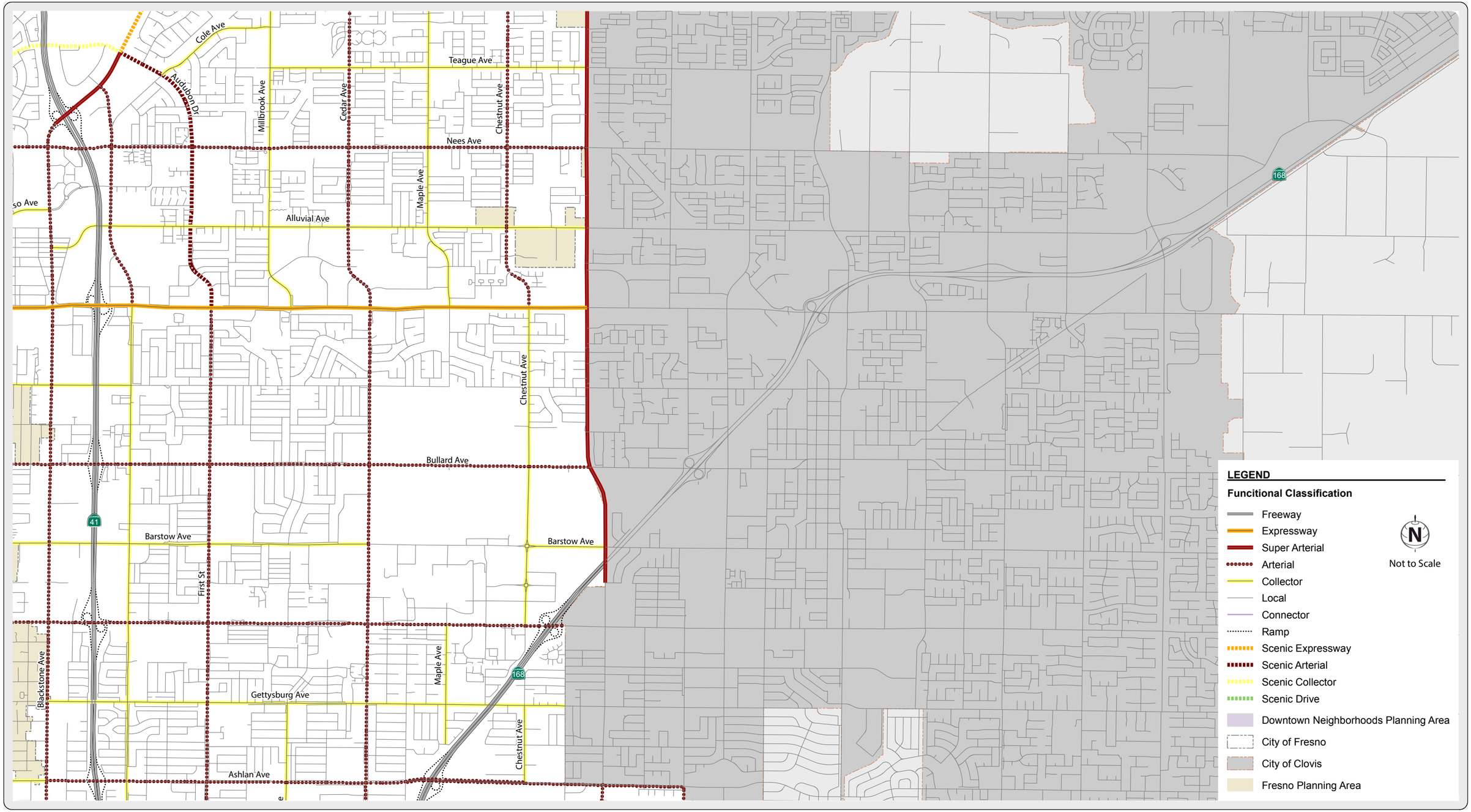
Not to Scale

River Vista Dr
Alluvial Ave
Spruce Ave
Herndon Ave
Milburn Ave
Palo Alto Ave
Bryan Ave
Hayes Ave
Polk Ave
Jeanne Ave
Santa Fe Ave
Figarden Dr
Brawley Ave
Sierra Ave
Escalon Ave
Golden State Blvd
Parkway Dr
Garfield Ave
Bullard Ave
Dante Ave
Cecelia Ave
Gates Ave
Blythe Ave
Barstow Ave
San Jose Ave
Valentine Ave
Marty Ave
Emerson Ave
Gettysburg Ave
Ashlan Ave
Shaw Ave
Maroa Ave
Blackstone Ave
Ingram Ave
Alluvial Ave
El Paso Ave
Locust Ave
99

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

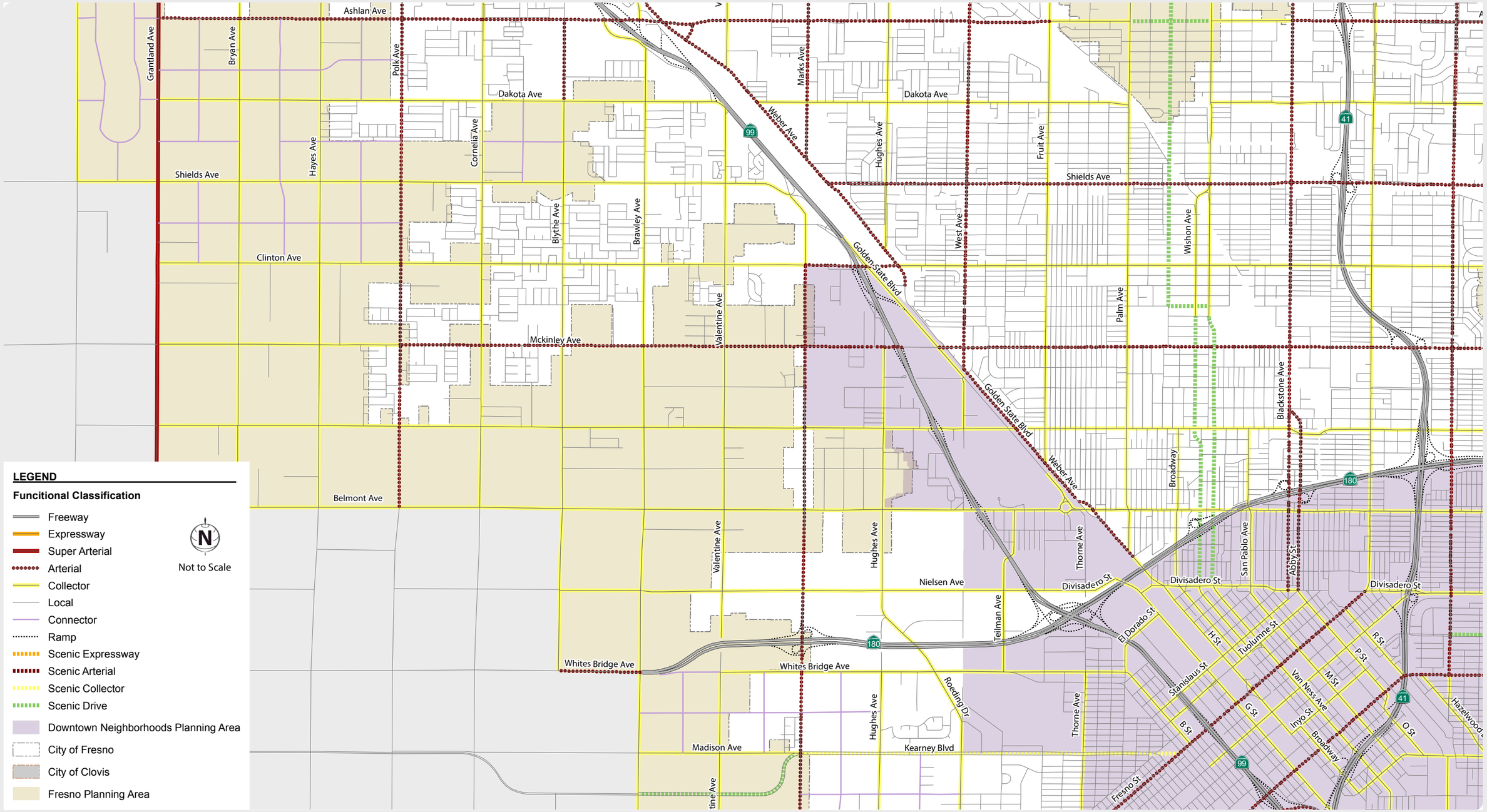
CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

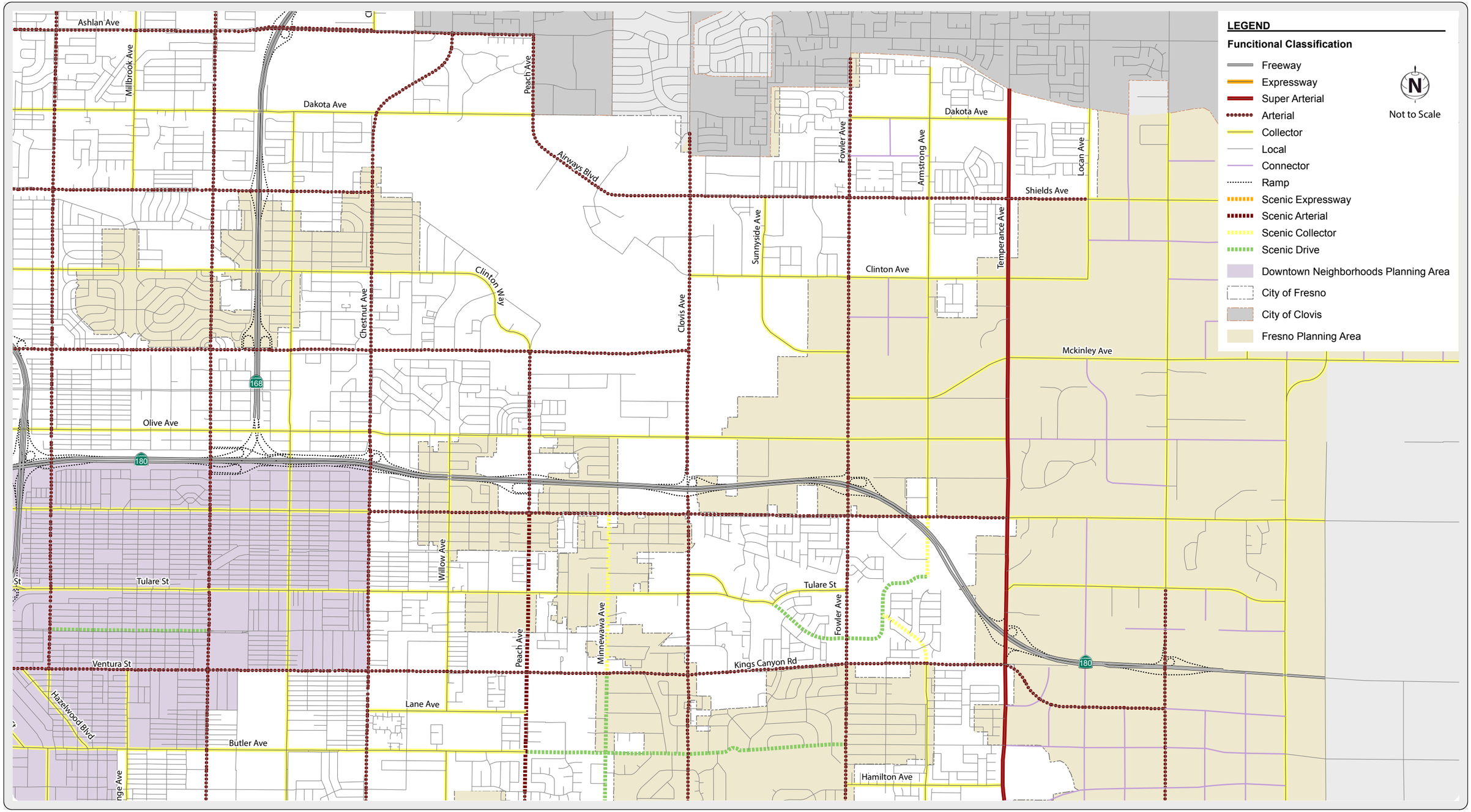
CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

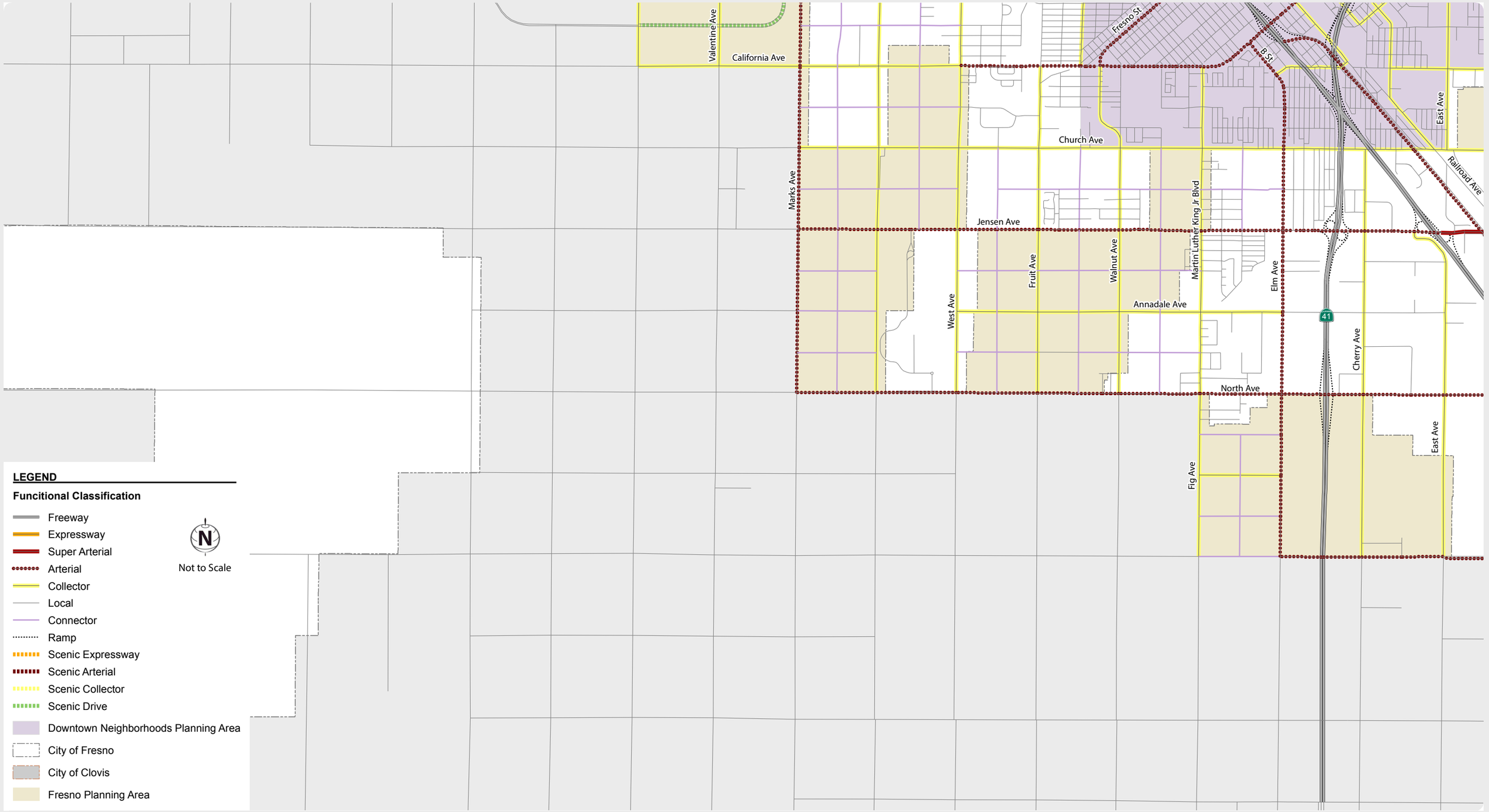
CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

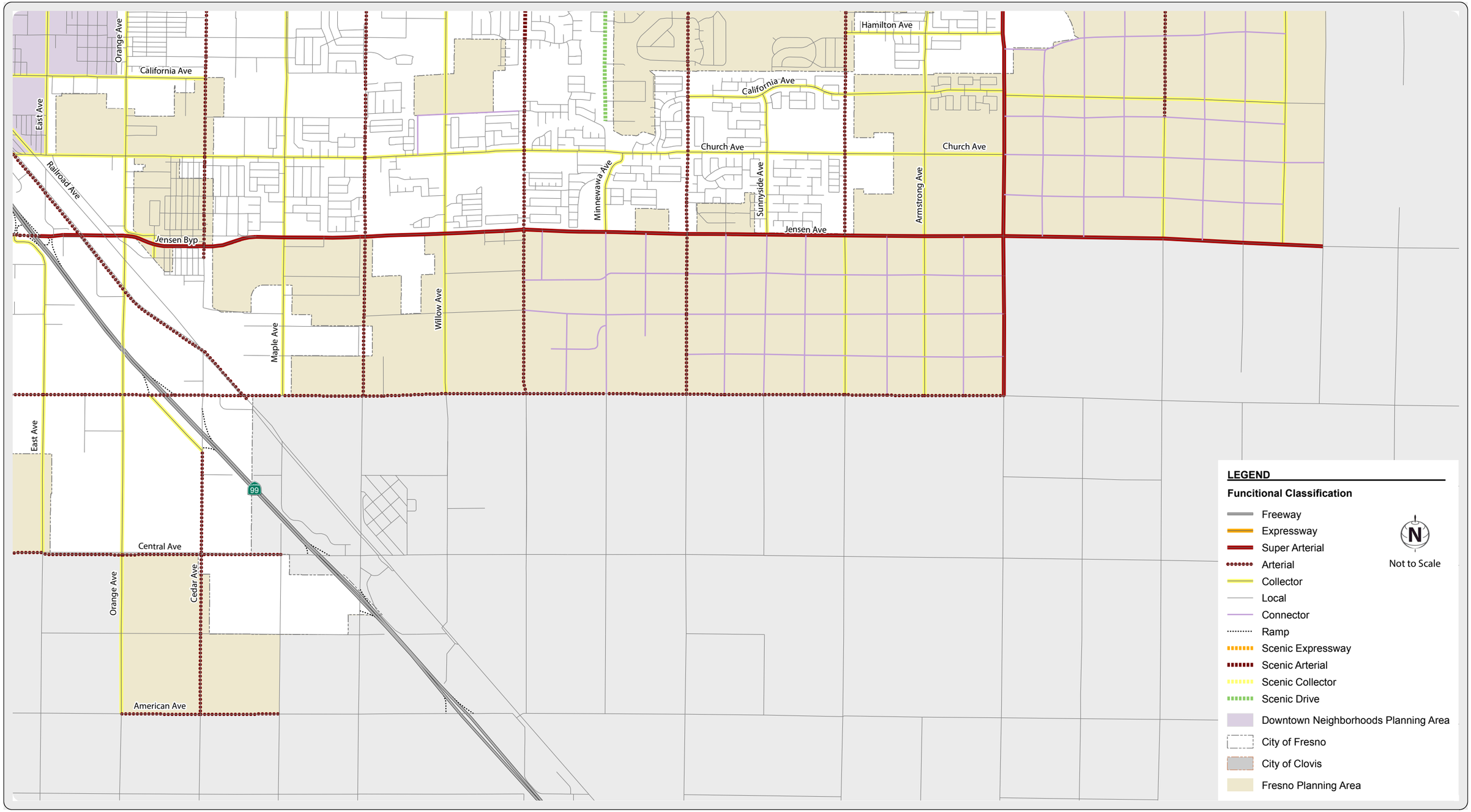
CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.6

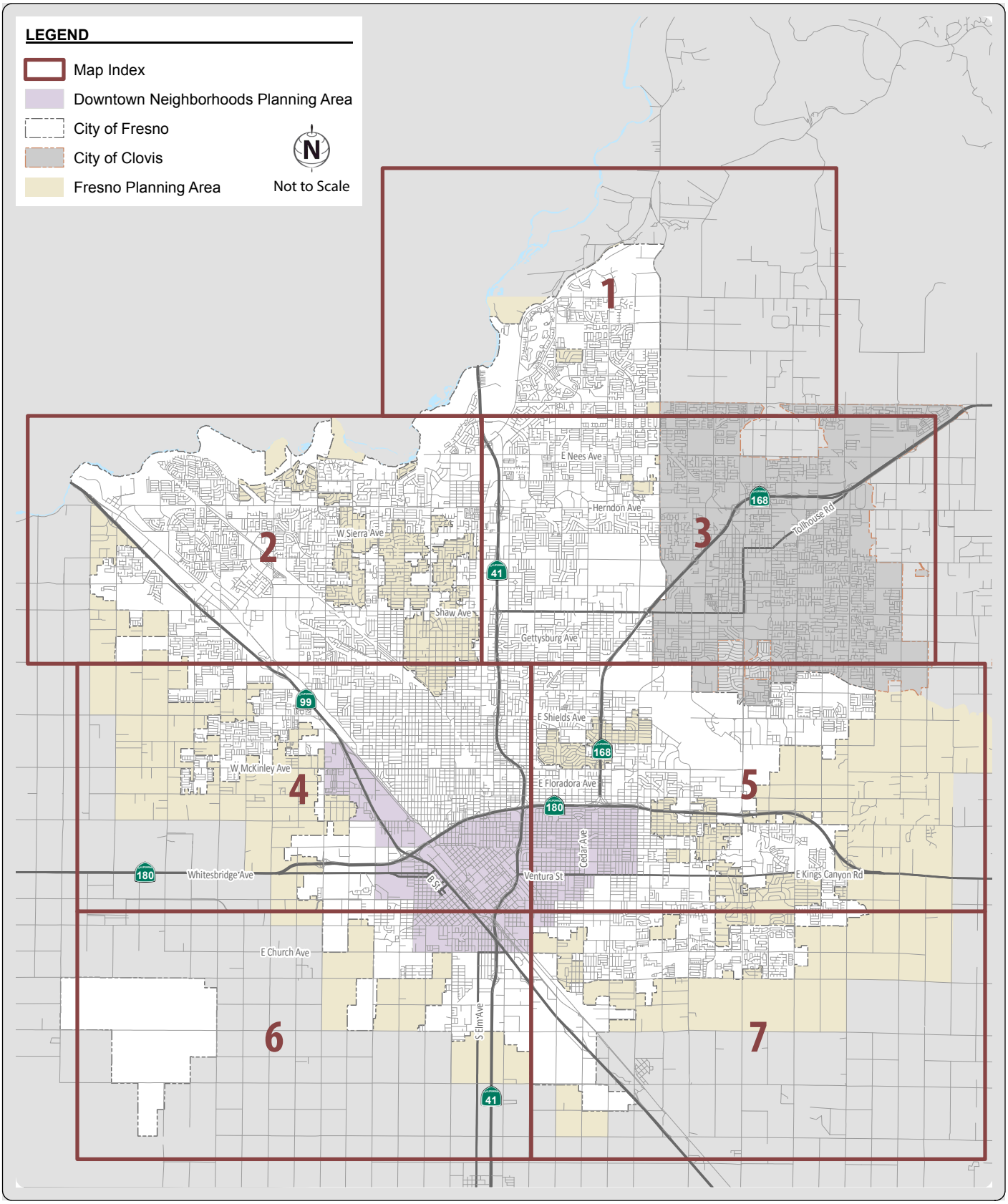


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH6_FuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION
Appendix H-6.7

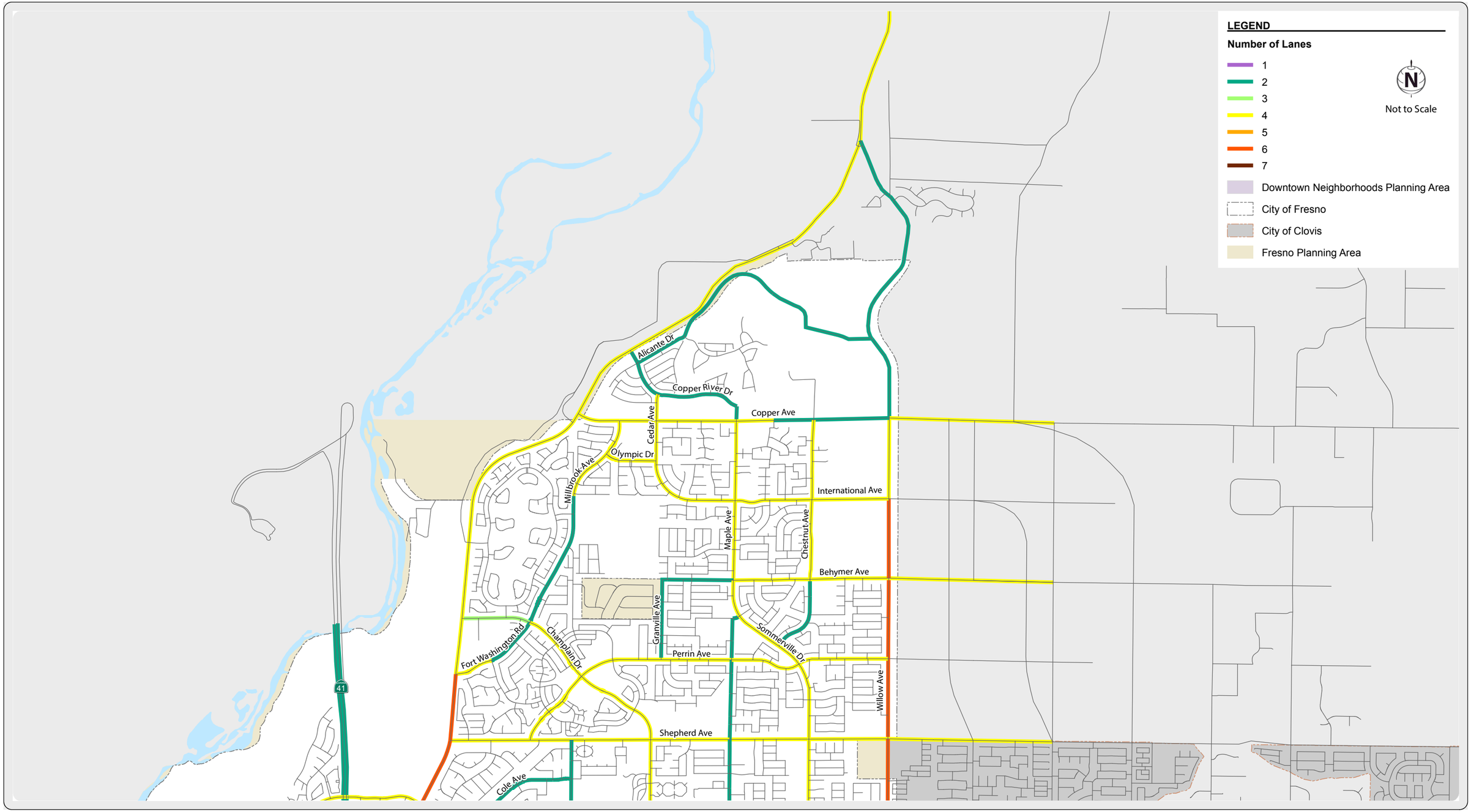
H.7 - Planning Area Exhibits – Planned Roadway Number of Lanes



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES
Appendix H-7.1

LEGEND

Number of Lanes

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Downtown Neighborhoods Planning Area

City of Fresno

City of Clovis

Fresno Planning Area

N

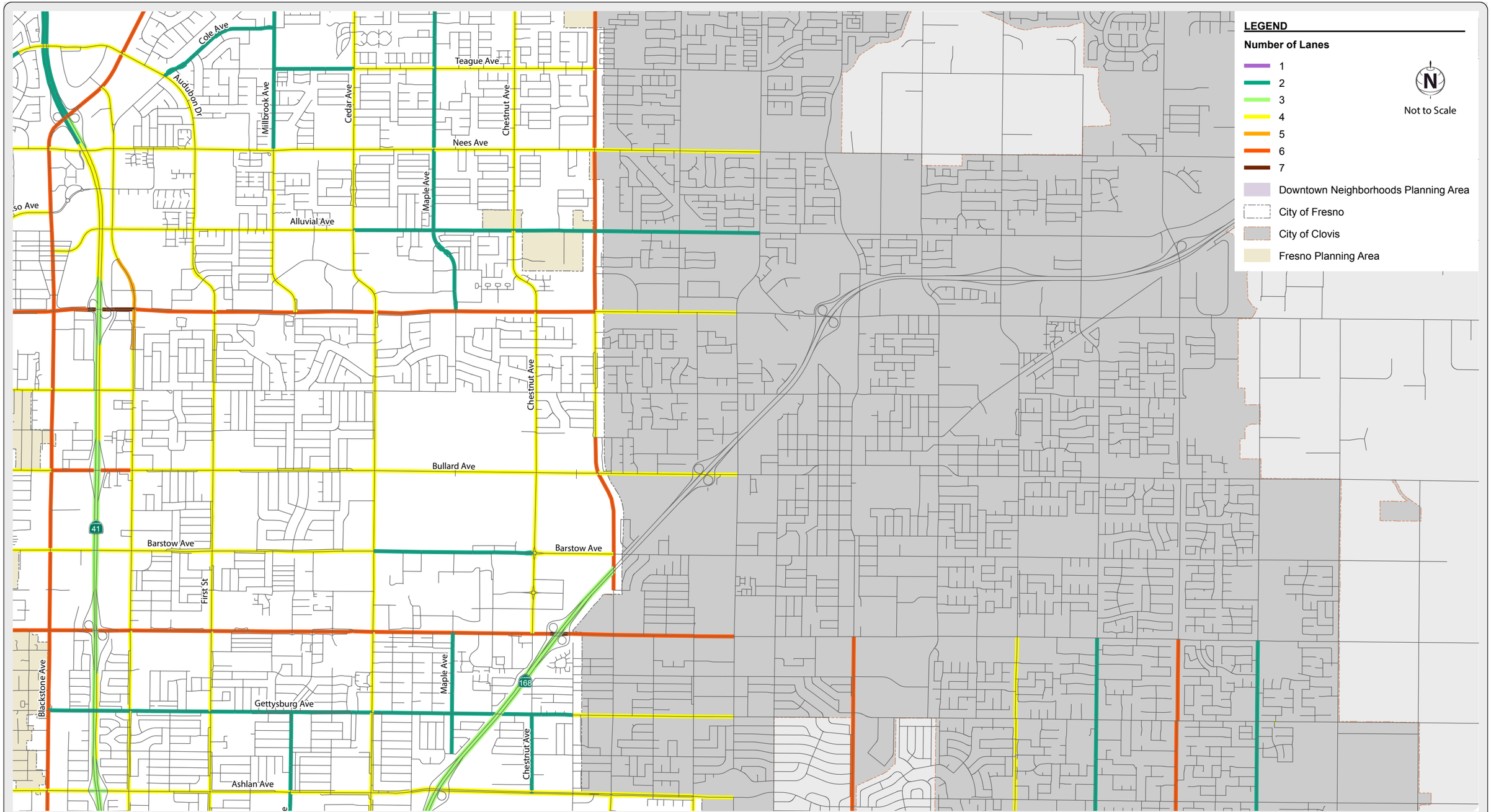
Not to Scale

River Vista Dr
Alluvial Ave
Spruce Ave
Herndon Ave
Milburn Ave
Spruce Ave
Bryan Ave
Hayes Ave
Polk Ave
Palo Alto Ave
Palo Alto Ave
Brawley Ave
Parkway Dr
Golden State Blvd
Sierra Ave
Jeanne Ave
Santa Fe Ave
Figarden Dr
Escalon Ave
Dante Ave
Cecelia Ave
Bullard Ave
Garfield Ave
Bullard Ave
Bryan Ave
Barstow Ave
Barstow Ave
Gates Ave
Blythe Ave
San Jose Ave
Valentine Ave
Marty Ave
Emerson Ave
Shaw Ave
Gettysburg Ave
Brawley Ave
Valentine Ave
Emerson Ave
Ashlan Ave
Maroa Ave
Blackstone Ave
Alluvial Ave
Ingram Ave
El Paso Ave
Locust Ave
Sierra Ave
99
99

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

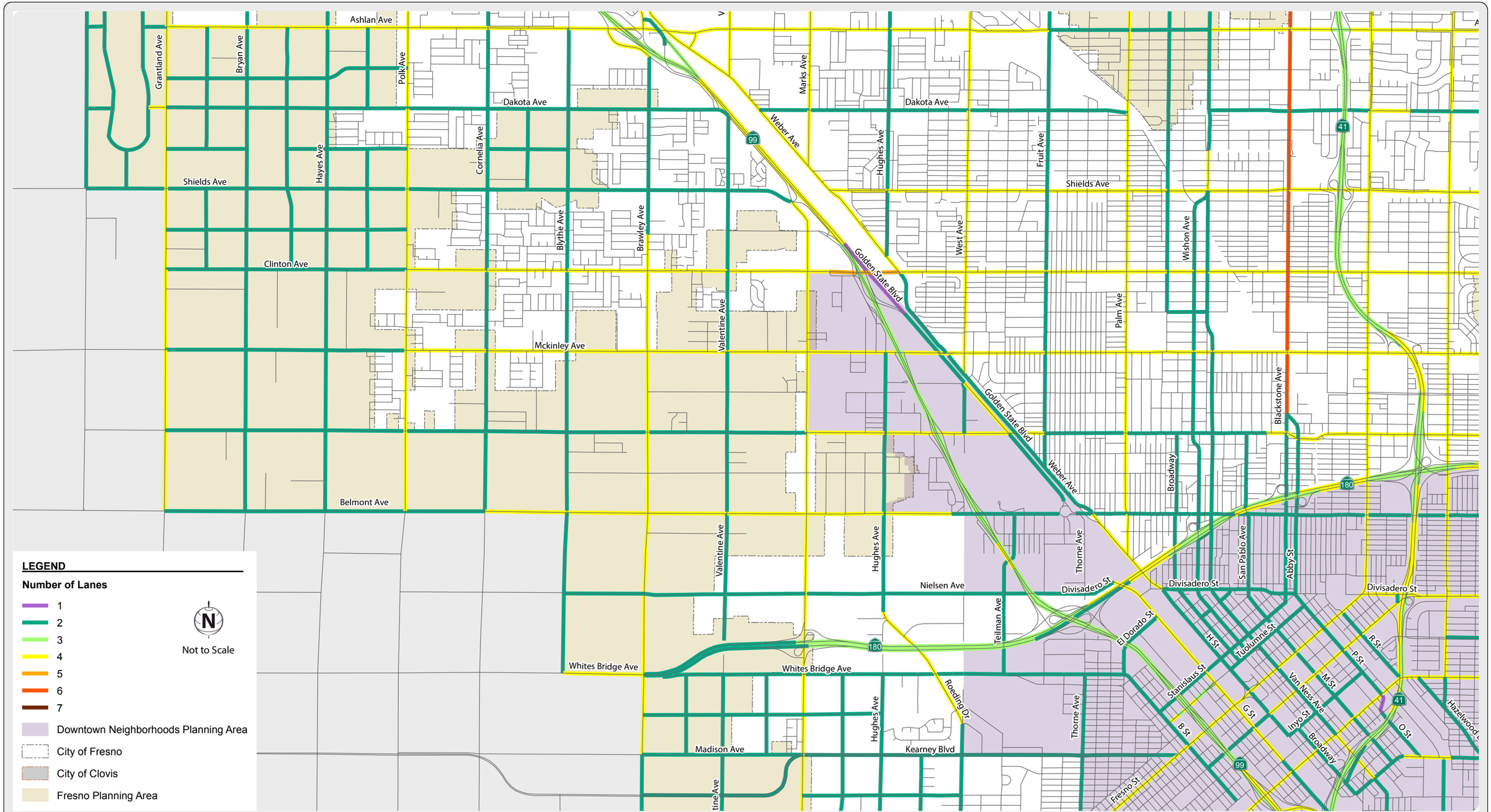
CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES
Appendix H-7.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES
Appendix H-7.3

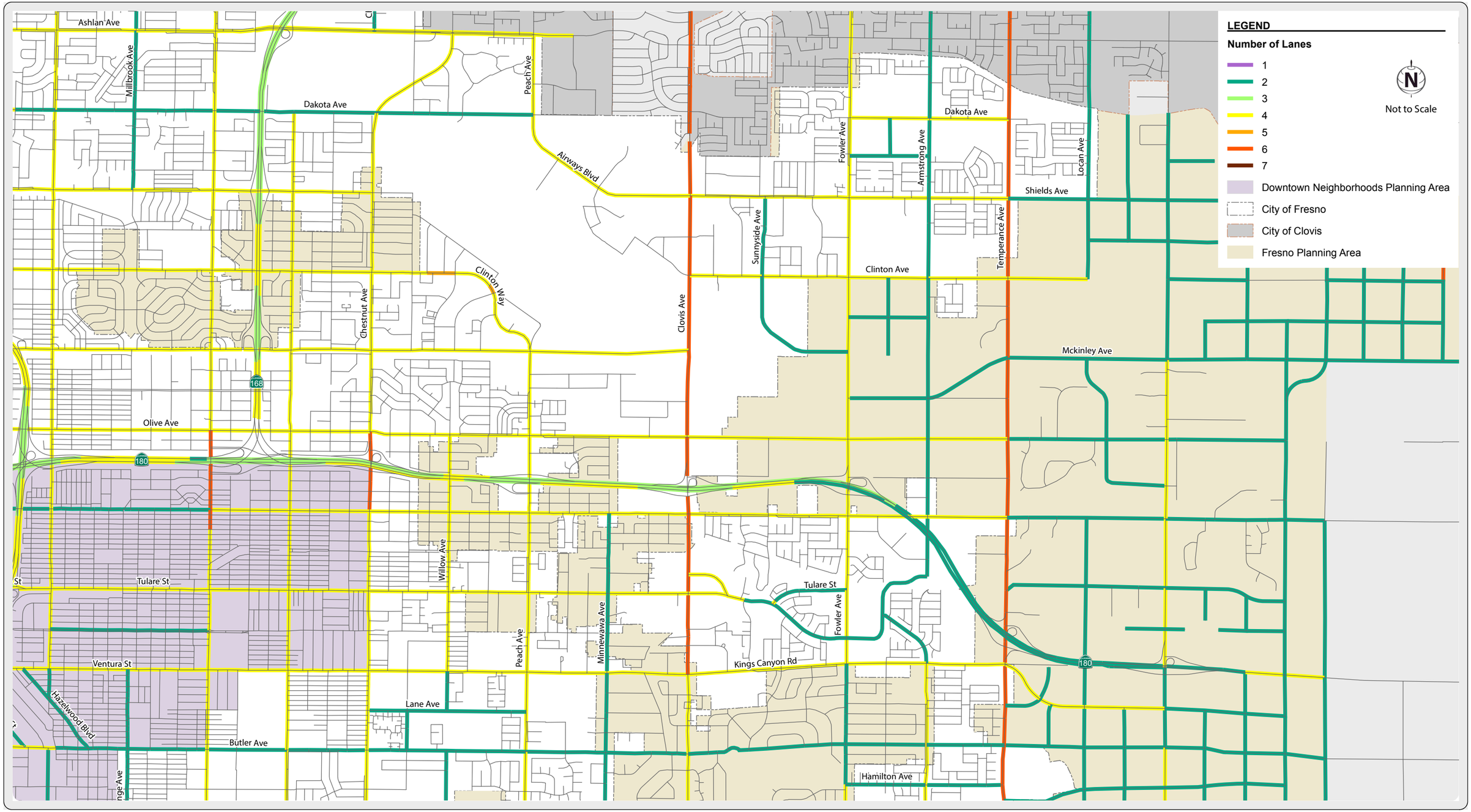


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES

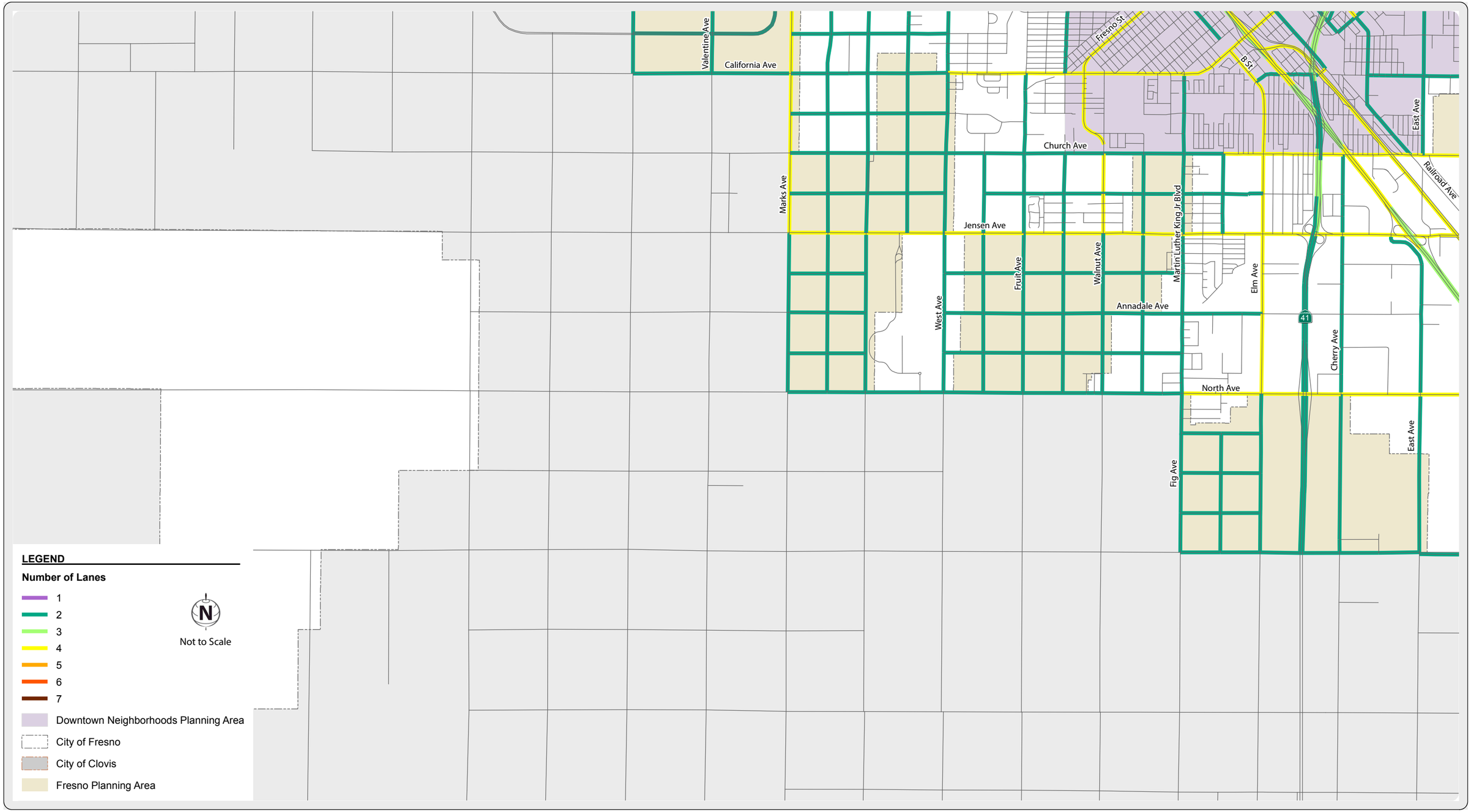
Appendix H-7.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

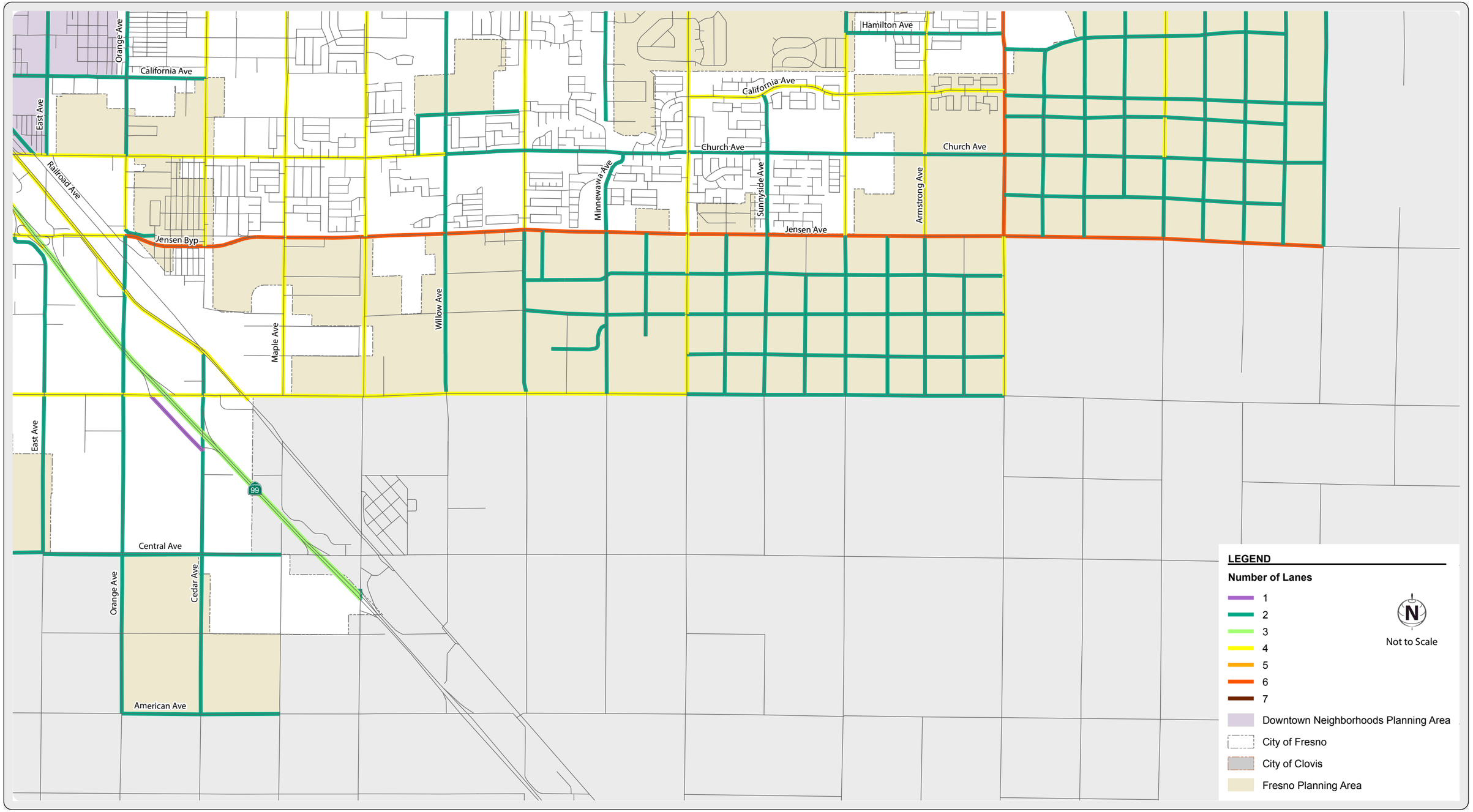
CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES
Appendix H-7.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES
Appendix H-7.6

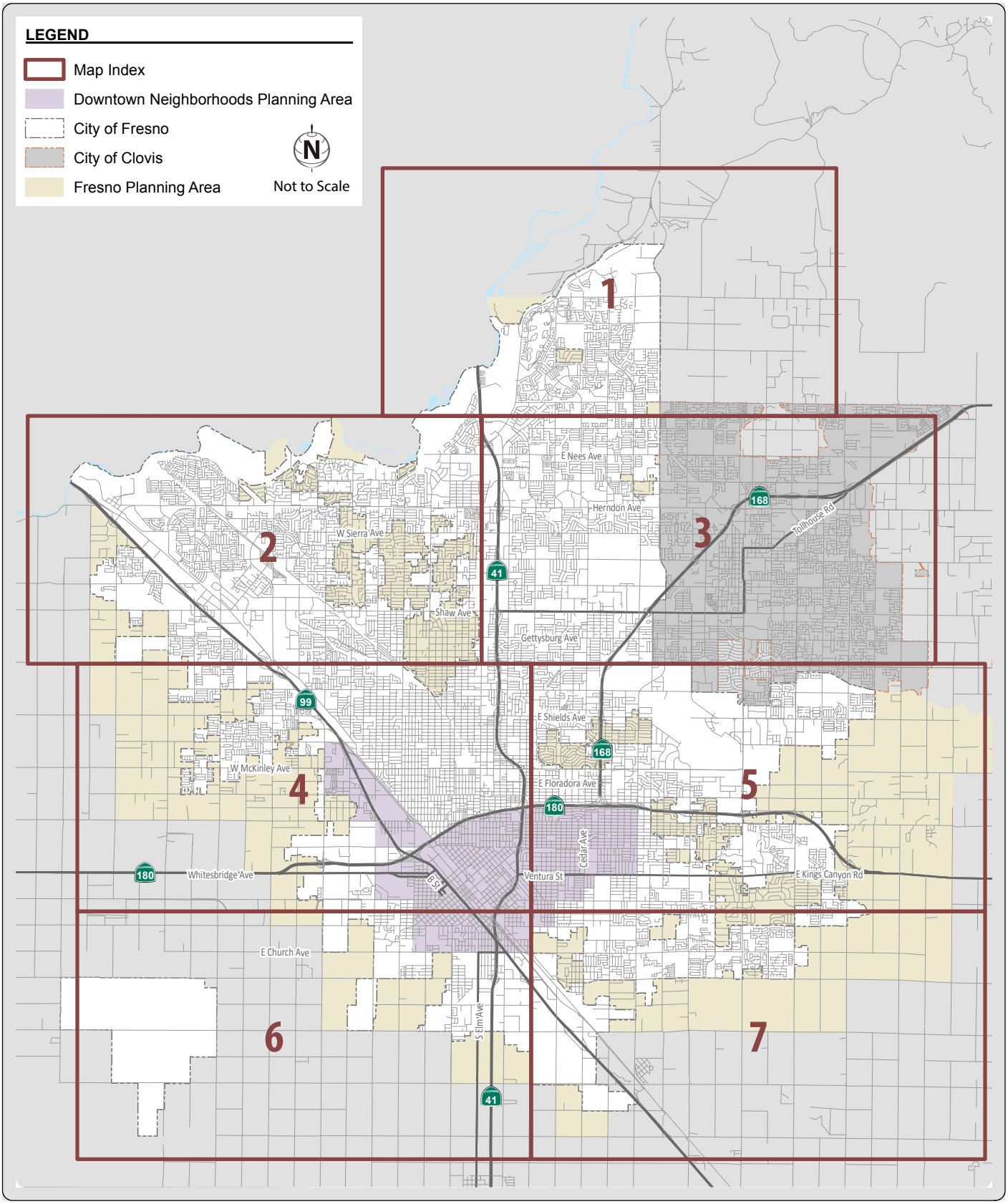


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH7_Lanes.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PLANNED ROADWAY NUMBER OF LANES
Appendix H-7.7

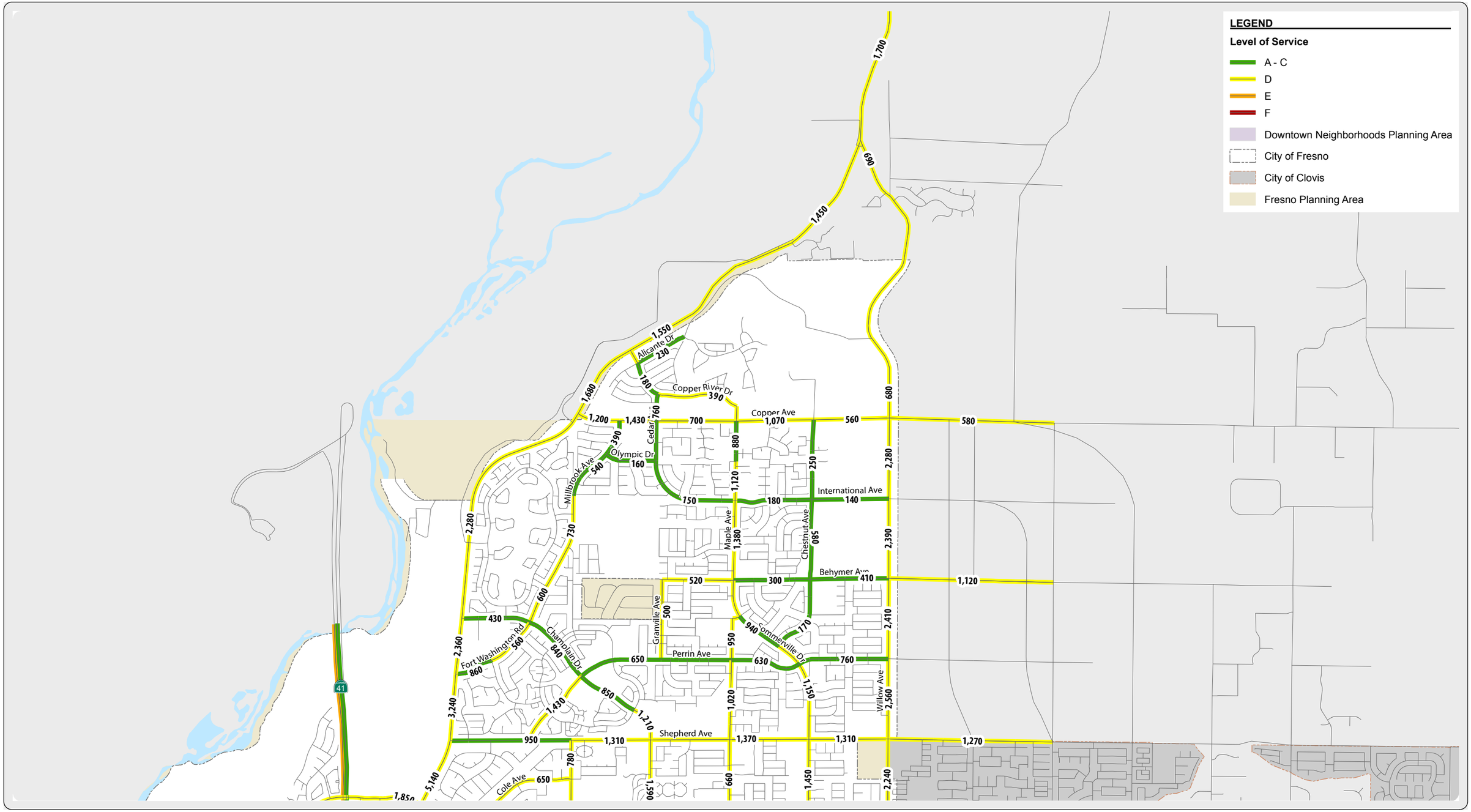
H.8 - Planning Area Exhibits – AM Peak Hour Volumes and LOS – Existing + Project Conditions



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-8.1

LEGEND

Level of Service

- A - C
- D
- E
- F

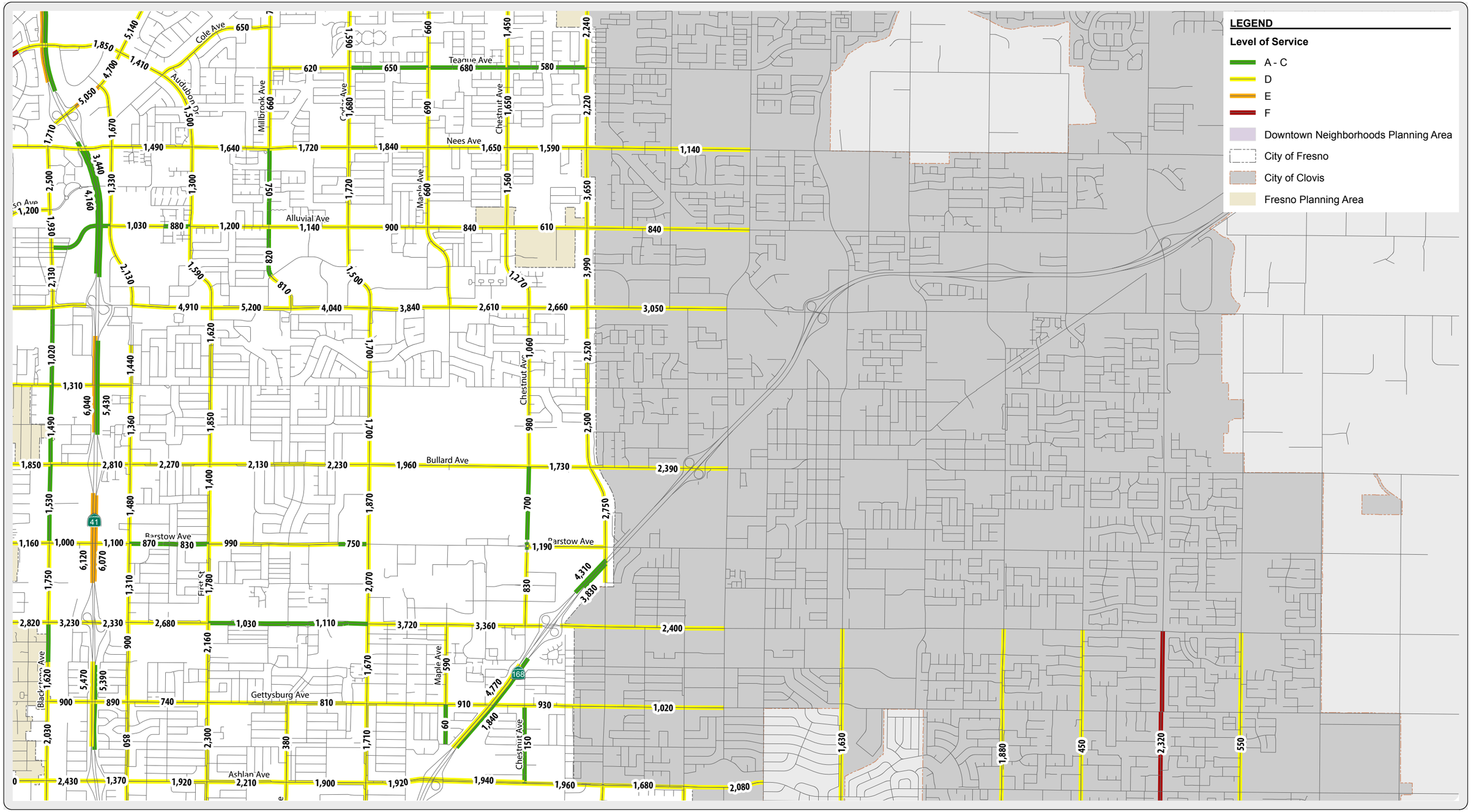
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS

Appendix H-8.2

FEHR & PEERS

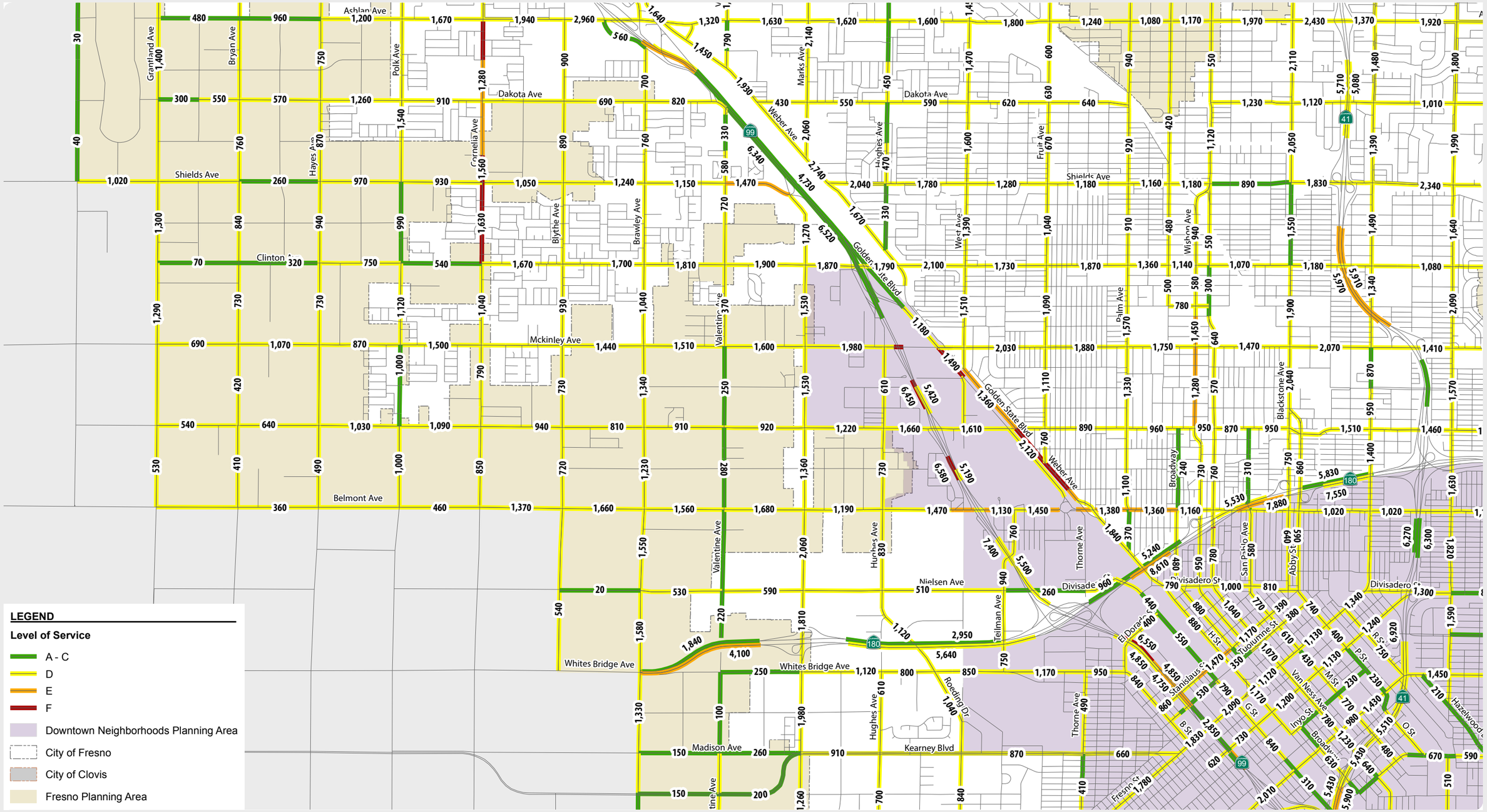
Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd

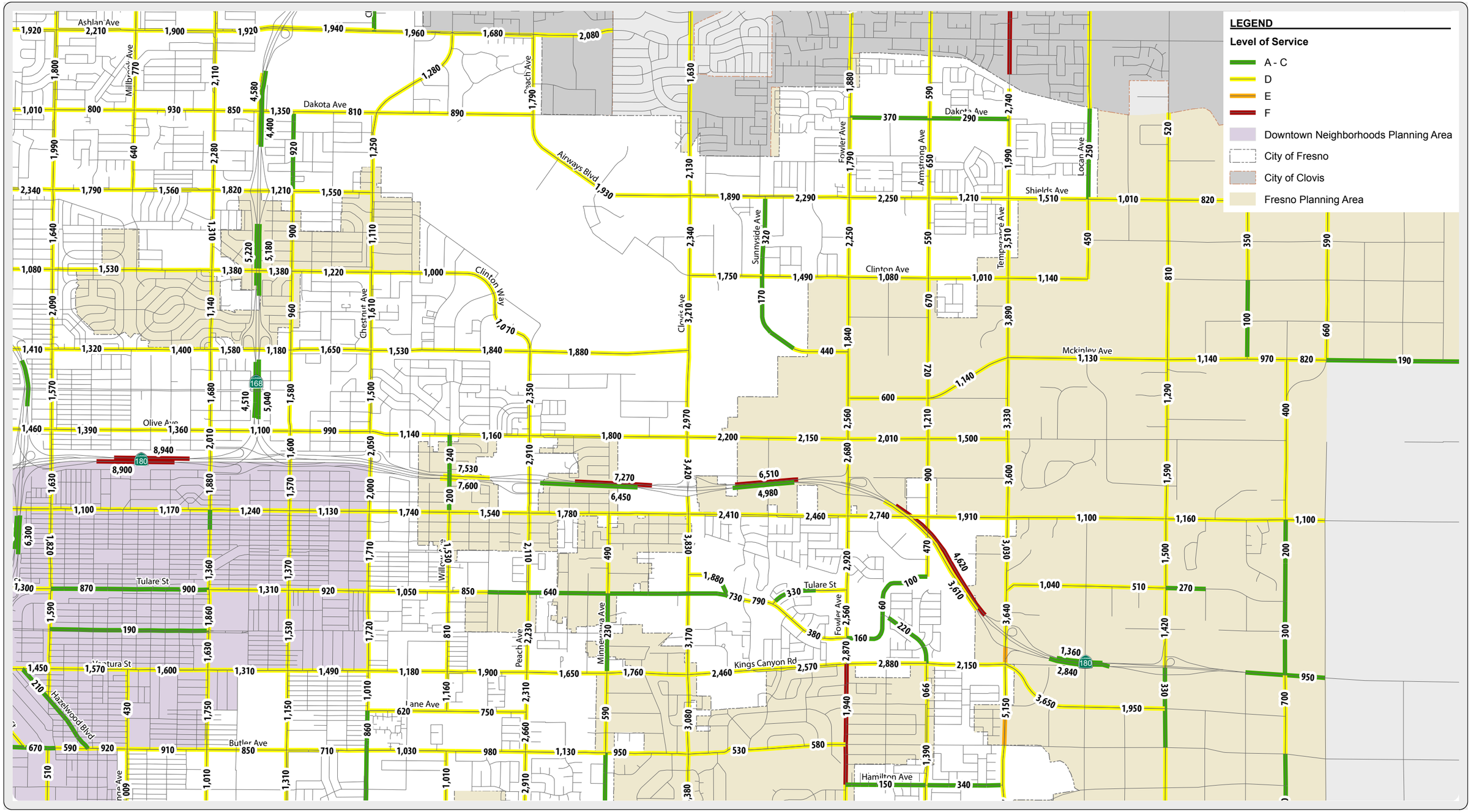
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-8.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd

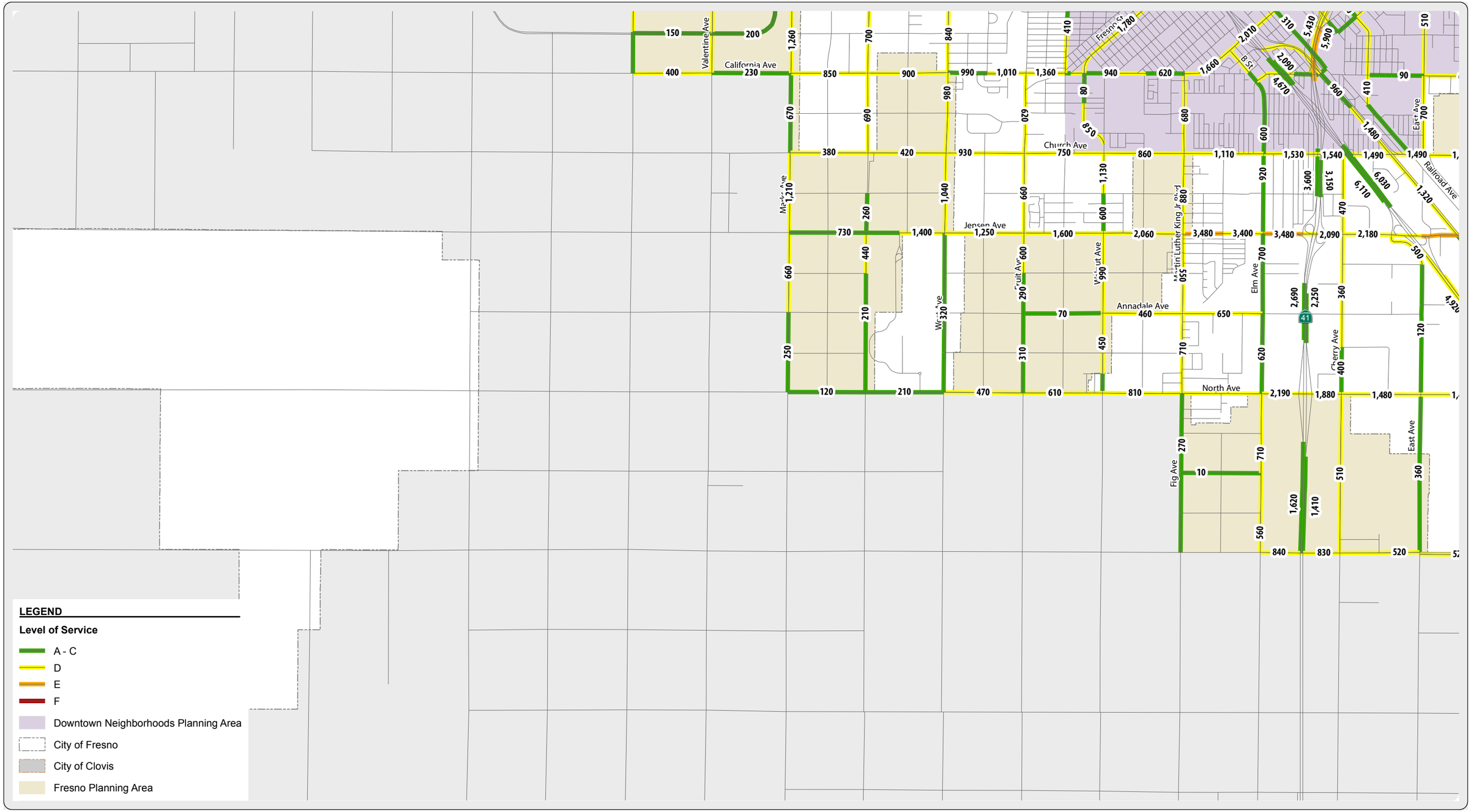
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-8.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd

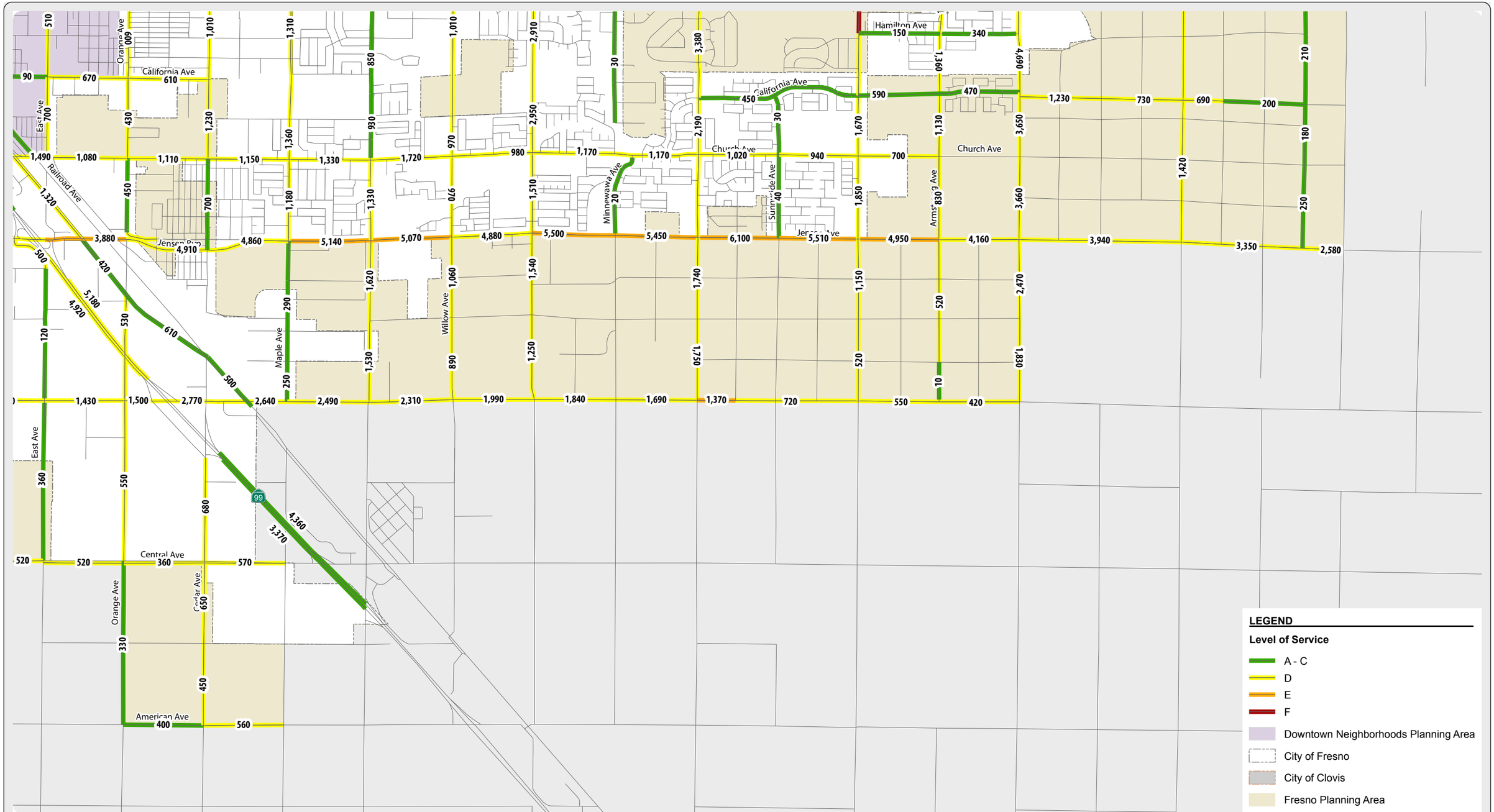
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-8.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-8.6

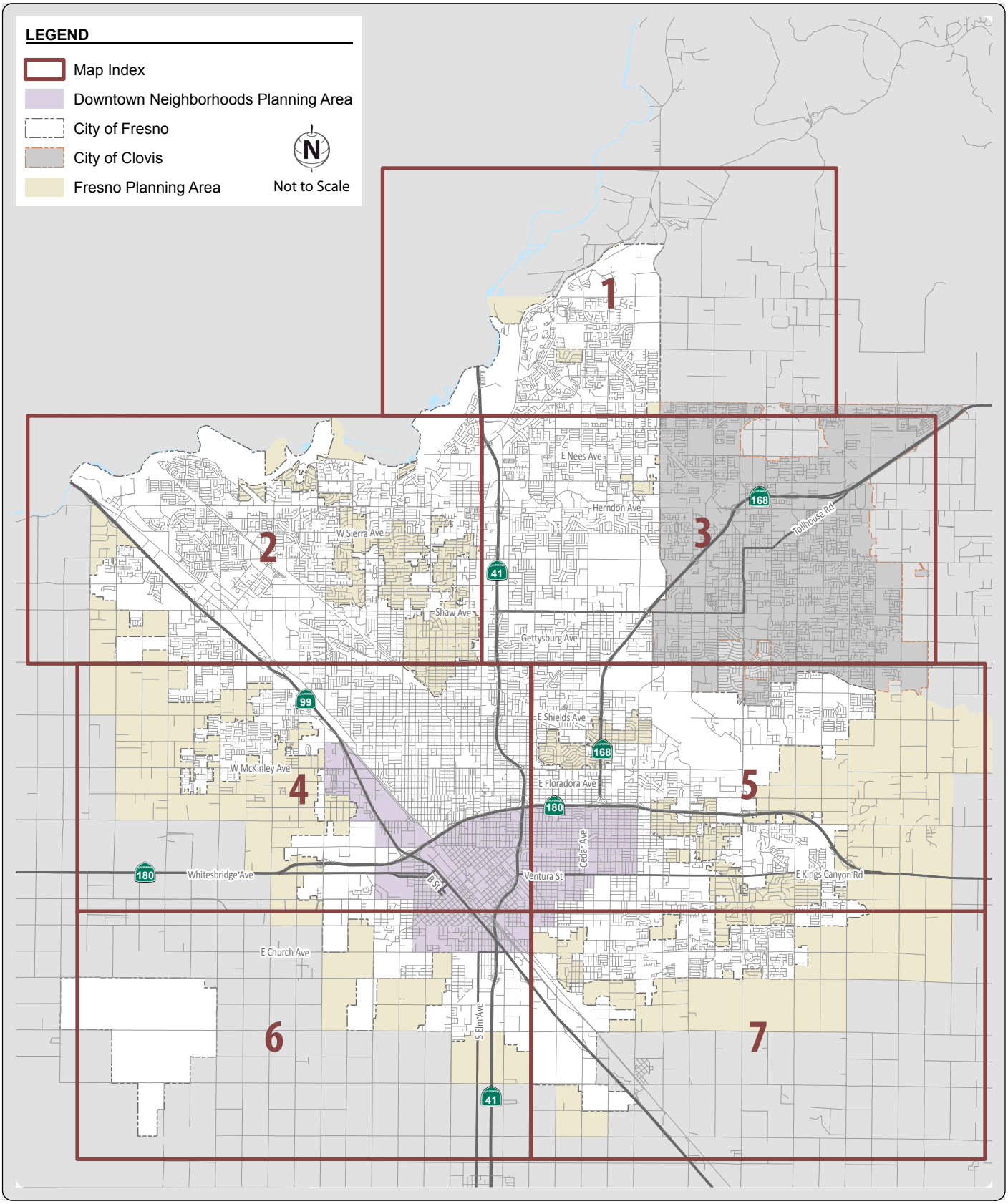


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH8_AM_LOS_EP.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-8.7

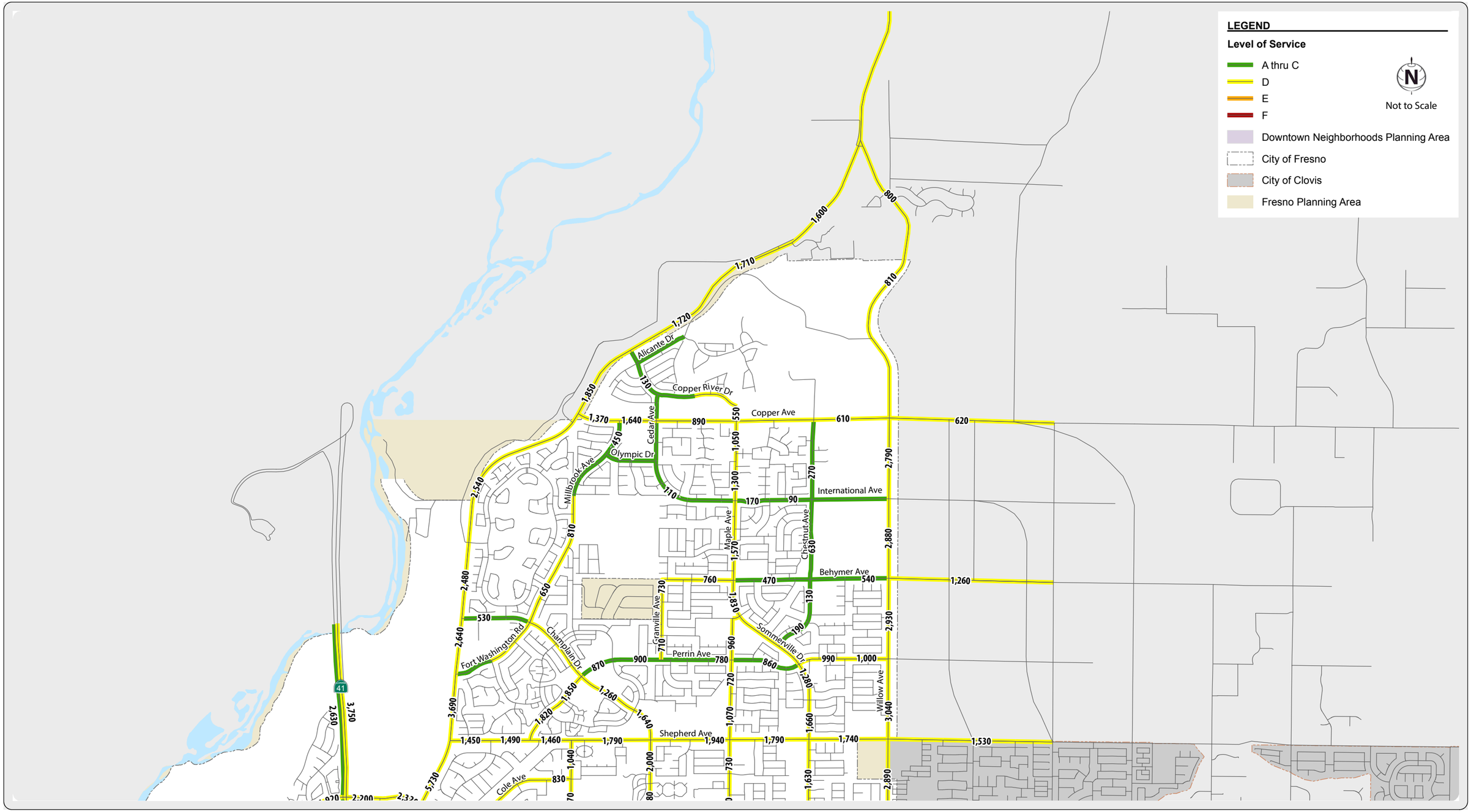
H.9 - Planning Area Exhibits – PM Peak Hour Volumes and LOS – Existing + Project Conditions



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH9_PM_LOS_EP.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-9.1

LEGEND

Level of Service

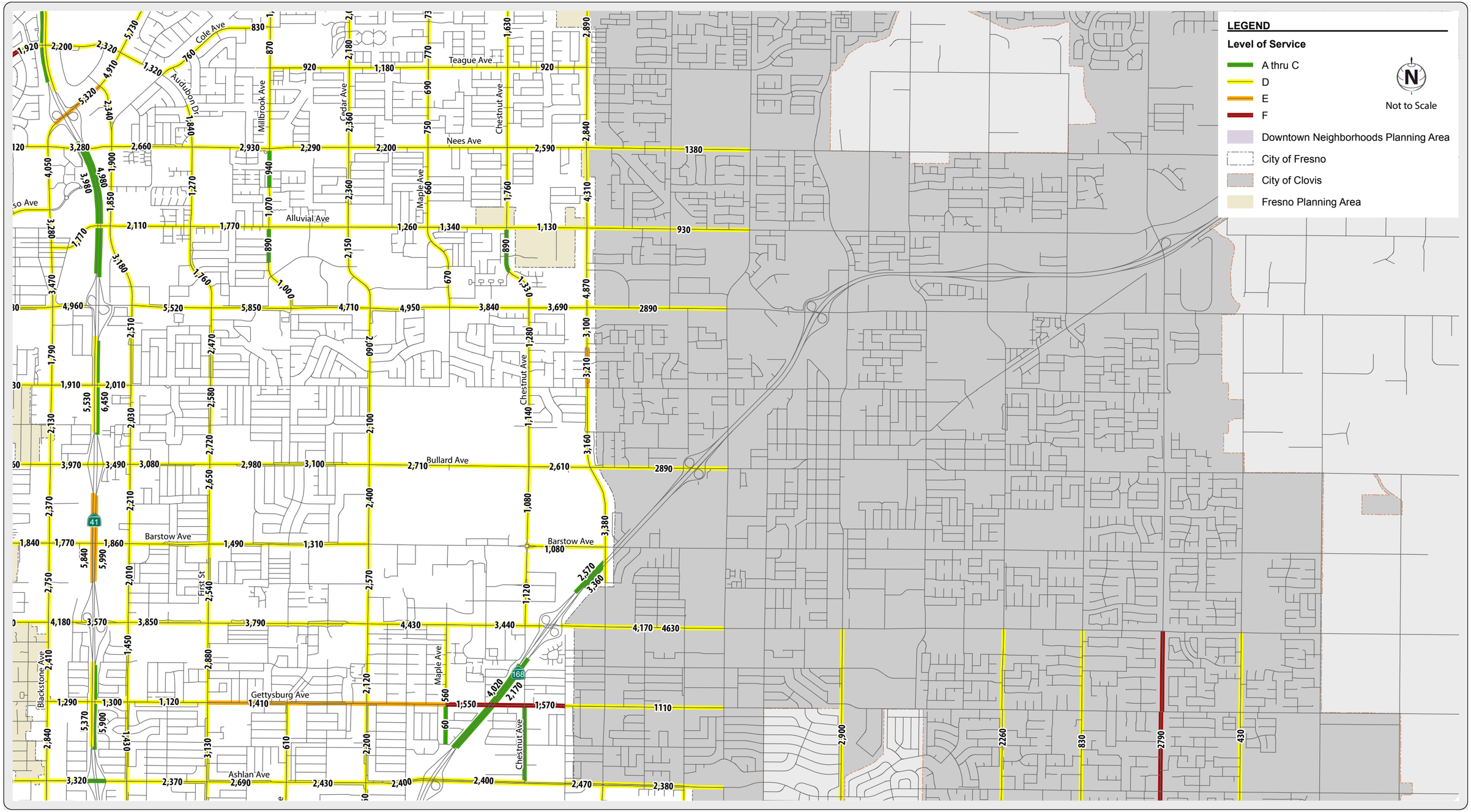
- A thru C
- D
- E
- F

Not to Scale

- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

River Vista Dr
Alluvial Ave
Spruce Ave
Herndon Ave
Millburn Ave
Hayes Ave
Polk Ave
Palo Alto Ave
Jeanne Ave
Santa Fe Ave
Rowley Ave
Figarden Dr
Escalon Ave
Dante Ave
Cecelia Ave
Bullard Ave
Parkway Dr
Golden State Blvd
Bryan Ave
Garfield Ave
Barstow Ave
Gates Ave
Blythe Ave
San Jose Ave
Valentine Ave
Marty Ave
Brawley Ave
Emerson Ave
Gettysburg Ave
Ashlan Ave
Ingram Ave
El Paso Ave
Locust Ave
Sierra Ave
Shaw Ave
Maroa Ave
Blackstone Ave

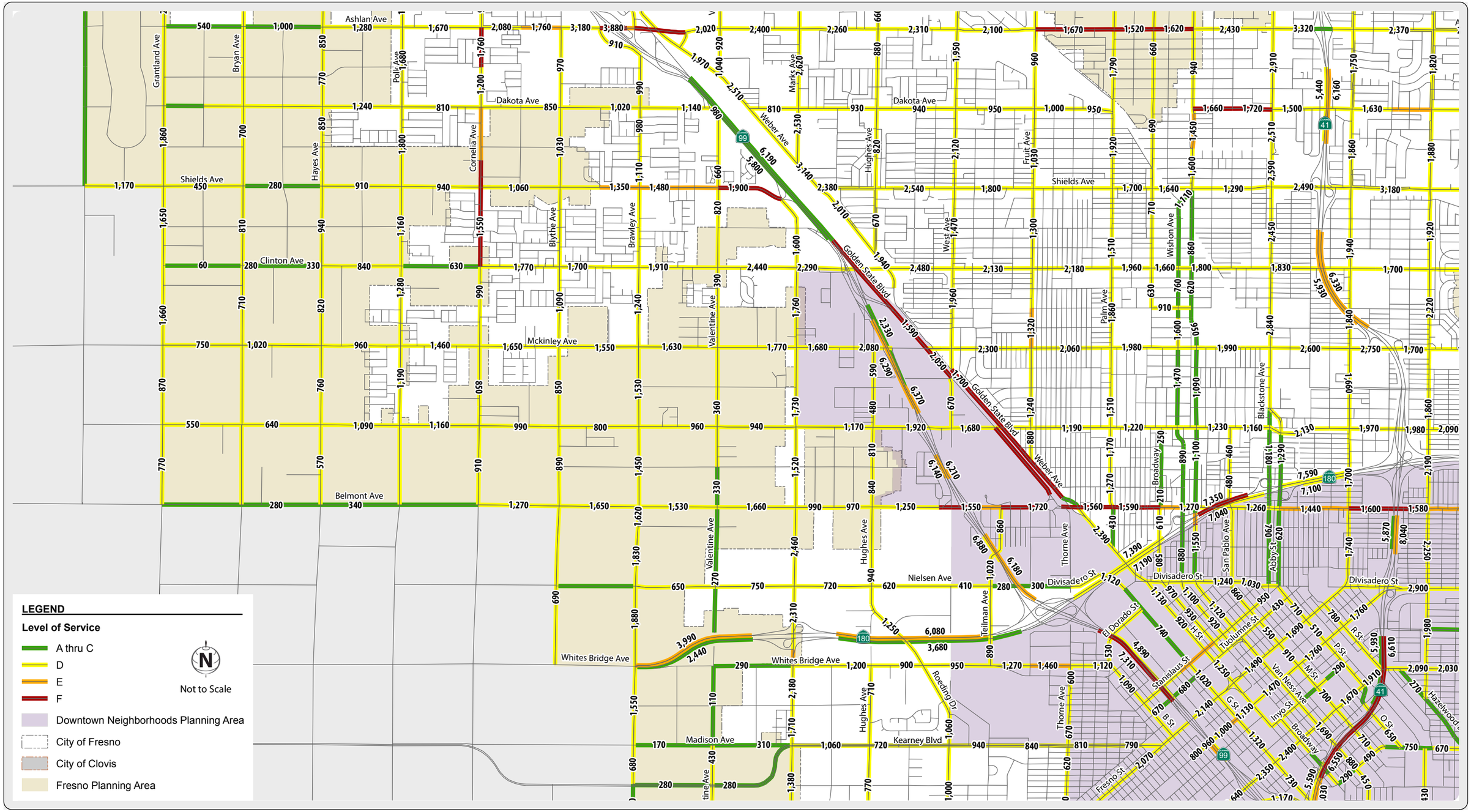
99



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH9_PM_LOS_EP.mxd

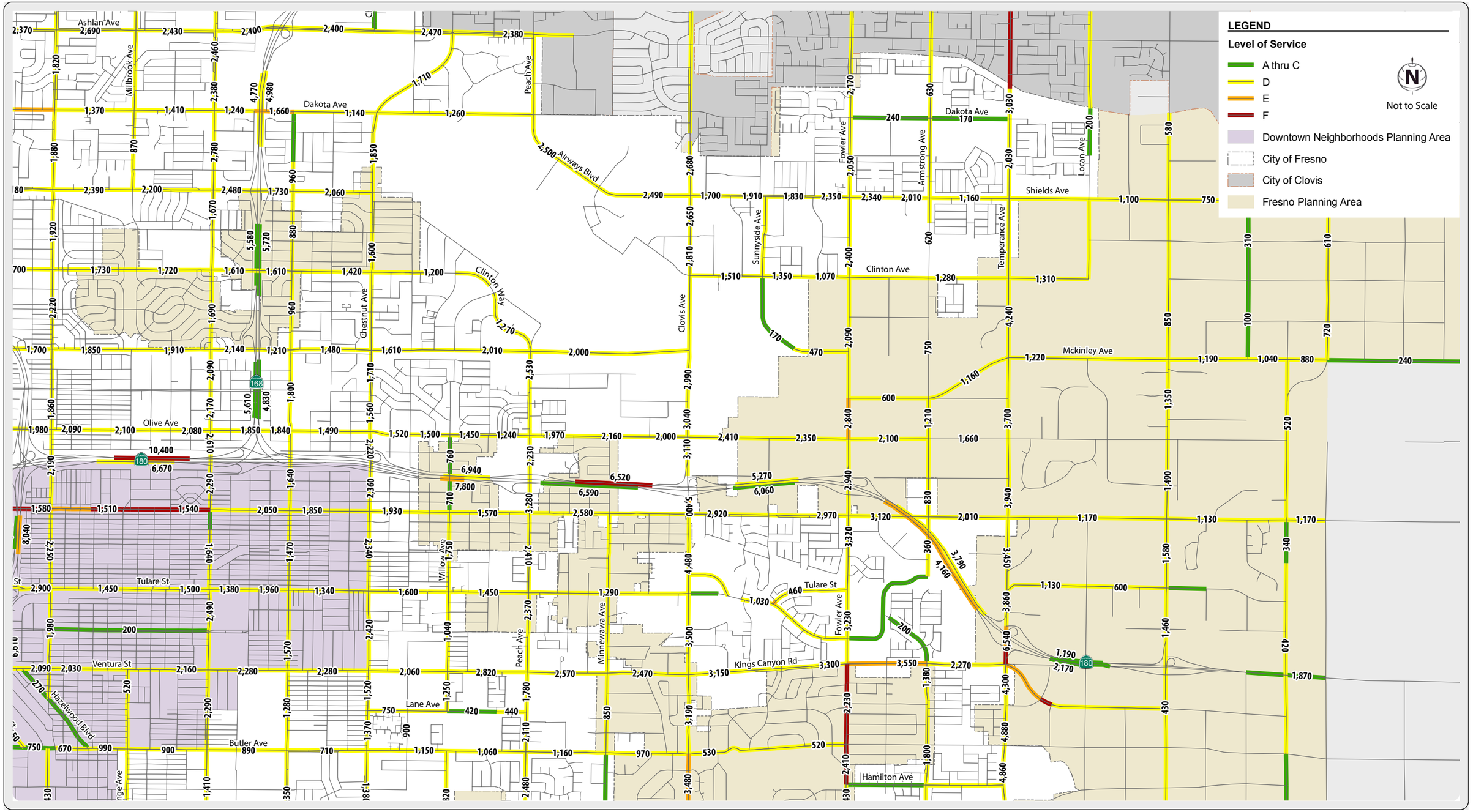
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-9.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH9_PM_LOS_EP.mxd

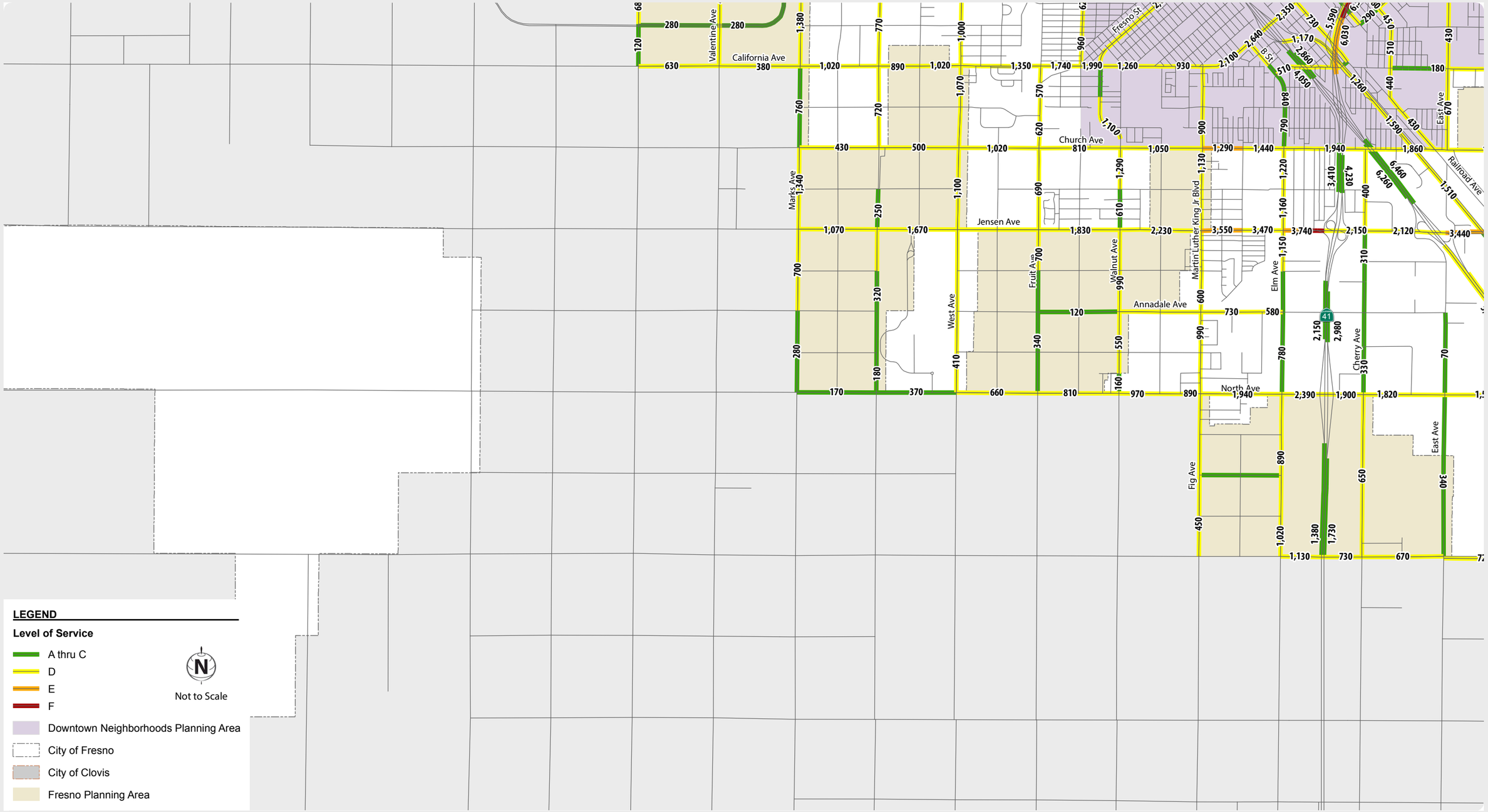
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-9.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH9_PM_LOS_EP.mxd

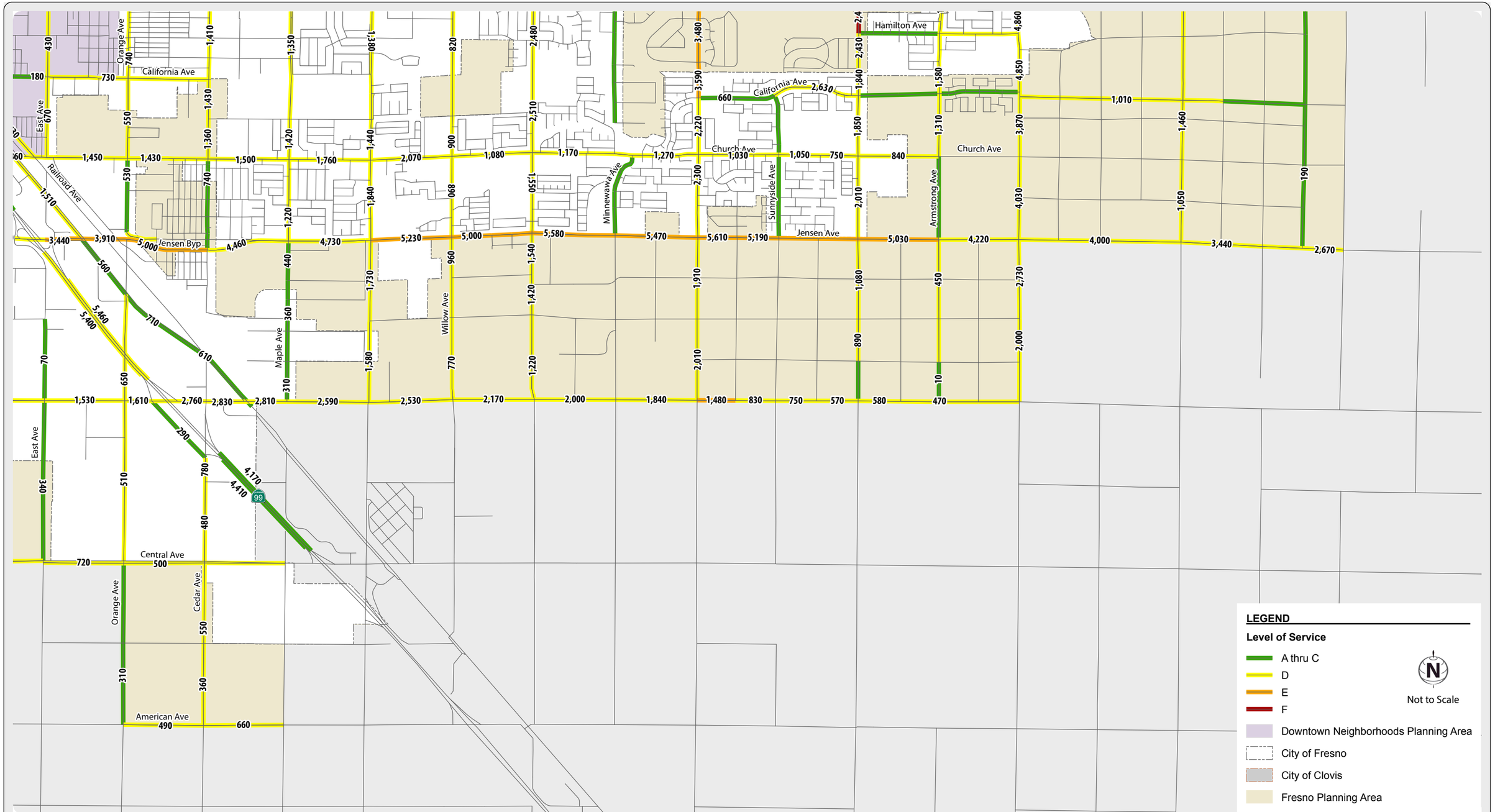
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-9.5



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH9_PM_LOS_EP.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-9.6

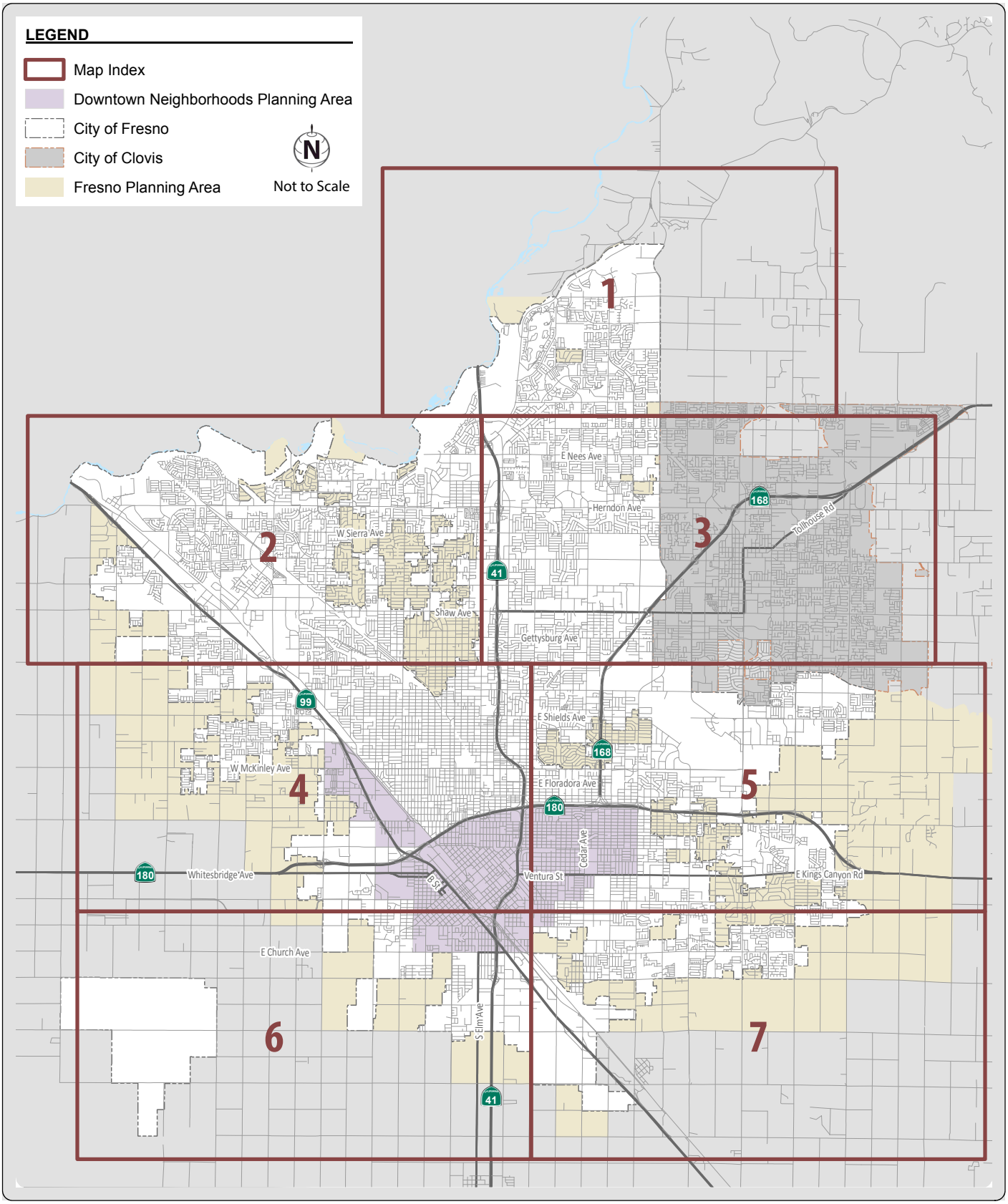


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH9_PM_LOS_EP.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - EXISTING + PROJECT CONDITIONS
Appendix H-9.7

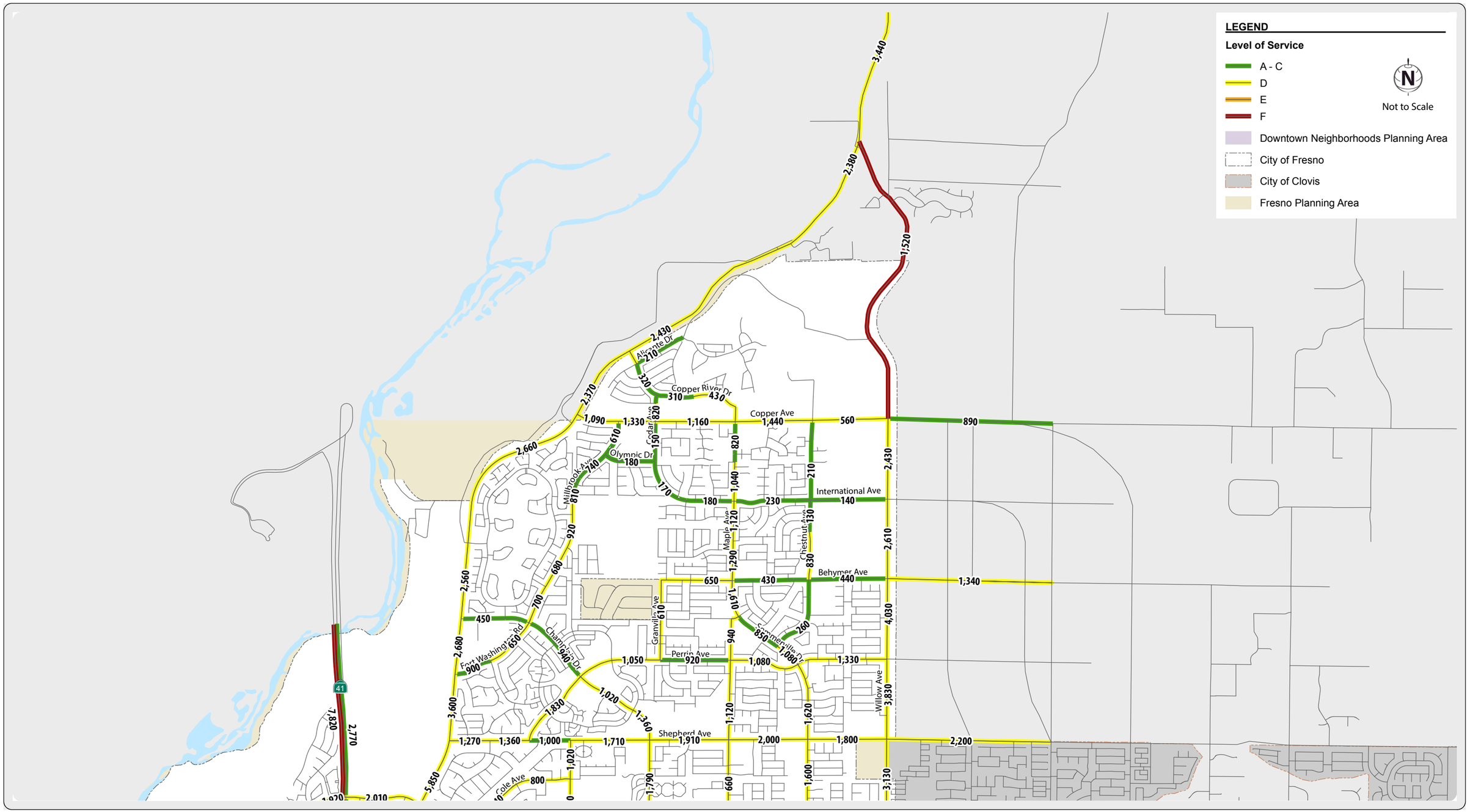
H.10 - Planning Area Exhibits – AM Peak Hour Volumes and LOS – Cumulative Conditions



FEHR PEERS

MAP INDEX

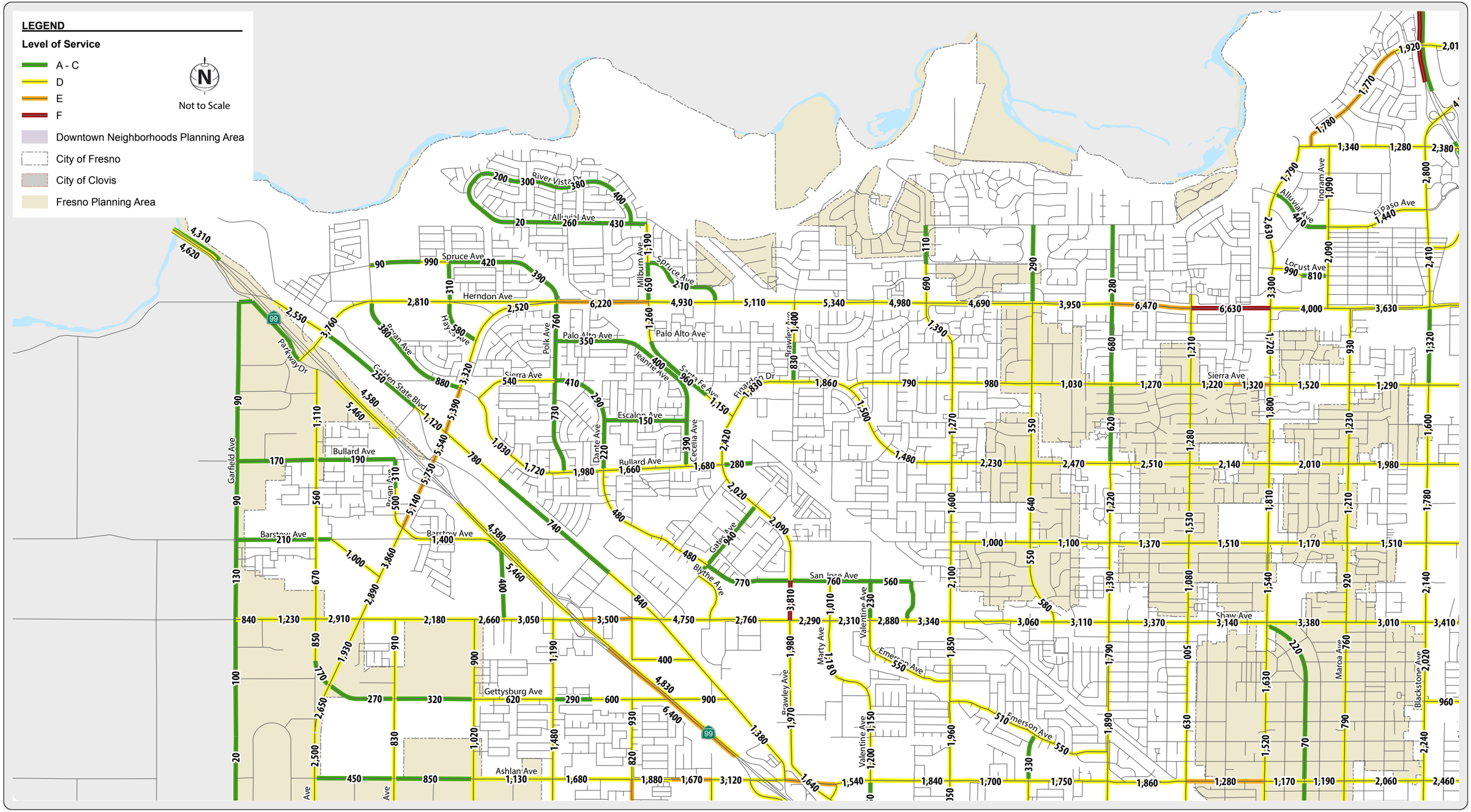
Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

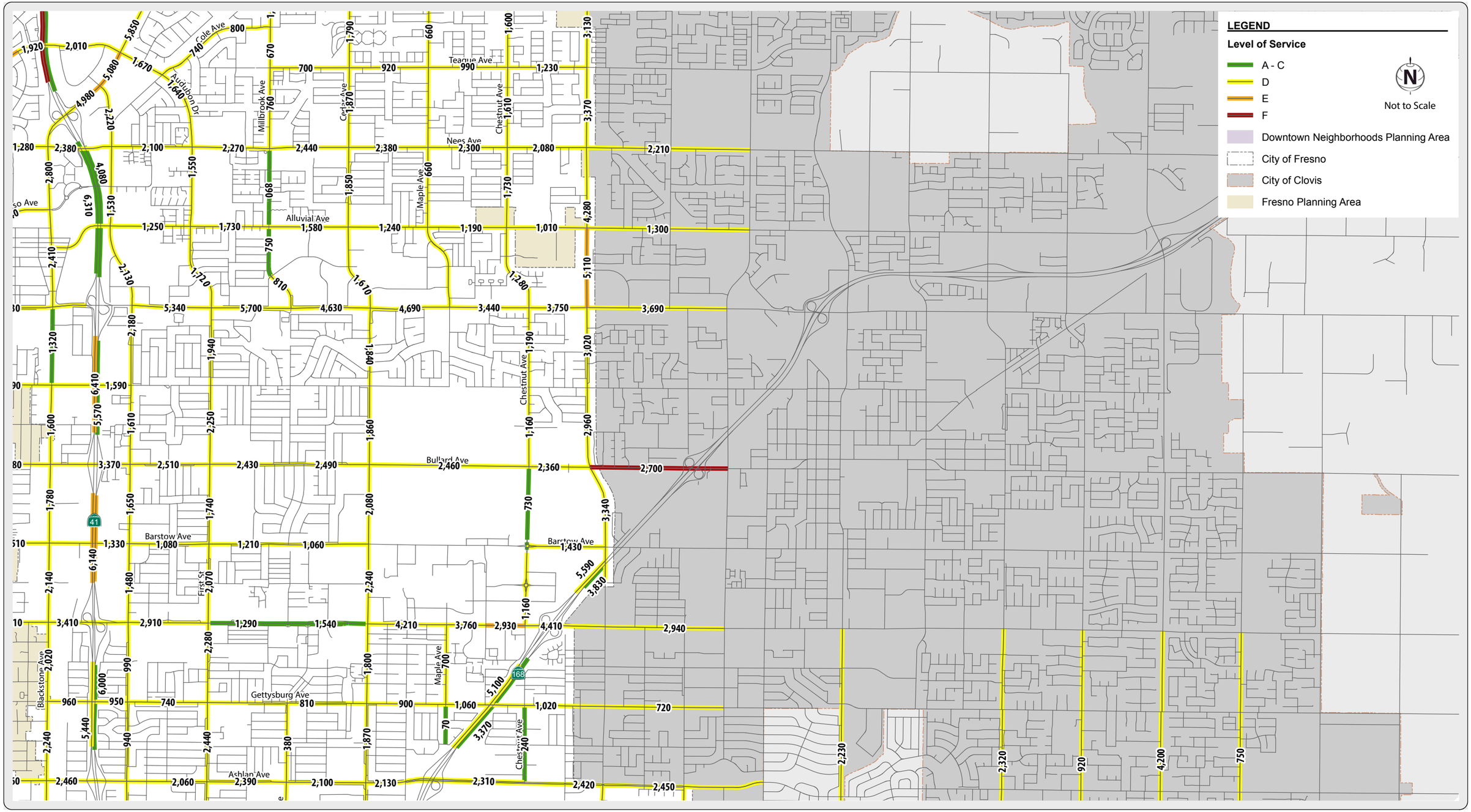
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-10.1



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

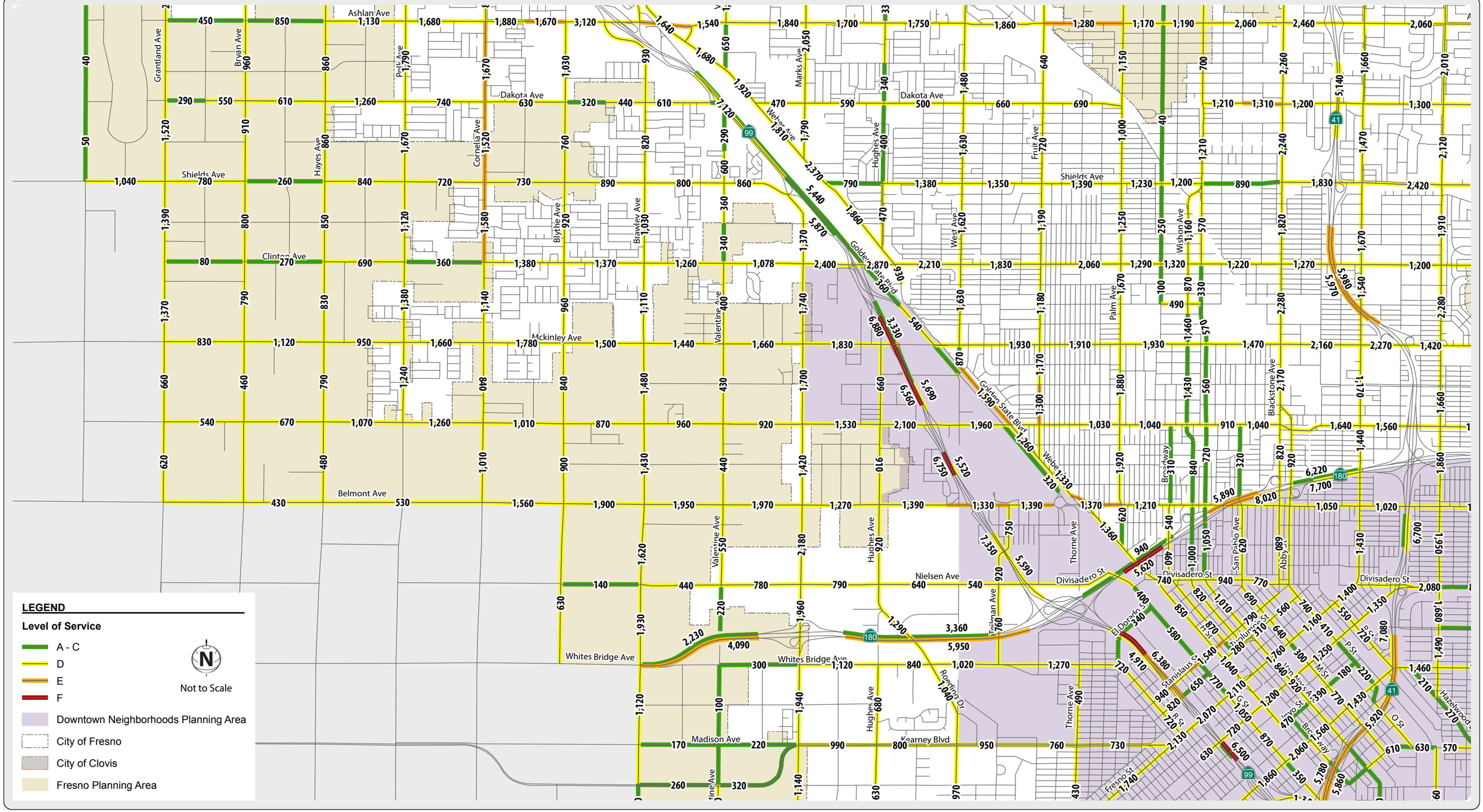
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

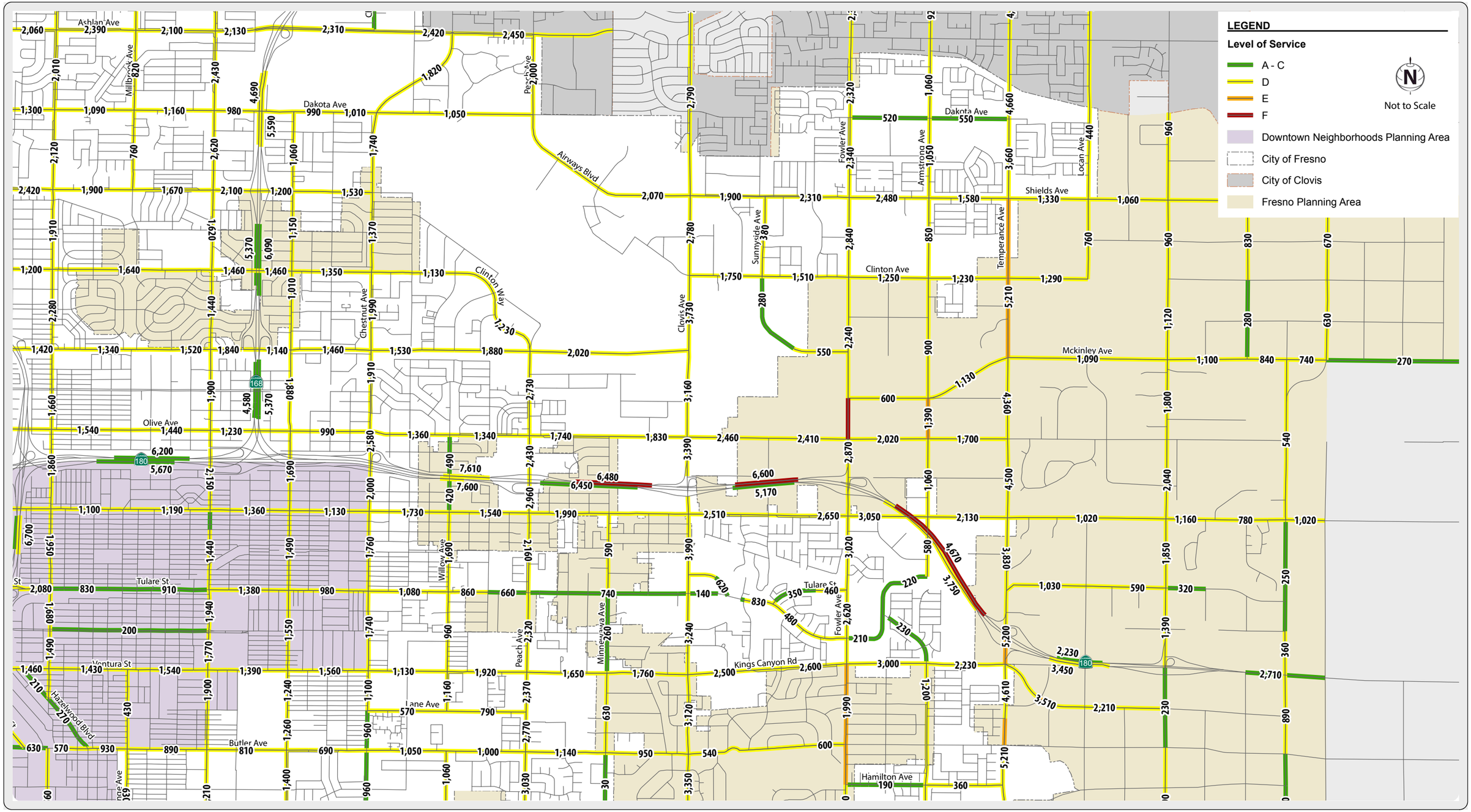
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-10.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

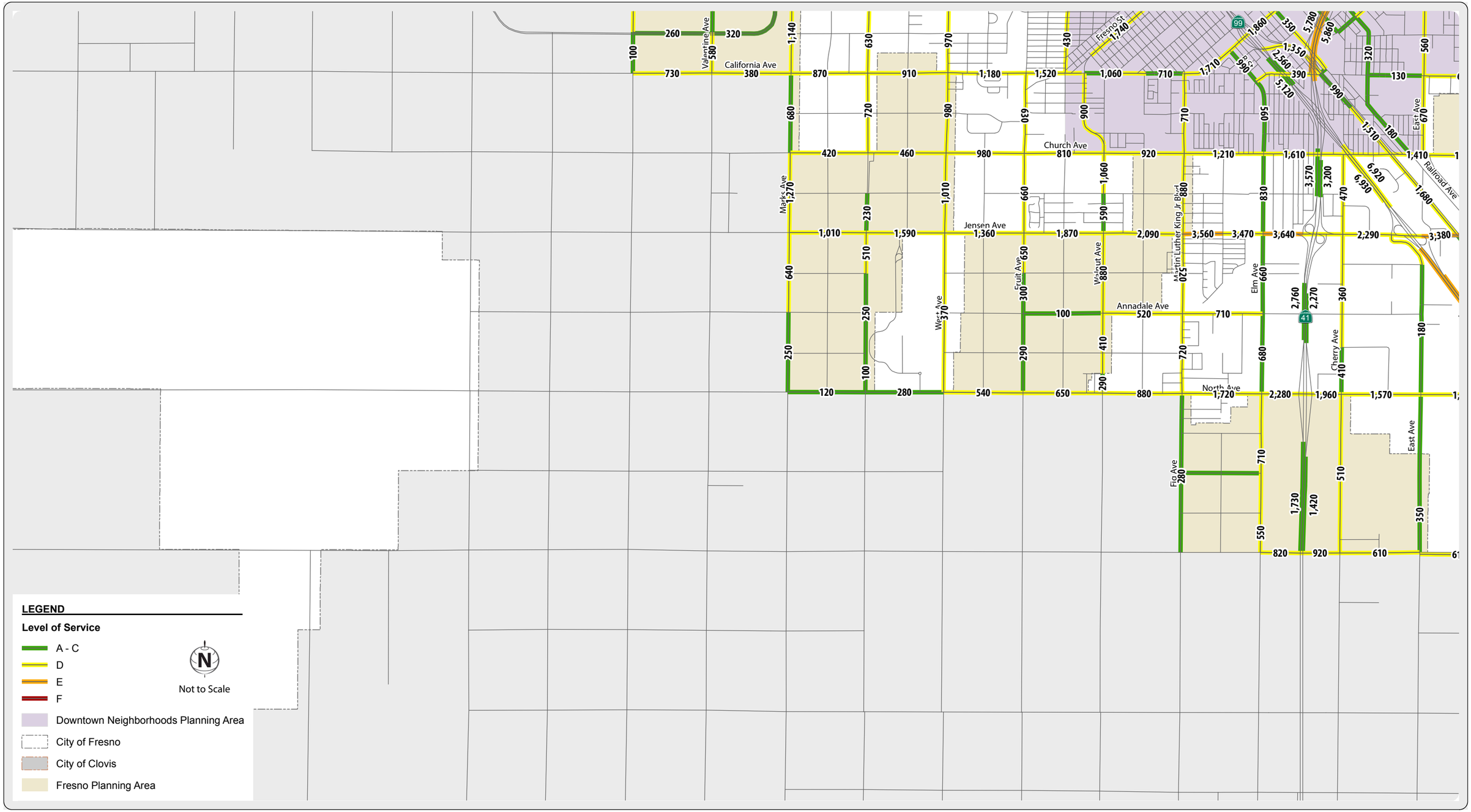
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-10.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

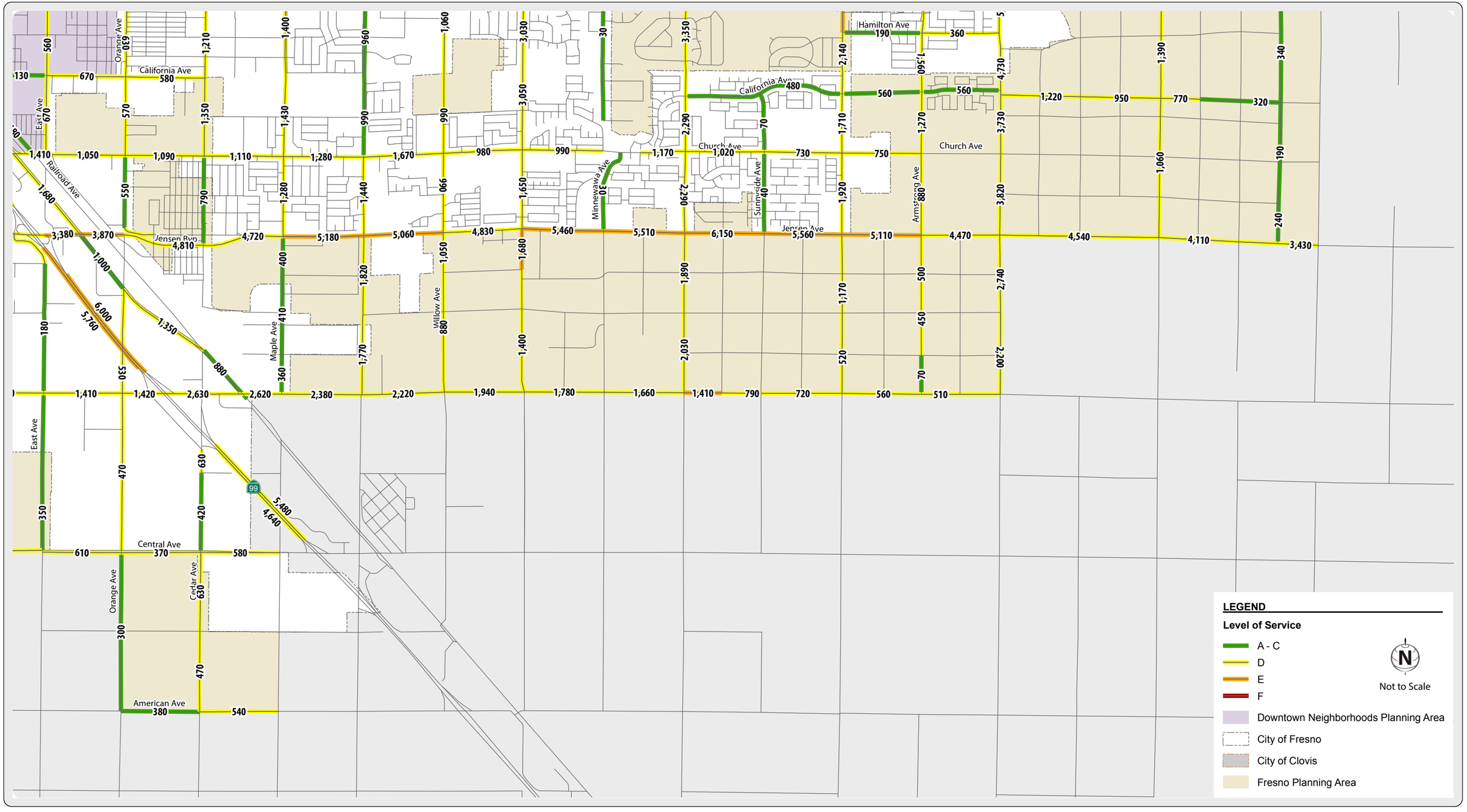
CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS

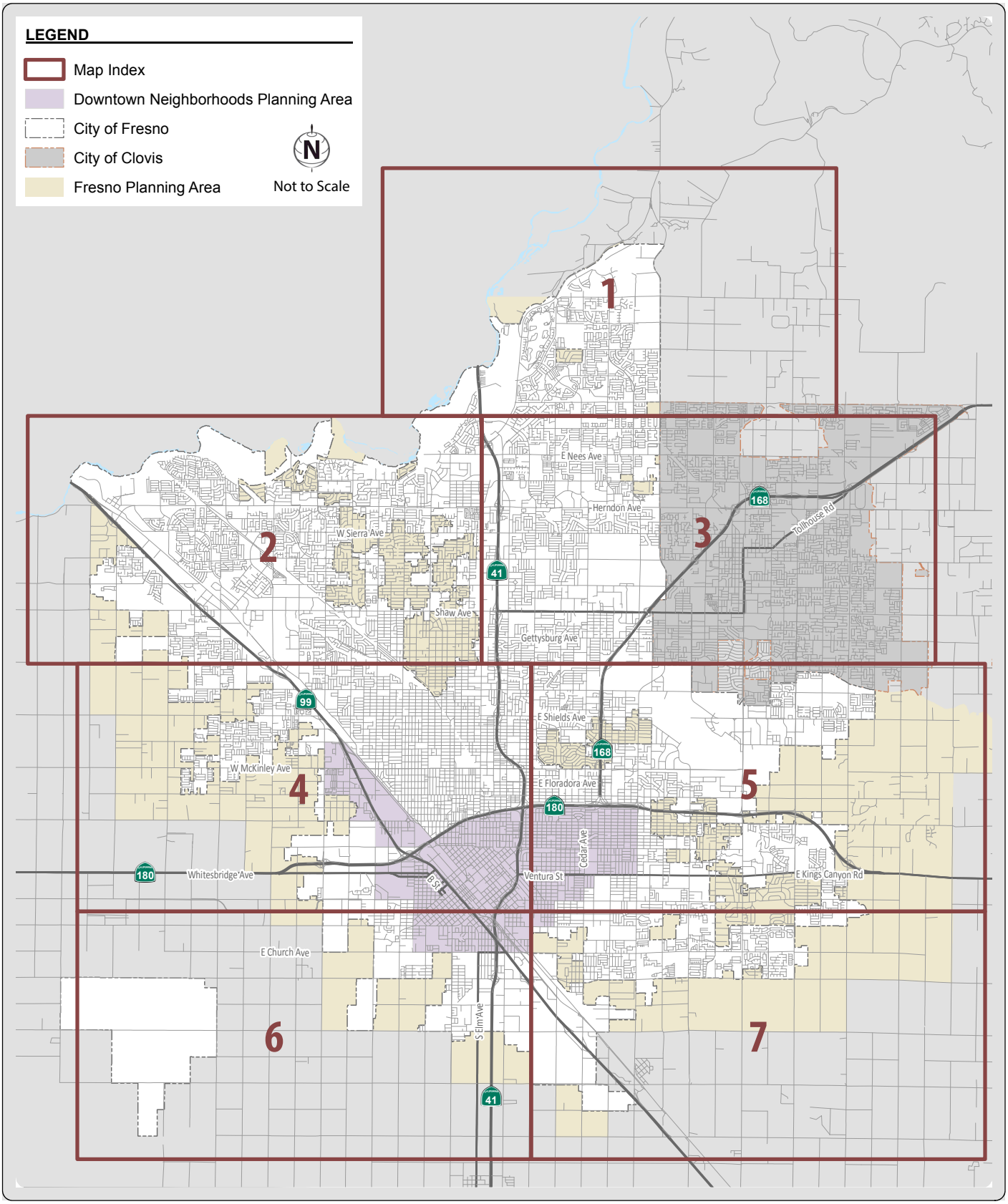


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH10_AM_LOS_CUML.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
AM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-10.7

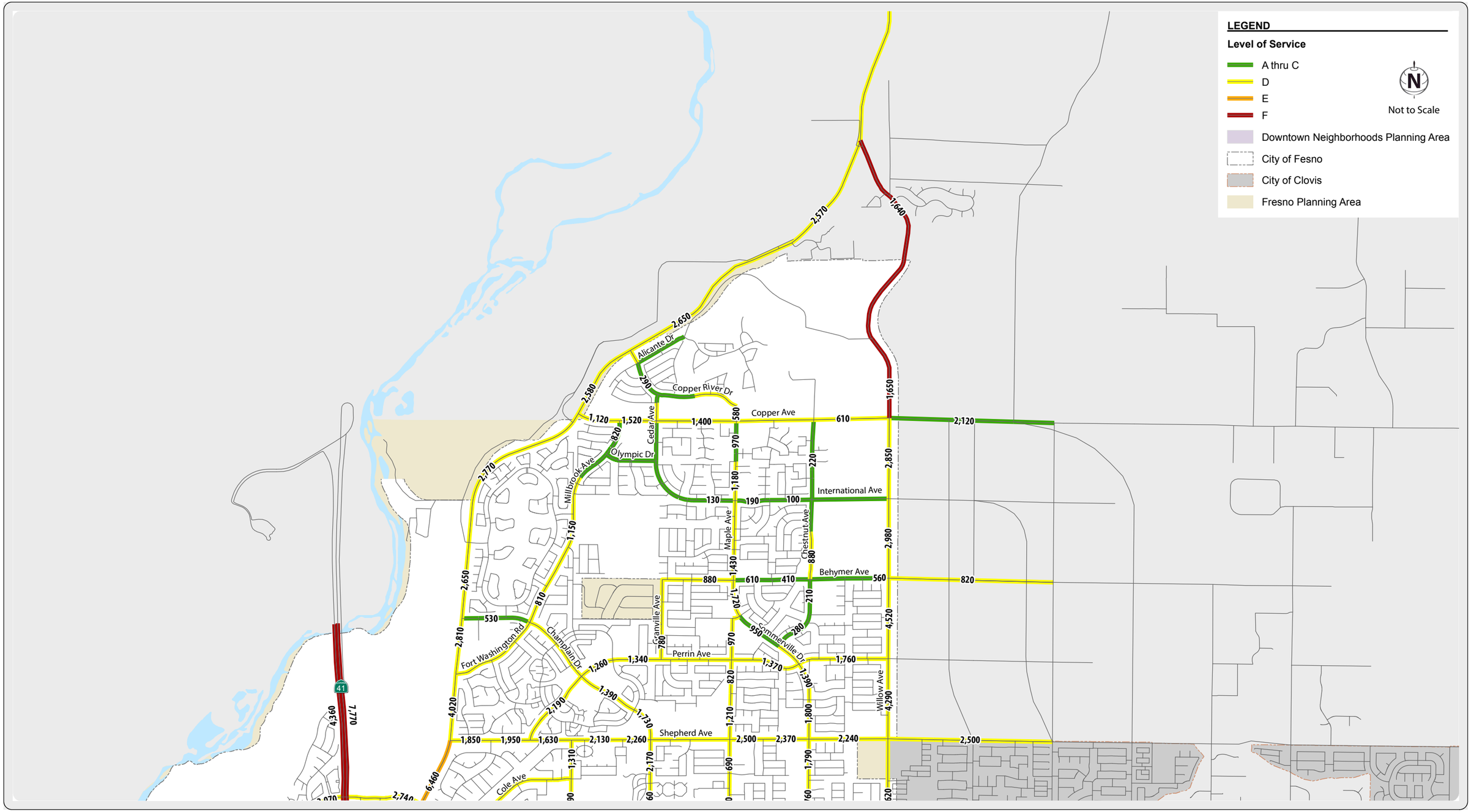
H.11 - Planning Area Exhibits – PM Peak Hour Volumes and LOS – Cumulative Conditions



FEHR PEERS

MAP INDEX

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F1-1_Index.mxd



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-11.1

LEGEND

Level of Service

- A thru C
- D
- E
- F

Not to Scale

- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

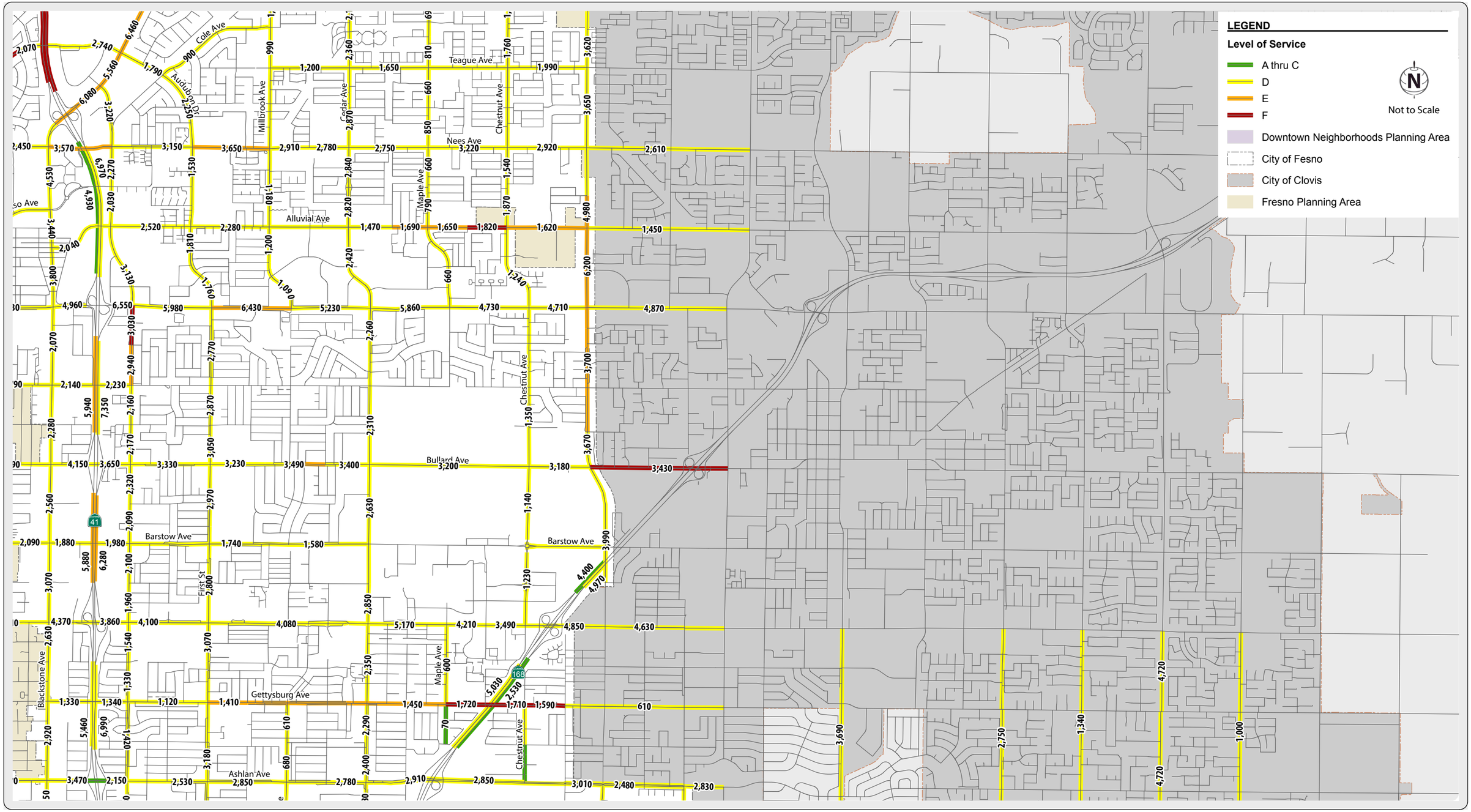
River Vista Dr · Alluvial Ave · Spruce Ave · Herndon Ave · Millburn Ave · Palo Alto Ave · Sierra Ave · Escalon Ave · Bullard Ave · Barstow Ave · San Jose Ave · Shaw Ave · Gettysburg Ave · Ashlan Ave · Emerson Ave · Locust Ave · El Paso Ave · Ingram Ave · Parkway Dr · Golden State Blvd · Hayes Ave · Bryan Ave · Polk Ave · Jeanne Ave · Santa Fe Ave · Figarden Dr · Brawley Ave · Marty Ave · Valentine Ave · Garfield Ave · Dante Ave · Cecelia Ave · Garet Ave · Blythe Ave · Maroa Ave · Blackstone Ave

99

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

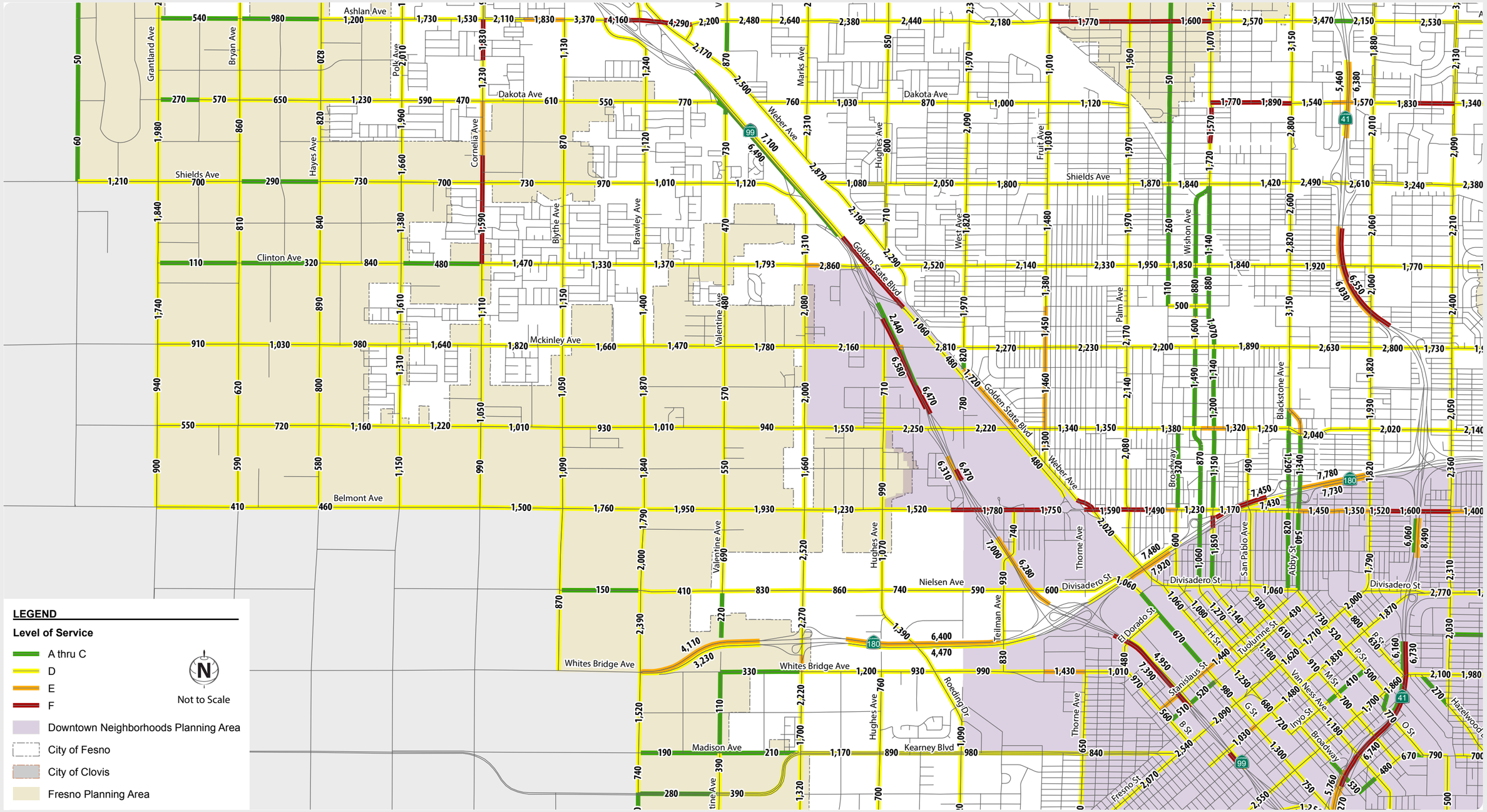
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-11.2



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

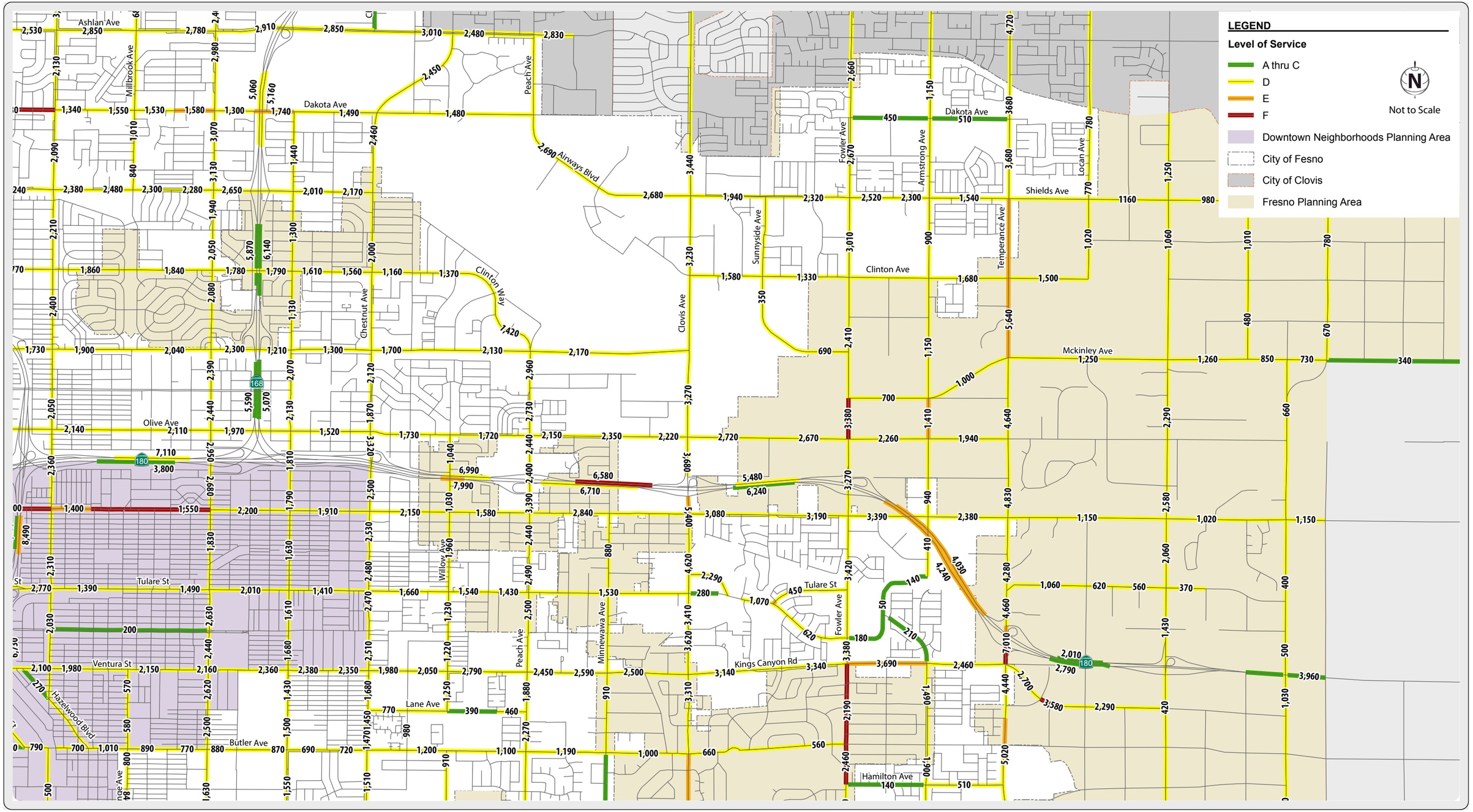
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-11.3



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

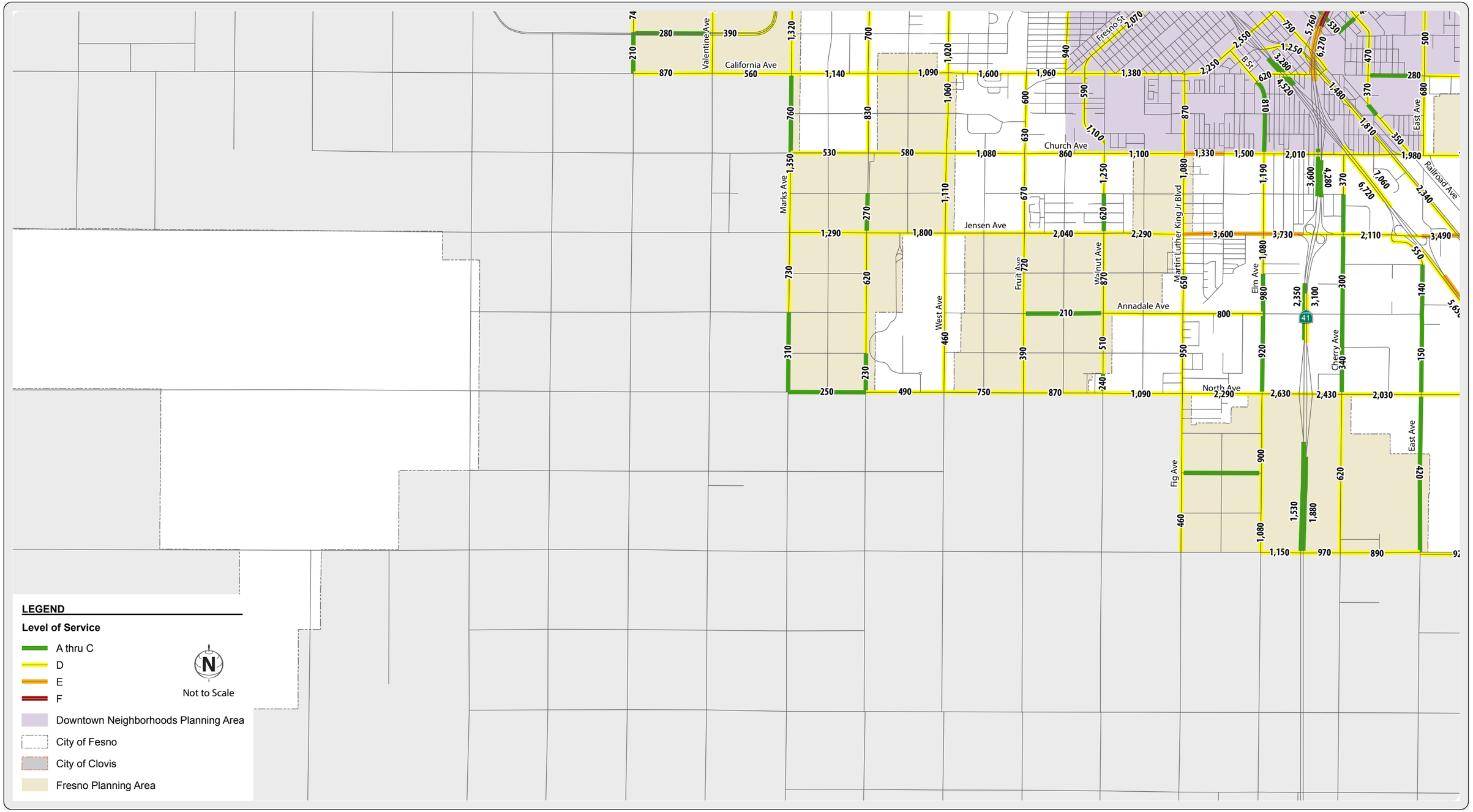
CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-11.4



FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS

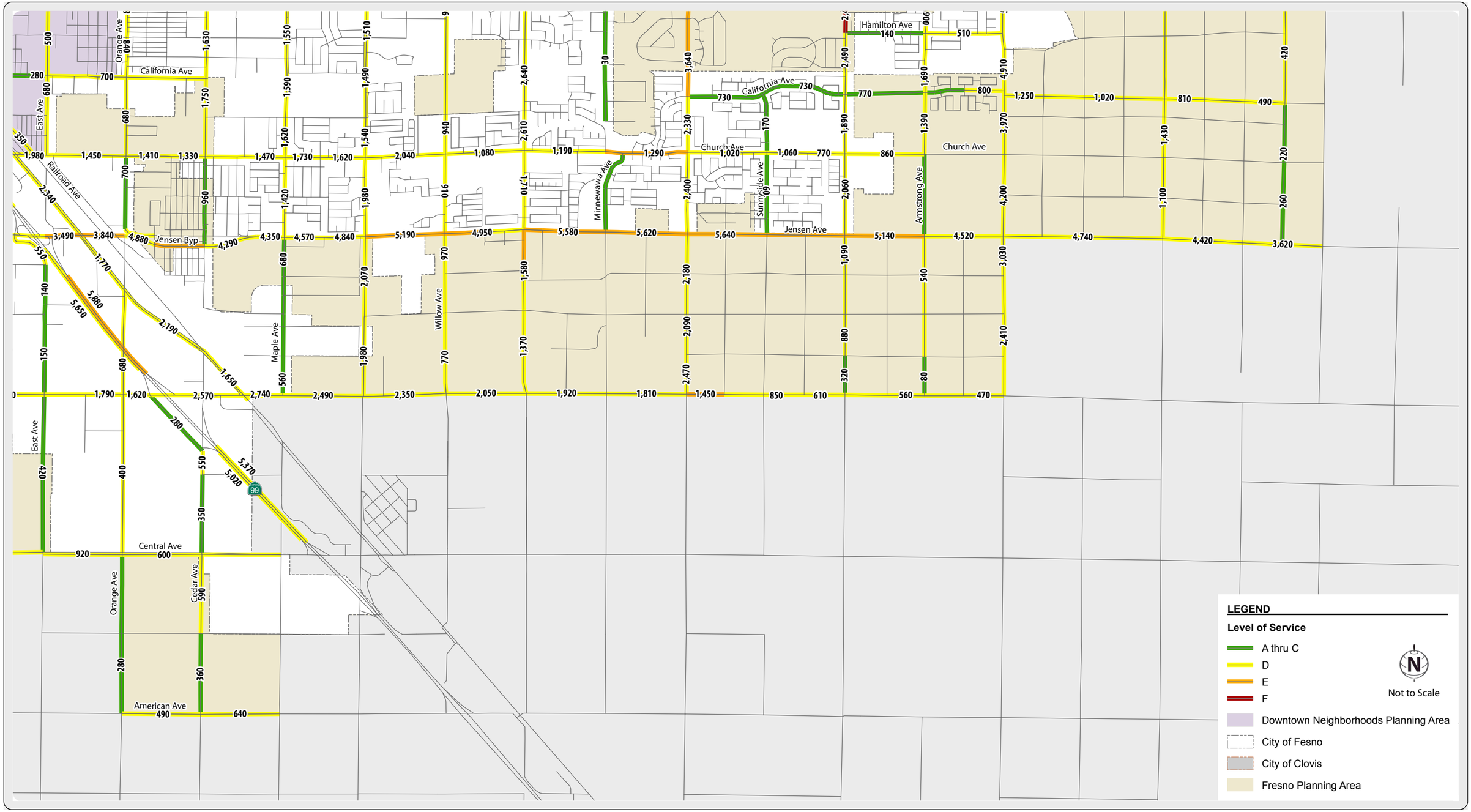


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS

Appendix H-11.6

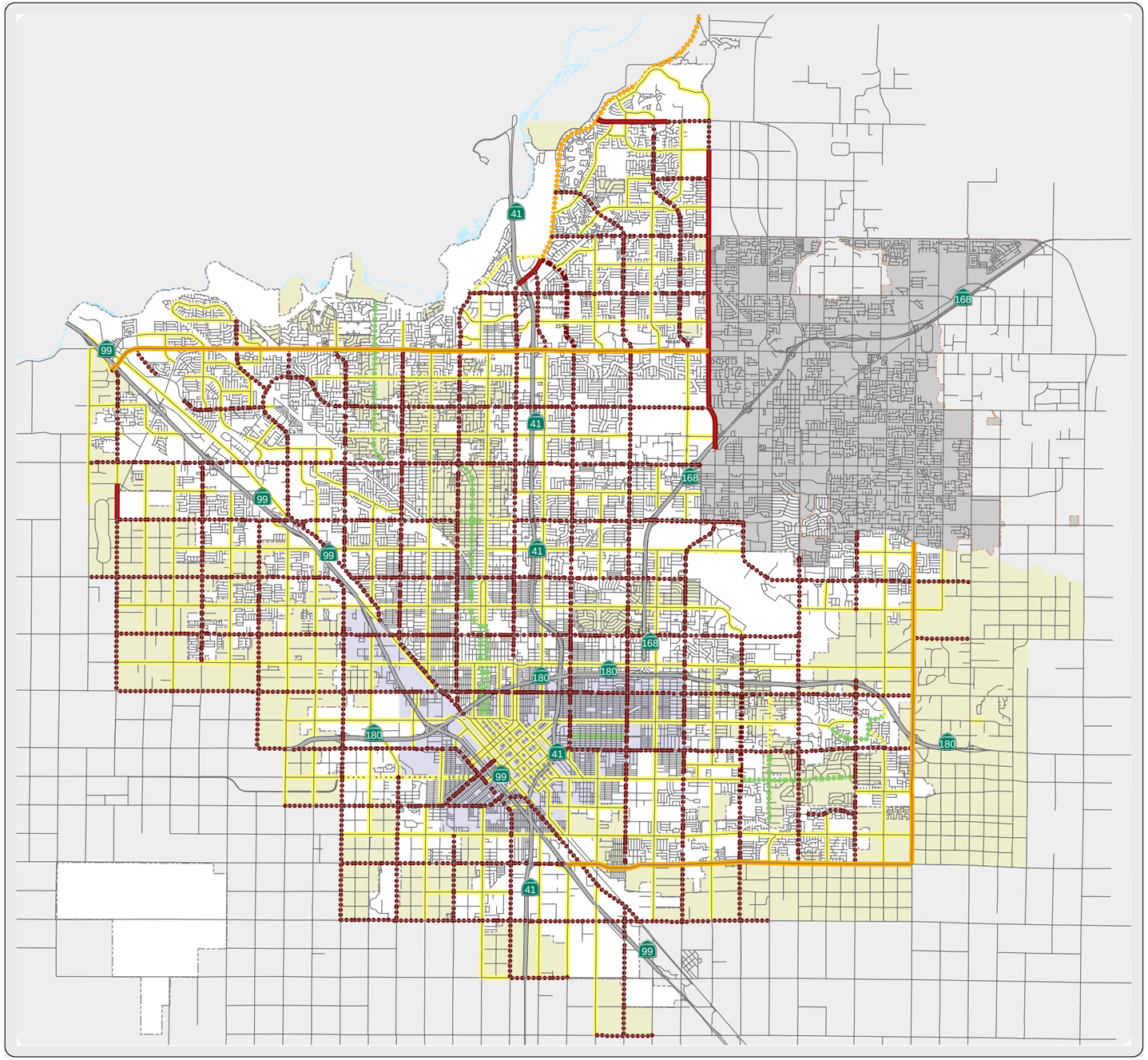


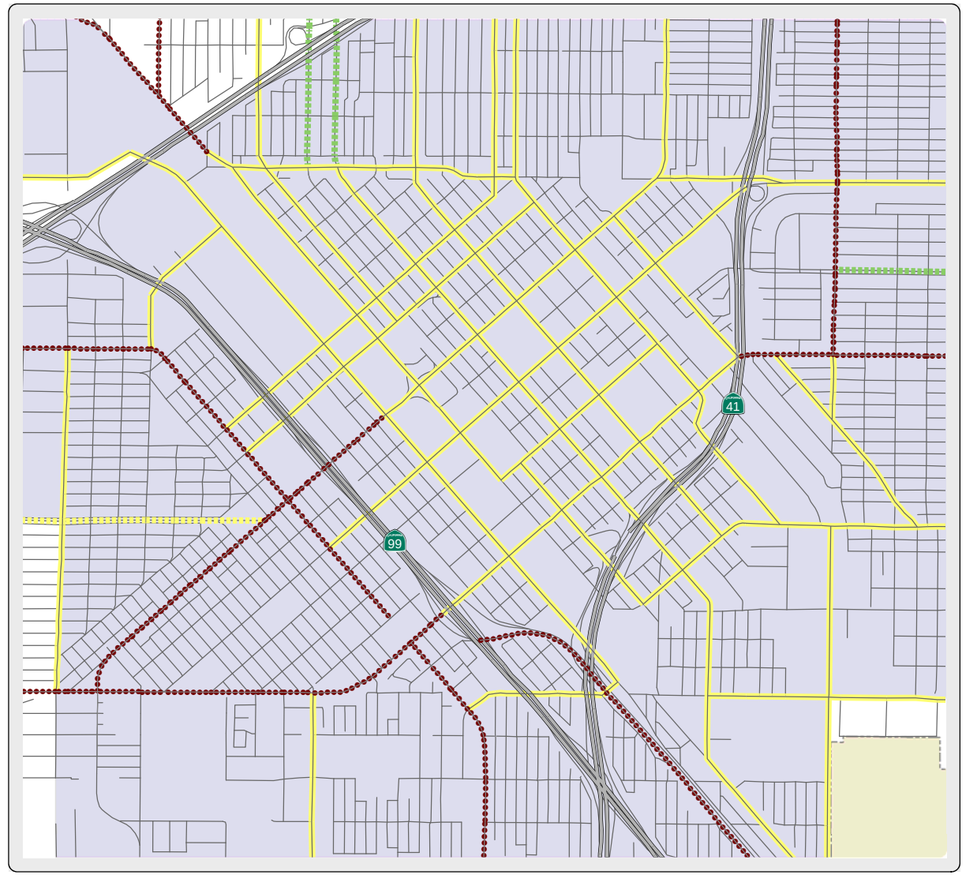
FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\AppH11_PM_LOS_CUML.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
PM PEAK HOUR VOLUMES AND LOS - CUMULATIVE CONDITIONS
Appendix H-11.7

H.12 - Other Exhibits





LEGEND

Functional Classification

- Freeway
- Expressway
- Super Arterial
- Arterial
- Collector
- Local
- Expressway
- Scenic Arterial
- Scenic Collector
- Scenic Drive
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

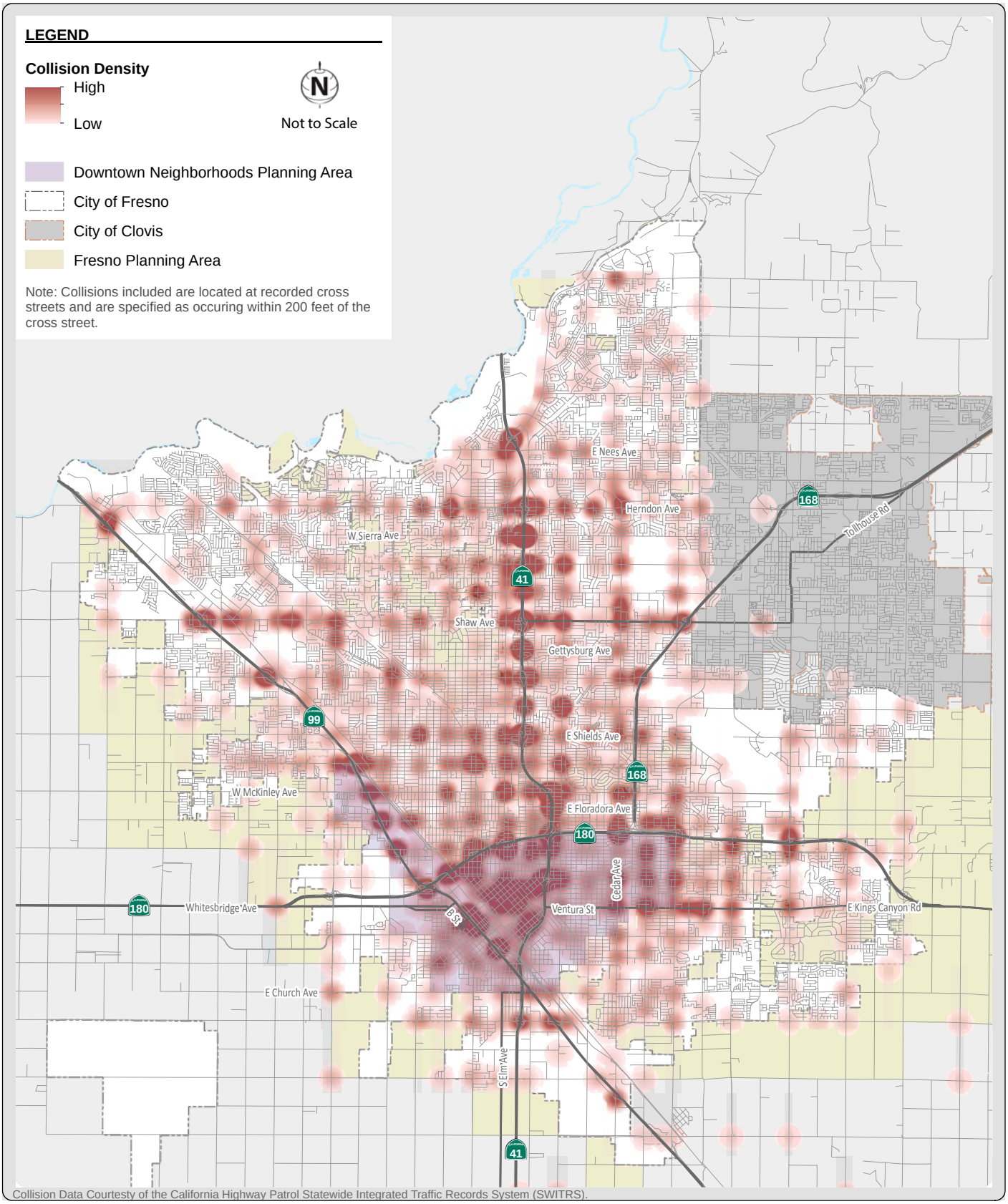
N

Not to Scale

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-1_FuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
EXISTING ROADWAY FUNCTIONAL CLASSIFICATION
Exhibit 5.14-1



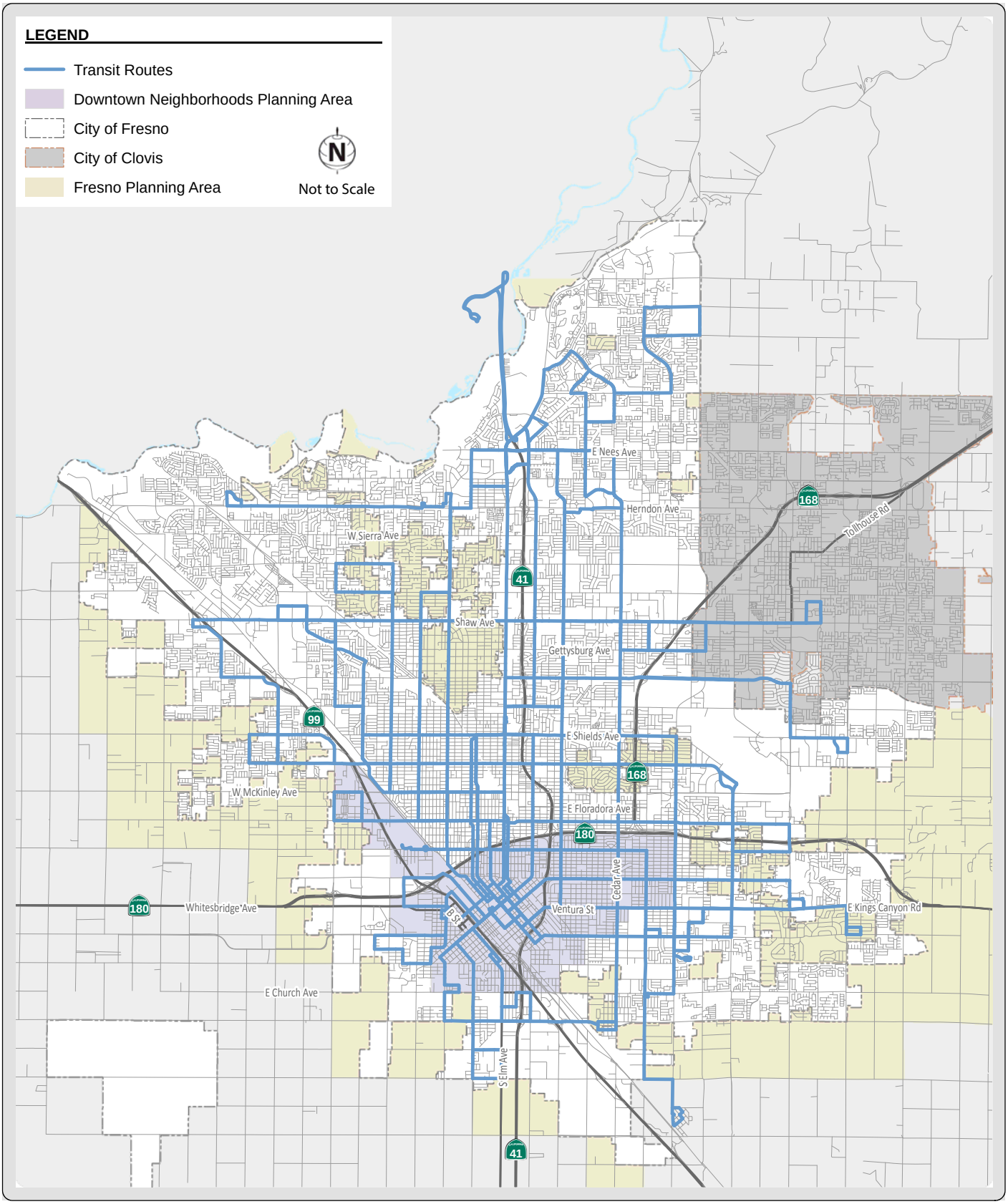
Collision Data Courtesy of the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS).

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-5_IntersectionCollisions.mxd

EXISTING VEHICLE COLLISIONS - 2009 TO PRESENT

Exhibit 5.14-5

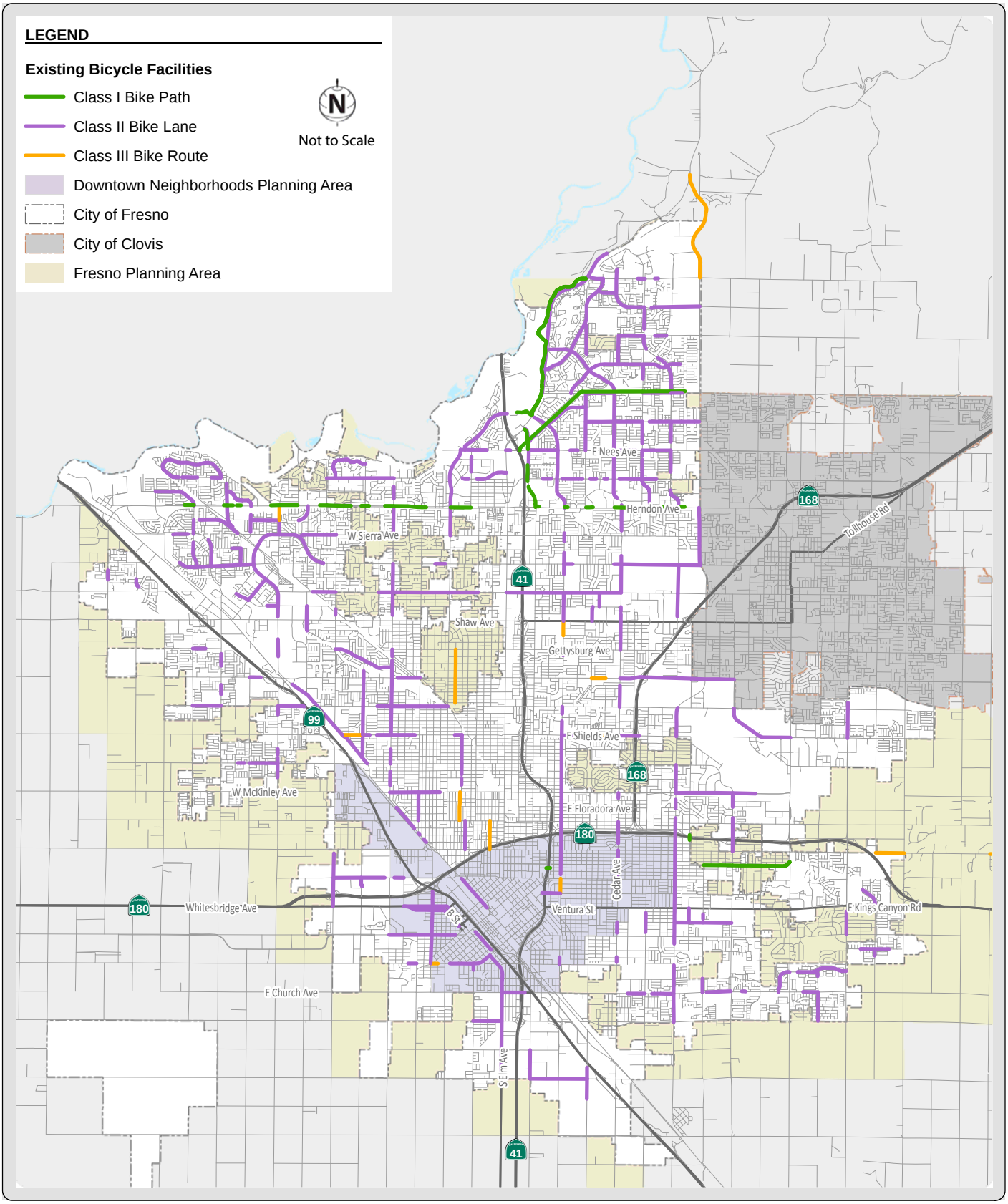


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-6_FAX Routes.mxd

EXISTING TRANSIT ROUTES

Exhibit 5.14-6

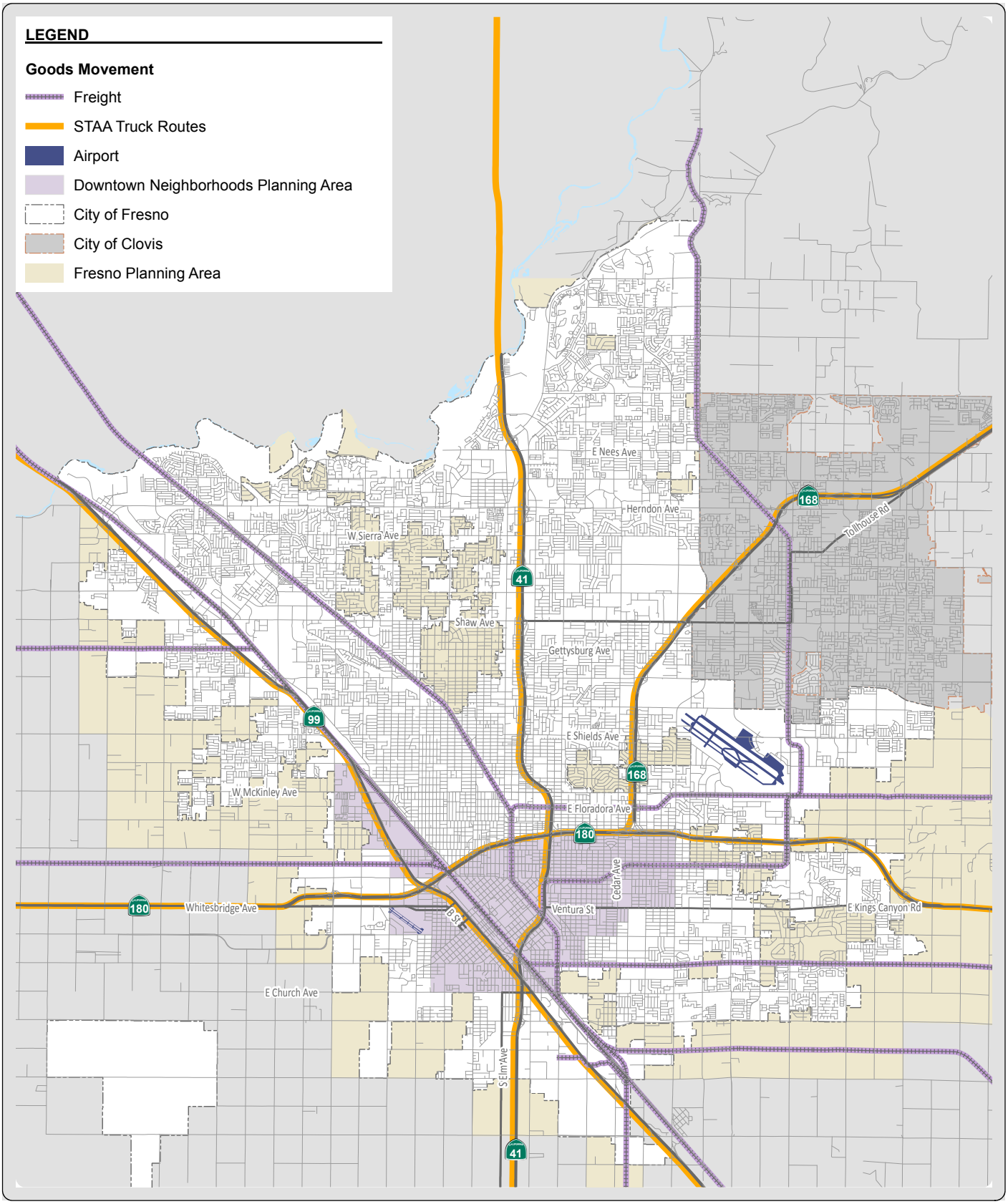


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-7_BikeFac.mxd

EXISTING BICYCLE FACILITIES

Exhibit 5.14-7

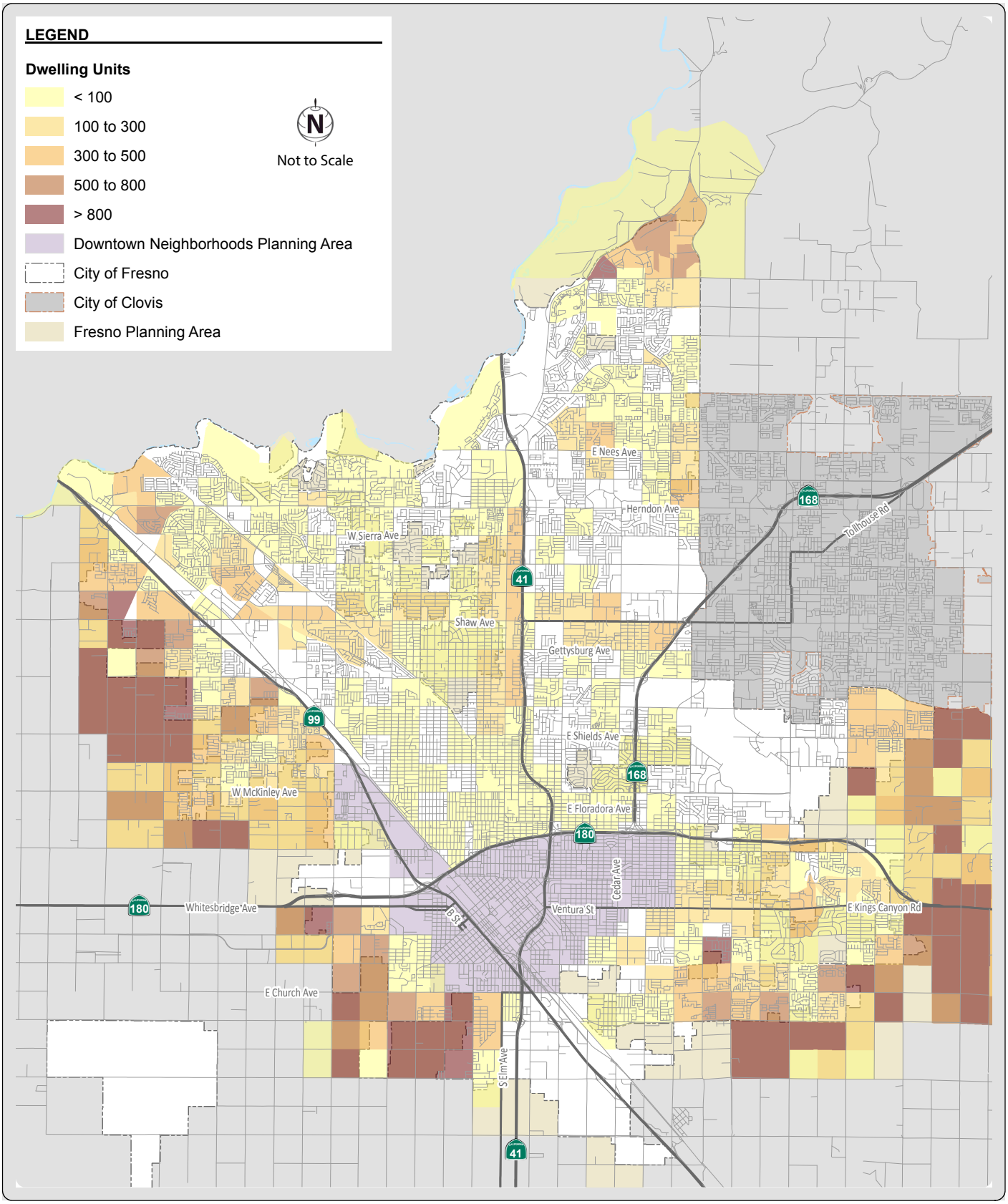


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-8_Goods.mxd

EXISTING GOODS MOVEMENTS AND AVIATION FACILITIES

Exhibit 5.14-8

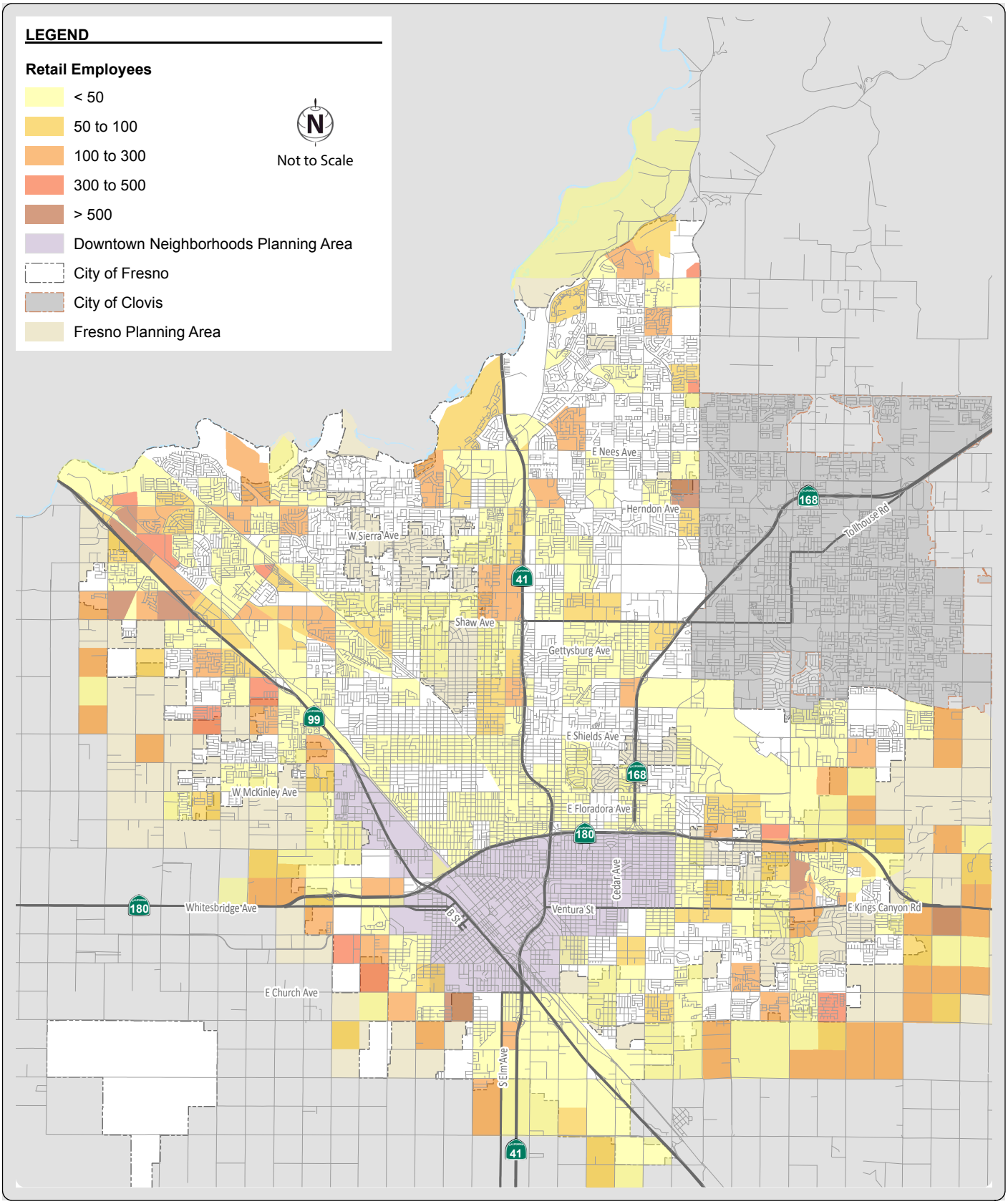


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-9_ResLU_Growth.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
RESIDENTIAL GROWTH

Exhibit 5.14.-9

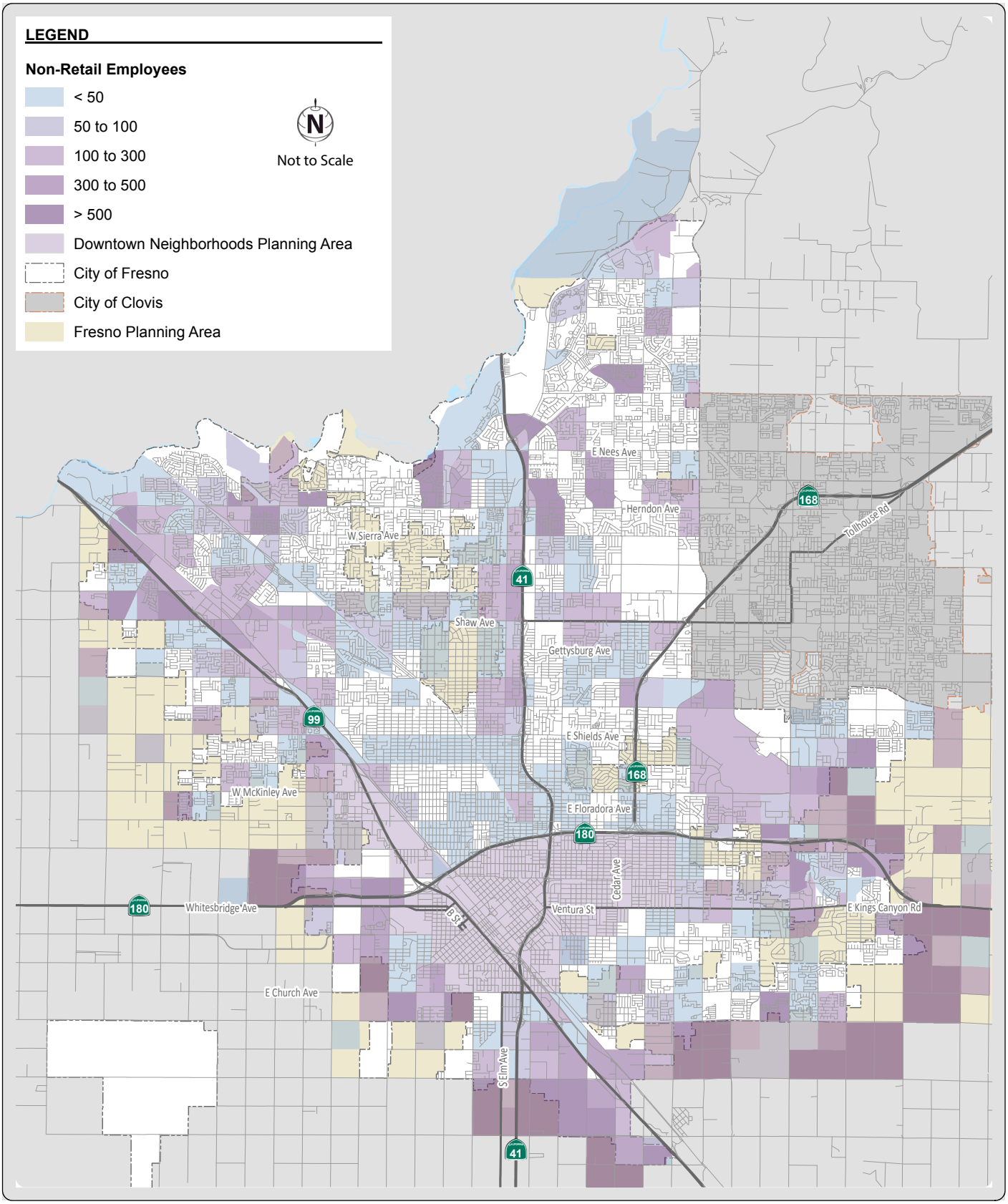


FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-10_RetailEmployment_Growth.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
RETAIL EMPLOYMENT GROWTH

Exhibit 5.14.-10

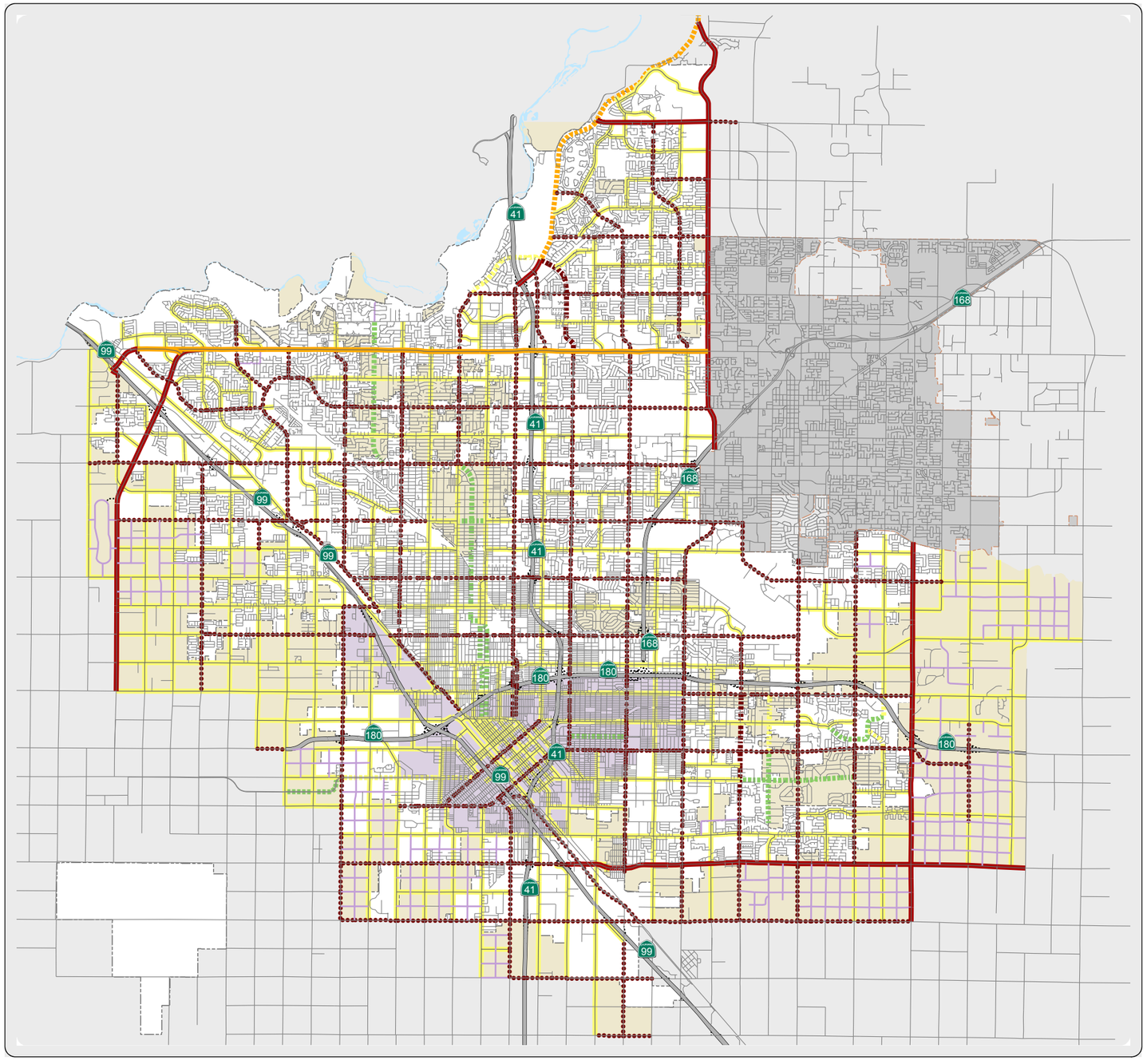


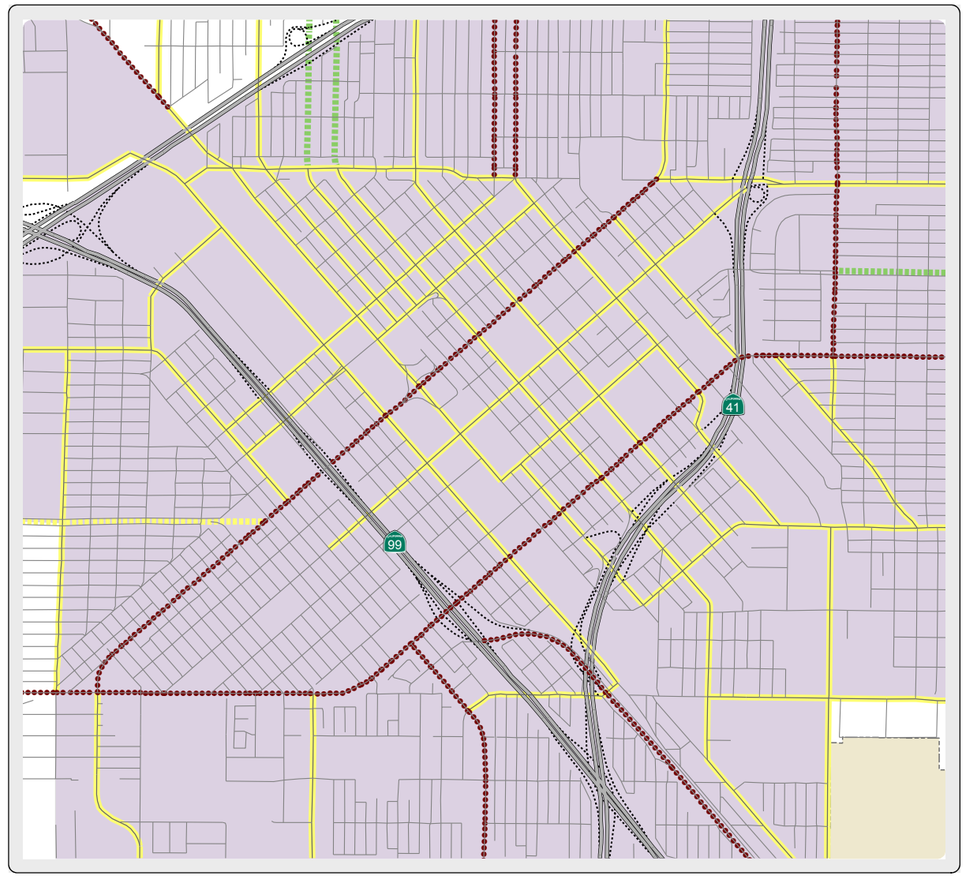
FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-11_NonRetailEmployment_Growth.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
NON-RETAIL EMPLOYMENT GROWTH

Exhibit 5.14.-11





LEGEND

Funcitional Classification

- Freeway
- Expressway
- Super Arterial
- Arterial
- Collector
- Local
- Connector
- Ramp
- Scenic Expressway
- Scenic Arterial
- Scenic Collector
- Scenic Drive
- Downtown Neighborhoods Planning Area
- City of Fresno
- City of Clovis
- Fresno Planning Area

N

Not to Scale

FEHR PEERS

Path: N:\2012Projects\3014_MasterEIRCityofFresnoGP\Graphics\Draft\GIS\MXD\FiguresNum\F5-14-12_FuncClass.mxd

CITY OF FRESNO GENERAL PLAN UPDATE
ROADWAY FUNCTIONAL CLASSIFICATION

Exhibit 5.14-12

I.1 - Noise Modeling

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes **Project: Fresno General Plan**

Site Conditions: Soft

	Vehicle Mix 1 (Collectors)				Vehicle Mix 2 (Arterials)				Vehicle Mix 3 (SR-41 Freeway)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	72.72%	12.09%	9.58%	94.39%	73.30%	10.20%	10.00%	93.40%	65.76%	13.48%	15.77%	95.00%
Medium Trucks	4.16%	0.46%	0.31%	4.92%	2.70%	0.30%	0.30%	3.20%	1.48%	0.27%	0.75%	2.50%
Heavy Trucks	0.23%	0.46%	0.01%	0.69%	2.90%	0.20%	0.30%	3.40%	1.37%	0.13%	1.00%	2.50%

	Vehicle Mix 4 (SR-99 Freeway)				Vehicle Mix 5 (SR-180 Freeway)				Vehicle Mix 6 (SR-168 Freeway)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	53.30%	10.92%	12.78%	77.00%	65.76%	13.48%	15.77%	95.00%	62.30%	12.77%	14.94%	90.00%
Medium Trucks	2.86%	0.52%	1.45%	4.83%	2.07%	0.38%	1.05%	3.50%	5.10%	0.92%	2.58%	8.60%
Heavy Trucks	9.95%	0.95%	7.27%	18.17%	0.82%	0.08%	0.60%	1.50%	0.77%	0.07%	0.56%	1.40%

Road Name: 2-Lane Collector **Segment: Existing**

Average Daily Traffic: 23100 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 1 Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 67.71 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	2.06	-2.08	-1.20	66.1	64.0	62.2	56.4	64.9	65.49	70 dBA:	**33**	**36**
Medium Trucks	76.31	-10.77	-2.08	-1.20	62.3	47.7	44.1	37.6	47.3	47.84	65 dBA:	**72**	**79**
Heavy Trucks	81.16	-19.32	-2.08	-1.20	58.6	31.4	40.4	19.0	33.7	37.25	60 dBA:	**155**	**169**
				Total:	**68.1**	**64.1**	**62.3**	**56.5**	**65.0**	**65.6**	55 dBA:	**333**	**365**

Road Name: 2-Lane Collector **Segment: Existing Plus Project**

Average Daily Traffic: 27700 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 1 Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	2.85	-2.41	-1.20	66.6	64.4	62.7	56.9	65.4	65.9	70 dBA:	**36**	**39**
Medium Trucks	76.31	-9.98	-2.41	-1.20	62.7	48.1	44.6	38.0	47.8	48.3	65 dBA:	**77**	**84**
Heavy Trucks	81.16	-18.53	-2.41	-1.20	59.0	31.8	40.9	19.5	34.2	37.7	60 dBA:	**166**	**182**
				Total:	**68.6**	**64.5**	**62.7**	**56.9**	**65.4**	**66.0**	55 dBA:	**358**	**391**

Road Name: 2-Lane Collector **Segment: Cumulative Plus Project**

Average Daily Traffic: 29900 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 1 Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	3.18	-2.41	-1.20	66.9	64.8	63.0	57.2	65.7	66.3	70 dBA:	**38**	**41**
Medium Trucks	76.31	-9.65	-2.41	-1.20	63.1	48.5	44.9	38.4	48.1	48.6	65 dBA:	**81**	**89**
Heavy Trucks	81.16	-18.20	-2.41	-1.20	59.3	32.2	41.2	19.8	34.5	38.0	60 dBA:	**175**	**191**
				Total:	**68.9**	**64.9**	**63.1**	**57.3**	**65.8**	**66.4**	55 dBA:	**376**	**412**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes

Project: Fresno General Plan
Site Conditions: Soft

Road Name: 4-Lane Collector **Segment: Existing**

Average Daily Traffic: 28600 Vehicles | Vehicle Speed: 30 MPH | Vehicle Mix: 1 | Roadway Classification: 4-Lane Collector

	NOISE PARAMETERS AT 92 FEET FROM CENTERLINE (Equiv. Lane Dist: 89.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	4.24	-3.91	-1.20	61.6	59.5	57.7	51.9	60.4	61.0	70 dBA:	**21**	**24**
Medium Trucks	73.11	-8.59	-3.91	-1.20	59.4	44.8	41.3	34.7	44.5	45.0	65 dBA:	**46**	**51**
Heavy Trucks	80.26	-17.14	-3.91	-1.20	58.0	30.8	39.8	18.5	33.2	36.7	60 dBA:	**100**	**109**
				Total:	**64.7**	**59.6**	**57.9**	**52.0**	**60.5**	**61.1**	55 dBA:	**215**	**235**

Road Name: 4-Lane Collector **Segment: Existing Plus Project**

Average Daily Traffic: 32600 Vehicles | Vehicle Speed: 30 MPH | Vehicle Mix: 1 | Roadway Classification: 4-Lane Collector

	NOISE PARAMETERS AT 92 FEET FROM CENTERLINE (Equiv. Lane Dist: 89.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	4.80	-3.91	-1.20	62.2	60.0	58.3	52.5	61.0	61.6	70 dBA:	**23**	**26**
Medium Trucks	73.11	-8.02	-3.91	-1.20	60.0	45.4	41.8	35.3	45.0	45.6	65 dBA:	**51**	**55**
Heavy Trucks	80.26	-16.58	-3.91	-1.20	58.6	31.4	40.4	19.0	33.7	37.3	60 dBA:	**109**	**119**
				Total:	**65.3**	**60.2**	**58.4**	**52.6**	**61.1**	**61.7**	55 dBA:	**234**	**257**

Road Name: 4-Lane Collector **Segment: Cumulative Plus Project**

Average Daily Traffic: 32800 Vehicles | Vehicle Speed: 30 MPH | Vehicle Mix: 1 | Roadway Classification: 4-Lane Collector

	NOISE PARAMETERS AT 92 FEET FROM CENTERLINE (Equiv. Lane Dist: 89.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	4.83	-3.91	-1.20	62.2	60.1	58.3	52.5	61.0	61.6	70 dBA:	**24**	**26**
Medium Trucks	73.11	-8.00	-3.91	-1.20	60.0	45.4	41.8	35.3	45.1	45.6	65 dBA:	**51**	**56**
Heavy Trucks	80.26	-16.55	-3.91	-1.20	58.6	31.4	40.4	19.1	33.8	37.3	60 dBA:	**109**	**120**
				Total:	**65.3**	**60.2**	**58.5**	**52.6**	**61.1**	**61.7**	55 dBA:	**235**	**258**

Road Name: 3-Lane Arterial **Segment: Existing**

Average Daily Traffic: 21200 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: 3-Lane Arterial

	NOISE PARAMETERS AT 77 FEET FROM CENTERLINE (Equiv. Lane Dist: 74.54 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	1.64	-2.70	-1.20	65.1	63.0	60.4	55.6	63.9	64.4	70 dBA:	**31**	**34**
Medium Trucks	76.31	-13.01	-2.70	-1.20	59.4	42.9	39.4	34.6	43.4	43.8	65 dBA:	**67**	**72**
Heavy Trucks	81.16	-12.75	-2.70	-1.20	64.5	48.3	42.7	39.7	48.6	48.9	60 dBA:	**144**	**155**
				Total:	**68.4**	**63.1**	**60.5**	**55.7**	**64.1**	**64.6**	55 dBA:	**311**	**335**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes

Project: Fresno General Plan
Site Conditions: Soft

Road Name: 3-Lane Arterial **Segment: Existing Plus Project**

Average Daily Traffic: 19900 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: 3-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	1.37	-4.26	-1.20	63.3	61.1	58.6	53.7	62.1	62.6	70 dBA:	**31**	**33**
Medium Trucks	76.31	-13.29	-4.26	-1.20	57.6	41.1	37.6	32.8	41.6	42.0	65 dBA:	**66**	**71**
Heavy Trucks	81.16	-13.02	-4.26	-1.20	62.7	46.5	40.9	37.9	46.7	47.0	60 dBA:	**142**	**153**
				Total:	**66.6**	**61.3**	**58.7**	**53.9**	**62.3**	**62.8**	55 dBA:	**305**	**329**

Road Name: 3-Lane Arterial **Segment: Cumulative Plus Project**

Average Daily Traffic: 20200 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: 3-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	1.43	-4.26	-1.20	63.3	61.2	58.6	53.8	62.2	62.7	70 dBA:	**31**	**33**
Medium Trucks	76.31	-13.22	-4.26	-1.20	57.6	41.2	37.6	32.9	41.6	42.1	65 dBA:	**66**	**72**
Heavy Trucks	81.16	-12.96	-4.26	-1.20	62.7	46.6	41.0	38.0	46.8	47.1	60 dBA:	**143**	**154**
				Total:	**66.6**	**61.4**	**58.8**	**53.9**	**62.3**	**62.8**	55 dBA:	**308**	**332**

Road Name: 4-Lane Arterial **Segment: Existing**

Average Daily Traffic: 36900 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 4-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	3.54	-4.26	-1.20	67.4	65.3	62.7	57.9	66.3	66.8	70 dBA:	**57**	**62**
Medium Trucks	77.62	-11.12	-4.26	-1.20	61.1	44.6	41.1	36.3	45.0	45.5	65 dBA:	**124**	**133**
Heavy Trucks	82.14	-10.85	-4.26	-1.20	65.8	49.7	44.1	41.1	49.9	50.2	60 dBA:	**267**	**287**
				Total:	**70.3**	**65.4**	**62.8**	**58.0**	**66.4**	**66.9**	55 dBA:	**575**	**619**

Road Name: 4-Lane Arterial **Segment: Existing Plus Project**

Average Daily Traffic: 52400 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 4-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	5.06	-4.26	-1.20	68.9	66.8	64.3	59.4	67.8	68.3	70 dBA:	**73**	**78**
Medium Trucks	77.62	-9.59	-4.26	-1.20	62.6	46.1	42.6	37.8	46.6	47.0	65 dBA:	**156**	**169**
Heavy Trucks	82.14	-9.33	-4.26	-1.20	67.4	51.2	45.6	42.6	51.4	51.7	60 dBA:	**337**	**363**
				Total:	**71.8**	**67.0**	**64.4**	**59.5**	**67.9**	**68.4**	55 dBA:	**726**	**782**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes **Project: Fresno General Plan**
Site Conditions: Soft

Road Name: 4-Lane Arterial **Segment: Cumulative Plus Project**
Average Daily Traffic: 55300 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: 4-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	5.29	-4.26	-1.20	69.2	67.0	64.5	59.6	68.0	68.5	70 dBA:	**75**	**81**
Medium Trucks	77.62	-9.36	-4.26	-1.20	62.8	46.3	42.8	38.0	46.8	47.2	65 dBA:	**162**	**175**
Heavy Trucks	82.14	-9.10	-4.26	-1.20	67.6	51.4	45.8	42.8	51.6	51.9	60 dBA:	**349**	**376**
				Total:	**72.0**	**67.2**	**64.6**	**59.8**	**68.1**	**68.6**	55 dBA:	**752**	**811**

Road Name: 4-Lane Super Arterial **Segment: Existing**
Average Daily Traffic: 29200 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: 4-Lane Super Arterial

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 105.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	2.06	-4.98	-1.20	67.0	64.9	62.3	57.5	65.8	66.3	70 dBA:	**59**	**64**
Medium Trucks	78.79	-12.59	-4.98	-1.20	60.0	43.5	40.0	35.3	44.0	44.4	65 dBA:	**127**	**137**
Heavy Trucks	83.02	-12.33	-4.98	-1.20	64.5	48.3	42.8	39.7	48.6	48.9	60 dBA:	**274**	**295**
				Total:	**69.5**	**65.0**	**62.4**	**57.6**	**65.9**	**66.4**	55 dBA:	**590**	**636**

Road Name: 4-Lane Super Arterial **Segment: Existing Plus Project**
Average Daily Traffic: 52200 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: 4-Lane Super Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	4.59	-5.57	-1.20	68.9	66.8	64.2	59.4	67.8	68.3	70 dBA:	**90**	**96**
Medium Trucks	78.79	-10.07	-5.57	-1.20	62.0	45.5	42.0	37.2	45.9	46.4	65 dBA:	**193**	**208**
Heavy Trucks	83.02	-9.80	-5.57	-1.20	66.4	50.3	44.7	41.7	50.5	50.8	60 dBA:	**416**	**448**
				Total:	**71.4**	**66.9**	**64.3**	**59.5**	**67.9**	**68.4**	55 dBA:	**895**	**965**

Road Name: 4-Lane Super Arterial **Segment: Cumulative Plus Project**
Average Daily Traffic: 52300 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 1 Roadway Classification: 4-Lane Super Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	4.64	-5.57	-1.20	69.0	66.8	65.0	59.3	67.8	68.3	70 dBA:	**89**	**97**
Medium Trucks	78.79	-8.19	-5.57	-1.20	63.8	49.2	45.7	39.1	48.9	49.4	65 dBA:	**191**	**209**
Heavy Trucks	83.02	-16.74	-5.57	-1.20	59.5	32.3	41.3	20.0	34.7	38.2	60 dBA:	**411**	**450**
				Total:	**70.5**	**66.9**	**65.1**	**59.3**	**67.8**	**68.4**	55 dBA:	**886**	**970**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes

Project: Fresno General Plan
Site Conditions: Soft

Road Name: 6-Lane Arterial **Segment: Existing**

Average Daily Traffic: 62600 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	5.83	-5.57	-1.20	68.4	66.3	63.7	58.9	67.2	67.7	70 dBA:	**83**	**89**
Medium Trucks	77.62	-8.82	-5.57	-1.20	62.0	45.6	42.0	37.3	46.0	46.5	65 dBA:	**178**	**192**
Heavy Trucks	82.14	-8.56	-5.57	-1.20	66.8	50.6	45.1	42.0	50.9	51.2	60 dBA:	**384**	**414**
				Total:	**71.2**	**66.4**	**63.8**	**59.0**	**67.4**	**67.9**	55 dBA:	**828**	**893**

Road Name: 6-Lane Arterial **Segment: Existing Plus Project**

Average Daily Traffic: 75200 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	6.63	-5.57	-1.20	69.2	67.1	64.5	59.7	68.0	68.5	70 dBA:	**94**	**101**
Medium Trucks	77.62	-8.02	-5.57	-1.20	62.8	46.3	42.8	38.1	46.8	47.3	65 dBA:	**202**	**217**
Heavy Trucks	82.14	-7.76	-5.57	-1.20	67.6	51.4	45.8	42.8	51.7	52.0	60 dBA:	**434**	**468**
				Total:	**72.0**	**67.2**	**64.6**	**59.8**	**68.2**	**68.7**	55 dBA:	**936**	**1009**

Road Name: 6-Lane Arterial **Segment: Cumulative Plus Project**

Average Daily Traffic: 81400 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	6.97	-5.57	-1.20	69.5	67.4	64.9	60.0	68.4	68.9	70 dBA:	**99**	**106**
Medium Trucks	77.62	-7.68	-5.57	-1.20	63.2	46.7	43.2	38.4	47.2	47.6	65 dBA:	**213**	**229**
Heavy Trucks	82.14	-7.42	-5.57	-1.20	68.0	51.8	46.2	43.2	52.0	52.3	60 dBA:	**458**	**494**
				Total:	**72.4**	**67.6**	**64.9**	**60.1**	**68.5**	**69.0**	55 dBA:	**987**	**1063**

Road Name: Scenic Arterial **Segment: Existing**

Average Daily Traffic: 20400 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Arterial

	NOISE PARAMETERS AT 122 FEET FROM CENTERLINE (Equiv. Lane Dist: 118.18 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	1.47	-5.71	-1.20	61.9	59.8	57.2	52.4	60.8	61.3	70 dBA:	**30**	**33**
Medium Trucks	76.31	-13.18	-5.71	-1.20	56.2	39.7	36.2	31.5	40.2	40.7	65 dBA:	**65**	**70**
Heavy Trucks	81.16	-12.91	-5.71	-1.20	61.3	45.2	39.6	36.6	45.4	45.7	60 dBA:	**141**	**151**
				Total:	**65.2**	**60.0**	**57.3**	**52.5**	**60.9**	**61.4**	55 dBA:	**303**	**326**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes **Project: Fresno General Plan**
Site Conditions: Soft

Road Name: Scenic Arterial **Segment: Existing Plus Project**
Average Daily Traffic: 31600 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Scenic Arterial

	NOISE PARAMETERS AT 122 FEET FROM CENTERLINE (Equiv. Lane Dist: 117.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	3.37	-5.68	-1.20	63.9	61.7	59.2	54.3	62.7	63.2	70 dBA:	**41**	**44**
Medium Trucks	76.31	-11.28	-5.68	-1.20	58.2	41.7	38.2	33.4	42.1	42.6	65 dBA:	**88**	**95**
Heavy Trucks	81.16	-11.01	-5.68	-1.20	63.3	47.1	41.5	38.5	47.3	47.6	60 dBA:	**189**	**204**
				Total:	**67.2**	**61.9**	**59.3**	**54.5**	**62.9**	**63.3**	55 dBA:	**407**	**439**

Road Name: Scenic Arterial **Segment: Cumulative Plus Project**
Average Daily Traffic: 32400 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Scenic Arterial

	NOISE PARAMETERS AT 122 FEET FROM CENTERLINE (Equiv. Lane Dist: 117.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	3.48	-5.68	-1.20	64.0	61.8	59.3	54.4	62.8	63.3	70 dBA:	**41**	**45**
Medium Trucks	76.31	-11.17	-5.68	-1.20	58.3	41.8	38.3	33.5	42.2	42.7	65 dBA:	**89**	**96**
Heavy Trucks	81.16	-10.91	-5.68	-1.20	63.4	47.2	41.6	38.6	47.4	47.7	60 dBA:	**192**	**207**
				Total:	**67.3**	**62.0**	**59.4**	**54.6**	**63.0**	**63.4**	55 dBA:	**414**	**446**

Road Name: 6-Lane Expressway **Segment: Existing**
Average Daily Traffic: 72800 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: 6-Lane Expressway

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 104.13 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	6.03	-4.88	-1.20	71.1	68.9	66.4	61.5	69.9	70.4	70 dBA:	**110**	**119**
Medium Trucks	78.79	-8.62	-4.88	-1.20	64.1	47.6	44.1	39.3	48.1	48.5	65 dBA:	**237**	**256**
Heavy Trucks	83.02	-8.36	-4.88	-1.20	68.6	52.4	46.8	43.8	52.6	52.9	60 dBA:	**511**	**551**
				Total:	**73.5**	**69.1**	**66.5**	**61.6**	**70.0**	**70.5**	55 dBA:	**1102**	**1188**

Road Name: 6-Lane Expressway **Segment: Existing Plus Project**
Average Daily Traffic: 88100 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: 6-Lane Expressway

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 102.06 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	6.86	-4.75	-1.20	72.0	69.9	67.3	62.5	70.9	71.4	70 dBA:	**128**	**138**
Medium Trucks	78.79	-7.79	-4.75	-1.20	65.0	48.6	45.0	40.3	49.0	49.5	65 dBA:	**275**	**296**
Heavy Trucks	83.02	-7.53	-4.75	-1.20	69.5	53.4	47.8	44.8	53.6	53.9	60 dBA:	**593**	**639**
				Total:	**74.5**	**70.0**	**67.4**	**62.6**	**71.0**	**71.5**	55 dBA:	**1277**	**1376**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes

Project: Fresno General Plan
Site Conditions: Soft

Road Name: 6-Lane Expressway **Segment: Cumulative Plus Project**

Average Daily Traffic: 91400 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Expressway

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 102.06 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	7.02	-4.75	-1.20	72.2	70.0	67.5	62.6	71.0	71.5	70 dBA:	**131**	**141**
Medium Trucks	78.79	-7.63	-4.75	-1.20	65.2	48.7	45.2	40.4	49.2	49.6	65 dBA:	**282**	**304**
Heavy Trucks	83.02	-7.37	-4.75	-1.20	69.7	53.5	47.9	44.9	53.7	54.0	60 dBA:	**607**	**655**
				Total:	**74.7**	**70.2**	**67.6**	**62.7**	**71.1**	**71.6**	55 dBA:	**1308**	**1410**

Road Name: Scenic Expressway **Segment: Existing**

Average Daily Traffic: 53100 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Expressway

	NOISE PARAMETERS AT 134 FEET FROM CENTERLINE (Equiv. Lane Dist: 126.4 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	4.66	-6.15	-1.20	68.4	66.3	63.7	58.9	67.3	67.8	70 dBA:	**90**	**97**
Medium Trucks	78.79	-9.99	-6.15	-1.20	61.5	45.0	41.5	36.7	45.4	45.9	65 dBA:	**193**	**208**
Heavy Trucks	83.02	-9.73	-6.15	-1.20	65.9	49.8	44.2	41.2	50.0	50.3	60 dBA:	**416**	**448**
				Total:	**70.9**	**66.4**	**63.8**	**59.0**	**67.4**	**67.9**	55 dBA:	**896**	**966**

Road Name: Scenic Expressway **Segment: Existing Plus Project**

Average Daily Traffic: 75200 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Expressway

	NOISE PARAMETERS AT 134 FEET FROM CENTERLINE (Equiv. Lane Dist: 126.4 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	6.17	-6.15	-1.20	69.9	67.8	65.3	60.4	68.8	69.3	70 dBA:	**113**	**122**
Medium Trucks	78.79	-8.48	-6.15	-1.20	63.0	46.5	43.0	38.2	46.9	47.4	65 dBA:	**243**	**262**
Heavy Trucks	83.02	-8.22	-6.15	-1.20	67.5	51.3	45.7	42.7	51.5	51.8	60 dBA:	**524**	**565**
				Total:	**72.4**	**67.9**	**65.3**	**60.5**	**68.9**	**69.4**	55 dBA:	**1130**	**1218**

Road Name: Scenic Expressway **Segment: Cumulative Plus Project**

Average Daily Traffic: 84900 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Expressway

	NOISE PARAMETERS AT 134 FEET FROM CENTERLINE (Equiv. Lane Dist: 126.4 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	6.70	-6.15	-1.20	70.5	68.3	65.8	60.9	69.3	69.8	70 dBA:	**122**	**132**
Medium Trucks	78.79	-7.95	-6.15	-1.20	63.5	47.0	43.5	38.7	47.5	47.9	65 dBA:	**264**	**284**
Heavy Trucks	83.02	-7.69	-6.15	-1.20	68.0	51.8	46.2	43.2	52.0	52.3	60 dBA:	**569**	**613**
				Total:	**72.9**	**68.5**	**65.9**	**61.0**	**69.4**	**69.9**	55 dBA:	**1225**	**1320**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes **Project: Fresno General Plan**
Site Conditions: Soft

Road Name: SR-41 Freeway **Segment: Existing**
Average Daily Traffic: 76800 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 3 Roadway Classification: SR-41 Freeway

	NOISE PARAMETERS AT 150 FEET FROM CENTERLINE (Equiv. Lane Dist: 137.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	5.20	-6.70	-1.20	72.8	70.2	69.4	65.3	72.8	73.3	70 dBA:	**232**	**251**
Medium Trucks	81.71	-10.60	-6.70	-1.20	63.2	44.1	42.7	42.4	49.1	49.3	65 dBA:	**500**	**540**
Heavy Trucks	85.21	-10.60	-6.70	-1.20	66.7	47.3	43.1	47.2	53.5	53.6	60 dBA:	**1078**	**1164**
				Total:	**74.1**	**70.3**	**69.4**	**65.4**	**72.8**	**73.3**	55 dBA:	**2323**	**2508**

Road Name: SR-41 Freeway **Segment: Existing Plus Project**
Average Daily Traffic: 104300 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 3 Roadway Classification: SR-41 Freeway

	NOISE PARAMETERS AT 150 FEET FROM CENTERLINE (Equiv. Lane Dist: 137.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	6.53	-6.70	-1.20	74.2	71.6	70.7	66.6	74.1	74.6	70 dBA:	**285**	**308**
Medium Trucks	81.71	-9.27	-6.70	-1.20	64.5	45.5	44.1	43.7	50.4	50.7	65 dBA:	**614**	**663**
Heavy Trucks	85.21	-9.27	-6.70	-1.20	68.0	48.6	44.4	48.5	54.8	54.9	60 dBA:	**1322**	**1427**
				Total:	**75.5**	**71.6**	**70.7**	**66.7**	**74.2**	**74.7**	55 dBA:	**2849**	**3075**

Road Name: SR-41 Freeway **Segment: Cumulative Plus Project**
Average Daily Traffic: 108400 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 3 Roadway Classification: SR-41 Freeway

	NOISE PARAMETERS AT 150 FEET FROM CENTERLINE (Equiv. Lane Dist: 137.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	6.69	-6.70	-1.20	74.3	71.7	70.9	66.8	74.3	74.8	70 dBA:	**292**	**316**
Medium Trucks	81.71	-9.10	-6.70	-1.20	64.7	45.6	44.2	43.9	50.6	50.8	65 dBA:	**630**	**680**
Heavy Trucks	85.21	-9.10	-6.70	-1.20	68.2	48.8	44.6	48.7	55.0	55.1	60 dBA:	**1357**	**1465**
				Total:	**75.6**	**71.8**	**70.9**	**66.9**	**74.3**	**74.8**	55 dBA:	**2923**	**3155**

Road Name: SR-180 Freeway **Segment: Existing**
Average Daily Traffic: 68740 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 4 Roadway Classification: SR-180 Freeway

	NOISE PARAMETERS AT 190 FEET FROM CENTERLINE (Equiv. Lane Dist: 176.82 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	3.80	-8.33	-1.20	69.8	66.3	65.4	61.3	68.8	69.3	70 dBA:	**250**	**263**
Medium Trucks	81.71	-8.22	-8.33	-1.20	64.0	47.7	46.3	46.0	52.7	52.9	65 dBA:	**540**	**566**
Heavy Trucks	85.21	-2.47	-8.33	-1.20	73.2	62.4	58.2	62.3	68.6	68.7	60 dBA:	**1162**	**1220**
				Total:	**75.2**	**67.8**	**66.2**	**64.9**	**71.8**	**72.1**	55 dBA:	**2505**	**2628**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes | **Project: Fresno General Plan** | **Site Conditions: Soft**

Road Name: SR-180 Freeway | **Segment: Existing Plus Project**

Average Daily Traffic: 97700 Vehicles | Vehicle Speed: 65 MPH | Vehicle Mix: 4 | Roadway Classification: SR-180 Freeway

	NOISE PARAMETERS AT 190 FEET FROM CENTERLINE (Equiv. Lane Dist: 176.82 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	5.33	-8.33	-1.20	71.3	67.8	67.0	62.9	70.4	70.9	70 dBA:	**317**	**332**
Medium Trucks	81.71	-6.70	-8.33	-1.20	65.5	49.3	47.9	47.6	54.2	54.5	65 dBA:	**682**	**716**
Heavy Trucks	85.21	-0.94	-8.33	-1.20	74.7	63.9	59.8	63.8	70.2	70.3	60 dBA:	**1470**	**1542**
				Total:	**76.7**	**69.3**	**67.8**	**66.4**	**73.3**	**73.6**	55 dBA:	**3166**	**3322**

Road Name: SR-180 Freeway | **Segment: Cumulative Plus Project**

Average Daily Traffic: 99700 Vehicles | Vehicle Speed: 65 MPH | Vehicle Mix: 4 | Roadway Classification: SR-180 Freeway

	NOISE PARAMETERS AT 190 FEET FROM CENTERLINE (Equiv. Lane Dist: 176.82 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	5.42	-8.33	-1.20	71.4	67.9	67.0	62.9	70.5	71.0	70 dBA:	**321**	**337**
Medium Trucks	81.71	-6.61	-8.33	-1.20	65.6	49.3	47.9	47.6	54.3	54.6	65 dBA:	**691**	**725**
Heavy Trucks	85.21	-0.85	-8.33	-1.20	74.8	64.0	59.8	63.9	70.2	70.3	60 dBA:	**1490**	**1563**
				Total:	**76.8**	**69.4**	**67.8**	**66.5**	**73.4**	**73.7**	55 dBA:	**3209**	**3367**

Road Name: SR-99 Freeway | **Segment: Existing**

Average Daily Traffic: 58100 Vehicles | Vehicle Speed: 65 MPH | Vehicle Mix: 5 | Roadway Classification: SR-99 Freeway

	NOISE PARAMETERS AT 120 FEET FROM CENTERLINE (Equiv. Lane Dist: 113.32 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	3.98	-5.43	-1.20	72.9	70.3	69.4	65.3	72.8	73.3	70 dBA:	**187**	**202**
Medium Trucks	81.71	-10.35	-5.43	-1.20	64.7	47.1	45.7	45.4	52.0	52.3	65 dBA:	**403**	**435**
Heavy Trucks	85.21	-14.03	-5.43	-1.20	64.5	42.9	38.7	42.8	49.1	49.2	60 dBA:	**868**	**937**
				Total:	**74.0**	**70.3**	**69.4**	**65.4**	**72.9**	**73.4**	55 dBA:	**1870**	**2019**

Road Name: SR-99 Freeway | **Segment: Existing Plus Project**

Average Daily Traffic: 98700 Vehicles | Vehicle Speed: 65 MPH | Vehicle Mix: 5 | Roadway Classification: SR-99 Freeway

	NOISE PARAMETERS AT 120 FEET FROM CENTERLINE (Equiv. Lane Dist: 113.32 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	6.29	-5.43	-1.20	75.2	72.6	71.7	67.6	75.1	75.6	70 dBA:	**266**	**287**
Medium Trucks	81.71	-8.05	-5.43	-1.20	67.0	49.4	48.0	47.7	54.3	54.6	65 dBA:	**574**	**619**
Heavy Trucks	85.21	-11.73	-5.43	-1.20	66.8	45.2	41.0	45.1	51.4	51.5	60 dBA:	**1236**	**1334**
				Total:	**76.3**	**72.6**	**71.7**	**67.7**	**75.2**	**75.7**	55 dBA:	**2662**	**2875**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Maximum Roadway Classification Volumes **Project: Fresno General Plan**
Site Conditions: Soft

Road Name: SR-99 Freeway **Segment: Cumulative Plus Project**
Average Daily Traffic: 104100 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 5 Roadway Classification: SR-99 Freeway

	NOISE PARAMETERS AT 120 FEET FROM CENTERLINE (Equiv. Lane Dist: 113.32 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	6.52	-5.43	-1.20	75.42	72.8	71.9	67.9	75.37	75.87	70 dBA:	**276**	**298**
Medium Trucks	81.71	-7.82	-5.43	-1.20	67.26	49.6	48.2	47.9	54.58	54.84	65 dBA:	**594**	**642**
Heavy Trucks	85.21	-11.50	-5.43	-1.20	67.08	45.4	41.3	45.3	51.66	51.77	60 dBA:	**1280**	**1383**
				Total:	**76.56**	**72.84**	**71.97**	**67.93**	**75.42**	**75.92**	55 dBA:	**2758**	**2979**

Road Name: SR-168 Freeway **Segment: Existing**
Average Daily Traffic: 56900 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 6 Roadway Classification: SR-168 Freeway

	NOISE PARAMETERS AT 160 FEET FROM CENTERLINE (Equiv. Lane Dist: 148.51 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	3.66	-7.20	-1.20	70.80	68.0	67.1	63.0	70.51	71.02	70 dBA:	**180**	**194**
Medium Trucks	81.71	-6.54	-7.20	-1.20	66.78	53.1	51.7	51.4	58.00	58.27	65 dBA:	**388**	**418**
Heavy Trucks	85.21	-14.42	-7.20	-1.20	62.39	40.4	36.3	40.3	46.68	46.78	60 dBA:	**835**	**901**
				Total:	**72.68**	**68.10**	**67.22**	**63.31**	**70.77**	**71.26**	55 dBA:	**1800**	**1941**

Road Name: SR-168 Freeway **Segment: Existing Plus Project**
Average Daily Traffic: 75600 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 6 Roadway Classification: SR-168 Freeway

	NOISE PARAMETERS AT 160 FEET FROM CENTERLINE (Equiv. Lane Dist: 148.51 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	4.89	-7.20	-1.20	72.04	69.2	68.3	64.2	71.75	72.25	70 dBA:	**218**	**235**
Medium Trucks	81.71	-5.30	-7.20	-1.20	68.01	54.3	52.9	52.6	59.24	59.50	65 dBA:	**469**	**505**
Heavy Trucks	85.21	-13.19	-7.20	-1.20	63.62	41.7	37.5	41.6	47.91	48.02	60 dBA:	**1010**	**1089**
				Total:	**73.91**	**69.34**	**68.45**	**64.55**	**72.00**	**72.49**	55 dBA:	**2175**	**2345**

Road Name: SR-168 Freeway **Segment: Cumulative Plus Project**
Average Daily Traffic: 86900 Vehicles Vehicle Speed: 65 MPH Vehicle Mix: 6 Roadway Classification: SR-168 Freeway

	NOISE PARAMETERS AT 160 FEET FROM CENTERLINE (Equiv. Lane Dist: 148.51 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	5.50	-7.20	-1.20	72.64	69.8	68.9	64.8	72.35	72.86	70 dBA:	**239**	**257**
Medium Trucks	81.71	-4.70	-7.20	-1.20	68.62	54.9	53.5	53.2	59.84	60.11	65 dBA:	**514**	**554**
Heavy Trucks	85.21	-12.58	-7.20	-1.20	64.23	42.3	38.1	42.2	48.52	48.62	60 dBA:	**1108**	**1195**
				Total:	**74.52**	**69.94**	**69.06**	**65.15**	**72.61**	**73.10**	55 dBA:	**2387**	**2574**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: 2-Lane Collector
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	23,100	vehicles
Peak Hour Volume:	2,310	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	50	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**3**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	62	feet
C.L. Dist. To Observer (Backyard):	72	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	82	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	2.06	-2.08	-1.20	0.00	-1.4	-3.8	0
Med Trucks:	76.31	-10.77	-2.08	-1.20	0.00	-0.74	-1.175	0
Hvy Trucks:	81.16	-19.32	-2.08	-1.20	0.00	-0.3	-0.3	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.1	64.0	62.2	56.4	64.9	65.5
Med Trucks:	62.3	47.7	44.1	37.6	47.3	47.8
Hvy Trucks:	58.6	31.4	40.4	19.0	33.7	37.3
Traffic Noise:	**68.1**	**64.1**	**62.3**	**56.5**	**65.0**	**65.6**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.6	60.8	55.0	63.5	64.1
Med Trucks:	61.5	46.9	43.4	36.8	46.6	47.1
Hvy Trucks:	58.3	31.1	40.1	18.7	33.4	37.0
Traffic Noise:	**67.1**	**62.7**	**60.9**	**55.1**	**63.6**	**64.2**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: 2-Lane Collector
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	27,700	vehicles
Peak Hour Volume:	2,770	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	23	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**3**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	62	feet
C.L. Dist. To Observer (Backyard):	72	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	82	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	2.85	-2.41	-1.20	0.00	-1.4	-3.8	0
Med Trucks:	76.31	-9.98	-2.41	-1.20	0.00	-0.74	-1.175	0
Hvy Trucks:	81.16	-18.53	-2.41	-1.20	0.00	-0.3	-0.3	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.3	62.5	56.8	65.3	65.8
Med Trucks:	62.7	48.1	44.6	38.0	47.8	48.3
Hvy Trucks:	59.0	31.8	40.9	19.5	34.2	37.7
Traffic Noise:	**68.5**	**64.4**	**62.6**	**56.8**	**65.3**	**65.9**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.2	63.0	61.3	55.5	64.0	64.5
Med Trucks:	62.0	47.4	43.8	37.3	47.0	47.6
Hvy Trucks:	58.7	31.5	40.6	19.2	33.9	37.4
Traffic Noise:	**67.5**	**63.1**	**61.4**	**55.5**	**64.1**	**64.6**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 2-Lane Collector
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	29,900	vehicles
Peak Hour Volume:	2,990	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	23	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**3**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	62	feet
C.L. Dist. To Observer (Backyard):	72	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	82	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	3.18	-2.41	-1.20	0.00	-1.4	-3.8	0
Med Trucks:	76.31	-9.65	-2.41	-1.20	0.00	-0.74	-1.175	0
Hvy Trucks:	81.16	-18.20	-2.41	-1.20	0.00	-0.3	-0.3	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.8	64.7	62.9	57.1	65.6	66.2
Med Trucks:	63.1	48.5	44.9	38.4	48.1	48.6
Hvy Trucks:	59.3	32.2	41.2	19.8	34.5	38.0
Traffic Noise:	**68.9**	**64.8**	**63.0**	**57.2**	**65.7**	**66.3**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.5	63.4	61.6	55.8	64.3	64.9
Med Trucks:	62.3	47.7	44.1	37.6	47.4	47.9
Hvy Trucks:	59.0	31.9	40.9	19.5	34.2	37.7
Traffic Noise:	**67.8**	**63.5**	**61.7**	**55.9**	**64.4**	**65.0**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: 4-Lane Collector
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	28,600	vehicles
Peak Hour Volume:	2,860	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	43	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	82	feet
C.L. Dist. To Observer (Backyard):	92	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	102	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	62.51	4.24	-3.90	-1.20	0.00	0	-0.183	0
Med Trucks:	73.11	-8.59	-3.90	-1.20	0.00	0	-0.119	0
Hvy Trucks:	80.26	-17.14	-3.90	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.5	57.7	51.9	60.4	61.0
Med Trucks:	59.4	44.8	41.3	34.7	44.5	45.0
Hvy Trucks:	58.0	30.8	39.8	18.5	33.2	36.7
Traffic Noise:	**64.7**	**59.6**	**57.9**	**52.0**	**60.5**	**61.1**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.6	59.5	57.7	51.9	60.4	61.0
Med Trucks:	59.4	44.8	41.3	34.7	44.5	45.0
Hvy Trucks:	58.0	30.8	39.8	18.5	33.2	36.7
Traffic Noise:	**64.7**	**59.6**	**57.9**	**52.0**	**60.5**	**61.1**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: 4-Lane Collector
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	32,600	vehicles
Peak Hour Volume:	3,260	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	43	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	82	feet
C.L. Dist. To Observer (Backyard):	92	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	102	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	62.51	4.80	-3.90	-1.20	0.00	0	-0.183	0
Med Trucks:	73.11	-8.02	-3.90	-1.20	0.00	0	-0.119	0
Hvy Trucks:	80.26	-16.58	-3.90	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.0	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.8	35.3	45.0	45.6
Hvy Trucks:	58.6	31.4	40.4	19.0	33.7	37.3
Traffic Noise:	**65.3**	**60.2**	**58.4**	**52.6**	**61.1**	**61.7**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.0	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.8	35.3	45.0	45.6
Hvy Trucks:	58.6	31.4	40.4	19.0	33.7	37.3
Traffic Noise:	**65.3**	**60.2**	**58.4**	**52.6**	**61.1**	**61.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 4-Lane Collector
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	32,800	vehicles
Peak Hour Volume:	3,280	vehicles
Vehicle Speed:	30	mph
Near/Far Lane Distance:	43	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	82	feet
C.L. Dist. To Observer (Backyard):	92	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	102	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	62.51	4.83	-3.90	-1.20	0.00	0	-0.183	0
Med Trucks:	73.11	-8.00	-3.90	-1.20	0.00	0	-0.119	0
Hvy Trucks:	80.26	-16.55	-3.90	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.1	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.9	35.3	45.1	45.6
Hvy Trucks:	58.6	31.4	40.4	19.1	33.8	37.3
Traffic Noise:	**65.3**	**60.2**	**58.5**	**52.6**	**61.1**	**61.7**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.1	58.3	52.5	61.0	61.6
Med Trucks:	60.0	45.4	41.9	35.3	45.1	45.6
Hvy Trucks:	58.6	31.4	40.4	19.1	33.8	37.3
Traffic Noise:	**65.3**	**60.2**	**58.5**	**52.6**	**61.1**	**61.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: 3-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	21,200	vehicles
Peak Hour Volume:	2,120	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	40	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	67	feet
C.L. Dist. To Observer (Backyard):	77	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	87	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	1.64	-2.70	-1.20	0.00	-0.1	-0.188	0
Med Trucks:	76.31	-13.01	-2.70	-1.20	0.00	0	-0.12	0
Hvy Trucks:	81.16	-12.75	-2.70	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	62.9	60.3	55.5	63.8	64.3
Med Trucks:	59.4	42.9	39.4	34.6	43.4	43.8
Hvy Trucks:	64.5	48.3	42.7	39.7	48.6	48.9
Traffic Noise:	**68.4**	**63.0**	**60.4**	**55.6**	**64.0**	**64.5**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	62.9	60.3	55.5	63.8	64.3
Med Trucks:	59.4	42.9	39.4	34.6	43.4	43.8
Hvy Trucks:	64.5	48.3	42.7	39.7	48.6	48.9
Traffic Noise:	**68.4**	**63.0**	**60.4**	**55.6**	**64.0**	**64.5**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: 3-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	19,900	vehicles
Peak Hour Volume:	1,990	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	90	feet
C.L. Dist. To Observer (Backyard):	100	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	110	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	1.37	-4.25	-1.20	0.00	0	-0.181	0
Med Trucks:	76.31	-13.29	-4.25	-1.20	0.00	0	-0.119	0
Hvy Trucks:	81.16	-13.02	-4.25	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.1	58.6	53.7	62.1	62.6
Med Trucks:	57.6	41.1	37.6	32.8	41.6	42.0
Hvy Trucks:	62.7	46.5	40.9	37.9	46.7	47.0
Traffic Noise:	**66.6**	**61.3**	**58.7**	**53.9**	**62.3**	**62.8**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.1	58.6	53.7	62.1	62.6
Med Trucks:	57.6	41.1	37.6	32.8	41.6	42.0
Hvy Trucks:	62.7	46.5	40.9	37.9	46.7	47.0
Traffic Noise:	**66.6**	**61.3**	**58.7**	**53.9**	**62.3**	**62.8**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 3-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	20,200	vehicles
Peak Hour Volume:	2,020	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	90	feet
C.L. Dist. To Observer (Backyard):	100	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	110	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	1.43	-4.25	-1.20	0.00	0	-0.181	0
Med Trucks:	76.31	-13.22	-4.25	-1.20	0.00	0	-0.119	0
Hvy Trucks:	81.16	-12.96	-4.25	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.2	58.7	53.8	62.2	62.7
Med Trucks:	57.6	41.2	37.6	32.9	41.6	42.1
Hvy Trucks:	62.7	46.6	41.0	38.0	46.8	47.1
Traffic Noise:	**66.6**	**61.4**	**58.8**	**53.9**	**62.3**	**62.8**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.2	58.7	53.8	62.2	62.7
Med Trucks:	57.6	41.2	37.6	32.9	41.6	42.1
Hvy Trucks:	62.7	46.6	41.0	38.0	46.8	47.1
Traffic Noise:	**66.6**	**61.4**	**58.8**	**53.9**	**62.3**	**62.8**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: 4-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	36,900	vehicles
Peak Hour Volume:	3,690	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**4**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	90	feet
C.L. Dist. To Observer (Backyard):	100	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	110	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	69.34	3.54	-4.25	-1.20	0.00	-4.6	-4.8	0
Med Trucks:	77.62	-11.12	-4.25	-1.20	0.00	-3.9	-4.1	0
Hvy Trucks:	82.14	-10.85	-4.25	-1.20	0.00	-1.22	-0.95	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.4	65.3	62.7	57.9	66.3	66.8
Med Trucks:	61.1	44.6	41.1	36.3	45.0	45.5
Hvy Trucks:	65.8	49.7	44.1	41.1	49.9	50.2
Traffic Noise:	**70.3**	**65.4**	**62.8**	**58.0**	**66.4**	**66.9**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	60.7	58.1	53.3	61.7	62.2
Med Trucks:	57.2	40.7	37.2	32.4	41.1	41.6
Hvy Trucks:	64.6	48.4	42.9	39.8	48.7	49.0
Traffic Noise:	**67.3**	**61.0**	**58.3**	**53.5**	**61.9**	**62.4**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: 4-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	52,400	vehicles
Peak Hour Volume:	5,240	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**4**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	90	feet
C.L. Dist. To Observer (Backyard):	100	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	110	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	69.34	5.06	-4.25	-1.20	0.00	-4.6	-4.8	0
Med Trucks:	77.62	-9.59	-4.25	-1.20	0.00	-3.9	-4.1	0
Hvy Trucks:	82.14	-9.33	-4.25	-1.20	0.00	-1.22	-0.95	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.0	66.8	64.3	59.4	67.8	68.3
Med Trucks:	62.6	46.1	42.6	37.8	46.6	47.0
Hvy Trucks:	67.4	51.2	45.6	42.6	51.4	51.7
Traffic Noise:	**71.8**	**67.0**	**64.4**	**59.5**	**67.9**	**68.4**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	62.2	59.7	54.8	63.2	63.7
Med Trucks:	58.7	42.2	38.7	33.9	42.7	43.1
Hvy Trucks:	66.1	50.0	44.4	41.4	50.2	50.5
Traffic Noise:	**68.8**	**62.5**	**59.8**	**55.0**	**63.4**	**63.9**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 4-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	55,300	vehicles
Peak Hour Volume:	5,530	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**5**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	90	feet
C.L. Dist. To Observer (Backyard):	100	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	110	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	69.34	5.29	-4.25	-1.20	0.00	-5.2	-5.1	0
Med Trucks:	77.62	-9.36	-4.25	-1.20	0.00	-5.1	-4.9	0
Hvy Trucks:	82.14	-9.10	-4.25	-1.20	0.00	-4.8	-4.1	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	67.0	64.5	59.6	68.0	68.5
Med Trucks:	62.8	46.3	42.8	38.0	46.8	47.2
Hvy Trucks:	67.6	51.4	45.8	42.8	51.6	51.9
Traffic Noise:	**72.0**	**67.2**	**64.6**	**59.8**	**68.2**	**68.6**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.8	59.3	54.4	62.8	63.3
Med Trucks:	57.7	41.2	37.7	32.9	41.7	42.1
Hvy Trucks:	62.8	46.6	41.0	38.0	46.8	47.1
Traffic Noise:	**67.0**	**62.0**	**59.4**	**54.6**	**63.0**	**63.4**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 4-Lane Super Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	52,300	vehicles
Peak Hour Volume:	5,230	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	90	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	72.7%	12.1%	9.6%	94.4%
Medium Trucks:	4.2%	0.5%	0.3%	4.9%
Heavy Trucks:	0.2%	0.5%	0.0%	0.7%

Site Data

Barrier Height:	**4**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	114	feet
C.L. Dist. To Observer (Backyard):	124	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	134	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	4.64	-5.57	-1.20	0.00	-4.5	-4.6	0
Med Trucks:	78.79	-8.19	-5.57	-1.20	0.00	-3.8	-3.9	0
Hvy Trucks:	83.02	-16.74	-5.57	-1.20	0.00	-1.355	-1.13	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.0	66.8	65.0	59.3	67.8	68.3
Med Trucks:	63.8	49.2	45.7	39.1	48.9	49.4
Hvy Trucks:	59.5	32.3	41.3	20.0	34.7	38.2
Traffic Noise:	**70.5**	**66.9**	**65.1**	**59.3**	**67.8**	**68.4**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	62.3	60.5	54.8	63.3	63.8
Med Trucks:	60.0	45.4	41.9	35.3	45.1	45.6
Hvy Trucks:	58.2	31.0	40.0	18.6	33.3	36.9
Traffic Noise:	**66.5**	**62.4**	**60.6**	**54.8**	**63.3**	**63.9**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: 6-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	62,600	vehicles
Peak Hour Volume:	6,260	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	90	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**4**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	114	feet
C.L. Dist. To Observer (Backyard):	124	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	134	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	69.34	5.83	-5.57	-1.20	0.00	-4.5	-4.6	0
Med Trucks:	77.62	-8.82	-5.57	-1.20	0.00	-3.8	-3.9	0
Hvy Trucks:	82.14	-8.56	-5.57	-1.20	0.00	-1.355	-1.13	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	66.3	63.7	58.9	67.2	67.7
Med Trucks:	62.0	45.6	42.0	37.3	46.0	46.5
Hvy Trucks:	66.8	50.7	45.1	42.0	50.9	51.2
Traffic Noise:	**71.3**	**66.4**	**63.8**	**59.0**	**67.4**	**67.9**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.8	59.2	54.4	62.7	63.2
Med Trucks:	58.2	41.8	38.2	33.5	42.2	42.7
Hvy Trucks:	65.5	49.3	43.7	40.7	49.5	49.8
Traffic Noise:	**68.2**	**62.0**	**59.4**	**54.6**	**63.0**	**63.5**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: 6-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	75,200	vehicles
Peak Hour Volume:	7,520	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	90	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**5**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	114	feet
C.L. Dist. To Observer (Backyard):	124	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	134	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	69.34	6.63	-5.57	-1.20	0.00	-5.1	-4.9	0
Med Trucks:	77.62	-8.02	-5.57	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	82.14	-7.76	-5.57	-1.20	0.00	-4.9	-4.2	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	67.1	64.5	59.7	68.0	68.5
Med Trucks:	62.8	46.4	42.8	38.1	46.8	47.3
Hvy Trucks:	67.6	51.4	45.9	42.8	51.7	52.0
Traffic Noise:	**72.0**	**67.2**	**64.6**	**59.8**	**68.2**	**68.7**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.0	59.4	54.6	62.9	63.4
Med Trucks:	57.9	41.5	37.9	33.2	41.9	42.4
Hvy Trucks:	62.7	46.5	41.0	37.9	46.8	47.1
Traffic Noise:	**67.0**	**62.1**	**59.5**	**54.7**	**63.1**	**63.6**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 6-Lane Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	81,400	vehicles
Peak Hour Volume:	8,140	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	90	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**5**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	114	feet
C.L. Dist. To Observer (Backyard):	124	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	134	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	69.34	6.97	-5.57	-1.20	0.00	-5.1	-4.9	0
Med Trucks:	77.62	-7.68	-5.57	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	82.14	-7.42	-5.57	-1.20	0.00	-4.9	-4.2	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.4	64.9	60.0	68.4	68.9
Med Trucks:	63.2	46.7	43.2	38.4	47.2	47.6
Hvy Trucks:	68.0	51.8	46.2	43.2	52.0	52.3
Traffic Noise:	**72.4**	**67.6**	**65.0**	**60.1**	**68.5**	**69.0**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.5	62.3	59.8	54.9	63.3	63.8
Med Trucks:	58.3	41.8	38.3	33.5	42.3	42.7
Hvy Trucks:	63.1	46.9	41.3	38.3	47.1	47.4
Traffic Noise:	**67.4**	**62.5**	**59.9**	**55.0**	**63.4**	**63.9**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: Scenic Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	20,400	vehicles
Peak Hour Volume:	2,040	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	62	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	112	feet
C.L. Dist. To Observer (Backyard):	122	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	132	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	1.47	-5.70	-1.20	0.00	0	-0.177	0
Med Trucks:	76.31	-13.18	-5.70	-1.20	0.00	0	-0.118	0
Hvy Trucks:	81.16	-12.91	-5.70	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	59.8	57.2	52.4	60.8	61.3
Med Trucks:	56.2	39.8	36.2	31.5	40.2	40.7
Hvy Trucks:	61.3	45.2	39.6	36.6	45.4	45.7
Traffic Noise:	**65.2**	**60.0**	**57.4**	**52.5**	**60.9**	**61.4**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	59.8	57.2	52.4	60.8	61.3
Med Trucks:	56.2	39.8	36.2	31.5	40.2	40.7
Hvy Trucks:	61.3	45.2	39.6	36.6	45.4	45.7
Traffic Noise:	**65.2**	**60.0**	**57.4**	**52.5**	**60.9**	**61.4**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: Scenic Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	31,600	vehicles
Peak Hour Volume:	3,160	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	112	feet
C.L. Dist. To Observer (Backyard):	122	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	132	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	3.37	-5.67	-1.20	0.00	0	-0.177	0
Med Trucks:	76.31	-11.28	-5.67	-1.20	0.00	0	-0.118	0
Hvy Trucks:	81.16	-11.01	-5.67	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.7	59.2	54.3	62.7	63.2
Med Trucks:	58.2	41.7	38.2	33.4	42.1	42.6
Hvy Trucks:	63.3	47.1	41.5	38.5	47.3	47.6
Traffic Noise:	**67.2**	**61.9**	**59.3**	**54.5**	**62.9**	**63.3**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.7	59.2	54.3	62.7	63.2
Med Trucks:	58.2	41.7	38.2	33.4	42.1	42.6
Hvy Trucks:	63.3	47.1	41.5	38.5	47.3	47.6
Traffic Noise:	**67.2**	**61.9**	**59.3**	**54.5**	**62.9**	**63.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: Scenic Arterial
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	32,400	vehicles
Peak Hour Volume:	3,240	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	66	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	112	feet
C.L. Dist. To Observer (Backyard):	122	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	132	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	3.48	-5.67	-1.20	0.00	0	-0.177	0
Med Trucks:	76.31	-11.17	-5.67	-1.20	0.00	0	-0.118	0
Hvy Trucks:	81.16	-10.91	-5.67	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.8	59.3	54.4	62.8	63.3
Med Trucks:	58.3	41.8	38.3	33.5	42.3	42.7
Hvy Trucks:	63.4	47.2	41.6	38.6	47.4	47.7
Traffic Noise:	**67.3**	**62.0**	**59.4**	**54.6**	**63.0**	**63.5**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.8	59.3	54.4	62.8	63.3
Med Trucks:	58.3	41.8	38.3	33.5	42.3	42.7
Hvy Trucks:	63.4	47.2	41.6	38.6	47.4	47.7
Traffic Noise:	**67.3**	**62.0**	**59.4**	**54.6**	**63.0**	**63.5**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: 6-Lane Expressway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	72,800	vehicles
Peak Hour Volume:	7,280	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	100	feet
C.L. Dist. To Observer (Backyard):	110	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	120	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	6.03	-4.88	-1.20	0.00	-6.94	-6.08	0
Med Trucks:	78.79	-8.62	-4.88	-1.20	0.00	-6.87	-5.7	0
Hvy Trucks:	83.02	-8.36	-4.88	-1.20	0.00	-5.7	-4.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.9	66.4	61.5	69.9	70.4
Med Trucks:	64.1	47.6	44.1	39.3	48.1	48.5
Hvy Trucks:	68.6	52.4	46.8	43.8	52.6	52.9
Traffic Noise:	**73.5**	**69.1**	**66.5**	**61.6**	**70.0**	**70.5**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.0	59.4	54.6	63.0	63.5
Med Trucks:	57.2	40.7	37.2	32.5	41.2	41.6
Hvy Trucks:	62.9	46.7	41.1	38.1	46.9	47.2
Traffic Noise:	**67.0**	**62.1**	**59.5**	**54.7**	**63.1**	**63.6**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: 6-Lane Expressway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	88,100	vehicles
Peak Hour Volume:	8,810	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	83	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	100	feet
C.L. Dist. To Observer (Backyard):	110	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	120	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	6.86	-4.75	-1.20	0.00	-6.94	-6.08	0
Med Trucks:	78.79	-7.79	-4.75	-1.20	0.00	-6.87	-5.7	0
Hvy Trucks:	83.02	-7.53	-4.75	-1.20	0.00	-5.7	-4.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.0	69.9	67.3	62.5	70.9	71.4
Med Trucks:	65.1	48.6	45.1	40.3	49.0	49.5
Hvy Trucks:	69.5	53.4	47.8	44.8	53.6	53.9
Traffic Noise:	**74.5**	**70.0**	**67.4**	**62.6**	**71.0**	**71.5**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.1	62.9	60.4	55.5	63.9	64.4
Med Trucks:	58.2	41.7	38.2	33.4	42.2	42.6
Hvy Trucks:	63.8	47.7	42.1	39.1	47.9	48.2
Traffic Noise:	**68.0**	**63.1**	**60.5**	**55.7**	**64.1**	**64.5**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: 6-Lane Expressway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	91,400	vehicles
Peak Hour Volume:	9,140	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	83	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	100	feet
C.L. Dist. To Observer (Backyard):	110	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	120	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	7.02	-4.75	-1.20	0.00	-6.94	-6.08	0
Med Trucks:	78.79	-7.63	-4.75	-1.20	0.00	-6.87	-5.7	0
Hvy Trucks:	83.02	-7.37	-4.75	-1.20	0.00	-5.7	-4.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.0	67.5	62.6	71.0	71.5
Med Trucks:	65.2	48.7	45.2	40.4	49.2	49.6
Hvy Trucks:	69.7	53.5	47.9	44.9	53.8	54.1
Traffic Noise:	**74.7**	**70.2**	**67.6**	**62.7**	**71.1**	**71.6**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.1	60.6	55.7	64.1	64.6
Med Trucks:	58.3	41.9	38.3	33.6	42.3	42.8
Hvy Trucks:	64.0	47.8	42.2	39.2	48.1	48.4
Traffic Noise:	**68.2**	**63.3**	**60.7**	**55.8**	**64.2**	**64.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: Scenic Expressway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	53,100	vehicles
Peak Hour Volume:	5,310	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	90	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**4**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	124	feet
C.L. Dist. To Observer (Backyard):	134	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	144	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	4.66	-6.14	-1.20	0.00	-4.4	-4.5	0
Med Trucks:	78.79	-9.99	-6.14	-1.20	0.00	-3.8	-3.8	0
Hvy Trucks:	83.02	-9.73	-6.14	-1.20	0.00	-1.355	-1.175	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	66.3	63.8	58.9	67.3	67.8
Med Trucks:	61.5	45.0	41.5	36.7	45.4	45.9
Hvy Trucks:	66.0	49.8	44.2	41.2	50.0	50.3
Traffic Noise:	**70.9**	**66.4**	**63.8**	**59.0**	**67.4**	**67.9**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.0	61.9	59.4	54.5	62.9	63.4
Med Trucks:	57.7	41.2	37.7	32.9	41.6	42.1
Hvy Trucks:	64.6	48.4	42.8	39.8	48.6	48.9
Traffic Noise:	**67.8**	**62.1**	**59.5**	**54.7**	**63.1**	**63.6**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: Scenic Expressway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	75,200	vehicles
Peak Hour Volume:	7,520	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	90	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**5**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	124	feet
C.L. Dist. To Observer (Backyard):	134	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	144	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	71.12	6.17	-6.14	-1.20	0.00	-5.1	-4.9	0
Med Trucks:	78.79	-8.48	-6.14	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	83.02	-8.22	-6.14	-1.20	0.00	-4.9	-4.2	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.8	65.3	60.4	68.8	69.3
Med Trucks:	63.0	46.5	43.0	38.2	47.0	47.4
Hvy Trucks:	67.5	51.3	45.7	42.7	51.5	51.8
Traffic Noise:	**72.4**	**67.9**	**65.3**	**60.5**	**68.9**	**69.4**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.8	62.7	60.2	55.3	63.7	64.2
Med Trucks:	58.1	41.6	38.1	33.3	42.1	42.5
Hvy Trucks:	62.6	46.4	40.8	37.8	46.6	46.9
Traffic Noise:	**67.4**	**62.8**	**60.2**	**55.4**	**63.8**	**64.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: SR-41 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	######	vehicles
Peak Hour Volume:	10,430	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	120	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	65.8%	13.5%	15.8%	95.0%
Medium Trucks:	1.5%	0.3%	0.8%	2.5%
Heavy Trucks:	1.4%	0.1%	1.0%	2.5%

Site Data

Barrier Height:	**8**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	140	feet
C.L. Dist. To Observer (Backyard):	150	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	160	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	6.53	-6.70	-1.20	0.00	-10.58	-8.8	-0.182
Med Trucks:	81.71	-9.27	-6.70	-1.20	0.00	-10.94	-8.95	-0.13
Hvy Trucks:	85.21	-9.27	-6.70	-1.20	0.00	-10.34	-7.65	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.2	71.6	70.7	66.6	74.1	74.6
Med Trucks:	64.5	45.5	44.1	43.7	50.4	50.7
Hvy Trucks:	68.0	48.6	44.4	48.5	54.8	54.9
Traffic Noise:	**75.5**	**71.6**	**70.7**	**66.7**	**74.2**	**74.7**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.6	61.0	60.1	56.0	63.5	64.0
Med Trucks:	53.6	34.5	33.1	32.8	39.5	39.7
Hvy Trucks:	57.7	38.3	34.1	38.2	44.5	44.6
Traffic Noise:	**64.9**	**61.0**	**60.1**	**56.1**	**63.6**	**64.1**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: SR-41 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	108,400	vehicles
Peak Hour Volume:	10,840	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	120	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	65.8%	13.5%	15.8%	95.0%
Medium Trucks:	1.5%	0.3%	0.8%	2.5%
Heavy Trucks:	1.4%	0.1%	1.0%	2.5%

Site Data

Barrier Height:	**8**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	140	feet
C.L. Dist. To Observer (Backyard):	150	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	160	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	6.69	-6.70	-1.20	0.00	-10.58	-8.8	-0.182
Med Trucks:	81.71	-9.10	-6.70	-1.20	0.00	-10.94	-8.95	-0.13
Hvy Trucks:	85.21	-9.10	-6.70	-1.20	0.00	-10.34	-7.65	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.3	71.7	70.9	66.8	74.3	74.8
Med Trucks:	64.7	45.6	44.2	43.9	50.6	50.8
Hvy Trucks:	68.2	48.8	44.6	48.7	55.0	55.1
Traffic Noise:	**75.6**	**71.8**	**70.9**	**66.9**	**74.4**	**74.8**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.8	61.1	60.3	56.2	63.7	64.2
Med Trucks:	53.8	34.7	33.3	33.0	39.6	39.9
Hvy Trucks:	57.9	38.4	34.3	38.3	44.7	44.8
Traffic Noise:	**65.1**	**61.2**	**60.3**	**56.3**	**63.8**	**64.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: SR-180 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	68,740	vehicles
Peak Hour Volume:	6,874	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	140	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	53.3%	10.9%	12.8%	77.0%
Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Heavy Trucks:	9.9%	1.0%	7.3%	18.2%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	180	feet
C.L. Dist. To Observer (Backyard):	190	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	200	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	3.80	-8.33	-1.20	0.00	-8.6	-6.94	-0.11
Med Trucks:	81.71	-8.22	-8.33	-1.20	0.00	-8.95	-6.94	0
Hvy Trucks:	85.21	-2.47	-8.33	-1.20	0.00	-8.2	-6	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.8	66.3	65.4	61.3	68.8	69.4
Med Trucks:	64.0	47.7	46.3	46.0	52.7	52.9
Hvy Trucks:	73.2	62.4	58.2	62.3	68.6	68.7
Traffic Noise:	**75.2**	**67.8**	**66.2**	**64.9**	**71.8**	**72.1**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.2	57.7	56.8	52.7	60.2	60.8
Med Trucks:	55.0	38.8	37.4	37.1	43.7	44.0
Hvy Trucks:	65.0	54.2	50.0	54.1	60.4	60.5
Traffic Noise:	**66.8**	**59.3**	**57.7**	**56.5**	**63.4**	**63.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: SR-180 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	97,700	vehicles
Peak Hour Volume:	9,770	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	140	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	53.3%	10.9%	12.8%	77.0%
Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Heavy Trucks:	9.9%	1.0%	7.3%	18.2%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	180	feet
C.L. Dist. To Observer (Backyard):	190	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	200	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	5.33	-8.33	-1.20	0.00	-8.6	-6.94	-0.11
Med Trucks:	81.71	-6.70	-8.33	-1.20	0.00	-8.95	-6.94	0
Hvy Trucks:	85.21	-0.94	-8.33	-1.20	0.00	-8.2	-6	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	67.8	67.0	62.9	70.4	70.9
Med Trucks:	65.5	49.3	47.9	47.6	54.2	54.5
Hvy Trucks:	74.7	63.9	59.8	63.8	70.2	70.3
Traffic Noise:	**76.7**	**69.3**	**67.8**	**66.4**	**73.3**	**73.6**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.7	59.2	58.4	54.3	61.8	62.3
Med Trucks:	56.5	40.3	38.9	38.6	45.3	45.5
Hvy Trucks:	66.5	55.7	51.6	55.6	62.0	62.1
Traffic Noise:	**68.3**	**60.9**	**59.2**	**58.0**	**64.9**	**65.2**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: SR-180 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	99,700	vehicles
Peak Hour Volume:	9,970	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	140	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	53.3%	10.9%	12.8%	77.0%
Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Heavy Trucks:	9.9%	1.0%	7.3%	18.2%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	180	feet
C.L. Dist. To Observer (Backyard):	190	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	200	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	5.42	-8.33	-1.20	0.00	-8.6	-6.94	-0.11
Med Trucks:	81.71	-6.61	-8.33	-1.20	0.00	-8.95	-6.94	0
Hvy Trucks:	85.21	-0.85	-8.33	-1.20	0.00	-8.2	-6	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	67.9	67.0	63.0	70.5	71.0
Med Trucks:	65.6	49.4	48.0	47.6	54.3	54.6
Hvy Trucks:	74.8	64.0	59.8	63.9	70.2	70.4
Traffic Noise:	**76.8**	**69.4**	**67.8**	**66.5**	**73.4**	**73.7**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	59.3	58.4	54.4	61.9	62.4
Med Trucks:	56.6	40.4	39.0	38.7	45.3	45.6
Hvy Trucks:	66.6	55.8	51.6	55.7	62.0	62.2
Traffic Noise:	**68.4**	**61.0**	**59.3**	**58.1**	**65.0**	**65.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: SR-99 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	58,100	vehicles
Peak Hour Volume:	5,810	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	80	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	53.3%	10.9%	12.8%	77.0%
Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Heavy Trucks:	9.9%	1.0%	7.3%	18.2%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	110	feet
C.L. Dist. To Observer (Backyard):	120	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	130	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	3.98	-5.43	-1.20	0.00	-9.03	-7.55	-0.148
Med Trucks:	81.71	-10.35	-5.43	-1.20	0.00	-9.18	-7.43	0
Hvy Trucks:	85.21	-14.03	-5.43	-1.20	0.00	-8.05	-5.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	70.3	69.4	65.3	72.8	73.3
Med Trucks:	64.7	47.1	45.7	45.4	52.0	52.3
Hvy Trucks:	64.5	42.9	38.7	42.8	49.1	49.2
Traffic Noise:	**74.0**	**70.3**	**69.4**	**65.4**	**72.9**	**73.4**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.3	60.4	56.3	63.8	64.3
Med Trucks:	55.5	37.9	36.5	36.2	42.9	43.1
Hvy Trucks:	56.5	34.8	30.7	34.7	41.1	41.2
Traffic Noise:	**65.1**	**61.3**	**60.4**	**56.4**	**63.9**	**64.4**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: SR-99 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	98,700	vehicles
Peak Hour Volume:	9,870	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	80	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	53.3%	10.9%	12.8%	77.0%
Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Heavy Trucks:	9.9%	1.0%	7.3%	18.2%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	110	feet
C.L. Dist. To Observer (Backyard):	120	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	130	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	6.29	-5.43	-1.20	0.00	-12.02	-7.55	-0.148
Med Trucks:	81.71	-8.05	-5.43	-1.20	0.00	-12.51	-7.43	0
Hvy Trucks:	85.21	-11.73	-5.43	-1.20	0.00	-11.62	-5.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.9	72.3	71.4	67.3	74.8	75.3
Med Trucks:	66.9	49.2	47.8	47.5	54.2	54.4
Hvy Trucks:	66.7	45.1	40.9	44.9	51.3	51.4
Traffic Noise:	**76.1**	**72.3**	**71.4**	**67.4**	**74.9**	**75.4**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.2	60.6	59.7	55.6	63.1	63.6
Med Trucks:	54.5	36.9	35.5	35.2	41.8	42.1
Hvy Trucks:	55.2	33.6	29.4	33.5	39.8	39.9
Traffic Noise:	**64.3**	**60.6**	**59.7**	**55.7**	**63.2**	**63.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: SR-99 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	104,100	vehicles
Peak Hour Volume:	10,410	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	80	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	53.3%	10.9%	12.8%	77.0%
Medium Trucks:	2.9%	0.5%	1.4%	4.8%
Heavy Trucks:	9.9%	1.0%	7.3%	18.2%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	110	feet
C.L. Dist. To Observer (Backyard):	120	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	130	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	6.52	-5.43	-1.20	0.00	-12.02	-7.55	-0.148
Med Trucks:	81.71	-7.82	-5.43	-1.20	0.00	-12.51	-7.43	0
Hvy Trucks:	85.21	-11.50	-5.43	-1.20	0.00	-11.62	-5.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.1	72.5	71.6	67.6	75.1	75.6
Med Trucks:	67.1	49.5	48.1	47.8	54.4	54.7
Hvy Trucks:	66.9	45.3	41.1	45.2	51.5	51.6
Traffic Noise:	**76.3**	**72.5**	**71.7**	**67.6**	**75.1**	**75.6**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.4	60.8	59.9	55.8	63.4	63.9
Med Trucks:	54.8	37.1	35.7	35.4	42.1	42.3
Hvy Trucks:	55.5	33.8	29.7	33.7	40.1	40.2
Traffic Noise:	**64.5**	**60.8**	**60.0**	**55.9**	**63.4**	**63.9**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing
Road Type: SR-168 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	56,900	vehicles
Peak Hour Volume:	5,690	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	120	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**6**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	150	feet
C.L. Dist. To Observer (Backyard):	160	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	170	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	3.66	-7.19	-1.20	0.00	-6.56	-5.7	0
Med Trucks:	81.71	-6.54	-7.19	-1.20	0.00	-6.64	-5.5	0
Hvy Trucks:	85.21	-14.42	-7.19	-1.20	0.00	-5.8	-4.9	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.0	67.1	63.0	70.5	71.0
Med Trucks:	66.8	53.1	51.7	51.4	58.0	58.3
Hvy Trucks:	62.4	40.4	36.3	40.3	46.7	46.8
Traffic Noise:	**72.7**	**68.1**	**67.2**	**63.3**	**70.8**	**71.3**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.2	61.4	60.5	56.4	64.0	64.5
Med Trucks:	60.1	46.4	45.0	44.7	51.4	51.6
Hvy Trucks:	56.6	34.6	30.5	34.5	40.9	41.0
Traffic Noise:	**66.2**	**61.5**	**60.7**	**56.8**	**64.2**	**64.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Existing Plus Project
Road Type: SR-168 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	75,600	vehicles
Peak Hour Volume:	7,560	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	120	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	150	feet
C.L. Dist. To Observer (Backyard):	160	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	170	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	4.89	-7.19	-1.20	0.00	-8.75	-7.15	-0.122
Med Trucks:	81.71	-5.30	-7.19	-1.20	0.00	-9.03	-7.08	0
Hvy Trucks:	85.21	-13.19	-7.19	-1.20	0.00	-8.15	-6	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.0	69.2	68.3	64.2	71.8	72.3
Med Trucks:	68.0	54.3	52.9	52.6	59.2	59.5
Hvy Trucks:	63.6	41.7	37.5	41.6	47.9	48.0
Traffic Noise:	**73.9**	**69.3**	**68.5**	**64.6**	**72.0**	**72.5**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	60.4	59.6	55.5	63.0	63.5
Med Trucks:	59.0	45.3	43.9	43.6	50.2	50.5
Hvy Trucks:	55.5	33.5	29.4	33.4	39.8	39.9
Traffic Noise:	**65.2**	**60.6**	**59.7**	**55.8**	**63.2**	**63.7**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: Cumulative Plus Project
Road Type: SR-168 Freeway
Project Name: Fresno GP
Job Number: 31680016

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	86,900	vehicles
Peak Hour Volume:	8,690	vehicles
Vehicle Speed:	65	mph
Near/Far Lane Distance:	120	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	73.3%	10.2%	10.0%	93.4%
Medium Trucks:	2.7%	0.3%	0.3%	3.2%
Heavy Trucks:	2.9%	0.2%	0.3%	3.4%

Site Data

Barrier Height:	**7**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	150	feet
C.L. Dist. To Observer (Backyard):	160	feet
Barrier Dist. To Observer (Backyard):	10	feet
C.L. Dist. To Observer (Structure):	170	feet
Barrier Dist. To Observer (Structure):	20	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	75.54	5.50	-7.19	-1.20	0.00	-8.75	-7.15	-0.122
Med Trucks:	81.71	-4.70	-7.19	-1.20	0.00	-9.03	-7.08	0
Hvy Trucks:	85.21	-12.58	-7.19	-1.20	0.00	-8.15	-6	0

UNMITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	69.8	68.9	64.8	72.4	72.9
Med Trucks:	68.6	54.9	53.5	53.2	59.8	60.1
Hvy Trucks:	64.2	42.3	38.1	42.2	48.5	48.6
Traffic Noise:	**74.5**	**69.9**	**69.1**	**65.2**	**72.6**	**73.1**

MITIGATED NOISE LEVELS

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.1	60.2	56.1	63.6	64.1
Med Trucks:	59.6	45.9	44.5	44.2	50.8	51.1
Hvy Trucks:	56.1	34.1	30.0	34.0	40.4	40.5
Traffic Noise:	**65.8**	**61.2**	**60.3**	**56.4**	**63.8**	**64.3**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITHOUT PROJECT **Project: Fresno General Plan**

Site Conditions: Soft

	Vehicle Mix 1 (Collectors)				Vehicle Mix 2 (Arterials)				Vehicle Mix 3 (SR-41 Freeway)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	72.72%	12.09%	9.58%	94.39%	73.30%	10.20%	10.00%	93.40%	65.76%	13.48%	15.77%	95.00%
Medium Trucks	4.16%	0.46%	0.31%	4.92%	2.70%	0.30%	0.30%	3.20%	1.48%	0.27%	0.75%	2.50%
Heavy Trucks	0.23%	0.46%	0.01%	0.69%	2.90%	0.20%	0.30%	3.40%	1.37%	0.13%	1.00%	2.50%
	Vehicle Mix 4 (SR-99 Freeway)				Vehicle Mix 5 (SR-180 Freeway)				Vehicle Mix 6 (SR-168 Freeway)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	53.30%	10.92%	12.78%	77.00%	65.76%	13.48%	15.77%	95.00%	62.30%	12.77%	14.94%	90.00%
Medium Trucks	2.86%	0.52%	1.45%	4.83%	2.07%	0.38%	1.05%	3.50%	5.10%	0.92%	2.58%	8.60%
Heavy Trucks	9.95%	0.95%	7.27%	18.17%	0.82%	0.08%	0.60%	1.50%	0.77%	0.07%	0.56%	1.40%

Road Name: 6-Lane Expressway **Segment: 0**

Average Daily Traffic: 13000 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: 6-Lane Expressway

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 104.13 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	-1.45	-4.88	-1.20	63.6	61.4	58.9	54.0	62.4	62.91	70 dBA:	**35**	**38**
Medium Trucks	78.79	-16.10	-4.88	-1.20	56.6	40.1	36.6	31.8	40.6	41.03	65 dBA:	**75**	**81**
Heavy Trucks	83.02	-15.84	-4.88	-1.20	61.1	44.9	39.3	36.3	45.1	45.45	60 dBA:	**162**	**175**
				Total:	**66.1**	**61.6**	**59.0**	**54.1**	**62.5**	**63.0**	55 dBA:	**349**	**377**

Road Name: 6-Lane Super Arterial **Segment: 0**

Average Daily Traffic: 26700 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	2.13	-5.57	-1.20	64.7	62.6	60.0	55.2	63.5	64.0	70 dBA:	**47**	**51**
Medium Trucks	77.62	-12.52	-5.57	-1.20	58.3	41.9	38.3	33.6	42.3	42.8	65 dBA:	**101**	**109**
Heavy Trucks	82.14	-12.26	-5.57	-1.20	63.1	46.9	41.4	38.3	47.2	47.5	60 dBA:	**218**	**235**
				Total:	**67.5**	**62.7**	**60.1**	**55.3**	**63.7**	**64.2**	55 dBA:	**469**	**506**

Road Name: 3-Lane Arterial **Segment: 0**

Average Daily Traffic: 6300 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: 3-Lane Arterial

	NOISE PARAMETERS AT 77 FEET FROM CENTERLINE (Equiv. Lane Dist: 74.54 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.63	-2.70	-1.20	59.8	57.7	55.1	50.3	58.7	59.2	70 dBA:	**14**	**15**
Medium Trucks	76.31	-18.28	-2.70	-1.20	54.1	37.6	34.1	29.4	38.1	38.6	65 dBA:	**30**	**32**
Heavy Trucks	81.16	-18.02	-2.70	-1.20	59.2	43.1	37.5	34.5	43.3	43.6	60 dBA:	**64**	**69**
				Total:	**63.1**	**57.9**	**55.2**	**50.4**	**58.8**	**59.3**	55 dBA:	**138**	**149**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITHOUT PROJECT

Project: Fresno General Plan
Site Conditions: Soft

Road Name: 4-Lane Arterial **Segment: 0**

Average Daily Traffic: 700 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 4-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-13.68	-4.26	-1.20	50.2	48.1	45.5	40.7	49.0	49.5	70 dBA:	**4**	**4**
Medium Trucks	77.62	-28.34	-4.26	-1.20	43.8	27.4	23.8	19.1	27.8	28.3	65 dBA:	**9**	**9**
Heavy Trucks	82.14	-28.07	-4.26	-1.20	48.6	32.4	26.9	23.8	32.7	33.0	60 dBA:	**19**	**20**
				Total:	**53.0**	**48.2**	**45.6**	**40.8**	**49.2**	**49.7**	55 dBA:	**41**	**44**

Road Name: 6-Lane Arterial **Segment: 0**

Average Daily Traffic: 46000 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	4.49	-5.57	-1.20	67.1	64.9	62.4	57.5	65.9	66.4	70 dBA:	**67**	**73**
Medium Trucks	77.62	-10.16	-5.57	-1.20	60.7	44.2	40.7	35.9	44.7	45.1	65 dBA:	**145**	**157**
Heavy Trucks	82.14	-9.90	-5.57	-1.20	65.5	49.3	43.7	40.7	49.5	49.8	60 dBA:	**313**	**337**
				Total:	**69.9**	**65.1**	**62.5**	**57.6**	**66.0**	**66.5**	55 dBA:	**674**	**727**

Road Name: 2-Lane Collector **Segment: 0**

Average Daily Traffic: 5400 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 1 | Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-4.25	-2.41	-1.20	59.5	57.3	55.6	49.8	58.3	58.8	70 dBA:	**12**	**13**
Medium Trucks	76.31	-17.08	-2.41	-1.20	55.6	41.0	37.5	30.9	40.7	41.2	65 dBA:	**26**	**28**
Heavy Trucks	81.16	-25.63	-2.41	-1.20	51.9	24.7	33.7	12.4	27.1	30.6	60 dBA:	**56**	**61**
				Total:	**61.5**	**57.4**	**55.6**	**49.8**	**58.3**	**58.9**	55 dBA:	**120**	**132**

Road Name: 4-Lane Collector **Segment: 0**

Average Daily Traffic: 3500 Vehicles | Vehicle Speed: 30 MPH | Vehicle Mix: 1 | Roadway Classification: 4-Lane Collector

	NOISE PARAMETERS AT 92 FEET FROM CENTERLINE (Equiv. Lane Dist: 89.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-4.89	-3.91	-1.20	52.5	50.3	48.6	42.8	51.3	51.9	70 dBA:	**5**	**6**
Medium Trucks	73.11	-17.71	-3.91	-1.20	50.3	35.7	32.1	25.6	35.3	35.9	65 dBA:	**11**	**12**
Heavy Trucks	80.26	-26.27	-3.91	-1.20	48.9	21.7	30.7	9.3	24.0	27.6	60 dBA:	**25**	**27**
				Total:	**55.6**	**50.5**	**48.7**	**42.9**	**51.4**	**52.0**	55 dBA:	**53**	**58**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITHOUT PROJECT

Project: Fresno General Plan
Site Conditions: Soft

Road Name: Freeway **Segment: 0**

Average Daily Traffic: 43500 Vehicles | Vehicle Speed: 65 MPH | Vehicle Mix: 4 | Roadway Classification: SR-41 Freeway

	NOISE PARAMETERS AT 285 FEET FROM CENTERLINE (Equiv. Lane Dist: 280.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	1.82	-11.34	-1.20	64.8	63.1	62.3	58.2	65.7	66.2	70 dBA:	**148**	**160**
Medium Trucks	81.71	-10.21	-11.34	-1.20	59.0	37.0	35.6	35.3	42.0	42.2	65 dBA:	**319**	**345**
Heavy Trucks	85.21	-4.46	-11.34	-1.20	68.2	40.2	36.0	40.1	46.4	46.5	60 dBA:	**688**	**743**
				Total:	**70.2**	**63.1**	**62.3**	**58.3**	**65.7**	**66.2**	55 dBA:	**1482**	**1600**

Road Name: Scenic Arterial **Segment: 0**

Average Daily Traffic: 18000 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Arterial

	NOISE PARAMETERS AT 122 FEET FROM CENTERLINE (Equiv. Lane Dist: 118.18 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	0.93	-5.71	-1.20	61.4	59.2	56.7	51.8	60.2	60.7	70 dBA:	**28**	**30**
Medium Trucks	76.31	-13.72	-5.71	-1.20	55.7	39.2	35.7	30.9	39.7	40.1	65 dBA:	**60**	**65**
Heavy Trucks	81.16	-13.46	-5.71	-1.20	60.8	44.6	39.0	36.0	44.8	45.1	60 dBA:	**129**	**139**
				Total:	**64.7**	**59.4**	**56.8**	**52.0**	**60.4**	**60.9**	55 dBA:	**279**	**300**

Road Name: Scenic Expressway **Segment: 0**

Average Daily Traffic: 53100 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Expressway

	NOISE PARAMETERS AT 134 FEET FROM CENTERLINE (Equiv. Lane Dist: 126.4 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	4.66	-6.15	-1.20	68.4	66.3	63.7	58.9	67.3	67.8	70 dBA:	**90**	**97**
Medium Trucks	78.79	-9.99	-6.15	-1.20	61.5	45.0	41.5	36.7	45.4	45.9	65 dBA:	**193**	**208**
Heavy Trucks	83.02	-9.73	-6.15	-1.20	65.9	49.8	44.2	41.2	50.0	50.3	60 dBA:	**416**	**448**
				Total:	**70.9**	**66.4**	**63.8**	**59.0**	**67.4**	**67.9**	55 dBA:	**896**	**966**

Road Name: 4-Lane Super Arterial **Segment: 0**

Average Daily Traffic: 25000 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: 4-Lane Super Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	1.39	-5.57	-1.20	65.7	63.6	61.1	56.2	64.6	65.1	70 dBA:	**55**	**59**
Medium Trucks	78.79	-13.26	-5.57	-1.20	58.8	42.3	38.8	34.0	42.7	43.2	65 dBA:	**118**	**127**
Heavy Trucks	83.02	-13.00	-5.57	-1.20	63.2	47.1	41.5	38.5	47.3	47.6	60 dBA:	**254**	**274**
				Total:	**68.2**	**63.7**	**61.1**	**56.3**	**64.7**	**65.2**	55 dBA:	**548**	**591**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITHOUT PROJECT

Project: Fresno General Plan
Site Conditions: Soft

Road Name: Connector **Segment: 0**

Average Daily Traffic: 100 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-21.62	-2.41	-1.20	42.1	40.0	37.4	32.6	41.0	41.5	70 dBA:	**1**	**1**
Medium Trucks	76.31	-36.27	-2.41	-1.20	36.4	19.9	16.4	11.7	20.4	20.9	65 dBA:	**2**	**2**
Heavy Trucks	81.16	-36.01	-2.41	-1.20	41.5	25.4	19.8	16.8	25.6	25.9	60 dBA:	**4**	**4**
				Total:	**45.4**	**40.2**	**37.5**	**32.7**	**41.1**	**41.6**	55 dBA:	**9**	**9**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITH PROJECT

Project: Fresno General Plan
Site Conditions: Soft

	Vehicle Mix 1 (Collectors)				Vehicle Mix 2 (Arterials)				Vehicle Mix 3 (SR-41 Freeway)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	72.72%	12.09%	9.58%	94.39%	73.30%	10.20%	10.00%	93.40%	65.76%	13.48%	15.77%	95.00%
Medium Trucks	4.16%	0.46%	0.31%	4.92%	2.70%	0.30%	0.30%	3.20%	1.48%	0.27%	0.75%	2.50%
Heavy Trucks	0.23%	0.46%	0.01%	0.69%	2.90%	0.20%	0.30%	3.40%	1.37%	0.13%	1.00%	2.50%

Road Name: 6-Lane Expressway **Segment: 0**

Average Daily Traffic: 88100 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Expressway

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 104.13 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	6.86	-4.88	-1.20	71.9	69.8	67.2	62.4	70.7	71.2	70 dBA:	**125**	**135**
Medium Trucks	78.79	-7.79	-4.88	-1.20	64.9	48.4	44.9	40.1	48.9	49.3	65 dBA:	**270**	**291**
Heavy Trucks	83.02	-7.53	-4.88	-1.20	69.4	53.2	47.6	44.6	53.5	53.8	60 dBA:	**581**	**626**
				Total:	**74.4**	**69.9**	**67.3**	**62.5**	**70.8**	**71.3**	55 dBA:	**1251**	**1349**

Road Name: 6-Lane Super Arterial **Segment: 0**

Average Daily Traffic: 87300 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	7.28	-5.57	-1.20	69.9	67.7	65.2	60.3	68.7	69.2	70 dBA:	**103**	**111**
Medium Trucks	77.62	-7.38	-5.57	-1.20	63.5	47.0	43.5	38.7	47.5	47.9	65 dBA:	**223**	**240**
Heavy Trucks	82.14	-7.11	-5.57	-1.20	68.3	52.1	46.5	43.5	52.3	52.6	60 dBA:	**480**	**517**
				Total:	**72.7**	**67.9**	**65.3**	**60.4**	**68.8**	**69.3**	55 dBA:	**1034**	**1114**

Road Name: 3-Lane Arterial **Segment: 0**

Average Daily Traffic: 19900 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: 3-Lane Arterial

	NOISE PARAMETERS AT 77 FEET FROM CENTERLINE (Equiv. Lane Dist: 74.54 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	1.37	-2.70	-1.20	64.8	62.7	60.1	55.3	63.7	64.1	70 dBA:	**30**	**32**
Medium Trucks	76.31	-13.29	-2.70	-1.20	59.1	42.6	39.1	34.4	43.1	43.5	65 dBA:	**64**	**69**
Heavy Trucks	81.16	-13.02	-2.70	-1.20	64.2	48.1	42.5	39.5	48.3	48.6	60 dBA:	**138**	**149**
				Total:	**68.1**	**62.9**	**60.2**	**55.4**	**63.8**	**64.3**	55 dBA:	**298**	**321**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITH PROJECT

Project: Fresno General Plan
Site Conditions: Soft

Road Name: 4-Lane Arterial **Segment: 0**

Average Daily Traffic: 52400 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 4-Lane Arterial

	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	5.06	-4.26	-1.20	68.9	66.8	64.3	59.4	67.8	68.3	70 dBA:	**73**	**78**
Medium Trucks	77.62	-9.59	-4.26	-1.20	62.6	46.1	42.6	37.8	46.6	47.0	65 dBA:	**156**	**169**
Heavy Trucks	82.14	-9.33	-4.26	-1.20	67.4	51.2	45.6	42.6	51.4	51.7	60 dBA:	**337**	**363**
				Total:	**71.8**	**67.0**	**64.4**	**59.5**	**67.9**	**68.4**	55 dBA:	**726**	**782**

Road Name: 6-Lane Arterial **Segment: 0**

Average Daily Traffic: 75200 Vehicles | Vehicle Speed: 45 MPH | Vehicle Mix: 2 | Roadway Classification: 6-Lane Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	6.63	-5.57	-1.20	69.2	67.1	64.5	59.7	68.0	68.5	70 dBA:	**94**	**101**
Medium Trucks	77.62	-8.02	-5.57	-1.20	62.8	46.3	42.8	38.1	46.8	47.3	65 dBA:	**202**	**217**
Heavy Trucks	82.14	-7.76	-5.57	-1.20	67.6	51.4	45.8	42.8	51.7	52.0	60 dBA:	**434**	**468**
				Total:	**72.0**	**67.2**	**64.6**	**59.8**	**68.2**	**68.7**	55 dBA:	**936**	**1009**

Road Name: 2-Lane Collector **Segment: 0**

Average Daily Traffic: 27700 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 1 | Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	2.85	-2.41	-1.20	66.6	64.4	62.7	56.9	65.4	65.9	70 dBA:	**36**	**39**
Medium Trucks	76.31	-9.98	-2.41	-1.20	62.7	48.1	44.6	38.0	47.8	48.3	65 dBA:	**77**	**84**
Heavy Trucks	81.16	-18.53	-2.41	-1.20	59.0	31.8	40.9	19.5	34.2	37.7	60 dBA:	**166**	**182**
				Total:	**68.6**	**64.5**	**62.7**	**56.9**	**65.4**	**66.0**	55 dBA:	**358**	**391**

Road Name: 4-Lane Collector **Segment: 0**

Average Daily Traffic: 32600 Vehicles | Vehicle Speed: 30 MPH | Vehicle Mix: 1 | Roadway Classification: 4-Lane Collector

	NOISE PARAMETERS AT 92 FEET FROM CENTERLINE (Equiv. Lane Dist: 89.64 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	4.80	-3.91	-1.20	62.2	60.0	58.3	52.5	61.0	61.6	70 dBA:	**23**	**26**
Medium Trucks	73.11	-8.02	-3.91	-1.20	60.0	45.4	41.8	35.3	45.0	45.6	65 dBA:	**51**	**55**
Heavy Trucks	80.26	-16.58	-3.91	-1.20	58.6	31.4	40.4	19.0	33.7	37.3	60 dBA:	**109**	**119**
				Total:	**65.3**	**60.2**	**58.4**	**52.6**	**61.1**	**61.7**	55 dBA:	**234**	**257**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITH PROJECT

Project: Fresno General Plan
Site Conditions: Soft

Road Name: Freeway **Segment: 0**

Average Daily Traffic: 104300 Vehicles | Vehicle Speed: 65 MPH | Vehicle Mix: 4 | Roadway Classification: SR-41 Freeway

	NOISE PARAMETERS AT 285 FEET FROM CENTERLINE (Equiv. Lane Dist: 280.58 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	75.54	6.53	-11.34	-1.20	69.5	66.9	66.1	62.0	69.5	70.0	70 dBA:	**266**	**287**
Medium Trucks	81.71	-9.27	-11.34	-1.20	59.9	40.8	39.4	39.1	45.8	46.0	65 dBA:	**572**	**618**
Heavy Trucks	85.21	-9.27	-11.34	-1.20	63.4	44.0	39.8	43.9	50.2	50.3	60 dBA:	**1233**	**1331**
				Total:	**70.8**	**66.9**	**66.1**	**62.1**	**69.5**	**70.0**	55 dBA:	**2655**	**2867**

Road Name: Scenic Arterial **Segment: 0**

Average Daily Traffic: 31600 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Arterial

	NOISE PARAMETERS AT 122 FEET FROM CENTERLINE (Equiv. Lane Dist: 118.18 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	3.37	-5.71	-1.20	63.8	61.7	59.1	54.3	62.7	63.2	70 dBA:	**41**	**44**
Medium Trucks	76.31	-11.28	-5.71	-1.20	58.1	41.6	38.1	33.4	42.1	42.6	65 dBA:	**87**	**94**
Heavy Trucks	81.16	-11.01	-5.71	-1.20	63.2	47.1	41.5	38.5	47.3	47.6	60 dBA:	**188**	**203**
				Total:	**67.1**	**61.9**	**59.2**	**54.4**	**62.8**	**63.3**	55 dBA:	**405**	**437**

Road Name: Scenic Expressway **Segment: 0**

Average Daily Traffic: 75200 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: Scenic Expressway

	NOISE PARAMETERS AT 134 FEET FROM CENTERLINE (Equiv. Lane Dist: 126.4 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	6.17	-6.15	-1.20	69.9	67.8	65.3	60.4	68.8	69.3	70 dBA:	**113**	**122**
Medium Trucks	78.79	-8.48	-6.15	-1.20	63.0	46.5	43.0	38.2	46.9	47.4	65 dBA:	**243**	**262**
Heavy Trucks	83.02	-8.22	-6.15	-1.20	67.5	51.3	45.7	42.7	51.5	51.8	60 dBA:	**524**	**565**
				Total:	**72.4**	**67.9**	**65.3**	**60.5**	**68.9**	**69.4**	55 dBA:	**1130**	**1218**

Road Name: 4-Lane Super Arterial **Segment: 0**

Average Daily Traffic: 52200 Vehicles | Vehicle Speed: 50 MPH | Vehicle Mix: 2 | Roadway Classification: 4-Lane Super Arterial

	NOISE PARAMETERS AT 124 FEET FROM CENTERLINE (Equiv. Lane Dist: 115.73 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	4.59	-5.57	-1.20	68.9	66.8	64.2	59.4	67.8	68.3	70 dBA:	**90**	**96**
Medium Trucks	78.79	-10.07	-5.57	-1.20	62.0	45.5	42.0	37.2	45.9	46.4	65 dBA:	**193**	**208**
Heavy Trucks	83.02	-9.80	-5.57	-1.20	66.4	50.3	44.7	41.7	50.5	50.8	60 dBA:	**416**	**448**
				Total:	**71.4**	**66.9**	**64.3**	**59.5**	**67.9**	**68.4**	55 dBA:	**895**	**965**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: MAXIMUM INCREASES BY ROAD CLASSIFICATION - WITH PROJECT

Project: Fresno General Plan
Site Conditions: Soft

Road Name: Connector **Segment: 0**

Average Daily Traffic: 13700 Vehicles | Vehicle Speed: 40 MPH | Vehicle Mix: 2 | Roadway Classification: 2-Lane Collector

	NOISE PARAMETERS AT 72 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.26 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-0.26	-2.41	-1.20	63.5	61.4	58.8	54.0	62.3	62.8	70 dBA:	**23**	**24**
Medium Trucks	76.31	-14.91	-2.41	-1.20	57.8	41.3	37.8	33.0	41.8	42.2	65 dBA:	**49**	**53**
Heavy Trucks	81.16	-14.64	-2.41	-1.20	62.9	46.7	41.1	38.1	47.0	47.3	60 dBA:	**105**	**114**
				Total:	**66.8**	**61.5**	**58.9**	**54.1**	**62.5**	**63.0**	55 dBA:	**227**	**245**

J.1 - Wastewater Technical Report

Wastewater Technical Report

for the

City of Fresno General Plan Update MEIR

June 18, 2013

Introduction

The City of Fresno (City) is in the process of updating the City's General Plan. The last update to the City's General Plan was in 2002, and it is referred to as the 2025 General Plan. The General Plan Update, in part, encourages infill projects and facilitates revitalization. The Master Environmental Impact Report evaluates the impacts associated with the General Plan Update and proposes mitigation measures.

Projected Wastewater Flows

The City's current wastewater master plan was completed in May 2006 and is based on the 2025 General Plan land use areas. The 2006 Wastewater Master Plan projects an average dry weather wastewater flow rate of 150 million gallons per day (MGD) for 2025 General Plan buildout.

The City of Fresno has developed a preliminary wastewater model based on the existing wastewater system infrastructure and the new land use designations proposed in the General Plan Update. The projected wastewater flows were estimated using the proposed General Plan Update land use designations together with equivalent dwelling unit factors for each land use designation. The total calculated average dry weather flow using the General Plan Update land use designations is 183.6 MGD, which exceeds the 2006 Wastewater Master Plan value by 33.6 MGD. See Appendix A for the wastewater modeling output.

According to the 2006 Wastewater Master Plan, the Fresno-Clovis Regional Wastewater Reclamation Facility has a rated capacity of 80 MGD.

Analysis of Wastewater Collection System

The existing wastewater collection system has several junction locations where flow distribution between downstream sewers can potentially be controlled. Two key junction locations include a junction structure located near the intersection of Herndon and Milburn Avenues and a junction structure located near the intersection of Dakota and Fresno Avenues, among others. The City's preliminary wastewater model did not incorporate specific decisions as to flow distribution at junction locations, but allowed uncontrolled distribution by the wastewater collection system hydraulic model. The City's modeling results indicated that a number of existing sewers will not provide sufficient capacity to accommodate General Plan Update buildout flows.

Blair, Church & Flynn performed additional model analyses to evaluate the effects of various flow distribution patterns, and their effects on system capacity. The City of Fresno's preliminary wastewater model, as supplemented by the Blair, Church & Flynn analyses, also shows that several areas within the wastewater system will experience flows in excess of existing sewer capacities, at General Plan Update buildout, although to a lesser extent than for uncontrolled flow distribution conditions. Figure 1.1 shows

several areas where wastewater flow rates are expected to exceed existing sewer capacity. Inasmuch as the wastewater model is preliminary, it is possible that other areas within the wastewater collection system may also experience flows in excess of existing sewer capacities.

Additionally, a separate wastewater analysis was performed by the City of Fresno for the downtown area as part of the Fulton Corridor Specific Plan and Community EIR Technical Report. The results of the analysis identified four potentially deficient pipe segments totaling 4,730 feet. According to the City of Fresno, the results should be considered preliminary until the sewer model input parameters are better defined. These potentially deficient pipe segments are also shown on Figure 1.1.

The 2006 Wastewater Master Plan defines a number of capital improvement program (CIP) projects to increase system capacity to accommodate 2025 General Plan buildout flows. Some of the projects have been implemented and so are now existing sewers, while other projects have yet to be implemented. The 2006 Wastewater Master Plan CIP projects that have yet to be implemented are shown on Figure 1.2, and the following paragraphs provide a summary of those same projects.

- Orange Avenue Trunk Sewer: This project involves a portion of the Orange Avenue Trunk Sewer, between Dakota and Jensen Avenues Approximately 37,240 feet of new sewer main will be installed and approximately 5,760 feet of existing sewer main will be rehabilitated. The size of the new sewer main will range from 27-inches to 42-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are RS03A, RL02, C01-REP, C02-REP, C03-REP, C04-REP, C05-REP, C06-REL and C07-REP.

- Marks Avenue Trunk Sewer: This project involves a portion of the Marks Avenue Trunk Sewer, between Clinton Avenue and Kearney Boulevard. Approximately 12,150 feet of new sewer main will be installed. The size of the new sewer main will range from 33-inches to 60-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CM1-REP and CM2-REP.

- North Avenue Trunk Sewer: This project involves a portion of the North Avenue Trunk Sewer, located between Polk and Fruit Avenues and also between Orange and Maple Avenues. Approximately 25,700 feet of new sewer main will be installed. The size of the new sewer main will range from 48-inches to 66-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CN1-REL1 and CN3-REL1.

- Ashlan Avenue Trunk Sewer: This project involves a portion of the Ashlan Avenue Trunk Sewer, located between Hughes and West Avenues and also between Fruit and Blackstone Avenues. Approximately 9,260 feet of new sewer main will be installed. The size of the new sewer main will range from 24-inches to 36-inches in diameter. The associated project designations in the 2006 Wastewater Master Plan are CA1-REL and CA2-REP.

The results of preliminary wastewater collection system modeling indicate that the remaining capacity improvement projects included in the 2006 Wastewater Master Plan CIP, as described above and shown on Figure 1.2, can be expected to provide sufficient sewer capacity to accommodate General Plan Update buildout wastewater flows for those particular sewers.

A comparison of Figures 1.1 and 1.2 will show that there other areas within the wastewater collection system where the General Plan Update buildout wastewater flow is expected to exceed the existing sewer capacity, and the sewer is not part of a 2006 Wastewater Master Plan CIP capacity improvement project. Thus, it is evident that additional capacity improvement projects beyond those provided for in the

2006 Wastewater Master Plan will be required in order to accommodate General Plan Update buildout wastewater flows.

The Geographic Information System (GIS) database for the City of Fresno wastewater collection system shows that approximately 28 sewer pipeline segments were installed with very flat slopes or, in some cases, with a zero slope. For these 28 segments, the preliminary wastewater collection system modeling indicates a corresponding lack of sewer capacity. However, it is believed that the modeling results for these isolated segments do not necessarily indicate the need for a capacity improvement project for General Plan Update buildout flows. Additional analysis should be undertaken to determine what impacts, if any, these 28 pipeline segments and any others like them may actually have.

Southeast Growth Area

The 2006 Wastewater Master Plan includes an option for a satellite wastewater treatment plant (WWTP) to serve the City's Southeast Growth Area (SEGA). The City's current wastewater model is based on this option, and does not provide for a conveyance system to deliver SEGA wastewater to the RWRF.

A secondary option presented in the 2006 Master Plan was to route all SEGA wastewater to the RWRF. For this option to be feasible, significant capacity enhancement of the wastewater conveyance system from SEGA to the RWRF would be required.

Fresno-Clovis Regional Wastewater Reclamation Facility

Based on preliminary modeling, the required capacity of the FCRWRF to serve future flows for General Plan Update buildout is 183.6 MGD. This exceeds the current rated capacity of 80 MGD, and the projected flow of 150 MGD for buildout of the 2025 General Plan, both as describe in the 2006 Wastewater Master Plan. Additional studies and planning should be undertaken for expansion of the RWRF.

Proposed Mitigations (Existing Condition to the 2025 General Plan)

a. Orange Avenue Trunk Line: Construct new sewer trunk line segments designated as RS03A, RL02, C01-REP, C02-REP, C03-REP, C04-REP, C05-REP, C06-REL and C07-REP in Chapter 6 of the City of Fresno 2006 Wastewater Master Plan.

b. Marks Avenue Trunk Line: Construct new sewer trunk line segments designated as CM1-REP and CM2-REP in Chapter 6 of the City of Fresno 2006 Wastewater Master Plan.

c. North Avenue Trunk Line: Construct new sewer trunk line segments designated as CN1-REL1 and CN3-REL1 in Chapter 6 of the City of Fresno 2006 Wastewater Master Plan.

d. Ashlan Avenue Sewer Line: Construct new sewer line segments designated as CA1-REL and CA2-REP in Chapter 6 of the City of Fresno 2006 Wastewater Master Plan.

e. Construct 70.0 million gallon per day (MGD) expansion at the Fresno-Clovis Regional Wastewater Reclamation Facility, in accordance with the City of Fresno 2006 Wastewater Master Plan.

f. Construct 25,000 acre-feet per year recycled water expansion to the Fresno-Clovis Regional Wastewater Reclamation Facility, in accordance with the January 2012 City of Fresno Metropolitan Water Resources Management Plan.

g. Construct 24 MGD wastewater treatment facility within the Southeast Growth Area, in accordance with the City of Fresno 2006 Wastewater Master Plan.

h. Construct new wastewater collection systems within the City of Fresno, in accordance with the City of Fresno 2006 Wastewater Master Plan.

Proposed Mitigations (2025 General Plan General Plan Update)

a. Prepare a wastewater master plan update for the General Plan Update buildout condition, incorporating a final calibrated wastewater collection system hydraulic model.

b. Construct 9.6 million gallon per day (MGD) expansion at the Fresno-Clovis Regional Wastewater Reclamation Facility.

c. As part of the wastewater master plan update, develop a capital improvement program providing detailed project descriptions and implementation schedules for capacity improvement projects necessary to accommodate General Plan Update buildout flows, for both the wastewater collection system and the RWRF.

d. As part of the wastewater master plan update, evaluate current planning for SEGA, and develop updated plans or confirm current plans for provision of wastewater collection and treatment service for SEGA. Incorporate detailed project descriptions and implementation schedules for related capital improvement projects for the wastewater collection system, and for RWRF expansion or a satellite wastewater treatment plant to provide service for SEGA.

e. Implement the updated wastewater master plan and its capital improvement program in accordance with master plan implementation schedules.

Recommendations

A wastewater master plan update should be prepared for the General Plan Update buildout condition, incorporating a final calibrated wastewater collection system hydraulic model. The master plan update should include a capital improvement program providing detailed project descriptions for capacity improvement projects necessary to accommodate General Plan Update buildout flows, for both the wastewater collection system and the RWRF. The wastewater master plan update should also address wastewater collection and treatment for SEGA, and provide detailed project descriptions for projects intended to provide service for SEGA.

Appendix A

CITY OF FRESNO MEIR

PRELIMINARY WASTEWATER MODELING RESULTS

Scale: 1"=1.5 mi

FIGURE 1.1

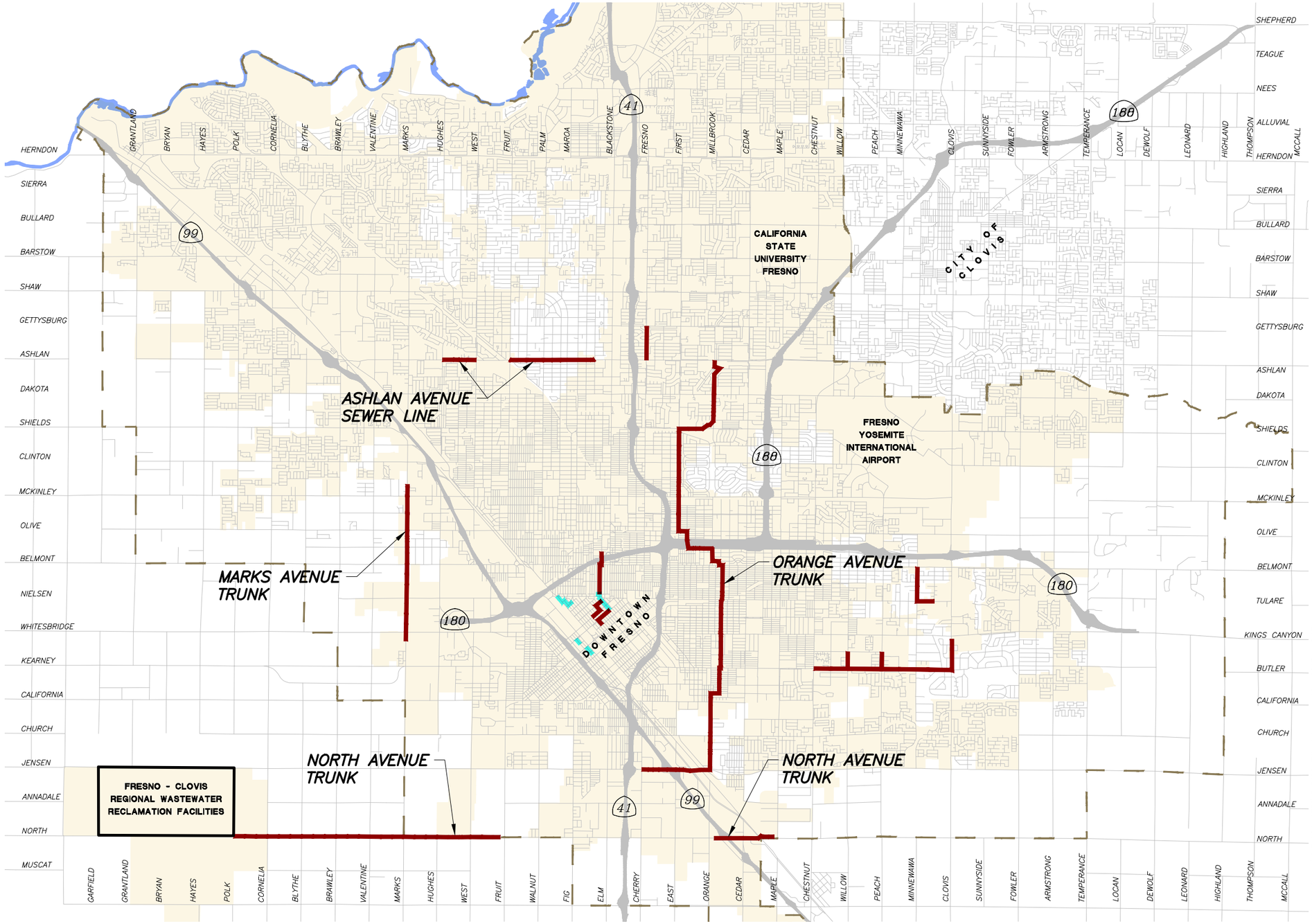
Blair, Church & Flynn
CONSULTING ENGINEERS

LEGEND:

- SEWERS WHERE PRELIMINARY MODELING INDICATES POTENTIAL CAPACITY DEFICITS
- SEWERS WHERE FULTON CORRIDOR SPECIFIC PLAN EIR TECHNICAL REPORT INDICATE POTENTIAL CAPACITY DEFICITS
- STREET CENTERLINES
- FRESNO SPHERE OF INFLUENCE
- FRESNO CITY LIMITS

NOTES:

1. FUTURE FLOWS BASED ON GENERAL PLAN UPDATE LAND USES.



SCALE IN MILES

0 0.75 1 1.5 3.0

C:\Users\Joshua\appdata\local\temp\AcPublish_1756\212192_EXH_1.dwg Jun 18, 2013 - 8:17am

CITY OF FRESNO MEIR

2006 WASTEWATER MASTER PLAN CIP PROJECTS PLANNED FOR CONSTRUCTION

FIGURE 1.2

Scale: 1"=1.5 mi

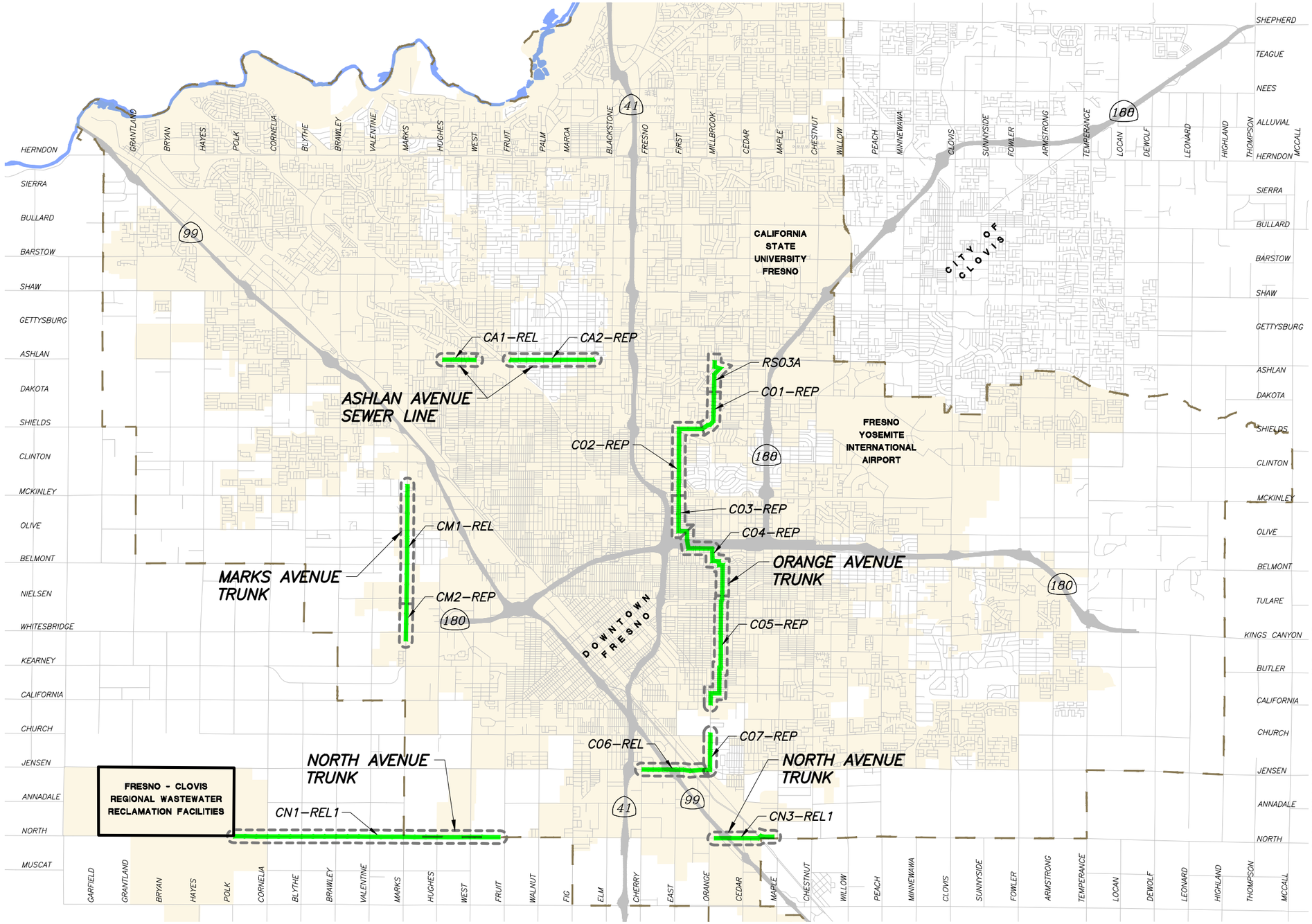
Blair, Church & Flynn
CONSULTING ENGINEERS

LEGEND:

- *2006 WASTEWATER MASTER PLAN CIP PROJECTS PLANNED FOR CONSTRUCTION*
- *STREET CENTERLINES*
- *FRESNO SPHERE OF INFLUENCE*
- *FRESNO CITY LIMITS*

NOTES:

1. *FUTURE FLOWS BASED ON GENERAL PLAN UPDATE LAND USES.*



SCALE IN MILES
0 0.75 1 1.5 3.0

C:\Users\Joshua\appdata\local\temp\AcPublish_17756\212192_EXHL_2.dwg Jun 18, 2013 - 8:17am

													ADV = ADVERSE PIPE						Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
18	8758	18.726	1.943	1.00	45	320.05	320.00	636	0.0001	10.4%	HERN	0.010	REHAB		yes	0.938	1.266	11.045	13.983	6275.510	9.037	-9.689
21	8683	18.672	1.934	1.00	45	319.08	318.94	705	0.0002	10.4%	HERN	0.010	REHAB		yes	0.938	2.012	11.045	22.223	9973.832	14.362	-4.310
28	8550	19.056	1.913	1.00	45	316.69	316.78	70	-0.0013	10.0%	HERN	0.013	ADV		yes	0.938		11.045	ADV	ADV	ADV	
50	7896	20.18	1.938	1.00	45	301.21	300.87	622.36	0.0005	9.6%	HERN	0.013			yes	0.938	2.567	11.045	28.354	12725.295	18.324	-1.856
138	39403	28.914	11.456	1.00	72	231.54	231.56	71.053	-0.0003	39.6%	CORN	0.013	ADV		yes	1.500		28.274	ADV	ADV	ADV	
178	25137	25.002	4.875	1.00	45	257.64	257.25	514.37	0.0008	19.5%	CORN	0.013	2500D		yes	0.938	3.009	11.045	33.232	14914.375	21.477	-3.525
181	310953	24.881	4.848	1.00	45	255.56	255.52	193.05	0.0002	19.5%	CORN	0.013	2500D		yes	0.938	1.561	11.045	17.242	7738.319	11.143	-13.738
183	27128	25.732	4.849	1.00	45	254.68	253.96	727.75	0.0010	18.8%	CORN	0.013	2000D		yes	0.938	3.455	11.045	38.157	17124.755	24.660	-1.072
190	285206	26.325	4.899	1.00	45	249.99	249.45	800.93	0.0007	18.6%	CORN	0.013	2500D		yes	0.938	2.852	11.045	31.499	14136.725	20.357	-5.968
192	285239	26.317	4.885	1.00	45	249.23	248.88	398.79	0.0009	18.6%	CORN	0.013	1750D		yes	0.938	3.254	11.045	35.938	16129.136	23.226	-3.091
193	29060	27.527	4.884	1.00	45	248.88	247.41	1225.99	0.0012	17.7%	CORN	0.013	1750D		yes	0.938	3.801	11.045	41.977	18839.475	27.129	-0.398
194	29059	27.334	4.883	1.00	45	247.41	247.06	300	0.0012	17.9%	CORN	0.013	2000D		yes	0.938	3.762	11.045	41.553	18649.188	26.855	-0.479
195	29061	27.308	4.881	1.00	45	247.06	245.76	1109.84	0.0012	17.9%	CORN	0.013	2500D		yes	0.938	3.759	11.045	41.518	18633.340	26.832	-0.476
197	30961	28.466	4.864	1.00	51	243.33	242.90	1040	0.0004	17.1%	CORN	0.013	2500D		yes	1.063	2.426	14.186	34.412	15443.942	22.239	-6.227
198	32937	28.437	4.85	1.00	51	242.90	242.47	1030	0.0004	17.1%	CORN	0.013	2500D		yes	1.063	2.437	14.186	34.578	15518.732	22.347	-6.090
199	32938	28.351	4.834	1.00	51	242.47	241.86	1461.33	0.0004	17.1%	CORN	0.013	3000D		yes	1.063	2.437	14.186	34.576	15517.844	22.346	-6.005
200	34724	28.52	4.936	1.00	51	241.86	240.42	2608.06	0.0006	17.3%	CORN	0.013	2500D		yes	1.063	2.803	14.186	39.766	17846.911	25.700	-2.820
205	39415	106.459	22.916	1.00	84	234.65	234.63	48	0.0004	21.5%	CORN	0.013	1750D		yes	1.750	3.385	38.485	130.265	58463.016	84.187	-22.272
206	346035	106.311	22.904	1.00	84	234.63	233.75	2573	0.0003	21.5%	CORN	0.013	1750D		yes	1.750	3.067	38.485	118.020	52967.354	76.273	-30.038
220	305162	17.446	1.718	1.00	45	320.73	320.58	535	0.0003	9.8%	HERN	0.010	REHAB		yes	0.938	2.391	11.045	26.406	11851.172	17.066	-0.380
231	10973	2.099	0.688	1.00	15	318.90	318.22	328.2	0.0021	32.8%	MRKS	0.013			yes	0.313	2.421	1.227	2.971	1333.496	1.920	-0.179
232	10974	2.065	0.686	1.00	15	318.22	317.67	325.6	0.0017	33.2%	MRKS	0.013			yes	0.313	2.186	1.227	2.683	1204.054	1.734	-0.331
233	10975	2.038	0.683	1.00	15	317.67	317.23	325.6	0.0014	33.5%	MRKS	0.013			yes	0.313	1.955	1.227	2.400	1076.938	1.551	-0.487
234	10976	2.024	0.681	1.00	15	317.23	316.73	325.8	0.0015	33.6%	MRKS	0.013			yes	0.313	2.084	1.227	2.557	1147.668	1.653	-0.371
235	10977	2.162	0.875	1.00	15	316.64	315.77	633.8	0.0014	40.5%	MRKS	0.013			yes	0.313	1.971	1.227	2.418	1085.401	1.563	-0.599
236	10978	2.12	0.869	1.00	15	315.77	315.71	36	0.0017	41.0%	MRKS	0.013			yes	0.313	2.172	1.227	2.665	1196.000	1.722	-0.398
237	10979	2.128	0.867	1.00	15	315.64	314.72	619.3	0.0015	40.7%	MRKS	0.013			yes	0.313	2.050	1.227	2.516	1129.146	1.626	-0.502
238	10980	2.128	0.857	1.00	15	314.72	314.03	670	0.0010	40.3%	MRKS	0.013			yes	0.313	1.707	1.227	2.095	940.143	1.354	-0.774
253	14197	10.282	3.064	1.00	30	305.85	305.76	70	0.0013	29.8%	MRKS	0.013	III		yes	0.625	3.014	4.909	14.793	6639.245	9.561	-0.721
317	23113	22.899	6.034	1.00	45	273.66	273.50	343	0.0005	26.4%	MRKS	0.010	REHAB		yes	0.938	3.084	11.045	34.061	15286.410	22.012	-0.887
320	25330	23.389	6.011	1.00	45	272.28	271.96	688.22	0.0005	25.7%	MRKS	0.010	REHAB		yes	0.938	3.079	11.045	34.006	15261.735	21.977	-1.412
324	275114	23.608	6.007	1.00	45	270.57	270.38	712.1	0.0003	25.4%	MRKS	0.010	REHAB		yes	0.938	2.332	11.045	25.760	11561.093	16.648	-6.960
333	29065	25.775	5.963	1.00	45	266.24	266.20	44.9	0.0009	23.1%	MRKS	0.013	CL2		yes	0.938	3.278	11.045	36.208	16250.100	23.400	-2.375
337	32959	26.494	5.952	1.00	45	263.81	263.80	22	0.0005	22.5%	MRKS	0.010	REHAB		yes	0.938	3.044	11.045	33.622	15089.722	21.729	-4.765
345	327826	8.744	1.426	1.00	36	262.00	262.02	35	-0.0006	16.3%	MRKS	0.010	ADV		yes	0.750		7.069	ADV	ADV	ADV	
347	285615	13.534	2.942	1.00	36	261.41	261.38	36	0.0008	21.7%	MRKS	0.013	SDR35		yes	0.750	2.736	7.069	19.343	8681.164	12.501	-1.033
353	36432	32.218	8.42	1.00	60	258.83	258.52	880	0.0004	26.1%	MRKS	0.013			yes	1.250	2.493	19.635	48.941	21964.725	31.629	-0.589
359	38217	75.004	18.047	1.00	66	255.20	255.08	107	0.0011	24.1%	MRKS	0.013			yes	1.375	4.736	23.758	112.522	50499.786	72.720	-2.284
364	38215	74.862	18.033	1.00	66	251.70	251.17	472	0.0011	24.1%	MRKS	0.013	CL5		yes	1.375	4.739	23.758	112.591	50530.982	72.765	-2.097
389	11056	0.424	0.424	1.00	12	315.66	316.08	90	-0.0047	100.0%	MRKS	0.013	ADV		yes	0.250		0.785	ADV	ADV	ADV	
411	11158	0.854	0.012	1.00	18	319.30	319.26	597	0.0001	1.4%	MRKS	0.013			yes	0.375	0.491	1.767	0.868	389.468	0.561	-0.293
421	12759	5.697	0.203	1.00	27	313.66	313.52	357	0.0004	3.6%	MRKS	0.010	REHAB		yes	0.563	2.018	3.976	8.025	3601.677	5.186	-0.511
422	292383	5.676	0.203	1.00	27	313.52	313.45	272.88	0.0003	3.6%	MRKS	0.010	REHAB		yes	0.563	1.632	3.976	6.491	2912.984	4.195	-1.481
431	14309	5.496	0.201	1.00	27	310.15	310.12	113.1	0.0003	3.7%	MRKS	0.013			yes	0.563	1.277	3.976	5.077	2278.562	3.281	-2.215
433	14307	5.497	0.269	1.00	27	309.20	309.19	104.9	0.0001	4.9%	MRKS	0.013			yes	0.563	0.765	3.976	3.044	1365.978	1.967	-3.530
434	14238	5.488	0.269	1.00	27	309.19	309.30	47	-0.0023	4.9%	MRKS	0.013	ADV		yes	0.563		3.976	ADV	ADV	ADV	
485	21566	8.088	2.499	1.00	24	296.96	296.44	616.56	0.0008	30.9%	FRUI	0.010	REHAB		yes	0.500	2.739	3.142	8.603	3861.208	5.560	-2.528
486	21567	8.078	2.498	1.00	24	296.44	295.66	662.7	0.0012	30.9%	FRUI	0.010	REHAB		yes	0.500	3.235	3.142	10.164	4561.398	6.568	-1.510
487	21568	8.131	2.497	1.00	24	295.66	295.01	416.7	0.0016	30.7%	FRUI	0.010	REHAB		yes	0.500	3.724	3.142	11.700	5251.146	7.562	-0.569
488	281991	8.122	2.497	1.00	24	295.01	294.89	242.47	0.0005	30.7%	FRUI	0.010	REHAB		yes	0.500	2.098	3.142	6.590	2957.814	4.259	-3.863
489	21626	8.116	2.497	1.00	24	294.89	294.80	169.54	0.0005	30.8%	FRUI	0.010	REHAB		yes	0.500	2.173	3.142	6.826	3063.334	4.411	-3.705
490	281990	8.111	2.496	1.00	24	294.80	294.20	440.6	0.0014	30.8%	FRUI	0.010	REHAB		yes	0.500	3.480	3.142	10.932	4906.396	7.065	-1.046
492	349803	8.246	2.549	1.00	27	293.70	293.54	425	0.0004	30.9%	FRUI	0.010	REHAB		yes	0.563	1.978	3.976	7.863	3528.909	5.082	-3.164
493	21389	8.747	2.67	1.00	27	293.54	293.09	542	0.0008	30.5%	FRUI	0.010	REHAB		yes	0.563	2.937	3.976	11.677	5240.606	7.546	-1.201
495	21387	8.918	2.667	1.00	27	292.08	291.91	547	0.0003	29.9%	FRUI	0.010	REHAB		yes	0.563	1.797	3.976	7.144	3206.311	4.617	-4.301
497	21285	8.906	2.663	1.00	27	291.16	290.54	665.7	0.0009	29.9%	FRUI	0.010	REHAB		yes	0.563	3.110	3.976	12.367	5550.492	7.993	-0.913
498	19318	8.908	2.66	1.00	27	290.54	289.89	661.5	0.0010	29.9%	FRUI	0.010	REHAB		yes	0.563	3.195	3.976	12.703	5701.205	8.210	-0.698
499	19319	8.953	2.657	1.00	27	289.89	289.31	648	0.0009	29.7%	FRUI	0.010	REHAB		yes	0.563	3.049	3.976	12.124	5441.284	7.835	-1.118
500	346009	8.94	2.654	1.00	27	289.31	288.58	661	0.0011	29.7%	FRUI	0.010	REHAB		yes	0.563	3.387	3.976	13.467	6044.155	8.704	-0.236
513	21181	10.795	2.682	1.00	30	283.88	283.56	328	0.0010	24.8%	FRUI	0.010	REHAB		yes	0.625	3.413	4.909	16.752	7518.443	10.827	0.032
516	23280	11.06	2.688	1.00	30	283.06	282.73	325	0.0010	24.3%	FRUI	0.010	REHAB		yes	0.625	3.482	4.909	17.090	7670.172	11.045	-0.015
517	345270	11.043	2.687	1.00	30	282.73	282.70	34	0.0009	24.3%	FRUI	0.010	REHAB		yes	0.625	3.246	4.909	15.932	7150.082	10.296	-0.747
518	23281	11.057	2.695	1.00	30	282.70	282.54	165	0.0010	24.4%	FRUI	0.010	REHAB		yes	0.625	3.402	4.909	16.701	7495.625	10.794	-0.263
519	23282	11.057	2.695	1.00	30	282.54	282.05	487.9	0.0010	24.4%	FRUI	0.010	REHAB		yes	0.625	3.463	4.909	16.997	7628.207	10.985	-0.072
520	23283	11.025	2.693	1.00	30	282.05	281.72	325.7	0.0010	24.4%	FRUI	0.010	REHAB		yes	0.625	3.478	4.909	17.072	7661.925	11.033	0.008
521	23284	11.058	2.691	1.00	30	281.72	281.56	166.5	0.0010	24.3%	FRUI	0.010	REHAB		yes	0.625	3.387	4.909	16.626	7461.784	10.745	-0.313
522	23285	11.064	2.691	1.00	30	281.56	281.24	321.5	0.0010	24.3%	FRUI	0.010	REHAB		yes	0.625	3.447	4.909	16.921	7594.065	10.935	-0.129
523	23286	11.274	2.69	1.00	30	281.24	281.06	174.75	0.0010	23.9%	FRUI	0.010	REHAB		yes	0.625	3.507	4.909	17.213	7725.338	11.124	-0.150
524	23287	11.298	2.689	1.00	30	281.06	280.88	169.3	0.0011	23.8%	FRUI	0.010	REHAB		yes	0.625	3.563	4.909	17.488	7848.698	11.302	0.004
525	23288	11.332	2.688	1.00	30	280.88	280.55	313.4	0.0011	23.7%	FRUI	0.010	REHAB		yes	0.625	3.545	4.909	17.404	7810.832	11.248	-0.084
526	23289	11.667	2.703	1.00	30	280.55	280.40	185.85	0.0008	23.2%	FRUI	0.010	REHAB		yes	0.625	3.104	4.909	15.237	6838.395	9.847	-1.820
527	25519	11.673	2.703	1.00	30	280.40	280.06	339.52	0.0010	23.2%	FRUI	0.010	REHAB		yes	0.625	3.458	4.909	16.972	7617.222	10.969	-0.704
528	25518	11.676	2.703	1.00	30	280.06	279.89	169.97	0.0010	23.2%	FRUI	0.010	REHAB		yes	0.625	3.455	4.909	16.962	7612.515	10.962	-0.714
529	25517	11.699	2.703	1.00	30	279.89	279.71	169.56	0.0011	23.1%	FRUI	0.010	REHAB		yes	0.625	3.560	4.909	17.475	7842.678	11.293	-0.406
530	25516	11.717	2.703	1.00	30	279.71	279.57	151.12	0.0009	23.1%	FRUI	0.010	REHAB		yes	0.625	3.326	4.909	16.325	7326.438	10.550	-1.167
531	25467	11.865	2.707	1.00	30	279.57	279.40	173.55	0.0010	22.8%	FRUI	0.010	REHAB		yes	0.625	3.420	4.909	16.786	7533.590	10.848	-1.017
532	25515	11.889	2.707	1.00	30	279.40	279.23	158.42	0.0011	22.8%	FRUI	0.010	REHAB		yes	0.625	3.579	4.909	17.569	7885.138	11.355	-0.534
533	25466	11.919	2.707	1.00	30	279.23	279.06	166.16	0.0010	22.7%	FRUI	0.010	REHAB		yes	0.625	3.495	4.909	17.155	7699.297	11.087	-0.832
534	25514	11.935	2.707	1.00	30	279.06	278.90	165.87	0.0010	22.7%	FRUI	0.010	REHAB		yes	0.625	3.393	4.909	16.658	7475.942	10.765	-1.170
535	25454	11.964	2.707	1.00	30	278.90	278.75	158.79	0.0009	22.6%	FRUI	0.010	REHAB		yes	0.625	3.358	4.909	16.484	7398.163	10.653	-1.311

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
536	25513	11.972	2.707	1.00	30	278.75	278.56	173.22	0.0011	22.6%	FRUI	0.010	REHAB		yes	0.625	3.619	4.909	17.763	7972.006	11.480	-0.492
537	25453	11.994	2.706	1.00	30	278.56	278.44	151.45	0.0008	22.6%	FRUI	0.010	REHAB		yes	0.625	3.076	4.909	15.097	6775.570	9.757	-2.237
538	25512	12.026	2.707	1.00	30	278.44	277.74	683.2	0.0010	22.5%	FRUI	0.010	REHAB		yes	0.625	3.497	4.909	17.168	7704.863	11.095	-0.931
548	27245	15.305	2.766	1.00	42	275.61	275.47	435.68	0.0003	18.1%	FRUI	0.010	REHAB		yes	0.875	2.446	9.621	23.530	10560.163	15.207	-0.098
551	29250	15.314	2.762	1.00	42	274.73	274.57	518.47	0.0003	18.0%	FRUI	0.010	REHAB		yes	0.875	2.397	9.621	23.059	10348.766	14.902	-0.412
553	29248	15.342	2.762	1.00	42	273.77	274.08	264.77	-0.0012	18.0%	FRUI	0.013	ADV		yes	0.875		9.621	ADV	ADV	ADV	
557	29244	15.302	2.761	1.00	42	273.81	273.75	242.24	0.0002	18.0%	FRUI	0.010	REHAB		yes	0.875	2.147	9.621	20.658	9271.353	13.351	-1.951
562	30988	15.281	2.759	1.00	42	272.73	272.64	287.64	0.0003	18.1%	FRUI	0.010	REHAB		yes	0.875	2.413	9.621	23.219	10420.463	15.005	-0.276
571	33036	15.458	2.75	1.00	42	270.62	270.22	803.61	0.0005	17.8%	FRUI	0.013	300DPVC		yes	0.875	2.341	9.621	22.527	10110.075	14.559	-0.899
572	33037	15.39	2.75	1.00	42	270.22	269.95	558.91	0.0005	17.9%	FRUI	0.013	300DPVC		yes	0.875	2.307	9.621	22.192	9959.969	14.342	-1.048
573	33038	15.468	2.749	1.00	42	269.95	269.93	38.88	0.0005	17.8%	FRUI	0.013	300DPVC		yes	0.875	2.380	9.621	22.901	10277.771	14.800	-0.668
574	33032	15.465	2.749	1.00	42	269.93	269.82	422.02	0.0003	17.8%	FRUI	0.010	REHAB		yes	0.875	2.203	9.621	21.192	9510.870	13.696	-1.769
575	33033	15.646	2.747	1.00	42	269.82	269.64	603.03	0.0003	17.6%	FRUI	0.010	REHAB		yes	0.875	2.357	9.621	22.678	10177.877	14.656	-0.990
596	34879	12.069	2.039	1.00	30	268.70	268.33	568	0.0007	16.9%	FRUI	0.010	REHAB		yes	0.625	2.789	4.909	13.689	6143.509	8.847	-3.222
597	34866	12.066	2.037	1.00	30	268.33	268.05	306	0.0009	16.9%	FRUI	0.010	REHAB		yes	0.625	3.305	4.909	16.224	7281.287	10.485	-1.581
598	34865	12.061	2.037	1.00	30	268.05	267.60	553.6	0.0008	16.9%	FRUI	0.010	REHAB		yes	0.625	3.115	4.909	15.291	6862.748	9.882	-2.179
600	34881	12.103	2.035	1.00	30	266.92	266.84	155	0.0005	16.8%	FRUI	0.010	REHAB		yes	0.625	2.482	4.909	12.185	5468.510	7.875	-4.228
602	36625	12.102	2.035	1.00	30	266.54	266.24	329	0.0009	16.8%	FRUI	0.010	REHAB		yes	0.625	3.299	4.909	16.196	7268.629	10.467	-1.635
603	36626	12.11	2.035	1.00	30	266.24	266.04	191	0.0010	16.8%	FRUI	0.010	REHAB		yes	0.625	3.536	4.909	17.355	7789.115	11.216	-0.894
604	36627	12.164	2.035	1.00	30	266.04	265.58	563	0.0008	16.7%	FRUI	0.010	REHAB		yes	0.625	3.123	4.909	15.331	6880.414	9.908	-2.256
605	36628	12.156	2.035	1.00	30	265.58	264.85	759	0.0010	16.7%	FRUI	0.010	REHAB		yes	0.625	3.389	4.909	16.633	7465.010	10.750	-1.406
606	36629	12.144	2.034	1.00	30	264.85	264.03	707	0.0012	16.7%	FRUI	0.010	REHAB		yes	0.625	3.721	4.909	18.266	8197.606	11.805	-0.339
607	36637	28.145	4.084	1.00	48	262.58	262.54	47.5	0.0008	14.5%	FRUI	0.013			yes	1.000	3.326	12.566	41.796	18758.099	27.012	-1.133
625	38251	41.216	7.147	1.00	60	256.47	256.28	784.42	0.0002	17.3%	MRKS	0.010	REHAB		yes	1.250	2.687	19.635	52.757	23677.295	34.095	-7.121
629	38249	41.893	8.12	1.00	60	255.25	255.22	133.35	0.0002	19.4%	MRKS	0.013			yes	1.250	1.992	19.635	39.111	17552.961	25.276	-16.617
650	21712	6.826	1.186	1.00	24	297.10	297.25	57	-0.0026	17.4%	FRUI	0.013	ADV		yes	0.500		3.142	ADV	ADV	ADV	
651	21711	6.297	1.187	1.00	24	297.62	297.10	683	0.0008	18.9%	FRUI	0.013			yes	0.500	2.001	3.142	6.288	2822.001	4.064	-2.233
667	25892	0.748	0.08	1.00	12	294.43	294.34	194	0.0005	10.7%	NCEN	0.010	REHAB		yes	0.250	1.285	0.785	1.010	453.096	0.652	-0.096
673	25898	0.986	0.23	1.00	12	292.14	292.00	165	0.0008	23.3%	NCEN	0.010	REHAB		yes	0.250	1.738	0.785	1.365	612.761	0.882	-0.104
675	25900	1.019	0.266	1.00	12	291.60	291.10	439.32	0.0011	26.1%	NCEN	0.010	REHAB		yes	0.250	2.013	0.785	1.581	709.682	1.022	0.003
686	27940	3.339	0.923	1.00	20	285.43	285.26	153	0.0011	27.6%	NCEN	0.013			yes	0.417	2.144	2.182	4.677	2099.048	3.023	-0.316
687	27941	3.333	0.923	1.00	20	285.26	285.16	102	0.0010	27.7%	NCEN	0.013			yes	0.417	2.014	2.182	4.393	1971.713	2.839	-0.494
688	27942	3.327	0.922	1.00	20	285.16	285.06	134.66	0.0007	27.7%	NCEN	0.013			yes	0.417	1.753	2.182	3.824	1716.028	2.471	-0.856
689	27943	3.647	0.988	1.00	20	285.06	284.38	501.55	0.0013	27.1%	NCEN	0.013			yes	0.417	2.361	2.182	5.151	2311.852	3.329	-0.318
690	29862	3.629	0.985	1.00	20	284.38	283.94	317.89	0.0014	27.1%	NCEN	0.013			yes	0.417	2.404	2.182	5.244	2353.406	3.389	-0.240
691	29863	3.611	0.983	1.00	20	283.94	283.31	499.52	0.0013	27.2%	NCEN	0.013			yes	0.417	2.284	2.182	4.983	2236.339	3.220	-0.391
702	29692	4.824	1.318	1.00	24	278.99	278.84	177.9	0.0008	27.3%	NCEN	0.013			yes	0.500	2.106	3.142	6.617	2969.775	4.276	-0.548
703	29693	4.814	1.316	1.00	24	278.84	278.74	126.7	0.0008	27.3%	NCEN	0.013			yes	0.500	2.038	3.142	6.402	2873.277	4.138	-0.676
704	31316	4.796	1.311	1.00	24	278.74	277.63	1311.18	0.0008	27.3%	NCEN	0.013			yes	0.500	2.111	3.142	6.630	2975.748	4.285	-0.511
705	31317	5.061	1.291	1.00	24	277.63	277.62	11.99	0.0008	25.5%	NCEN	0.013			yes	0.500	2.095	3.142	6.581	2953.631	4.253	-0.808
706	337959	5.051	1.287	1.00	24	277.62	276.83	965.72	0.0008	25.5%	NCEN	0.013			yes	0.500	2.075	3.142	6.518	2925.188	4.212	-0.839
707	31318	6.965	1.261	1.00	27	276.58	276.46	176.93	0.0007	18.1%	NCEN	0.013			yes	0.563	2.042	3.976	8.118	3643.522	5.247	-1.718
708	31319	6.975	1.258	1.00	27	276.46	276.36	118.71	0.0008	18.0%	NCEN	0.013			yes	0.563	2.276	3.976	9.048	4060.578	5.847	-1.128
709	33381	6.974	1.254	1.00	27	276.36	276.14	277.15	0.0008	18.0%	NCEN	0.013			yes	0.563	2.209	3.976	8.783	3941.717	5.676	-1.298
710	33380	0.381	0	1.00	8	281.96	281.61	198.1	0.0018	0.0%	NCEN	0.013				0.167	1.477	0.349	0.515	231.321	0.333	-0.048
711	33331	0.38	0	1.00	8	281.62	281.06	490.22	0.0011	0.0%	NCEN	0.013				0.167	1.182	0.349	0.413	185.172	0.267	-0.113
712	33332	0.38	0	1.00	8	281.06	280.76	461.32	0.0007	0.0%	NCEN	0.013				0.167	0.896	0.349	0.313	140.340	0.202	-0.178
713	33394	0.486	0	1.00	8	280.76	280.74	17.5	0.0011	0.0%	NCEN	0.013				0.167	1.188	0.349	0.415	186.046	0.268	-0.218
714	33333	0.486	0	1.00	8	280.39	279.83	399.34	0.0014	0.0%	NCEN	0.013				0.167	1.315	0.349	0.459	206.085	0.297	-0.189
715	33383	0.485	0	1.00	8	279.83	279.27	399.71	0.0014	0.0%	NCEN	0.013				0.167	1.315	0.349	0.459	205.989	0.297	-0.188
753	33382	6.617	1.246	1.00	27	276.14	275.37	947.46	0.0008	18.8%	NCEN	0.013			yes	0.563	2.235	3.976	8.887	3988.379	5.743	-0.874
775	349987	3.707	1.074	1.00	24	280.17	280.20	66.26	-0.0005	29.0%	NCEN	0.010	SDR35		yes	0.500		3.142	ADV	ADV	ADV	
777	349989	3.698	1.072	1.00	24	279.79	279.80	6	-0.0017	29.0%	NCEN	0.010	SDR35		yes	0.500		3.142	ADV	ADV	ADV	
783	23988	0.314	0.119	1.00	10	297.18	297.17	43	0.0002	37.9%	NCEN	0.013			yes	0.208	0.621	0.545	0.339	151.939	0.219	-0.095
785	23990	0.334	0.13	1.00	10	296.44	296.32	378.41	0.0003	38.9%	NCEN	0.013			yes	0.208	0.725	0.545	0.395	177.424	0.255	-0.079
798	26014	1.396	0.187	1.00	15	288.95	288.94	49	0.0002	13.4%	NCEN	0.010	REHAB		yes	0.313	0.988	1.227	1.212	544.067	0.783	-0.613
808	29914	0.496	0.147	1.00	12	282.19	282.24	87.29	-0.0006	29.6%	NCEN	0.013	ADV		yes	0.250		0.785	ADV	ADV	ADV	
848	18018	3.416	1.218	1.00	21	313.90	314.06	62	-0.0026	35.7%	ORAN	0.013	ADV		yes	0.438		2.405	ADV	ADV	ADV	
856	20056	5.254	1.535	1.00	24	310.95	310.44	480	0.0011	29.2%	ORAN	0.013	D1500		yes	0.500	2.364	3.142	7.428	3333.729	4.801	-0.453
860	20060	5.376	1.516	1.00	24	308.48	307.84	532.37	0.0012	28.2%	ORAN	0.013	D1500		yes	0.500	2.515	3.142	7.901	3546.084	5.106	-0.270
866	19954	2.984	0.801	1.00	21	304.63	304.08	999	0.0006	26.8%	FRUI	0.013	1500D		yes	0.438	1.558	2.405	3.748	1682.309	2.423	-0.561
868	19708	3.659	0.813	1.00	21	303.48	303.31	172.7	0.0010	22.2%	FRUI	0.013			yes	0.438	2.084	2.405	5.012	2249.498	3.239	-0.420
869	19709	3.808	0.812	1.00	21	303.31	302.97	338.5	0.0010	21.3%	FRUI	0.013			yes	0.438	2.105	2.405	5.063	2272.309	3.272	-0.536
870	19710	3.8	0.812	1.00	21	302.97	302.63	336.5	0.0010	21.4%	FRUI	0.013			yes	0.438	2.111	2.405	5.078	2279.052	3.282	-0.518
871	19711	3.789	0.812	1.00	21	302.63	302.22	406.4	0.0010	21.4%	FRUI	0.013			yes	0.438	2.110	2.405	5.074	2277.311	3.279	-0.510
873	19713	3.825	0.809	1.00	21	301.21	300.92	662.1	0.0004	21.2%	FRUI	0.013			yes	0.438	1.390	2.405	3.343	1500.529	2.161	-1.664
874	19714	6.366	1.19	1.00	21	300.92	300.89	44	0.0007	18.7%	FRUI	0.010	REHAB		yes	0.438	2.255	2.405	5.423	2433.800	3.505	-2.861
875	21702	6.367	1.19	1.00	21	300.89	300.09	693	0.0012	18.7%	FRUI	0.010	REHAB		yes	0.438	2.934	2.405	7.056	3166.861	4.560	-1.807
876	21703	6.314	1.187	1.00	24	299.54	299.35	380	0.0005	18.8%	FRUI	0.013			yes	0.500	1.622	3.142	5.096	2286.919	3.293	-3.021
877	21704	6.28	1.186	1.00	24	299.35	298.95	440	0.0009	18.9%	FRUI	0.013			yes	0.500	2.187	3.142	6.871	3083.681	4.441	-1.839
878	21705	6.232	1.183	1.00	24	298.95	298.81	380	0.0004	19.0%	FRUI	0.013			yes	0.500	1.392	3.142	4.374	1963.080	2.827	-3.405
879	21706	6.207	1.18	1.00	24	298.81	298.53	260	0.0011	19.0%	FRUI	0.013			yes	0.500	2.380	3.142	7.478	3356.280	4.833	-1.374
880	21707	6.216	1.179	1.00	24	298.53	298.28	260	0.0010	19.0%	FRUI	0.013			yes	0.500	2.249	3.142	7.066	3171.386	4.567	-1.649
881	21708	6.23	1.178	1.00	24	298.28	298.29	290	0.0000	18.9%	FRUI	0.013	ADV		yes	0.500		3.142	ADV	ADV	ADV	
882	21709	6.247	1.178	1.00	24	298.29	298.16	260	0.0005	18.9%	FRUI	0.013			yes	0.500	1.622	3.142	5.096	2286.919	3.293	-2.954
883	21710	6.245	1.178	1.00	24	298.16	297.62	446	0.0012	18.9%	FRUI	0.013			yes	0.500	2.524	3.142	7.929	3558.732	5.125	-1.120
891	22055	3.504	0.848	1.00	21	304.27	304.14	272.15	0.0005	24.2%	ORAN	0.013	1500D	Yes		0.438	1.452	2.405	3.492	1567.021	2.257	-1.247
905	26280	5.734	0.855	1.00	24	296.01	295.34	577.69	0.0012	14.9%	ORAN	0.013	1350D	Yes		0.500	2.470	3.142	7.761	3483.019	5.016	-0.718
906	26279	5.701	0.853	1.00	24	295.34	294.68	579.39	0.0011	15.0%	ORAN	0.013	1350D	Yes		0.500	2.445	3.142	7.680	3446.619	4.963	-0.738
907	26281	5.801	0.853	1.00	24	294.68	294.49	167	0.0011	14.7%	ORAN	0.013	1350D	Yes		0.500	2.460	3.142	7.727	3467.833	4.994	-0.807

														ADV = ADVERSE PIPE						Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
915	28169	6.754	0.883	1.00	30	290.02	289.84	280	0.0006	13.1%	ORAN	0.013	1350D	Yes		0.625	2.131	4.909	10.460	4694.655	6.760	0.006
920	277688	8.07	0.909	1.00	30	288.10	288.09	57	0.0002	11.3%	ORAN	0.013	CL4	Yes		0.625	1.113	4.909	5.465	2452.500	3.532	-4.538
921	30183	8.052	0.909	1.00	30	288.09	287.99	654	0.0002	11.3%	ORAN	0.013	CL4	Yes		0.625	1.039	4.909	5.102	2289.589	3.297	-4.755
924	30124	8.149	0.908	1.00	30	287.67	287.53	165	0.0008	11.1%	ORAN	0.013	1350D	Yes		0.625	2.448	4.909	12.018	5393.473	7.767	-0.382
926	30126	8.223	0.907	1.00	30	287.22	286.91	330.83	0.0009	11.0%	ORAN	0.013	1350D	Yes		0.625	2.573	4.909	12.629	5667.935	8.162	-0.061
927	30127	8.259	0.906	1.00	30	286.91	286.60	331.37	0.0009	11.0%	ORAN	0.013	1350D	Yes		0.625	2.571	4.909	12.619	5663.315	8.155	-0.104
941	31865	8.804	0.901	1.00	30	282.51	282.42	294.13	0.0003	10.2%	ORAN	0.010	REHAB	Yes		0.625	1.911	4.909	9.382	4210.575	6.063	-2.741
948	33955	15.996	0.935	1.00	36	280.22	279.55	709	0.0009	5.8%	SCEN	0.013	1750D	Yes		0.750	2.914	7.069	20.598	9244.488	13.312	-2.684
949	33956	16.316	0.934	1.00	36	279.55	279.15	417	0.0010	5.7%	SCEN	0.013	1750D	Yes		0.750	2.936	7.069	20.753	9313.878	13.412	-2.904
950	33957	16.286	0.933	1.00	36	279.15	278.96	199	0.0010	5.7%	ORAN	0.013	1750D	Yes		0.750	2.929	7.069	20.705	9292.206	13.381	-2.905
951	33958	16.452	0.933	1.00	36	278.96	278.83	141	0.0009	5.7%	ORAN	0.013	1750D	Yes		0.750	2.878	7.069	20.346	9131.260	13.149	-3.303
952	33959	16.435	0.933	1.00	36	278.83	278.77	86	0.0007	5.7%	ORAN	0.013	1750D	Yes		0.750	2.504	7.069	17.699	7943.191	11.438	-4.997
953	35829	16.534	0.933	1.00	36	278.77	278.74	30.87	0.0010	5.6%	ORAN	0.013	2000D	Yes		0.750	2.955	7.069	20.889	9374.776	13.500	-3.034
954	344566	16.531	0.932	1.00	36	278.74	278.63	127.63	0.0009	5.6%	ORAN	0.013	2000D	Yes		0.750	2.783	7.069	19.671	8828.533	12.713	-3.818
955	35762	16.53	0.932	1.00	36	278.63	278.27	377.52	0.0010	5.6%	ORAN	0.013	2000D	Yes		0.750	2.931	7.069	20.720	9299.342	13.391	-3.139
956	35761	16.528	0.932	1.00	36	278.27	277.75	541.38	0.0010	5.6%	ORAN	0.013	2000D	Yes		0.750	2.935	7.069	20.747	9311.104	13.408	-3.120
957	35830	16.63	0.931	1.00	36	277.75	277.25	520.03	0.0010	5.6%	ORAN	0.013	2000D	Yes		0.750	2.939	7.069	20.777	9324.797	13.428	-3.202
958	35831	16.62	0.931	1.00	36	277.25	276.93	340.13	0.0009	5.6%	ORAN	0.013	2000D	Yes		0.750	2.908	7.069	20.553	9224.039	13.283	-3.337
959	35832	16.738	0.931	1.00	36	276.92	276.46	480.19	0.0010	5.6%	ORAN	0.013	2000D	Yes		0.750	2.934	7.069	20.739	9307.669	13.403	-3.335
960	35833	16.736	0.931	1.00	36	276.46	276.38	92.93	0.0009	5.6%	ORAN	0.013	2000D	Yes		0.750	2.781	7.069	19.660	8823.393	12.706	-4.030
961	35857	16.789	0.931	1.00	36	276.38	276.27	122	0.0009	5.5%	ORAN	0.013	2000D	Yes		0.750	2.846	7.069	20.120	9029.943	13.003	-3.786
962	37515	16.815	0.931	1.00	36	276.27	276.19	93	0.0009	5.5%	ORAN	0.013	2000D	Yes		0.750	2.780	7.069	19.653	8820.072	12.701	-4.114
963	37565	16.812	0.931	1.00	36	276.18	276.07	120.16	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.868	7.069	20.274	9098.818	13.102	-3.710
964	37569	16.814	0.931	1.00	36	276.07	275.76	330.05	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.905	7.069	20.536	9216.363	13.272	-3.542
965	37570	16.815	0.93	1.00	36	275.76	275.44	341.04	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.904	7.069	20.525	9211.724	13.265	-3.550
966	37571	16.814	0.93	1.00	36	275.44	275.12	329.67	0.0010	5.5%	ORAN	0.013	1750D	Yes		0.750	2.953	7.069	20.876	9369.229	13.492	-3.322
967	37572	16.812	0.93	1.00	36	275.12	274.81	329.59	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.907	7.069	20.550	9222.792	13.281	-3.531
968	37573	16.799	0.929	1.00	36	274.81	274.51	325	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.880	7.069	20.358	9136.662	13.157	-3.642
969	37574	16.786	0.929	1.00	36	274.51	274.37	135	0.0010	5.5%	ORAN	0.013	1750D	Yes		0.750	3.053	7.069	21.578	9684.244	13.945	-2.841
970	37514	16.78	0.929	1.00	36	274.37	274.34	30	0.0010	5.5%	ORAN	0.013	1750D	Yes		0.750	2.998	7.069	21.189	9509.739	13.694	-3.086
971	37566	16.808	0.928	1.00	36	274.34	273.91	458.16	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.904	7.069	20.528	9212.855	13.267	-3.541
972	37575	16.843	0.936	1.00	36	273.91	273.78	138.48	0.0009	5.6%	ORAN	0.013	1750D	Yes		0.750	2.904	7.069	20.530	9213.969	13.268	-3.575
973	37567	16.832	0.935	1.00	36	273.78	273.44	362	0.0009	5.6%	ORAN	0.013	1750D	Yes		0.750	2.905	7.069	20.535	9216.240	13.271	-3.561
974	37568	16.859	0.935	1.00	36	273.44	273.12	344.96	0.0009	5.5%	ORAN	0.013	1750D	Yes		0.750	2.887	7.069	20.408	9159.235	13.189	-3.670
979	38995	5.635	0.268	1.00	24	273.84	273.76	144	0.0006	4.8%	SCEN	0.010	REHAB		yes	0.500	2.223	3.142	6.983	3133.812	4.513	-1.122
981	38997	5.635	0.268	1.00	24	272.87	272.93	76.17	-0.0008	4.8%	SCEN	0.013	ADV		yes	0.500		3.142	ADV	ADV	ADV	
983	38998	5.684	0.268	1.00	24	271.69	271.50	379	0.0005	4.7%	SCEN	0.010	REHAB		yes	0.500	2.111	3.142	6.633	2976.915	4.287	-1.397
989	39815	7.483	0.271	1.00	30	270.01	269.77	499	0.0005	3.6%	SCEN	0.013			yes	0.625	1.843	4.909	9.048	4060.709	5.847	-1.636
990	39814	7.481	0.271	1.00	30	269.77	269.43	520	0.0007	3.6%	SCEN	0.013			yes	0.625	2.149	4.909	10.549	4734.611	6.818	-0.663
991	39813	7.482	0.271	1.00	30	269.43	269.42	18	0.0006	3.6%	SCEN	0.013			yes	0.625	1.981	4.909	9.724	4364.256	6.285	-1.197
1009	39631	16.069	1.063	1.00	48	264.90	264.97	582.57	-0.0001	6.6%	JENS	0.013	ADV		yes	1.000		12.566	ADV	ADV	ADV	
1010	39632	16.07	1.064	1.00	48	264.97	264.85	759.58	0.0002	6.6%	JENS	0.010	REHAB		yes	1.000	1.873	12.566	23.534	10562.162	15.210	-0.860
1055	40970	79.345	19.781	1.00	66	243.39	242.73	887.59	0.0007	24.9%	NORT	0.010	REHAB		yes	1.375	5.013	23.758	119.110	53456.427	76.977	-2.368
1056	40972	79.323	19.73	1.00	66	242.73	242.07	887.59	0.0007	24.9%	NORT	0.010	REHAB		yes	1.375	5.013	23.758	119.110	53456.427	76.977	-2.346
1057	40971	79.318	19.675	1.00	66	242.07	241.41	887.59	0.0007	24.8%	NORT	0.010	REHAB		yes	1.375	5.013	23.758	119.110	53456.427	76.977	-2.341
1058	40964	79.308	19.619	1.00	66	241.41	240.76	884.98	0.0007	24.7%	NORT	0.010	REHAB		yes	1.375	4.983	23.758	118.378	53128.078	76.504	-2.804
1059	40966	79.294	19.561	1.00	66	240.76	240.11	884.98	0.0007	24.7%	NORT	0.010	REHAB		yes	1.375	4.983	23.758	118.378	53128.078	76.504	-2.790
1060	40965	79.275	19.522	1.00	66	240.11	239.46	884.98	0.0007	24.6%	NORT	0.010	REHAB		yes	1.375	4.983	23.758	118.378	53128.078	76.504	-2.771
1100	286559	57.366	13.238	1.00	66	260.79	260.66	230.17	0.0006	23.1%	NORT	0.013	SDR35		yes	1.375	3.361	23.758	79.852	35837.534	51.606	-5.760
1107	286548	58.705	13.794	1.00	66	258.02	257.69	475	0.0007	23.5%	NORT	0.013	SDR35		yes	1.375	3.728	23.758	88.562	39746.690	57.235	-1.470
1110	286539	59.108	14.779	1.00	66	256.62	256.28	527.65	0.0006	25.0%	NORT	0.013	SDR35		yes	1.375	3.590	23.758	85.291	38278.710	55.121	-3.987
1112	286537	59.083	14.774	1.00	66	255.68	255.22	660	0.0007	25.0%	NORT	0.013	SDR35		yes	1.375	3.734	23.758	88.704	39810.511	57.327	-1.756
1114	286535	59.046	14.759	1.00	66	254.61	254.56	190.27	0.0003	25.0%	NORT	0.013	SDR35		yes	1.375	2.293	23.758	54.468	24445.034	35.201	-23.845
1158	38432	4.118	0.005	1.00	30	265.10	265.04	294.09	0.0002	0.1%	SCEN	0.013			yes	0.625	1.200	4.909	5.893	2644.734	3.808	-0.310
1171	38351	5.186	0.081	1.00	30	261.82	261.77	154.39	0.0003	1.6%	SCEN	0.013			yes	0.625	1.513	4.909	7.425	3332.130	4.798	-0.388
1194	284589	18.21	0.846	1.00	48	267.36	267.39	50.06	-0.0006	4.6%	JENS	0.013	ADV	Yes		1.000		12.566	ADV	ADV	ADV	
1231	37358	0.595	0	1.00	18	277.54	277.66	12	-0.0100	0.0%	SCEN	0.013	ADV			0.375		1.767	ADV	ADV	ADV	
1237	340997	1.813	0.005	1.00	30	274.85	274.89	59	-0.0007	0.3%	SCEN	0.013	ADV		yes	0.625		4.909	ADV	ADV	ADV	
1244	35624	0.255	0	1.00	6	287.10	285.57	474.56	0.0032	0.0%	SCEN	0.013				0.125	1.650	0.196	0.324	145.374	0.209	-0.046
1245	35606	0.253	0	1.00	6	285.57	285.00	492.22	0.0012	0.0%	SCEN	0.013				0.125	0.989	0.196	0.194	87.125	0.125	-0.128
1246	35438	0.249	0	1.00	6	285.00	284.56	364.46	0.0012	0.0%	SCEN	0.013				0.125	1.009	0.196	0.198	88.959	0.128	-0.121
1248	35497	0.247	0	1.00	8	283.91	283.82	158	0.0006	0.0%	SCEN	0.013				0.167	0.838	0.349	0.293	131.346	0.189	-0.058
1249	35512	0.247	0	1.00	8	283.82	283.64	320.87	0.0006	0.0%	SCEN	0.013				0.167	0.832	0.349	0.290	130.345	0.188	-0.059
1330	17732	1.737	0.357	1.00	15	306.23	305.97	260	0.0010	20.6%	FRUI	0.010	REHAB		yes	0.313	2.187	1.227	2.683	1204.343	1.734	-0.003
1331	17733	1.805	0.356	1.00	15	305.97	305.71	260	0.0010	19.7%	FRUI	0.010	REHAB		yes	0.313	2.187	1.227	2.683	1204.343	1.734	-0.071
1332	17734	1.835	0.355	1.00	15	305.71	305.45	260	0.0010	19.3%	FRUI	0.010	REHAB		yes	0.313	2.187	1.227	2.683	1204.343	1.734	-0.101
1333	17735	1.978	0.354	1.00	15	305.45	305.18	260	0.0010	17.9%	FRUI	0.010	REHAB		yes	0.313	2.228	1.227	2.735	1227.284	1.767	-0.211
1334	17736	1.994	0.354	1.00	15	305.18	304.92	260	0.0010	17.8%	FRUI	0.010	REHAB		yes	0.313	2.187	1.227	2.683	1204.343	1.734	-0.260
1335	17737	2.01	0.353	1.00	15	304.92	304.66	260	0.0010	17.6%	FRUI	0.010	REHAB		yes	0.313	2.187	1.227	2.683	1204.343	1.734	-0.276
1336	17738	2.025	0.352	1.00	15	304.66	304.62	51.4	0.0008	17.4%	FRUI	0.010	REHAB		yes	0.313	1.929	1.227	2.367	1062.425	1.530	-0.495
1337	17739	2.062	0.359	1.00	15	304.62	304.41	208.6	0.0010	17.4%	FRUI	0.010	REHAB		yes	0.313	2.194	1.227	2.692	1208.377	1.740	-0.322
1338	17740	2.073	0.358	1.00	15	304.41	304.13	279.4	0.0010	17.3%	FRUI	0.010	REHAB		yes	0.313	2.189	1.227	2.686	1205.635	1.736	-0.337
1464	18267	0.773	0.061	1.00	12	321.61	321.54	60.347	0.0011	7.9%	CHES	0.013			yes	0.250	1.507	0.785	1.183	531.074	0.765	-0.008
1506	28579	5.686	0.075	1.00	39	302.89	303.09	28.64	-0.0070	1.3%	CHES	0.013	ADV		yes	0.813		8.296	ADV	ADV	ADV	
1574	36145	13.999	1.565	1.00	45	289.91	289.90	163.68	0.0001	11.2%	CHES	0.010	REHAB		yes	0.938	1.116	11.045	12.327	5532.160	7.966	-6.033
1575	36146	0.389	0.079	1.00	12	294.62	294.86	16	-0.0150	20.3%	CHES	0.013	ADV		yes	0.250		0.785	ADV	ADV	ADV	
1623	279454	21.122	4.147	1.00	48	282.34	282.32	372.44	0.0001	19.6%	CHES	0.010	REHAB		yes	1.000	1.092	12.566	13.721	6157.945	8.867	-12.255
1624	40280	21.025	4.144	1.00	48	282.32	282.27	372.44	0.0001	19.7%	CHES	0.010	REHAB		yes	1.000	1.726	12.566	21.695	9736.566	14.021	-7.004
1663	276635	45.816	12.031	1.00	57	273.14	273.12	45	0.0004	26.3%	JENS	0.010	REHAB		yes	1.188	3.518	17.721	62.349	27982.283	40.294	-5.522
1666	277015	45.724	12.017	1.00	57	272.37	272.18	207	0.0009	26.3%	JENS	0.013	CL3		yes	1.188	3.889	17.721	68.924	30933.046	44.544	-1.180

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1667	41242	45.688	12.011	1.00	57	272.18	272.00	279.49	0.0006	26.3%	JENS	0.013	CL3		yes	1.188	3.258	17.721	57.734	25911.000	37.312	-8.376
1668	41243	45.66	12.004	1.00	57	272.00	271.45	584.16	0.0009	26.3%	NORT	0.013	CL3		yes	1.188	3.939	17.721	69.806	31328.997	45.114	-0.546
1669	339638	45.576	11.99	1.00	57	271.45	270.97	562.51	0.0009	26.3%	NORT	0.013	CL3		yes	1.188	3.750	17.721	66.456	29825.419	42.949	-2.627
1670	41217	45.51	11.971	1.00	57	270.13	268.78	2277	0.0006	26.3%	NORT	0.013			yes	1.188	3.126	17.721	55.394	24860.876	35.800	-9.710
1674	286628	45.519	11.906	1.00	66	267.74	267.78	106.33	-0.0004	26.2%	NORT	0.013	ADV		yes	1.375		23.758	ADV	ADV	ADV	
1686	286574	45.588	11.869	1.00	66	262.86	262.85	39.33	0.0003	26.0%	NORT	0.013			yes	1.375	2.255	23.758	53.577	24045.224	34.625	-10.963
1687	297552	45.581	11.868	1.00	66	262.85	262.82	93.52	0.0003	26.0%	NORT	0.013			yes	1.375	2.533	23.758	60.179	27008.420	38.892	-6.689
1746	17333	3.178	0.463	1.00	21	294.48	294.03	623.5	0.0007	14.6%	MRKS	0.013			yes	0.438	1.784	2.405	4.292	1926.173	2.774	-0.404
1757	17300	1.076	0.558	1.00	12	293.71	293.29	240	0.0017	51.9%	MRKS	0.013			yes	0.250	1.920	0.785	1.508	676.932	0.975	-0.101
1759	17302	1.102	0.558	1.00	12	292.92	292.48	220	0.0020	50.6%	MRKS	0.013			yes	0.250	2.053	0.785	1.612	723.671	1.042	-0.060
1784	15231	0.778	0.562	1.00	12	297.83	297.75	107.1	0.0007	72.2%	MRKS	0.013			yes	0.250	1.215	0.785	0.954	428.215	0.617	-0.161
1820	15054	3.738	1.241	1.00	21	290.23	289.58	520	0.0013	33.2%	MRKS	0.013			yes	0.438	2.352	2.405	5.657	2538.805	3.656	-0.082
1821	15053	3.753	1.232	1.00	21	289.58	289.26	259.75	0.0012	32.8%	MRKS	0.013			yes	0.438	2.309	2.405	5.554	2492.839	3.590	-0.163
1822	15052	3.793	1.227	1.00	21	289.26	288.95	261.19	0.0012	32.3%	MRKS	0.013			yes	0.438	2.307	2.405	5.548	2489.914	3.585	-0.208
1823	15051	3.849	1.222	1.00	21	288.95	288.17	644.56	0.0012	31.7%	MRKS	0.013			yes	0.438	2.309	2.405	5.554	2492.552	3.589	-0.260
1830	346007	4.496	1.2	1.00	24	285.56	285.08	652	0.0007	26.7%	MRKS	0.013			yes	0.500	1.968	3.142	6.183	2774.998	3.996	-0.500
1846	14912	0.459	0.377	1.00	12	292.46	292.32	412	0.0003	82.1%	MRKS	0.013			yes	0.250	0.846	0.785	0.665	298.292	0.430	-0.029
1864	13530	0.64	0.278	1.00	10	291.75	290.48	665.4	0.0019	43.4%	CORN	0.013			yes	0.208	1.778	0.545	0.970	435.276	0.627	-0.013
1866	13528	1.089	0.735	1.00	12	288.79	287.68	652.5	0.0017	67.5%	CORN	0.013			yes	0.250	1.893	0.785	1.487	667.417	0.961	-0.128
1870	13469	1.159	0.794	1.00	15	286.03	285.93	133.35	0.0007	68.5%	CORN	0.013			yes	0.313	1.457	1.227	1.788	802.251	1.155	-0.004
1873	13472	1.717	0.787	1.00	15	285.15	284.91	316.18	0.0008	45.8%	CORN	0.013			yes	0.313	1.465	1.227	1.798	807.133	1.162	-0.555
1874	13475	1.738	0.786	1.00	15	284.91	284.59	278	0.0012	45.2%	CORN	0.013			yes	0.313	1.805	1.227	2.215	993.938	1.431	-0.307
1875	13477	1.744	0.786	1.00	15	284.59	284.28	305	0.0010	45.1%	CORN	0.013			yes	0.313	1.696	1.227	2.081	933.980	1.345	-0.399
1879	13383	4.309	0.992	1.00	24	282.30	281.98	689.08	0.0005	23.0%	CORN	0.013			yes	0.500	1.563	3.142	4.911	2203.972	3.174	-1.135
1883	13339	5.429	2.391	1.00	27	280.75	280.39	711	0.0005	44.0%	CORN	0.013			yes	0.563	1.764	3.976	7.014	3148.096	4.533	-0.896
1908	13343	1.527	1.431	1.00	18	282.14	282.11	128	0.0002	93.7%	CORN	0.013			yes	0.375	0.918	1.767	1.623	728.424	1.049	-0.478
1928	36353	1.556	1.094	1.00	15	306.40	306.18	180.66	0.0012	70.3%	CHES	0.013			yes	0.313	1.856	1.227	2.278	1022.320	1.472	-0.084
1929	36354	1.553	1.091	1.00	15	306.18	305.95	190.31	0.0012	70.3%	CHES	0.013			yes	0.313	1.849	1.227	2.269	1018.450	1.467	-0.086
1930	36355	1.558	1.097	1.00	15	306.02	305.83	159	0.0012	70.4%	CHES	0.013			yes	0.313	1.839	1.227	2.256	1012.710	1.458	-0.100
1931	36356	1.588	1.128	1.00	15	305.83	305.49	287.39	0.0012	71.0%	CHES	0.013			yes	0.313	1.830	1.227	2.245	1007.651	1.451	-0.137
1932	36357	1.645	1.182	1.00	15	305.49	304.98	421.35	0.0012	71.9%	CHES	0.013			yes	0.313	1.851	1.227	2.271	1019.225	1.468	-0.177
1933	36358	1.642	1.173	1.00	15	304.98	304.26	600.82	0.0012	71.4%	CHES	0.013			yes	0.313	1.841	1.227	2.260	1014.147	1.460	-0.182
1934	36359	1.65	1.161	1.00	15	304.26	303.68	480.29	0.0012	70.4%	CHES	0.013			yes	0.313	1.848	1.227	2.268	1018.050	1.466	-0.184
1935	36360	1.643	1.149	1.00	15	303.68	303.11	462.72	0.0012	69.9%	CHES	0.013			yes	0.313	1.867	1.227	2.291	1028.217	1.481	-0.162
1936	36274	1.687	1.147	1.00	15	303.02	302.88	89.09	0.0016	68.0%	CHES	0.013			yes	0.313	2.109	1.227	2.588	1161.332	1.672	-0.015
1937	36275	1.691	1.147	1.00	15	302.88	302.28	486.1	0.0012	67.8%	CHES	0.013			yes	0.313	1.869	1.227	2.293	1029.247	1.482	-0.209
1938	36276	1.694	1.145	1.00	15	302.28	301.22	693.55	0.0015	67.6%	CHES	0.013			yes	0.313	2.079	1.227	2.552	1145.304	1.649	-0.045
1939	36277	1.692	1.141	1.00	15	301.22	300.64	515.1	0.0011	67.4%	CHES	0.013			yes	0.313	1.785	1.227	2.190	983.048	1.416	-0.276
1941	36279	1.686	1.132	1.00	15	299.63	298.89	501.48	0.0015	67.1%	CHES	0.013			yes	0.313	2.043	1.227	2.508	1125.371	1.621	-0.065
1945	36250	2.028	1.196	1.00	18	296.78	296.39	447.23	0.0009	59.0%	CHES	0.013			yes	0.375	1.772	1.767	3.131	1405.062	2.023	-0.005
1947	36211	3.129	1.631	1.00	21	295.83	295.27	797.32	0.0007	52.1%	CHES	0.013			yes	0.438	1.760	2.405	4.234	1900.137	2.736	-0.393
1948	299679	3.119	1.629	1.00	21	295.27	294.85	533.17	0.0008	52.2%	CHES	0.013			yes	0.438	1.864	2.405	4.484	2012.329	2.898	-0.221
1952	36157	4.839	2.385	1.00	24	293.32	293.24	133	0.0006	49.3%	CHES	0.010	REHAB		yes	0.500	2.313	3.142	7.266	3260.832	4.696	-0.143
1954	36159	4.947	2.381	1.00	24	292.90	292.66	384	0.0006	48.1%	CHES	0.010	REHAB		yes	0.500	2.357	3.142	7.406	3323.910	4.786	-0.161
1955	346640	4.935	2.381	1.00	24	292.66	292.45	411	0.0005	48.2%	CHES	0.010	REHAB		yes	0.500	2.132	3.142	6.696	3005.370	4.328	-0.607
1957	36136	5.16	2.379	1.00	24	292.24	292.11	275	0.0005	46.1%	CHES	0.010	REHAB		yes	0.500	2.050	3.142	6.441	2890.777	4.163	-0.997
1959	36153	5.151	2.378	1.00	24	291.91	291.80	163	0.0007	46.2%	CHES	0.010	REHAB		yes	0.500	2.450	3.142	7.696	3453.916	4.974	-0.177
1964	32583	0.989	0.225	1.00	10	307.35	306.90	331	0.0014	22.8%	CHES	0.013			yes	0.208	1.501	0.545	0.819	367.364	0.529	-0.460
1965	32584	0.999	0.224	1.00	10	306.90	306.40	331	0.0015	22.4%	CHES	0.013			yes	0.208	1.582	0.545	0.863	387.235	0.558	-0.441
1997	36245	0.978	0.48	1.00	12	298.54	297.98	325.13	0.0017	49.1%	CHES	0.013			yes	0.250	1.905	0.785	1.496	671.570	0.967	-0.011
1998	36246	1.005	0.478	1.00	12	297.98	297.40	334.96	0.0017	47.6%	CHES	0.013			yes	0.250	1.910	0.785	1.500	673.354	0.970	-0.035
2000	32590	0.563	0.223	1.00	10	311.36	310.39	667.51	0.0015	39.6%	CHES	0.013			yes	0.208	1.552	0.545	0.846	379.805	0.547	-0.016
2001	32576	0.766	0.22	1.00	10	310.24	309.31	670.4	0.0014	28.7%	CHES	0.013			yes	0.208	1.516	0.545	0.827	371.089	0.534	-0.232
2002	32577	0.783	0.217	1.00	10	309.31	308.98	165	0.0020	27.7%	CHES	0.013			yes	0.208	1.820	0.545	0.993	445.573	0.642	-0.141
2003	32578	0.812	0.216	1.00	10	308.98	308.51	328	0.0014	26.6%	CHES	0.013			yes	0.208	1.541	0.545	0.840	377.152	0.543	-0.269
2004	32579	0.834	0.214	1.00	10	308.51	308.00	334	0.0015	25.7%	CHES	0.013			yes	0.208	1.591	0.545	0.867	389.328	0.561	-0.273
2005	32580	0.856	0.213	1.00	10	308.00	307.75	161	0.0016	24.9%	CHES	0.013			yes	0.208	1.604	0.545	0.875	392.610	0.565	-0.291
2006	32581	0.909	0.214	1.00	10	307.73	307.59	125	0.0011	23.5%	CHES	0.013			yes	0.208	1.362	0.545	0.743	333.436	0.480	-0.429
2007	32582	0.917	0.213	1.00	10	307.59	307.35	207	0.0012	23.2%	CHES	0.013			yes	0.208	1.386	0.545	0.756	339.254	0.489	-0.428
2042	30898	2.418	0.169	1.00	12	313.35	311.69	669	0.0025	7.0%	CHES	0.013			yes	0.250	2.287	0.785	1.796	806.059	1.161	-1.257
925	30125	8.174	0.908	0.82	30	287.53	287.22	327.36	0.0009	11.1%	ORAN	0.013	1350D	Yes		0.625	2.586	4.909	12.696	5697.896	8.205	0.031
332	29066	25.821	5.963	0.82	45	266.78	266.24	835.1	0.0006	23.1%	MRKS	0.010	REHAB		yes	0.938	3.631	11.045	40.102	17997.833	25.917	0.096
1671	41216	45.489	11.907	0.82	57	268.78	268.42	375	0.0010	26.2%	NORT	0.013			yes	1.188	3.978	17.721	70.488	31634.915	45.554	0.065
1052	40976	79.519	19.909	0.82	66	245.50	244.80	878.38	0.0008	25.0%	NORT	0.010	REHAB		yes	1.375	5.190	23.758	123.307	55340.357	79.690	0.171
1951	36202	3.379	1.639	0.82	21	293.67	293.32	321	0.0011	48.5%	CHES	0.013			yes	0.438	2.193	2.405	5.275	2367.493	3.409	0.030
824	17484	0.78	0.295	0.82	12	298.97	298.21	658.2	0.0012	37.8%	MRKS	0.013			yes	0.250	1.560	0.785	1.225	549.862	0.792	0.012
336	30966	26.582	5.959	0.81	45	264.84	263.81	1496	0.0007	22.4%	MRKS	0.010	REHAB		yes	0.938	3.747	11.045	41.380	18571.432	26.743	0.161
515	21183	10.849	2.688	0.81	30	283.23	283.06	170.32	0.0010	24.8%	FRUI	0.010	REHAB		yes	0.625	3.452	4.909	16.944	7604.689	10.951	0.102
1054	40977	79.406	19.827	0.81	66	244.09	243.39	878.38	0.0008	25.0%	NORT	0.010	REHAB		yes	1.375	5.190	23.758	123.307	55340.357	79.690	0.284
1756	17299	1.006	0.549	0.81	12	294.15	293.71	229	0.0019	54.6%	MRKS	0.013			yes	0.250	2.012	0.785	1.580	709.308	1.021	0.015
674	25899	0.985	0.227	0.81	12	292.00	291.60	366	0.0011	23.0%	NCEN	0.010	REHAB		yes	0.250	1.973	0.785	1.550	695.439	1.001	0.016
1996	36244	0.952	0.482	0.81	12	299.12	298.54	336.13	0.0017	50.6%	CHES	0.013			yes	0.250	1.907	0.785	1.498	672.181	0.968	0.016
862	20061	5.616	1.515	0.81	24	307.48	306.48	670	0.0015	27.0%	ORAN	0.013	D1500		yes	0.500	2.802	3.142	8.804	3951.195	5.690	0.074
1329	17731	1.698	0.358	0.81	15	306.76	306.23	534.53	0.0010	21.1%	FRUI	0.010	REHAB		yes	0.313	2.177	1.227	2.672	1199.228	1.727	0.029
984	38999	5.68	0.267	0.81	24	271.50	271.05	496	0.0009	4.7%	SCEN	0.010	REHAB		yes	0.500	2.840	3.142	8.923	4004.743	5.767	0.087
1044	280917	78.079	18.646	0.81	66	250.70	250.41	372.8	0.0008	23.9%	NORT	0.010	REHAB		yes	1.375	5.128	23.758	121.827	54675.807	78.733	0.654
923	276957	8.157	0.908	0.81	30	287.96	287.67	300.32	0.0010	11.1%	ORAN	0.013	1350D	Yes		0.625	2.612	4.909	12.820	5753.781	8.285	0.128
1053	40978	79.464	19.87	0.81	66	244.80	244.09	878.38	0.0008	25.0%	NORT	0.010	REHAB		yes	1.375	5.227	23.758	124.185	55734.244	80.257	0.793
1745	17332	3.175	0.465	0.81	21	294.80	294.48	327	0.0010	14.6%	MRKS	0.013			yes	0.438	2.078	2.405	4.998	2242.892	3.230	0.055
187	277575	26.208	4.906	0.81	45	251.84	251.80	34.84	0.0011	18.7%	CORN	0.013	2500D		yes	0.938	3.722	11.045	41.104	18447.612	26.565	0.357

													ADV = ADVERSE PIPE						Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
511	21179	10.625	2.679	0.81	30	284.21	284.05	165	0.0010	25.2%	FRUI	0.010	REHAB		yes	0.625	3.402	4.909	16.701	7495.625	10.794	0.169
1042	40995	78.119	18.664	0.81	66	251.26	251.10	209.61	0.0008	23.9%	NORT	0.010	REHAB		yes	1.375	5.143	23.758	122.179	54834.020	78.961	0.842
1049	40982	79.66	19.993	0.81	66	247.60	246.90	860.79	0.0008	25.1%	NORT	0.010	REHAB		yes	1.375	5.243	23.758	124.561	55902.930	80.500	0.840
1050	40984	79.62	19.972	0.81	66	246.90	246.20	860.79	0.0008	25.1%	NORT	0.010	REHAB		yes	1.375	5.243	23.758	124.561	55902.930	80.500	0.880
1051	40983	79.572	19.943	0.81	66	246.20	245.50	861.26	0.0008	25.1%	NORT	0.010	REHAB		yes	1.375	5.241	23.758	124.527	55887.675	80.478	0.906
2022	36200	1.462	0.841	0.81	15	294.81	294.07	591	0.0013	57.5%	CHES	0.013			yes	0.313	1.882	1.227	2.310	1036.642	1.493	0.031
186	27131	25.477	4.82	0.81	45	252.80	251.84	883.06	0.0011	18.9%	CORN	0.013	2500D		yes	0.938	3.621	11.045	39.998	17951.045	25.850	0.373
2012	34352	0.954	0.358	0.81	12	297.60	297.47	74	0.0018	37.5%	CHES	0.013			yes	0.250	1.924	0.785	1.511	678.238	0.977	0.023
372	39423	75.017	18.366	0.81	66	242.61	241.53	882	0.0012	24.5%	MRKS	0.013	CL5		yes	1.375	4.949	23.758	117.575	52767.727	75.986	0.969
225	305163	16.937	1.727	0.81	45	321.90	321.77	455	0.0003	10.2%	HERN	0.010	REHAB		yes	0.938	2.414	11.045	26.657	11963.508	17.227	0.290
346	285616	13.559	2.946	0.81	36	262.06	261.41	639	0.0010	21.7%	MRKS	0.013	SDR35		yes	0.750	3.023	7.069	21.371	9591.242	13.811	0.252
514	21182	10.817	2.681	0.81	30	283.56	283.23	325.31	0.0010	24.8%	FRUI	0.010	REHAB		yes	0.625	3.480	4.909	17.082	7666.517	11.040	0.223
757	33367	6.671	1.22	0.81	27	273.99	273.44	481.25	0.0011	18.3%	NCEN	0.013			yes	0.563	2.650	3.976	10.538	4729.634	6.811	0.140
1742	17329	3.194	0.469	0.81	21	296.79	296.13	659	0.0010	14.7%	MRKS	0.013			yes	0.438	2.102	2.405	5.056	2269.011	3.267	0.073
754	33326	6.693	1.223	0.80	27	275.37	275.14	199.52	0.0012	18.3%	NCEN	0.013			yes	0.563	2.662	3.976	10.584	4750.094	6.840	0.147
755	286088	6.69	1.223	0.80	27	275.14	274.68	399.74	0.0012	18.3%	NCEN	0.013			yes	0.563	2.660	3.976	10.575	4745.934	6.834	0.144
1045	40996	78.068	18.644	0.80	66	250.41	249.73	861.27	0.0008	23.9%	NORT	0.010	REHAB		yes	1.375	5.166	23.758	122.734	55083.174	79.320	1.252
170	18774	19.867	4.218	0.80	45	266.31	266.12	281.43	0.0007	21.2%	CORN	0.013	2500D		yes	0.938	2.839	11.045	31.354	14071.583	20.263	0.396
756	33325	6.683	1.222	0.80	27	274.68	273.99	599.26	0.0012	18.3%	NCEN	0.013			yes	0.563	2.660	3.976	10.578	4747.319	6.836	0.153
1041	40994	78.155	18.674	0.80	66	251.78	251.26	651	0.0008	23.9%	NORT	0.010	REHAB		yes	1.375	5.176	23.758	122.975	55191.032	79.475	1.320
1743	17330	3.19	0.467	0.80	21	296.13	295.47	659	0.0010	14.6%	MRKS	0.013			yes	0.438	2.102	2.405	5.056	2269.011	3.267	0.077
2021	36199	1.416	0.845	0.80	15	295.09	294.81	235.45	0.0012	59.7%	CHES	0.013			yes	0.313	1.834	1.227	2.251	1010.267	1.455	0.039
697	349990	4.364	1.207	0.80	24	279.80	279.71	165	0.0005	27.7%	NCEN	0.010	SDR35		yes	0.500	2.202	3.142	6.919	3105.192	4.471	0.107
1325	15736	0.865	0.296	0.80	12	308.98	308.60	260	0.0015	34.2%	FRUI	0.013			yes	0.250	1.755	0.785	1.378	618.630	0.891	0.026
1326	15737	0.876	0.296	0.80	12	308.60	308.23	246.04	0.0015	33.8%	FRUI	0.013			yes	0.250	1.780	0.785	1.398	627.515	0.904	0.028
1755	17298	1.01	0.549	0.80	12	295.07	294.15	459	0.0020	54.4%	MRKS	0.013			yes	0.250	2.055	0.785	1.614	724.459	1.043	0.033
1783	15230	0.783	0.566	0.80	12	298.21	297.83	315.67	0.0012	72.3%	MRKS	0.013			yes	0.250	1.593	0.785	1.251	561.437	0.808	0.025
1744	17331	3.171	0.466	0.80	21	295.47	294.81	659	0.0010	14.7%	MRKS	0.013			yes	0.438	2.102	2.405	5.056	2269.011	3.267	0.096
1782	15228	0.786	0.57	0.80	12	298.61	298.21	329	0.0012	72.5%	MRKS	0.013			yes	0.250	1.601	0.785	1.257	564.233	0.812	0.026
541	27239	15.173	2.773	0.80	42	277.06	276.67	684.6	0.0006	18.3%	FRUI	0.013			yes	0.875	2.505	9.621	24.100	10815.856	15.575	0.402
256	15645	10.339	3.235	0.80	30	304.66	304.35	328.65	0.0009	31.3%	MRKS	0.010	REHAB		yes	0.625	3.356	4.909	16.472	7392.713	10.646	0.307
331	29082	25.868	5.977	0.80	45	267.38	266.78	882	0.0007	23.1%	MRKS	0.010	REHAB		yes	0.938	3.724	11.045	41.132	18460.094	26.583	0.715
748	36561	15.478	2.077	0.80	48	263.80	263.78	68.54	0.0003	13.4%	WALN	0.013			yes	1.000	1.958	12.566	24.603	11042.021	15.901	0.423
1877	13385	4.214	0.843	0.80	21	283.13	282.58	310	0.0018	20.0%	CORN	0.013			yes	0.438	2.798	2.405	6.729	3020.006	4.349	0.135
184	332222	25.601	4.836	0.80	45	253.96	253.49	416.43	0.0011	18.9%	CORN	0.013	2000D		yes	0.938	3.690	11.045	40.754	18290.566	26.338	0.737
506	21174	10.308	2.676	0.80	30	285.70	285.54	170	0.0009	26.0%	FRUI	0.010	REHAB		yes	0.625	3.352	4.909	16.454	7384.572	10.634	0.326
1520	30613	9.105	0.389	0.80	39	298.11	298.05	331.1	0.0002	4.3%	CHES	0.010	REHAB		yes	0.813	1.749	8.296	14.508	6511.412	9.376	0.271
922	30123	8.161	0.909	0.80	30	287.99	287.96	30	0.0010	11.1%	ORAN	0.013	1350D	Yes		0.625	2.658	4.909	13.046	5855.264	8.432	0.271
1098	286576	56.095	11.899	0.79	66	261.57	261.13	622.92	0.0007	21.2%	NORT	0.013			yes	1.375	3.759	23.758	89.299	40077.535	57.712	1.617
512	21180	10.749	2.683	0.79	30	284.05	283.88	165	0.0010	25.0%	FRUI	0.010	REHAB		yes	0.625	3.507	4.909	17.215	7726.313	11.126	0.377
1105	286547	58.736	13.806	0.79	66	258.70	258.19	657.53	0.0008	23.5%	NORT	0.013	SDR35		yes	1.375	3.939	23.758	93.576	41996.984	60.476	1.740
543	27241	15.158	2.771	0.79	42	276.50	276.36	242.8	0.0006	18.3%	FRUI	0.013			yes	0.875	2.520	9.621	24.246	10881.449	15.669	0.511
1061	40958	79.253	19.519	0.79	66	239.46	238.72	886.11	0.0008	24.6%	WWTP	0.010	REHAB		yes	1.375	5.324	23.758	126.483	56765.536	81.742	2.489
366	39438	75.163	18.336	0.79	66	249.98	248.86	877.5	0.0013	24.4%	MRKS	0.013	CL5		yes	1.375	5.053	23.758	120.039	53873.632	77.578	2.415
509	21177	10.389	2.677	0.79	30	284.87	284.55	330.26	0.0010	25.8%	FRUI	0.010	REHAB		yes	0.625	3.401	4.909	16.695	7492.674	10.789	0.400
1046	40988	78.062	18.616	0.79	66	249.73	249.02	871.6	0.0008	23.8%	NORT	0.010	REHAB		yes	1.375	5.247	23.758	124.667	55950.597	80.569	2.507
1047	40990	78.057	18.585	0.79	66	249.02	248.31	871.6	0.0008	23.8%	NORT	0.010	REHAB		yes	1.375	5.247	23.758	124.667	55950.597	80.569	2.512
1048	40989	78.048	18.551	0.79	66	248.31	247.60	871.6	0.0008	23.8%	NORT	0.010	REHAB		yes	1.375	5.247	23.758	124.667	55950.597	80.569	2.521
1268	35340	1.276	0	0.79	18	278.47	278.24	611.89	0.0004	0.0%	SCEN	0.013				0.375	1.163	1.767	2.055	922.478	1.328	0.052
1463	18268	0.73	0.062	0.79	12	321.84	321.61	219.77	0.0011	8.5%	CHES	0.013			yes	0.250	1.501	0.785	1.179	529.146	0.762	0.032
1043	40997	78.108	18.658	0.79	66	251.10	250.70	488.47	0.0008	23.9%	NORT	0.010	REHAB		yes	1.375	5.261	23.758	124.995	56097.719	80.781	2.673
872	19712	3.849	0.811	0.79	21	302.22	301.21	668.1	0.0015	21.1%	FRUI	0.013			yes	0.438	2.582	2.405	6.211	2787.708	4.014	0.165
188	27129	26.517	4.918	0.79	45	251.72	250.75	785.98	0.0012	18.5%	CORN	0.013	2500D		yes	0.938	3.859	11.045	42.616	19126.229	27.542	1.025
624	38260	40.878	6.616	0.79	60	256.81	256.47	906.91	0.0004	16.2%	MRKS	0.010	REHAB		yes	1.250	3.343	19.635	65.635	29456.896	42.418	1.540
1062	40960	79.227	19.512	0.79	66	238.72	237.97	886.11	0.0008	24.6%	WWTP	0.010	REHAB		yes	1.375	5.349	23.758	127.077	57032.311	82.127	2.900
1876	13386	3.975	0.785	0.79	21	284.02	283.13	550	0.0016	19.7%	CORN	0.013			yes	0.438	2.672	2.405	6.426	2884.170	4.153	0.178
510	21178	10.644	2.68	0.79	30	284.55	284.21	331	0.0010	25.2%	FRUI	0.010	REHAB		yes	0.625	3.502	4.909	17.189	7714.633	11.109	0.465
909	26329	6.451	0.855	0.79	27	294.06	293.69	331	0.0011	13.3%	ORAN	0.013	1350D	Yes		0.563	2.621	3.976	10.422	4677.550	6.736	0.285
496	21284	8.914	2.665	0.79	27	291.91	291.16	593	0.0013	29.9%	FRUI	0.010	REHAB		yes	0.563	3.625	3.976	14.412	6468.122	9.314	0.400
1096	286575	56.168	11.915	0.79	66	262.34	262.05	401.78	0.0007	21.2%	NORT	0.013			yes	1.375	3.800	23.758	90.270	40513.116	58.339	2.171
1758	17301	1.102	0.558	0.79	12	293.29	292.92	149.85	0.0025	50.6%	MRKS	0.013			yes	0.250	2.281	0.785	1.792	804.079	1.158	0.056
474	286053	0.908	0.843	0.79	15	300.98	300.88	330.28	0.0003	92.8%	FRUI	0.010	REHAB		yes	0.313	1.203	1.227	1.477	662.688	0.954	0.046
335	30965	26.631	5.962	0.78	45	265.42	264.84	776.56	0.0007	22.4%	MRKS	0.010	REHAB		yes	0.938	3.902	11.045	43.099	19342.788	27.854	1.223
542	27240	15.065	2.772	0.78	42	276.67	276.50	291.6	0.0006	18.4%	FRUI	0.013			yes	0.875	2.534	9.621	24.380	10941.522	15.756	0.691
859	20059	5.39	1.516	0.78	24	308.84	308.48	243.4	0.0015	28.1%	ORAN	0.013	D1500		yes	0.500	2.790	3.142	8.764	3933.298	5.664	0.274
928	30128	8.35	0.906	0.78	30	286.60	286.27	305	0.0011	10.9%	ORAN	0.013	1350D	Yes		0.625	2.765	4.909	13.571	6090.508	8.770	0.420
1828	17035	4.498	1.205	0.78	24	286.65	286.13	502.28	0.0010	26.8%	MRKS	0.013			yes	0.500	2.334	3.142	7.332	3290.748	4.739	0.241
2020	36198	1.377	0.849	0.78	15	295.53	295.09	369.46	0.0012	61.7%	CHES	0.013			yes	0.313	1.836	1.227	2.253	1010.996	1.456	0.079
327	27157	24.741	6	0.78	45	269.15	268.29	1321.64	0.0007	24.3%	MRKS	0.010	REHAB		yes	0.938	3.642	11.045	40.228	18054.490	25.998	1.257
265	17571	10.71	3.396	0.78	33	300.24	300.03	328.66	0.0006	31.7%	MRKS	0.010	REHAB		yes	0.688	2.941	5.940	17.469	7840.262	11.290	0.580
599	34880	12.054	2.035	0.78	30	267.60	266.92	505	0.0013	16.9%	FRUI	0.010	REHAB		yes	0.625	4.009	4.909	19.681	8832.804	12.719	0.665
912	26326	6.378	0.854	0.78	27	292.94	292.75	170	0.0011	13.4%	ORAN	0.013	1350D	Yes		0.563	2.621	3.976	10.422	4677.178	6.735	0.357
1109	286545	58.685	13.834	0.78	66	257.15	256.62	660.35	0.0008	23.6%	NORT	0.013	SDR35		yes	1.375	4.007	23.758	95.189	42721.024	61.518	2.833
1978	32386	4.598	1.003	0.78	27	300.08	299.88	345	0.0006	21.8%	CHES	0.013			yes	0.563	1.888	3.976	7.506	3368.503	4.851	0.253
370	39431	75.034	18.433	0.78	66	245.02	243.85	889	0.0013	24.6%	MRKS	0.013	CL5		yes	1.375	5.131	23.758	121.893	54705.735	78.776	3.742
1429	346953	0.548	0.281	0.78	12	321.03	321.02	16	0.0006	51.3%	ORAN	0.013			yes	0.250	1.148	0.785	0.901	404.544	0.583	0.035
908	26330	6.462	0.855	0.78	27	294.25	294.06	165	0.0012	13.2%	ORAN	0.013	1350D	Yes		0.563	2.660	3.976	10.578	4747.515	6.836	0.374
494	21390	8.761	2.669	0.78	27	293.09	292.08	804.3	0.0013	30.5%	FRUI	0.010	REHAB		yes	0.563	3.612	3.976	14.361	6445.054	9.281	0.520
911	26327	6.402	0.854	0.78	27	293.31	292.94	326	0.0011	13.3%	ORAN	0.013	1350D	Yes		0.563	2.641	3.976	10.502	4713.284	6.787	0.385
375	39413	74.956	18.246	0.78	66	239.05	237.87	891	0.0013	24.3%	MRKS	0.013	CL5		yes	1.375	5.147	23.758	122.276	54877.328	79.023	4.067

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
901	24217	4.66	0.839	0.78	24	298.64	297.52	991	0.0011	18.0%	ORAN	0.013	1350D	Yes		0.500	2.439	3.142	7.661	3438.255	4.951	0.291
179	25135	24.978	4.867	0.77	45	257.25	255.93	1161.34	0.0011	19.5%	CORN	0.013	2500D		yes	0.938	3.707	11.045	40.945	18375.935	26.461	1.483
910	26328	6.427	0.855	0.77	27	293.69	293.31	331	0.0011	13.3%	ORAN	0.013	1350D	Yes		0.563	2.656	3.976	10.562	4740.338	6.826	0.399
1108	286546	58.681	13.787	0.77	66	257.69	257.15	662	0.0008	23.5%	NORT	0.013	SDR35		yes	1.375	4.039	23.758	95.963	43068.395	62.018	3.337
1949	36189	3.345	1.636	0.77	21	294.85	293.76	916.49	0.0012	48.9%	CHES	0.013			yes	0.438	2.291	2.405	5.509	2472.616	3.561	0.216
904	24215	4.627	0.834	0.77	24	296.66	296.01	579.75	0.0011	18.0%	ORAN	0.013	1350D	Yes		0.500	2.429	3.142	7.630	3424.539	4.931	0.304
1103	286556	57.332	13.237	0.77	66	259.90	259.23	855.77	0.0008	23.1%	NORT	0.013	SDR35		yes	1.375	3.957	23.758	94.015	42193.901	60.759	3.427
1881	13340	4.268	0.989	0.77	24	281.41	280.91	524	0.0010	23.2%	CORN	0.013			yes	0.500	2.241	3.142	7.039	3159.259	4.549	0.281
1943	36248	1.96	1.198	0.77	18	298.12	297.49	672.17	0.0009	61.1%	CHES	0.013			yes	0.375	1.837	1.767	3.246	1456.664	2.098	0.138
774	349986	3.707	1.074	0.77	24	280.20	280.17	70	0.0004	29.0%	NCEN	0.010	SDR35		yes	0.500	1.952	3.142	6.133	2752.459	3.964	0.257
902	24214	4.651	0.836	0.77	24	297.52	297.09	377.17	0.0011	18.0%	ORAN	0.013	1350D	Yes		0.500	2.449	3.142	7.694	3453.278	4.973	0.322
1960	36154	5.233	2.378	0.77	24	291.80	291.41	456	0.0009	45.4%	CHES	0.010	REHAB		yes	0.500	2.758	3.142	8.664	3888.294	5.599	0.366
507	21175	10.313	2.678	0.77	30	285.54	285.21	326.09	0.0010	26.0%	FRUI	0.010	REHAB		yes	0.625	3.476	4.909	17.062	7657.342	11.027	0.714
1104	286555	57.273	13.214	0.77	66	259.23	258.70	673.47	0.0008	23.1%	NORT	0.013	SDR35		yes	1.375	3.967	23.758	94.258	42302.849	60.916	3.643
2019	36197	1.379	0.851	0.77	15	295.68	295.53	121.68	0.0012	61.7%	CHES	0.013			yes	0.313	1.868	1.227	2.292	1028.591	1.481	0.102
368	39429	75.185	18.485	0.77	66	247.52	246.31	889	0.0014	24.6%	MRKS	0.013	CL5		yes	1.375	5.218	23.758	123.959	55633.017	80.112	4.927
903	24213	4.637	0.835	0.77	24	297.09	296.66	377.08	0.0011	18.0%	ORAN	0.013	1350D	Yes		0.500	2.450	3.142	7.695	3453.690	4.973	0.336
1102	286557	57.324	13.222	0.77	66	260.26	259.90	455.23	0.0008	23.1%	NORT	0.013	SDR35		yes	1.375	3.977	23.758	94.487	42405.933	61.065	3.741
39	283051	19.33	1.931	0.77	45	308.95	308.64	445.08	0.0007	10.0%	HERN	0.013			yes	0.938	2.899	11.045	32.015	14368.487	20.691	1.361
229	305169	17.07	1.731	0.77	42	323.06	322.67	840	0.0005	10.1%	HERN	0.010	REHAB		yes	0.875	2.940	9.621	28.283	12693.549	18.279	1.209
365	39437	75.222	18.349	0.77	66	251.17	249.98	868	0.0014	24.4%	MRKS	0.013	CL5		yes	1.375	5.236	23.758	124.409	55834.730	80.402	5.180
1956	36160	5.167	2.38	0.77	24	292.45	292.24	249	0.0008	46.1%	CHES	0.010	REHAB		yes	0.500	2.739	3.142	8.603	3861.172	5.560	0.393
426	14314	5.642	0.202	0.77	27	312.82	312.24	637.9	0.0009	3.6%	MRKS	0.013			yes	0.563	2.364	3.976	9.400	4218.609	6.075	0.433
508	21176	10.326	2.677	0.76	30	285.21	284.87	330.4	0.0010	25.9%	FRUI	0.010	REHAB		yes	0.625	3.505	4.909	17.205	7721.635	11.119	0.793
326	351853	24.58	6.007	0.76	45	269.63	269.15	713	0.0007	24.4%	MRKS	0.010	REHAB		yes	0.938	3.705	11.045	40.918	18364.048	26.444	1.864
857	20057	5.256	1.53	0.76	24	310.44	309.79	437.3	0.0015	29.1%	ORAN	0.013	D1500		yes	0.500	2.797	3.142	8.786	3943.054	5.678	0.422
975	38992	19.4	0.935	0.76	48	272.12	271.46	1315	0.0005	4.8%	ORAN	0.013			yes	1.000	2.568	12.566	32.267	14481.539	20.853	1.453
176	299930	23.621	4.846	0.76	45	259.68	258.75	883.52	0.0011	20.5%	CORN	0.013	2500D		yes	0.938	3.564	11.045	39.358	17663.734	25.436	1.815
854	18024	3.575	1.212	0.76	21	312.16	311.99	204.4	0.0008	33.9%	ORAN	0.010	REHAB		yes	0.438	2.490	2.405	5.989	2688.033	3.871	0.296
373	39424	75.003	18.327	0.76	66	241.53	240.31	882	0.0014	24.4%	MRKS	0.013	CL5		yes	1.375	5.260	23.758	124.964	56083.670	80.760	5.757
976	38993	19.351	0.934	0.76	48	271.46	270.80	1315	0.0005	4.8%	ORAN	0.013			yes	1.000	2.568	12.566	32.267	14481.539	20.853	1.502
23	328477	18.607	1.927	0.76	45	318.51	318.42	231	0.0004	10.4%	HERN	0.010	REHAB		yes	0.938	2.818	11.045	31.128	13970.368	20.117	1.510
290	17193	16.193	4.644	0.76	39	289.27	289.01	410.89	0.0006	28.7%	MRKS	0.010	REHAB		yes	0.813	3.268	8.296	27.111	12167.547	17.521	1.328
1815	307238	2.789	0.401	0.76	24	292.14	292.10	160	0.0002	14.4%	MRKS	0.010	SDR35		yes	0.500	1.491	3.142	4.684	2102.225	3.027	0.238
1347	19723	2.585	0.389	0.76	18	301.51	301.24	270	0.0010	15.0%	FRUI	0.010	REHAB		yes	0.375	2.466	1.767	4.358	1956.015	2.817	0.232
491	21388	8.258	2.55	0.76	27	294.20	293.70	425	0.0012	30.9%	FRUI	0.010	REHAB		yes	0.563	3.496	3.976	13.900	6238.288	8.983	0.725
1950	36201	3.333	1.63	0.76	21	293.76	293.67	72.75	0.0012	48.9%	CHES	0.013			yes	0.438	2.336	2.405	5.619	2521.808	3.631	0.298
1091	41151	10.292	0.056	0.76	36	263.66	263.61	126.65	0.0004	0.5%	NORT	0.010	REHAB		yes	0.750	2.449	7.069	17.308	7767.734	11.186	0.894
1255	35498	1.205	0	0.76	16	281.87	281.63	351.95	0.0007	0.0%	SCEN	0.013				0.333	1.458	1.396	2.036	913.957	1.316	0.111
371	39422	75.026	18.401	0.76	66	243.85	242.61	882.9	0.0014	24.5%	MRKS	0.013	CL5		yes	1.375	5.300	23.758	125.920	56512.678	81.378	6.352
594	34878	11.756	2.04	0.76	30	269.43	268.94	358.53	0.0014	17.4%	FRUI	0.010	REHAB		yes	0.625	4.039	4.909	19.828	8898.670	12.814	1.058
858	20058	5.235	1.524	0.76	24	309.79	308.84	631.3	0.0015	29.1%	ORAN	0.013	D1500		yes	0.500	2.814	3.142	8.840	3967.434	5.713	0.478
185	332223	25.528	4.829	0.76	45	253.49	252.80	548.3	0.0013	18.9%	CORN	0.013	2000D		yes	0.938	3.894	11.045	43.003	19299.662	27.792	2.264
288	17192	16.201	4.654	0.76	39	289.65	289.41	373.57	0.0006	28.7%	MRKS	0.010	REHAB		yes	0.813	3.293	8.296	27.318	12260.234	17.655	1.454
201	36427	28.335	4.924	0.75	51	240.42	238.32	2639.15	0.0008	17.4%	CORN	0.013	2500D		yes	1.063	3.365	14.186	47.738	21424.871	30.852	2.517
213	3639	0.948	0.165	0.75	12	335.48	334.67	405	0.0020	17.4%	HERN	0.013			yes	0.250	2.053	0.785	1.612	723.671	1.042	0.094
1346	19722	2.566	0.389	0.75	18	301.77	301.51	260	0.0010	15.2%	FRUI	0.010	REHAB		yes	0.375	2.466	1.767	4.358	1956.015	2.817	0.251
1856	14905	0.426	0.392	0.75	12	294.42	294.32	247	0.0004	92.0%	MRKS	0.013			yes	0.250	0.924	0.785	0.725	325.595	0.469	0.043
374	39412	74.983	18.288	0.75	66	240.31	239.05	892	0.0014	24.4%	MRKS	0.013	CL5		yes	1.375	5.315	23.758	126.282	56675.277	81.612	6.629
698	349992	4.353	1.205	0.75	24	279.71	279.57	225	0.0006	27.7%	NCEN	0.010	SDR35		yes	0.500	2.352	3.142	7.390	3316.515	4.776	0.423
899	24216	4.657	0.84	0.75	24	299.03	298.81	183	0.0012	18.0%	ORAN	0.013	1350D	Yes		0.500	2.515	3.142	7.901	3546.105	5.106	0.449
285	17189	16.202	4.659	0.75	39	290.15	289.89	400	0.0006	28.8%	MRKS	0.010	REHAB		yes	0.813	3.312	8.296	27.478	12332.065	17.758	1.556
545	27242	15.205	2.769	0.75	42	276.24	276.09	388.58	0.0004	18.2%	FRUI	0.010	REHAB		yes	0.875	2.681	9.621	25.790	11574.329	16.667	1.462
685	27939	3.338	0.914	0.75	20	285.88	285.65	236.4	0.0010	27.4%	NCEN	0.010	REHAB		yes	0.417	2.608	2.182	5.690	2553.449	3.677	0.339
1942	36247	1.835	1.145	0.75	18	298.67	298.10	655.39	0.0009	62.4%	CHES	0.013			yes	0.375	1.769	1.767	3.127	1403.189	2.021	0.186
289	17190	16.205	4.648	0.75	39	289.41	289.27	214.3	0.0007	28.7%	MRKS	0.010	REHAB			0.813	3.321	8.296	27.547	12363.234	17.803	1.598
1097	286571	56.139	11.909	0.75	66	262.05	261.57	600.22	0.0008	21.2%	NORT	0.013				1.375	3.999	23.758	95.017	42643.829	61.407	5.268
1872	13471	1.717	0.791	0.75	15	285.68	285.15	261.79	0.0020	46.1%	CORN	0.013				0.313	2.393	1.227	2.937	1318.160	1.898	0.181
1944	36249	2.027	1.198	0.75	18	297.49	296.78	665.21	0.0011	59.1%	CHES	0.013				0.375	1.960	1.767	3.464	1554.457	2.238	0.211
286	297796	16.192	4.653	0.75	39	289.89	289.73	245	0.0007	28.7%	MRKS	0.010	REHAB			0.813	3.320	8.296	27.542	12361.071	17.800	1.608
1106	286549	58.717	13.798	0.75	66	258.19	258.02	193	0.0009	23.5%	NORT	0.013	SDR35			1.375	4.197	23.758	99.720	44754.490	64.446	5.729
1940	36278	1.689	1.137	0.75	15	300.64	299.63	511.89	0.0020	67.3%	CHES	0.013				0.313	2.363	1.227	2.900	1301.305	1.874	0.185
677	25902	1.016	0.257	0.75	12	290.83	290.74	38.36	0.0023	25.3%	NCEN	0.013				0.250	2.224	0.785	1.746	783.805	1.129	0.113
1095	286572	56.192	11.921	0.75	66	262.66	262.34	395.75	0.0008	21.2%	NORT	0.013				1.375	4.021	23.758	95.544	42880.055	61.747	5.555
1345	19721	2.54	0.39	0.75	18	302.03	301.77	260	0.0010	15.4%	FRUI	0.010	REHAB			0.375	2.466	1.767	4.358	1956.015	2.817	0.277
369	39430	75.113	18.462	0.75	66	246.31	245.02	889	0.0015	24.6%	MRKS	0.013	CL5			1.375	5.387	23.758	127.992	57442.691	82.717	7.604
1913	34550	0.481	0.033	0.75	10	314.03	313.47	401	0.0014	6.9%	CHES	0.013				0.208	1.521	0.545	0.830	372.328	0.536	0.055
291	17194	16.171	4.639	0.75	39	289.01	288.44	864	0.0007	28.7%	MRKS	0.010	REHAB			0.813	3.337	8.296	27.683	12423.950	17.890	1.719
947	271203	15.505	0.936	0.75	36	280.68	280.22	494.65	0.0009	6.0%	ORAN	0.010	REHAB	Yes		0.750	3.758	7.069	26.564	11921.801	17.167	1.662
1880	13382	4.294	0.991	0.74	24	281.98	281.41	541.97	0.0011	23.1%	CORN	0.013				0.500	2.352	3.142	7.390	3316.772	4.776	0.482
1999	32589	0.523	0.225	0.74	10	312.47	311.36	667.81	0.0017	43.0%	CHES	0.013				0.208	1.659	0.545	0.905	406.199	0.585	0.062
867	19707	2.979	0.798	0.74	21	303.54	303.48	58	0.0010	26.8%	FRUI	0.013				0.438	2.136	2.405	5.138	2306.051	3.321	0.342
437	14243	5.604	0.424	0.74	27	307.87	307.86	10.4	0.0010	7.6%	MRKS	0.013				0.563	2.431	3.976	9.666	4338.253	6.247	0.643
865	293174	2.9	0.803	0.74	21	305.10	304.63	478	0.0010	27.7%	FRUI	0.013	1500D			0.438	2.083	2.405	5.009	2248.238	3.237	0.337
1111	286538	59.094	14.777	0.74	66	256.28	255.68	660	0.0009	25.0%	NORT	0.013	SDR35			1.375	4.264	23.758	101.308	45466.808	65.472	6.378
328	29079	25.865	5.986	0.74	45	268.29	267.91	476.55	0.0008	23.1%	MRKS	0.010	REHAB			0.938	4.032	11.045	44.533	19986.196	28.780	2.915
853	18023	3.543	1.213	0.74	21	312.37	312.16	241	0.0009	34.2%	ORAN	0.010	REHAB			0.438	2.549	2.405	6.131	2751.387	3.962	0.419
898	21942	4.576	0.84	0.74	24	299.95	299.03	763.54	0.0012	18.4%	ORAN	0.013	1350D	Yes		0.500	2.518	3.142	7.910	3550.127	5.112	0.536
946	33954	15.548	0.937	0.74	36	281.15	280.68	496.35	0.0009	6.0%	ORAN	0.010	REHAB	Yes		0.750	3.792	7.069	26.805	12030.034	17.323	1.775
1767	17328	2.912	0.424	0.74	21	297.44	296.79	653	0.0010	14.6%	MRKS	0.013				0.438	2.096	2.405	5.040	2262.077	3.257	0.345

													ADV = ADVERSE PIPE						Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
252	14196	9.989	2.661	0.74	30	306.21	305.90	299	0.0010	26.6%	MRKS	0.010	REHAB			0.625	3.518	4.909	17.270	7750.596	11.161	1.172
887	22051	3.37	0.85	0.74	21	305.11	305.10	7.49	0.0013	25.2%	ORAN	0.013	1500D	Yes		0.438	2.427	2.405	5.837	2619.789	3.772	0.402
1980	32319	4.64	0.998	0.74	27	299.29	298.85	663	0.0007	21.5%	CHES	0.013				0.563	2.020	3.976	8.031	3604.136	5.190	0.550
554	29247	15.336	2.762	0.74	42	274.17	274.10	171.89	0.0004	18.0%	FRUI	0.010	REHAB			0.875	2.753	9.621	26.489	11888.146	17.119	1.783
749	36581	15.458	2.076	0.74	48	263.78	263.61	495.47	0.0003	13.4%	WALN	0.013				1.000	2.123	12.566	26.679	11973.508	17.242	1.784
1254	35429	1.209	0	0.74	16	281.94	281.87	95.09	0.0007	0.0%	SCEN	0.013				0.333	1.506	1.396	2.103	943.723	1.359	0.150
42	283053	19.363	1.927	0.74	45	307.67	307.25	550	0.0008	10.0%	HERN	0.013				0.938	3.035	11.045	33.523	15045.012	21.665	2.302
376	39414	74.923	18.2	0.74	66	237.87	236.53	905	0.0015	24.3%	CORN	0.013	CL5			1.375	5.442	23.758	129.290	58025.503	83.557	8.634
544	27252	15.175	2.77	0.74	42	276.36	276.24	300	0.0004	18.3%	FRUI	0.010	REHAB			0.875	2.729	9.621	26.252	11782.037	16.966	1.791
555	29246	15.329	2.762	0.74	42	274.10	274.03	171.3	0.0004	18.0%	FRUI	0.010	REHAB			0.875	2.758	9.621	26.534	11908.601	17.148	1.819
1829	17036	4.529	1.203	0.74	24	286.13	285.56	478	0.0012	26.6%	MRKS	0.013				0.500	2.505	3.142	7.869	3531.745	5.086	0.557
227	8763	17.045	1.731	0.74	42	322.67	322.55	237	0.0005	10.2%	HERN	0.010	REHAB			0.875	3.070	9.621	29.536	13255.828	19.088	2.043
822	17477	0.713	0.296	0.74	12	300.70	299.91	658.1	0.0012	41.5%	MRKS	0.013				0.250	1.591	0.785	1.249	560.652	0.807	0.094
897	21941	4.526	0.841	0.74	24	300.61	299.95	550.42	0.0012	18.6%	ORAN	0.013	1350D	Yes		0.500	2.512	3.142	7.891	3541.528	5.100	0.574
1921	34558	0.845	0.405	0.74	12	310.32	309.84	285	0.0017	47.9%	CHES	0.013				0.250	1.884	0.785	1.480	664.086	0.956	0.111
214	3640	0.92	0.164	0.74	12	334.67	333.86	405	0.0020	17.8%	HERN	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.122
1195	39799	18.212	0.846	0.74	48	267.39	267.27	420	0.0003	4.6%	JENS	0.010	REHAB	Yes		1.000	2.519	12.566	31.649	14204.140	20.454	2.242
896	21940	4.514	0.841	0.73	24	301.21	300.61	499.77	0.0012	18.6%	ORAN	0.013	1350D	Yes		0.500	2.513	3.142	7.896	3543.695	5.103	0.589
1430	18273	0.631	0.281	0.73	12	321.02	320.85	180	0.0009	44.5%	ORAN	0.013				0.250	1.411	0.785	1.108	497.295	0.716	0.085
1827	17034	4.508	1.205	0.73	24	286.96	286.65	259	0.0012	26.7%	MRKS	0.013				0.500	2.510	3.142	7.884	3538.318	5.095	0.587
287	17191	16.186	4.649	0.73	39	289.73	289.65	116.43	0.0007	28.7%	MRKS	0.010	REHAB			0.813	3.406	8.296	28.251	12679.195	18.258	2.072
329	29080	25.849	5.981	0.73	45	267.91	267.76	183.39	0.0008	23.1%	MRKS	0.010	REHAB			0.938	4.084	11.045	45.102	20241.858	29.148	3.299
361	38212	74.994	18.046	0.73	66	255.02	254.19	549.48	0.0015	24.1%	MRKS	0.013	CL5			1.375	5.496	23.758	130.587	58607.596	84.395	9.401
1825	17032	4.379	1.209	0.73	24	287.91	287.59	282	0.0011	27.6%	MRKS	0.013				0.500	2.444	3.142	7.677	3445.215	4.961	0.582
362	38213	74.958	18.045	0.73	66	254.19	253.14	694.25	0.0015	24.1%	MRKS	0.013	CL5			1.375	5.500	23.758	130.670	58644.530	84.448	9.490
505	19277	9.355	2.655	0.73	30	286.38	285.76	663.05	0.0009	28.4%	FRUI	0.010	REHAB			0.625	3.341	4.909	16.401	7360.588	10.599	1.244
1113	286536	59.065	14.768	0.73	66	255.22	254.61	650	0.0009	25.0%	NORT	0.013	SDR35			1.375	4.332	23.758	102.931	46195.433	66.521	7.456
1321	14346	0.661	0.295	0.73	12	311.48	311.20	268.12	0.0010	44.6%	FRUI	0.013	CL2			0.250	1.484	0.785	1.165	522.926	0.753	0.092
1752	17295	0.835	0.558	0.73	12	297.02	296.72	180	0.0017	66.8%	MRKS	0.013				0.250	1.874	0.785	1.472	660.618	0.951	0.116
1222	35620	1.449	0	0.73	16	281.71	281.59	186.73	0.0006	0.0%	SCEN	0.010	REHAB			0.333	1.829	1.396	2.554	1146.278	1.651	0.202
177	319997	23.493	4.839	0.73	45	258.75	257.64	963.45	0.0012	20.6%	CORN	0.013	2500D			0.938	3.728	11.045	41.176	18479.751	26.611	3.118
307	346012	21.681	5.83	0.73	42	278.73	278.39	405	0.0008	26.9%	MRKS	0.010	REHAB			0.875	3.953	9.621	38.032	17068.775	24.579	2.898
319	23086	23.097	6.016	0.73	45	272.58	272.28	454.6	0.0007	26.0%	MRKS	0.010	REHAB			0.938	3.668	11.045	40.512	18181.867	26.182	3.085
367	39439	75.093	18.319	0.73	66	248.86	247.52	877.5	0.0015	24.4%	MRKS	0.013	CL5			1.375	5.527	23.758	131.301	58927.721	84.856	9.763
1826	17033	4.502	1.206	0.73	24	287.59	286.96	520	0.0012	26.8%	MRKS	0.013				0.500	2.525	3.142	7.932	3559.872	5.126	0.624
339	327832	8.753	1.392	0.73	36	263.84	263.80	128	0.0003	15.9%	MRKS	0.010				0.750	2.178	7.069	15.399	6910.937	9.952	1.199
1664	41245	45.801	12.03	0.73	57	273.12	272.83	394	0.0007	26.3%	JENS	0.010	REHAB			1.188	4.528	17.721	80.237	36010.180	51.855	6.054
993	39788	7.476	0.271	0.73	30	269.14	269.13	7.981	0.0010	3.6%	SCEN	0.013				0.625	2.661	4.909	13.062	5862.229	8.442	0.966
1966	30757	4.271	1.004	0.73	27	304.80	304.41	662	0.0006	23.5%	CHES	0.013				0.563	1.903	3.976	7.566	3395.743	4.890	0.619
992	39789	7.481	0.271	0.73	30	269.42	269.14	273.02	0.0010	3.6%	SCEN	0.013				0.625	2.701	4.909	13.259	5950.779	8.569	1.088
1342	19718	2.449	0.39	0.73	18	302.91	302.65	260	0.0010	15.9%	FRUI	0.010	REHAB			0.375	2.466	1.767	4.358	1956.015	2.817	0.368
1869	13467	1.146	0.785	0.73	15	286.33	286.03	307	0.0010	68.5%	CORN	0.013				0.313	1.663	1.227	2.041	915.795	1.319	0.173
1973	30705	4.469	1.005	0.73	27	302.15	301.72	665	0.0006	22.5%	CHES	0.013				0.563	1.994	3.976	7.927	3557.582	5.123	0.654
429	14311	5.565	0.202	0.72	27	311.08	310.75	327.54	0.0010	3.6%	MRKS	0.013				0.563	2.489	3.976	9.895	4440.750	6.395	0.830
916	28170	7.157	0.902	0.72	30	289.84	289.41	453	0.0009	12.6%	ORAN	0.013	1350D	Yes		0.625	2.589	4.909	12.711	5704.684	8.215	1.058
1343	19719	2.475	0.39	0.72	18	302.65	302.18	459	0.0010	15.8%	FRUI	0.010	REHAB			0.375	2.496	1.767	4.410	1979.314	2.850	0.375
823	17482	0.762	0.296	0.72	12	299.91	298.97	658	0.0014	38.8%	MRKS	0.013				0.250	1.735	0.785	1.363	611.613	0.881	0.119
1063	40959	79.2	19.502	0.72	66	237.97	237.29	660.28	0.0010	24.6%	WWTP	0.010	REHAB			1.375	5.900	23.758	140.175	62910.704	90.591	11.391
1461	18284	0.699	0.062	0.72	12	322.67	322.27	330.91	0.0012	8.9%	CHES	0.013				0.250	1.596	0.785	1.254	562.602	0.810	0.111
53	7759	20.503	1.953	0.72	45	297.81	297.40	452.5	0.0009	9.5%	HERN	0.013				0.938	3.306	11.045	36.516	16388.223	23.599	3.096
182	25136	24.851	4.845	0.72	45	255.52	254.68	632.75	0.0013	19.5%	CORN	0.013	2000D			0.938	4.004	11.045	44.226	19848.658	28.582	3.731
1751	17294	0.828	0.559	0.72	12	297.19	297.02	100	0.0017	67.5%	MRKS	0.013				0.250	1.893	0.785	1.487	667.192	0.961	0.133
978	305138	5.618	0.268	0.72	24	274.35	273.84	441.88	0.0012	4.8%	SCEN	0.010	REHAB			0.500	3.204	3.142	10.064	4516.917	6.504	0.886
1093	292122	10.95	0.056	0.72	36	263.60	263.52	94	0.0009	0.5%	NORT	0.013				0.750	2.765	7.069	19.548	8773.031	12.633	1.683
228	346613	17.03	1.73	0.72	42	322.55	322.38	316	0.0005	10.2%	HERN	0.010	REHAB			0.875	3.164	9.621	30.445	13663.794	19.676	2.646
230	305171	17.007	1.73	0.72	42	322.38	322.16	411	0.0005	10.2%	HERN	0.010	REHAB			0.875	3.156	9.621	30.369	13629.528	19.627	2.620
504	19278	9.356	2.656	0.72	30	287.02	286.38	655	0.0010	28.4%	FRUI	0.010	REHAB			0.625	3.415	4.909	16.765	7524.180	10.835	1.479
1101	286558	57.35	13.233	0.72	66	260.66	260.26	431.86	0.0009	23.1%	NORT	0.013	SDR35			1.375	4.304	23.758	102.258	45893.303	66.086	8.736
1680	286602	45.771	11.897	0.72	66	264.78	264.39	661.17	0.0006	26.0%	NORT	0.013				1.375	3.435	23.758	81.604	36624.064	52.739	6.968
502	353015	9.298	2.656	0.72	30	287.95	287.69	269	0.0010	28.6%	FRUI	0.010	REHAB			0.625	3.397	4.909	16.674	7483.424	10.776	1.478
850	18020	3.41	1.216	0.72	21	313.48	313.01	538.8	0.0009	35.7%	ORAN	0.010	REHAB			0.438	2.550	2.405	6.134	2752.870	3.964	0.554
1460	18283	0.683	0.062	0.72	12	323.06	322.67	332.39	0.0012	9.1%	CHES	0.013				0.250	1.573	0.785	1.235	554.287	0.798	0.115
1920	34557	0.817	0.374	0.72	12	311.27	310.32	567	0.0017	45.8%	CHES	0.013				0.250	1.879	0.785	1.476	662.363	0.954	0.137
2011	34335	0.853	0.22	0.72	12	298.17	297.60	311	0.0018	25.8%	CHES	0.013				0.250	1.965	0.785	1.544	692.761	0.998	0.145
44	283049	19.347	1.922	0.72	45	306.68	306.23	548.16	0.0008	9.9%	HERN	0.013				0.938	3.147	11.045	34.758	15599.181	22.463	3.116
1754	17297	0.893	0.55	0.72	12	295.39	295.07	159	0.0020	61.6%	MRKS	0.013				0.250	2.059	0.785	1.618	725.943	1.045	0.152
1953	36158	4.84	2.384	0.72	24	293.24	292.90	392	0.0009	49.3%	CHES	0.010	REHAB			0.500	2.777	3.142	8.725	3915.666	5.639	0.799
1975	30683	4.553	1.006	0.72	27	301.13	300.65	692	0.0007	22.1%	CHES	0.013				0.563	2.065	3.976	8.210	3684.674	5.306	0.753
863	19956	2.842	0.807	0.72	21	306.43	305.73	677	0.0010	28.4%	FRUI	0.013	1500D			0.438	2.136	2.405	5.137	2305.483	3.320	0.478
1946	36251	2.106	1.193	0.72	18	296.39	296.11	215.14	0.0013	56.6%	CHES	0.013				0.375	2.157	1.767	3.811	1710.372	2.463	0.357
1927	36352	1.257	0.794	0.71	15	307.01	306.47	441.07	0.0012	63.2%	CHES	0.013				0.313	1.861	1.227	2.284	1025.061	1.476	0.219
1341	19717	2.401	0.39	0.71	18	303.17	302.91	260	0.0010	16.2%	FRUI	0.010	REHAB			0.375	2.466	1.767	4.358	1956.015	2.817	0.416
1344	19720	2.485	0.39	0.71	18	302.18	302.03	140	0.0011	15.7%	FRUI	0.010	REHAB			0.375	2.553	1.767	4.511	2024.668	2.916	0.431
259	15648	10.448	3.287	0.71	30	303.31	302.90	328.61	0.0012	31.5%	MRKS	0.010	REHAB			0.625	3.859	4.909	18.945	8502.397	12.243	1.795
676	25901	1.016	0.258	0.71	12	291.10	290.89	134	0.0016	25.4%	NCEN	0.010	REHAB			0.250	2.363	0.785	1.856	832.773	1.199	0.183
1324	15735	0.791	0.298	0.71	12	310.07	308.98	680.96	0.0016	37.7%	FRUI	0.013	CL 3			0.250	1.837	0.785	1.443	647.409	0.932	0.141
2043	30899	2.418	0.191	0.71	18	311.41	310.47	545	0.0017	7.9%	CHES	0.013				0.375	2.492	1.767	4.403	1976.034	2.845	0.427
175	22766	23.717	4.85	0.71	45	260.68	259.68	795.77	0.0013	20.4%	CORN	0.013	2500D			0.938	3.894	11.045	43.003	19299.917	27.792	4.075
622	38258	40.682	6.276	0.71	60	257.61	257.29	678.95	0.0005	15.4%	MRKS	0.010	REHAB			1.250	3.748	19.635	73.592	33028.261	47.561	6.879
501	19280	9.3	2.657	0.71	30	288.33	287.95	382	0.0010	28.6%	FRUI	0.010	REHAB			0.625	3.446	4.909	16.916	7591.891	10.932	1.632

													ADV = ADVERSE PIPE							Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
601	34882	12.101	2.035	0.71	30	266.84	266.54	178	0.0017	16.8%	FRUI	0.010	REHAB			0.625	4.486	4.909	22.018	9881.900	14.230	2.129
671	25896	0.892	0.172	0.71	12	292.85	292.65	164.68	0.0012	19.3%	NCEN	0.010	REHAB			0.250	2.080	0.785	1.633	733.101	1.056	0.164
189	305480	26.39	4.907	0.71	45	250.75	249.99	485.53	0.0016	18.6%	CORN	0.013	2500D			0.938	4.346	11.045	47.995	21540.113	31.018	4.628
900	24280	4.649	0.839	0.71	24	298.81	298.64	122	0.0014	18.0%	ORAN	0.013	1350D	Yes		0.500	2.708	3.142	8.507	3817.775	5.498	0.849
1340	19716	2.348	0.39	0.71	18	303.42	303.17	256	0.0010	16.6%	FRUI	0.010	REHAB			0.375	2.437	1.767	4.307	1932.957	2.783	0.435
280	17334	12.075	3.694	0.71	39	292.57	292.45	286	0.0004	30.6%	MRKS	0.010	REHAB			0.813	2.661	8.296	22.077	9908.017	14.268	2.193
430	14310	5.541	0.202	0.71	27	310.75	310.15	566.3	0.0011	3.6%	MRKS	0.013				0.563	2.552	3.976	10.147	4553.904	6.558	1.017
889	22053	3.468	0.849	0.71	21	304.72	304.36	226.82	0.0016	24.5%	ORAN	0.013	1500D	Yes		0.438	2.646	2.405	6.365	2856.392	4.113	0.645
51	7897	20.298	1.958	0.71	45	300.87	299.04	1957.45	0.0009	9.6%	HERN	0.013				0.938	3.358	11.045	37.092	16646.749	23.971	3.673
1753	17296	0.905	0.556	0.71	12	296.72	295.39	620.54	0.0021	61.4%	MRKS	0.013				0.250	2.125	0.785	1.669	749.147	1.079	0.174
1884	346005	5.382	2.389	0.71	27	280.39	279.67	718	0.0010	44.4%	CORN	0.013				0.563	2.483	3.976	9.871	4430.325	6.380	0.998
1922	34559	0.87	0.431	0.71	12	309.84	308.81	518	0.0020	49.5%	CHES	0.013				0.250	2.047	0.785	1.608	721.572	1.039	0.169
31	283064	19.046	1.909	0.70	45	316.06	315.80	529	0.0005	10.0%	HERN	0.010	REHAB			0.938	3.166	11.045	34.962	15691.029	22.595	3.549
45	8283	19.952	1.942	0.70	45	306.23	305.42	890	0.0009	9.7%	HERN	0.013				0.938	3.314	11.045	36.597	16424.673	23.652	3.700
913	28167	6.87	0.889	0.70	30	292.50	291.23	1354	0.0009	12.9%	ORAN	0.013	1350D	Yes		0.625	2.574	4.909	12.635	5670.730	8.166	1.296
1099	286570	56.136	11.972	0.70	66	261.13	260.78	374.05	0.0009	21.3%	NORT	0.013				1.375	4.326	23.758	102.780	46127.509	66.424	10.288
436	14240	5.605	0.427	0.70	27	308.60	307.87	662.37	0.0011	7.6%	MRKS	0.013				0.563	2.603	3.976	10.349	4644.539	6.688	1.083
503	19279	9.294	2.656	0.70	30	287.69	287.02	656.3	0.0010	28.6%	FRUI	0.010	REHAB			0.625	3.491	4.909	17.137	7690.880	11.075	1.781
46	8287	19.923	1.937	0.70	45	305.42	303.82	1746.75	0.0009	9.7%	HERN	0.013				0.938	3.324	11.045	36.715	16477.596	23.728	3.805
977	38994	5.619	0.268	0.70	24	274.36	274.35	8.12	0.0012	4.8%	SCEN	0.010	REHAB			0.500	3.309	3.142	10.396	4665.854	6.719	1.100
1917	34554	0.76	0.314	0.70	12	312.83	312.32	332	0.0015	41.3%	CHES	0.013				0.250	1.799	0.785	1.413	634.223	0.913	0.153
888	22052	3.449	0.85	0.70	21	305.10	304.72	237	0.0016	24.6%	ORAN	0.013	1500D	Yes		0.438	2.660	2.405	6.397	2870.945	4.134	0.685
54	7750	20.502	1.952	0.70	45	297.40	297.36	40.964	0.0010	9.5%	CORN	0.013				0.938	3.432	11.045	37.908	17012.888	24.499	3.997
1339	19715	2.327	0.391	0.70	18	303.88	303.42	466.5	0.0010	16.8%	FRUI	0.010	REHAB			0.375	2.449	1.767	4.328	1942.340	2.797	0.470
558	29243	15.287	2.761	0.70	42	273.69	273.55	301.06	0.0005	18.1%	FRUI	0.010	REHAB			0.875	2.942	9.621	28.306	12703.632	18.293	3.006
885	22049	3.361	0.851	0.70	21	305.63	305.57	39.13	0.0015	25.3%	ORAN	0.013	1500D	Yes		0.438	2.601	2.405	6.256	2807.553	4.043	0.682
37	283057	19.151	1.933	0.70	39	310.82	310.00	446	0.0018	10.1%	HERN	0.013				0.813	4.285	8.296	35.549	15954.209	22.974	3.823
48	8005	19.928	1.925	0.70	45	302.96	302.18	833.2	0.0009	9.7%	HERN	0.013				0.938	3.361	11.045	37.117	16657.963	23.987	4.059
1436	18122	0.992	0.321	0.70	15	318.71	318.19	640	0.0008	32.4%	ORAN	0.013				0.313	1.516	1.227	1.861	835.061	1.202	0.210
1462	18285	0.697	0.062	0.70	12	322.27	321.84	326.19	0.0013	8.9%	CHES	0.013				0.250	1.667	0.785	1.309	587.523	0.846	0.149
47	8006	19.933	1.929	0.70	45	303.82	302.96	915.61	0.0009	9.7%	HERN	0.013				0.938	3.366	11.045	37.178	16685.652	24.027	4.094
261	15650	10.491	3.285	0.70	30	302.42	301.98	328.61	0.0013	31.3%	MRKS	0.010	REHAB			0.625	3.998	4.909	19.626	8807.969	12.683	2.192
266	17572	10.753	3.408	0.70	33	300.03	299.50	626.71	0.0008	31.7%	MRKS	0.010	REHAB			0.688	3.384	5.940	20.098	9019.843	12.989	2.236
174	20750	21.994	4.353	0.69	45	263.82	260.78	2649.22	0.0011	19.8%	CORN	0.013	2500D			0.938	3.721	11.045	41.094	18442.806	26.558	4.564
263	17569	10.671	3.356	0.69	33	301.25	300.70	657.09	0.0008	31.4%	MRKS	0.010	REHAB			0.688	3.366	5.940	19.994	8973.529	12.922	2.251
672	25897	0.976	0.235	0.69	12	292.65	292.14	331	0.0015	24.1%	NCEN	0.010	REHAB			0.250	2.343	0.785	1.840	825.735	1.189	0.213
172	18775	20.012	4.221	0.69	45	265.32	264.44	922	0.0010	21.1%	CORN	0.013	3000D			0.938	3.393	11.045	37.478	16819.965	24.221	4.209
595	34864	12.071	2.039	0.69	30	268.94	268.70	134	0.0018	16.9%	FRUI	0.010	REHAB			0.625	4.624	4.909	22.698	10186.924	14.669	2.598
52	7760	20.289	1.956	0.69	45	299.04	297.81	1249.3	0.0010	9.6%	HERN	0.013				0.938	3.446	11.045	38.064	17083.168	24.600	4.311
550	29251	15.332	2.763	0.69	42	274.98	274.73	519	0.0005	18.0%	FRUI	0.010	REHAB			0.875	2.994	9.621	28.809	12929.351	18.618	3.286
939	31869	8.448	0.902	0.69	30	284.15	283.27	1001	0.0009	10.7%	ORAN	0.010	REHAB	Yes		0.625	3.240	4.909	15.902	7136.974	10.277	1.829
890	22054	3.487	0.849	0.69	21	304.36	304.27	52.95	0.0017	24.3%	ORAN	0.013	1500D	Yes		0.438	2.738	2.405	6.586	2955.939	4.257	0.770
914	28168	6.76	0.887	0.69	30	291.23	290.02	1267	0.0010	13.1%	ORAN	0.013	1350D	Yes		0.625	2.597	4.909	12.750	5722.040	8.240	1.480
1184	39859	16.912	0.803	0.69	48	270.28	270.21	143.5	0.0005	4.7%	ORAN	0.013		Yes		1.000	2.531	12.566	31.811	14276.728	20.558	3.646
1358	16026	1.602	0.545	0.69	18	316.52	316.31	256.72	0.0008	34.0%	ORAN	0.013				0.375	1.716	1.767	3.032	1360.845	1.960	0.358
1708	15843	0.736	0.054	0.69	12	308.72	308.09	420	0.0015	7.3%	FRUI	0.013				0.250	1.778	0.785	1.396	626.717	0.902	0.166
1709	15844	0.747	0.054	0.69	12	308.09	307.74	226	0.0015	7.2%	FRUI	0.013				0.250	1.807	0.785	1.419	636.804	0.917	0.170
334	30967	26.664	5.963	0.69	45	266.20	265.42	768.23	0.0010	22.4%	MRKS	0.010	REHAB			0.938	4.550	11.045	50.251	22552.477	32.476	5.812
1260	35501	1.208	0	0.69	16	281.18	281.00	201.19	0.0009	0.0%	SCEN	0.013				0.333	1.642	1.396	2.292	1028.765	1.481	0.273
1262	35316	1.215	0	0.69	16	280.64	280.29	397.59	0.0009	0.0%	SCEN	0.013				0.333	1.649	1.396	2.303	1033.472	1.488	0.273
1263	35315	1.213	0	0.69	16	280.29	279.93	406.45	0.0009	0.0%	SCEN	0.013				0.333	1.650	1.396	2.303	1033.729	1.489	0.276
1182	39857	16.852	0.804	0.69	48	270.80	270.55	511	0.0005	4.8%	ORAN	0.013		Yes		1.000	2.535	12.566	31.858	14297.667	20.589	3.737
1185	39860	17.045	0.803	0.69	48	270.21	270.11	200	0.0005	4.7%	ORAN	0.013		Yes		1.000	2.563	12.566	32.206	14454.086	20.814	3.769
1261	35509	1.216	0	0.69	16	281.00	280.64	402.3	0.0009	0.0%	SCEN	0.013				0.333	1.660	1.396	2.318	1040.493	1.498	0.282
1601	39014	2.958	0.131	0.69	21	279.67	279.10	460	0.0012	4.4%	ORAN	0.013				0.438	2.338	2.405	5.624	2523.863	3.634	0.676
884	22048	3.376	0.852	0.69	21	306.48	305.63	524.82	0.0016	25.2%	ORAN	0.013	1500D	Yes		0.438	2.673	2.405	6.429	2885.437	4.155	0.779
1186	39861	17.099	0.803	0.69	48	270.11	269.46	1286	0.0005	4.7%	ORAN	0.013		Yes		1.000	2.577	12.566	32.381	14532.550	20.927	3.828
1264	35314	1.21	0	0.69	16	279.93	279.59	382.4	0.0009	0.0%	SCEN	0.013				0.333	1.655	1.396	2.311	1037.155	1.494	0.284
196	30960	28.737	4.876	0.69	51	245.20	243.33	1801	0.0010	17.0%	CORN	0.013	1750D			1.063	3.844	14.186	54.532	24473.977	35.243	6.506
559	29242	15.274	2.76	0.69	42	273.55	273.52	61.32	0.0005	18.1%	FRUI	0.010	REHAB			0.875	3.018	9.621	29.033	13030.166	18.763	3.489
886	22050	3.378	0.851	0.69	21	305.57	305.11	281.94	0.0016	25.2%	ORAN	0.013	1500D	Yes		0.438	2.683	2.405	6.453	2896.062	4.170	0.792
1323	15734	0.757	0.303	0.69	12	311.19	310.07	691.07	0.0016	40.0%	FRUI	0.013	CL 3			0.250	1.848	0.785	1.452	651.439	0.938	0.181
1428	18272	0.552	0.281	0.69	12	321.48	321.03	523	0.0009	50.9%	ORAN	0.013				0.250	1.347	0.785	1.058	474.659	0.684	0.132
917	30120	7.164	0.901	0.69	30	289.41	289.22	173	0.0011	12.6%	ORAN	0.013	1350D			0.625	2.785	4.909	13.672	6136.210	8.836	1.672
309	346011	21.655	5.823	0.68	42	277.89	277.41	485	0.0010	26.9%	MRKS	0.010	REHAB			0.875	4.292	9.621	41.294	18532.762	26.687	5.032
1266	35313	1.206	0	0.68	16	279.58	279.21	406.12	0.0009	0.0%	SCEN	0.013				0.333	1.659	1.396	2.317	1039.894	1.497	0.291
1865	13529	0.954	0.707	0.68	12	290.48	288.79	652.6	0.0026	74.1%	CORN	0.013				0.250	2.336	0.785	1.835	823.466	1.186	0.232
258	15647	10.457	3.287	0.68	30	303.77	303.31	328.61	0.0014	31.4%	MRKS	0.010	REHAB			0.625	4.088	4.909	20.067	9005.926	12.969	2.512
323	25326	23.592	6.009	0.68	45	270.73	270.57	194.83	0.0008	25.5%	MRKS	0.010	REHAB			0.938	4.092	11.045	45.193	20282.648	29.207	5.615
683	27937	3.216	0.773	0.68	20	287.59	286.80	682.47	0.0012	24.0%	NCEN	0.010	REHAB			0.417	2.845	2.182	6.206	2785.216	4.011	0.795
1253	33645	1.213	0	0.68	16	282.32	282.04	306.25	0.0009	0.0%	SCEN	0.013				0.333	1.678	1.396	2.343	1051.730	1.514	0.301
49	7895	20.156	1.939	0.68	45	302.18	301.21	951.13	0.0010	9.6%	HERN	0.013				0.938	3.508	11.045	38.740	17386.620	25.037	4.881
1684	286598	45.653	11.879	0.68	66	263.54	263.40	206.78	0.0007	26.0%	NORT	0.013				1.375	3.680	23.758	87.427	39237.430	56.502	10.849
308	21004	21.673	5.827	0.68	42	278.39	277.89	495	0.0010	26.9%	MRKS	0.010	REHAB			0.875	4.336	9.621	41.718	18722.886	26.961	5.288
1683	286599	45.691	11.885	0.68	66	263.89	263.54	513.62	0.0007	26.0%	NORT	0.013				1.375	3.692	23.758	87.710	39364.421	56.685	10.994
40	283054	19.326	1.93	0.68	45	308.64	308.22	444.21	0.0009	10.0%	HERN	0.013				0.938	3.377	11.045	37.302	16740.935	24.107	4.781
849	18019	3.424	1.218	0.68	21	314.06	313.48	567.1	0.0010	35.6%	ORAN	0.010	REHAB			0.438	2.761	2.405	6.642	2980.813	4.292	0.868
1183	39858	16.88	0.803	0.68	48	270.55	270.28	529	0.0005	4.8%	ORAN	0.013		Yes		1.000	2.589	12.566	32.539	14603.591	21.029	4.149
1328	15739	0.934	0.295	0.68	12	307.84	307.01	550	0.0015	31.6%	FRUI	0.010	REHAB			0.250	2.318	0.785	1.821	817.198	1.177	0.243
564	30990	15.337	2.757	0.68	42	272.44	272.27	331.05	0.0005	18.0%	FRUI	0.010	REHAB			0.875	3.092	9.621	29.745	13349.594	19.223	3.886

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
852	18022	3.553	1.215	0.68	21	312.84	312.37	423	0.0011	34.2%	ORAN	0.010	REHAB			0.438	2.878	2.405	6.923	3106.915	4.474	0.921
125	39387	29.509	11.85	0.68	72	235.89	235.73	880	0.0002	40.2%	WWTP	0.013	D1850			1.500	2.020	28.274	57.105	25628.727	36.905	7.396
310	20998	21.923	6.061	0.68	42	277.41	277.19	209.27	0.0011	27.6%	MRKS	0.010	REHAB			0.875	4.424	9.621	42.559	19100.655	27.505	5.582
1039	41004	77.476	17.978	0.68	66	253.85	252.82	873.38	0.0012	23.2%	NORT	0.010	REHAB			1.375	6.314	23.758	150.002	67321.092	96.942	19.466
1918	34555	0.758	0.313	0.68	12	312.32	311.74	342	0.0017	41.3%	CHES	0.013				0.250	1.891	0.785	1.485	666.388	0.960	0.202
1995	36243	0.771	0.375	0.68	12	299.69	299.12	324.67	0.0018	48.6%	CHES	0.013				0.250	1.924	0.785	1.511	678.020	0.976	0.205
1038	275958	77.481	17.99	0.67	66	254.53	253.85	573.59	0.0012	23.2%	NORT	0.010	REHAB			1.375	6.330	23.758	150.396	67497.522	97.196	19.715
216	8837	16.815	1.731	0.67	42	323.53	323.06	754	0.0006	10.3%	HERN	0.010	REHAB			0.875	3.406	9.621	32.772	14708.001	21.180	4.365
260	15649	10.489	3.286	0.67	30	302.90	302.42	328.65	0.0015	31.3%	MRKS	0.010	REHAB			0.625	4.176	4.909	20.497	9199.064	13.247	2.758
945	33892	12.81	0.937	0.67	36	281.26	281.15	133.68	0.0008	7.3%	ORAN	0.010	REHAB	Yes		0.750	3.535	7.069	24.987	11214.375	16.149	3.339
1040	41003	77.498	18.01	0.67	66	252.82	251.78	873.38	0.0012	23.2%	NORT	0.010	REHAB			1.375	6.344	23.758	150.729	67647.104	97.412	19.914
1252	33644	1.174	0	0.67	16	282.51	282.32	215	0.0009	0.0%	SCEN	0.013				0.333	1.650	1.396	2.304	1034.000	1.489	0.315
2018	36196	1.142	0.613	0.67	15	296.05	295.68	313.61	0.0012	53.7%	CHES	0.013				0.313	1.827	1.227	2.242	1006.266	1.449	0.307
623	38259	40.892	6.551	0.67	60	257.29	256.81	868	0.0006	16.0%	MRKS	0.010	REHAB			1.250	4.060	19.635	79.715	35775.884	51.517	10.625
1075	317425	60.367	15.071	0.67	60	236.87	236.32	457	0.0012	25.0%	WWTP	0.010	REHAB			1.250	5.989	19.635	117.598	52777.992	76.000	15.633
759	33389	6.97	1.216	0.67	30	272.84	272.40	400.21	0.0011	17.4%	NCEN	0.013				0.625	2.787	4.909	13.680	6139.441	8.841	1.871
760	33392	6.992	1.213	0.67	30	272.40	271.96	397.16	0.0011	17.3%	NCEN	0.013				0.625	2.797	4.909	13.732	6162.970	8.875	1.883
864	19955	2.916	0.805	0.67	21	305.73	305.10	489	0.0013	27.6%	FRUI	0.013	1500D			0.438	2.384	2.405	5.734	2573.494	3.706	0.790
1037	41002	77.483	17.996	0.67	66	254.89	254.53	299.79	0.0012	23.2%	NORT	0.010	REHAB			1.375	6.371	23.758	151.364	67932.381	97.823	20.340
1077	317413	60.297	15.033	0.67	60	230.40	230.00	195.15	0.0020	24.9%	WWTP	0.013				1.250	6.012	19.635	118.054	52982.443	76.295	15.998
1919	34556	0.755	0.312	0.67	12	311.74	311.27	274	0.0017	41.3%	CHES	0.013				0.250	1.901	0.785	1.493	670.193	0.965	0.210
1981	32318	4.644	0.994	0.67	27	298.85	298.28	663	0.0009	21.4%	CHES	0.013				0.563	2.299	3.976	9.140	4102.156	5.907	1.263
616	285453	38.092	5.436	0.67	60	258.73	258.53	411.77	0.0005	14.3%	FRUI	0.010	REHAB			1.250	3.805	19.635	74.708	33528.742	48.281	10.189
1229	37360	2.444	0.001	0.67	18	278.96	278.31	525	0.0012	0.0%	SCEN	0.010	REHAB			0.375	2.744	1.767	4.849	2176.452	3.134	0.690
1593	37656	1.623	0.103	0.67	18	285.11	284.59	562.98	0.0009	6.3%	ORAN	0.013				0.375	1.823	1.767	3.222	1446.052	2.082	0.459
1907	13344	1.501	1.404	0.67	18	282.50	282.14	455	0.0008	93.5%	CORN	0.013				0.375	1.688	1.767	2.982	1338.364	1.927	0.426
1926	36351	1.168	0.703	0.67	15	307.49	307.01	379.71	0.0013	60.2%	CHES	0.013				0.313	1.891	1.227	2.321	1041.601	1.500	0.332
1977	32385	4.58	1.004	0.67	27	300.36	300.08	331	0.0008	21.9%	CHES	0.013				0.563	2.280	3.976	9.067	4069.083	5.859	1.279
567	31070	15.519	2.754	0.67	42	271.83	271.48	640	0.0005	17.7%	FRUI	0.010	REHAB			0.875	3.190	9.621	30.696	13776.359	19.838	4.319
1256	35430	1.196	0	0.67	16	281.63	281.54	92	0.0009	0.0%	SCEN	0.013				0.333	1.707	1.396	2.383	1069.618	1.540	0.344
1750	17291	0.813	0.56	0.67	12	297.55	297.19	178	0.0020	68.9%	MRKS	0.013				0.250	2.065	0.785	1.621	727.725	1.048	0.235
1993	36241	0.74	0.382	0.67	12	301.86	300.83	613.16	0.0017	51.6%	CHES	0.013				0.250	1.882	0.785	1.478	663.220	0.955	0.215
41	285593	19.368	1.929	0.67	45	308.22	307.67	550	0.0010	10.0%	HERN	0.013				0.938	3.473	11.045	38.362	17216.673	24.792	5.424
560	29241	15.271	2.76	0.66	42	273.52	273.46	112.24	0.0005	18.1%	FRUI	0.010	REHAB			0.875	3.154	9.621	30.349	13620.473	19.613	4.342
1167	38347	5.141	0.004	0.66	30	262.66	262.46	324.92	0.0006	0.1%	SCEN	0.013				0.625	2.085	4.909	10.236	4593.812	6.615	1.474
1570	36134	13.993	1.57	0.66	45	290.73	290.68	161.34	0.0003	11.2%	CHES	0.010	REHAB			0.938	2.514	11.045	27.762	12459.670	17.942	3.949
35	8501	19.158	1.934	0.66	39	312.85	311.91	444.63	0.0021	10.1%	HERN	0.013				0.813	4.595	8.296	38.120	17108.043	24.636	5.478
204	346037	27.998	4.907	0.66	60	236.68	236.65	66	0.0005	17.5%	CORN	0.013	1750D			1.250	2.831	19.635	55.593	24950.251	35.928	7.930
617	38300	39.7	5.432	0.66	60	258.53	258.51	36.91	0.0005	13.7%	FRUI	0.010	REHAB			1.250	4.019	19.635	78.908	35413.805	50.996	11.296
626	38252	41.408	7.458	0.66	60	256.28	255.76	880.9	0.0006	18.0%	MRKS	0.010	REHAB			1.250	4.195	19.635	82.360	36963.066	53.227	11.819
758	33368	6.946	1.218	0.66	30	273.07	272.84	203.12	0.0011	17.5%	NCEN	0.013				0.625	2.828	4.909	13.883	6230.660	8.972	2.026
1079	40733	8.68	0.057	0.66	36	266.57	266.42	379.6	0.0004	0.7%	NORT	0.010	REHAB			0.750	2.450	7.069	17.316	7771.314	11.191	2.511
1257	35499	1.195	0	0.66	16	281.54	281.42	124.99	0.0010	0.0%	SCEN	0.013				0.333	1.720	1.396	2.401	1077.745	1.552	0.357
314	23110	22.22	6.05	0.66	45	275.76	275.21	689.58	0.0008	27.2%	MRKS	0.010	REHAB			0.938	4.033	11.045	44.538	19988.564	28.784	6.564
202	38207	28.263	4.921	0.66	60	237.91	237.13	1648.67	0.0005	17.4%	CORN	0.013	2000D			1.250	2.885	19.635	56.644	25421.970	36.608	8.345
435	14239	5.487	0.269	0.66	27	309.30	308.60	557.23	0.0013	4.9%	MRKS	0.013				0.563	2.779	3.976	11.049	4958.649	7.140	1.653
1170	38350	5.194	0.082	0.66	30	262.03	261.82	326.15	0.0006	1.6%	SCEN	0.013				0.625	2.133	4.909	10.469	4698.372	6.766	1.572
1994	36242	0.739	0.379	0.66	12	300.83	299.69	659.46	0.0017	51.3%	CHES	0.013				0.250	1.909	0.785	1.499	672.797	0.969	0.230
43	283052	19.356	1.924	0.66	45	307.25	306.68	550.12	0.0010	9.9%	HERN	0.013				0.938	3.536	11.045	39.049	17524.996	25.236	5.880
191	27130	26.323	4.885	0.66	45	249.45	249.23	115.22	0.0019	18.6%	CORN	0.013	1750D			0.938	4.799	11.045	53.008	23790.120	34.258	7.935
255	15644	10.343	3.246	0.66	30	305.16	304.66	328.65	0.0015	31.4%	MRKS	0.010	REHAB			0.625	4.262	4.909	20.920	9388.755	13.520	3.177
363	38214	74.913	18.041	0.66	66	253.14	251.70	717.2	0.0020	24.1%	MRKS	0.013	CL5			1.375	6.337	23.758	150.556	67569.688	97.300	22.387
568	31069	15.517	2.752	0.66	42	271.46	270.90	986	0.0006	17.7%	FRUI	0.010	REHAB			0.875	3.251	9.621	31.282	14039.316	20.217	4.700
628	283108	41.81	8.108	0.66	60	255.27	255.25	32.5	0.0006	19.4%	MRKS	0.010	REHAB			1.250	4.283	19.635	84.091	37740.090	54.346	12.536
1327	15738	0.893	0.295	0.66	12	308.23	307.84	260	0.0015	33.0%	FRUI	0.010	REHAB			0.250	2.311	0.785	1.815	814.732	1.173	0.280
1749	17327	0.786	0.561	0.66	12	297.75	297.55	102	0.0020	71.4%	MRKS	0.013				0.250	2.033	0.785	1.597	716.541	1.032	0.246
203	38208	28.116	4.914	0.66	60	237.13	236.68	956	0.0005	17.5%	CORN	0.013	1750D			1.250	2.888	19.635	56.699	25446.411	36.643	8.527
610	38354	28.56	4.309	0.66	54	260.88	260.50	445	0.0009	15.1%	FRUI	0.013				1.125	3.620	15.904	57.575	25839.442	37.209	8.649
1166	38346	5.137	0.004	0.66	30	262.87	262.66	330.25	0.0006	0.1%	SCEN	0.013				0.625	2.119	4.909	10.404	4669.116	6.724	1.587
1974	30678	4.559	1.007	0.66	27	301.72	301.13	671	0.0009	22.1%	CHES	0.013				0.563	2.325	3.976	9.244	4148.550	5.974	1.415
315	23111	22.195	6.041	0.66	45	275.21	274.99	270.66	0.0008	27.2%	MRKS	0.010	REHAB			0.938	4.071	11.045	44.961	20178.639	29.057	6.862
608	38352	28.572	4.297	0.66	54	262.04	261.46	673.78	0.0009	15.0%	FRUI	0.013				1.125	3.635	15.904	57.806	25943.363	37.358	8.786
311	20999	21.947	6.059	0.65	42	277.19	276.64	476.87	0.0012	27.6%	MRKS	0.010	REHAB			0.875	4.633	9.621	44.578	20006.529	28.809	6.862
484	21565	8.092	2.499	0.65	24	297.25	296.96	93.54	0.0031	30.9%	FRUI	0.010	REHAB			0.500	5.251	3.142	16.495	7403.030	10.660	2.568
612	277711	28.481	4.304	0.65	54	260.11	259.73	443.55	0.0009	15.1%	FRUI	0.013				1.125	3.626	15.904	57.669	25881.643	37.270	8.789
747	36560	15.472	2.078	0.65	48	263.99	263.80	399.95	0.0005	13.4%	WALN	0.013				1.000	2.498	12.566	31.393	14088.981	20.288	4.816
1169	38349	5.133	0.004	0.65	30	262.24	262.03	327.85	0.0006	0.1%	SCEN	0.013				0.625	2.127	4.909	10.442	4686.175	6.748	1.615
1355	14571	1.38	0.384	0.65	18	317.86	317.74	170	0.0007	27.8%	ORAN	0.013	CL4			0.375	1.594	1.767	2.817	1264.139	1.820	0.440
1707	15842	0.613	0.055	0.65	12	309.52	308.72	661.22	0.0012	9.0%	FRUI	0.013				0.250	1.597	0.785	1.254	562.857	0.811	0.198
1858	14907	0.432	0.387	0.65	12	293.68	293.37	515.05	0.0006	89.6%	MRKS	0.013				0.250	1.126	0.785	0.885	396.992	0.572	0.140
356	38219	33.215	10.048	0.65	60	256.70	256.10	900	0.0007	30.3%	MRKS	0.013				1.250	3.429	19.635	67.327	30216.255	43.511	10.296
797	26065	1.374	0.159	0.65	15	289.66	288.95	644.4	0.0011	11.6%	NCEN	0.010	REHAB			0.313	2.295	1.227	2.817	1264.158	1.820	0.446
1191	39866	18.215	0.846	0.65	48	268.30	268.17	332	0.0004	4.6%	JENS	0.010	REHAB	Yes		1.000	2.948	12.566	37.051	16628.444	23.945	5.730
1971	30761	4.325	0.996	0.65	27	303.28	302.75	661	0.0008	23.0%	CHES	0.013				0.563	2.220	3.976	8.827	3961.583	5.705	1.380
1220	35618	1.296	0	0.65	16	282.38	282.12	373.44	0.0007	0.0%	SCEN	0.010	REHAB			0.333	1.904	1.396	2.658	1193.116	1.718	0.422
1223	35621	1.614	0	0.65	16	281.59	281.19	370.68	0.0011	0.0%	SCEN	0.010	REHAB			0.333	2.370	1.396	3.310	1485.378	2.139	0.525
1459	18310	0.613	0.062	0.65	12	323.74	323.06	556	0.0012	10.1%	CHES	0.013				0.250	1.605	0.785	1.261	565.904	0.815	0.202
1681	286601	45.728	11.891	0.65	66	264.39	264.06	431.75	0.0008	26.0%	NORT	0.013				1.375	3.910	23.758	92.892	41689.972	60.034	14.306
34	283055	19.15	1.934	0.65	39	313.82	312.85	435.3	0.0022	10.1%	HERN	0.013				0.813	4.718	8.296	39.136	17564.158	25.292	6.142
746	36559	15.467	2.078	0.65	48	264.02	263.99	62.51	0.0005	13.4%	WALN	0.013				1.000	2.511	12.566	31.553	14160.921	20.392	4.925

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
980	38996	5.639	0.268	0.65	24	273.76	272.87	584	0.0015	4.8%	SCEN	0.010	REHAB			0.500	3.681	3.142	11.565	5190.363	7.474	1.835
1164	276960	5.031	0.004	0.65	30	263.29	263.08	337.25	0.0006	0.1%	SCEN	0.013				0.625	2.097	4.909	10.295	4620.406	6.653	1.622
1322	14347	0.661	0.294	0.65	12	311.20	311.19	7	0.0014	44.5%	FRUI	0.013	CL2			0.250	1.735	0.785	1.363	611.613	0.881	0.220
2014	36192	1.075	0.522	0.65	15	297.17	297.02	130.81	0.0011	48.6%	CHES	0.013				0.313	1.801	1.227	2.210	992.046	1.429	0.354
251	14188	10.004	2.662	0.65	30	307.17	306.21	656	0.0015	26.6%	MRKS	0.010	REHAB			0.625	4.180	4.909	20.517	9208.174	13.260	3.256
609	38353	28.571	4.313	0.65	54	261.46	260.88	659.5	0.0009	15.1%	FRUI	0.013				1.125	3.674	15.904	58.429	26222.732	37.761	9.190
611	277710	28.521	4.307	0.65	54	260.50	260.11	445	0.0009	15.1%	FRUI	0.013				1.125	3.667	15.904	58.327	26177.227	37.695	9.174
1566	36139	13.829	1.443	0.65	45	291.60	291.53	216.39	0.0003	10.4%	CHES	0.010	REHAB			0.938	2.568	11.045	28.364	12729.842	18.331	4.502
30	283065	19.048	1.909	0.65	45	316.42	316.06	584	0.0006	10.0%	HERN	0.010	REHAB			0.938	3.545	11.045	39.155	17572.656	25.305	6.257
33	283056	19.152	1.935	0.65	39	314.80	313.82	434.25	0.0023	10.1%	HERN	0.013				0.813	4.748	8.296	39.385	17675.793	25.453	6.301
684	27938	3.234	0.811	0.65	20	286.80	285.88	685.8	0.0013	25.1%	NCEN	0.010	REHAB			0.417	3.062	2.182	6.681	2998.349	4.318	1.084
1163	38344	5.032	0.004	0.65	30	263.39	263.29	158	0.0006	0.1%	SCEN	0.013				0.625	2.114	4.909	10.379	4658.198	6.708	1.676
276	17432	11.922	3.707	0.65	36	295.60	294.59	1267.8	0.0008	31.1%	MRKS	0.010	III	Yes		0.750	3.478	7.069	24.586	11034.363	15.889	3.967
427	14313	5.605	0.202	0.65	27	312.24	311.30	679.9	0.0014	3.6%	MRKS	0.013				0.563	2.915	3.976	11.591	5202.031	7.491	1.886
851	18021	3.397	1.215	0.65	21	313.01	312.84	148	0.0011	35.8%	ORAN	0.010	REHAB			0.438	2.926	2.405	7.039	3158.961	4.549	1.152
944	31868	12.807	0.937	0.65	36	281.33	281.26	75.93	0.0009	7.3%	ORAN	0.010	REHAB	Yes		0.750	3.742	7.069	26.449	11870.097	17.093	4.286
1165	38345	5.037	0.004	0.65	30	263.08	262.87	328.19	0.0006	0.1%	SCEN	0.013				0.625	2.126	4.909	10.436	4683.747	6.745	1.708
1168	38348	5.137	0.004	0.65	30	262.46	262.24	331.33	0.0007	0.1%	SCEN	0.013				0.625	2.166	4.909	10.631	4771.198	6.871	1.734
761	35129	7.024	1.211	0.65	30	271.96	271.71	200.08	0.0012	17.2%	NCEN	0.013				0.625	2.971	4.909	14.584	6545.075	9.425	2.401
1458	18309	0.605	0.063	0.65	12	324.34	323.74	487.73	0.0012	10.4%	CHES	0.013				0.250	1.610	0.785	1.265	567.560	0.817	0.212
2016	36194	1.087	0.539	0.65	15	296.82	296.26	463.67	0.0012	49.6%	CHES	0.013				0.313	1.849	1.227	2.269	1018.114	1.466	0.379
566	31071	15.398	2.755	0.64	42	272.00	271.83	286.85	0.0006	17.9%	FRUI	0.010	REHAB			0.875	3.321	9.621	31.955	14341.264	20.651	5.253
670	25895	0.855	0.155	0.64	12	293.33	292.85	330	0.0015	18.1%	NCEN	0.010	REHAB			0.250	2.276	0.785	1.788	802.293	1.155	0.300
32	8500	19.154	1.935	0.64	39	315.80	314.80	433	0.0023	10.1%	HERN	0.013				0.813	4.803	8.296	39.842	17881.002	25.749	6.595
38	8382	19.332	1.932	0.64	45	309.44	308.95	446	0.0011	10.0%	HERN	0.013				0.938	3.641	11.045	40.209	18045.954	25.986	6.654
275	17431	11.756	3.708	0.64	36	295.63	295.60	38	0.0008	31.5%	MRKS	0.010	III	Yes		0.750	3.463	7.069	24.475	10984.512	15.818	4.062
110	32927	30.673	12.504	0.64	72	240.85	240.67	797.07	0.0002	40.8%	WWTP	0.013	D1850			1.500	2.251	28.274	63.642	28562.512	41.130	10.457
169	18777	19.856	4.222	0.64	45	266.91	266.45	396.95	0.0012	21.3%	CORN	0.013	2500D			0.938	3.743	11.045	41.341	18553.754	26.717	6.861
1085	41148	8.714	0.056	0.64	36	265.12	264.87	574.19	0.0004	0.6%	NORT	0.010	REHAB			0.750	2.571	7.069	18.176	8157.445	11.747	3.033
1172	38385	5.184	0.081	0.64	30	261.77	261.74	43.63	0.0007	1.6%	FRUI	0.013				0.625	2.204	4.909	10.818	4855.282	6.992	1.808
1958	36152	5.155	2.379	0.64	24	292.11	291.91	151	0.0013	46.1%	CHES	0.010	REHAB			0.500	3.432	3.142	10.782	4838.778	6.968	1.813
1968	30759	4.292	1.001	0.64	27	303.99	303.85	169	0.0008	23.3%	CHES	0.013				0.563	2.257	3.976	8.972	4026.727	5.798	1.506
313	21001	21.934	6.051	0.64	45	275.81	275.76	59.26	0.0008	27.6%	MRKS	0.010	REHAB			0.938	4.148	11.045	45.808	20558.752	29.605	7.671
1359	16077	1.599	0.543	0.64	18	316.31	316.16	148.15	0.0010	34.0%	ORAN	0.013				0.375	1.903	1.767	3.362	1508.937	2.173	0.574
1868	13465	1.083	0.718	0.64	15	287.06	286.33	600	0.0012	66.3%	CORN	0.013				0.313	1.855	1.227	2.277	1021.863	1.471	0.388
173	18776	19.919	4.211	0.64	45	264.44	263.82	525.5	0.0012	21.1%	CORN	0.013	2500D			0.938	3.773	11.045	41.668	18700.736	26.929	7.010
1320	14343	0.641	0.272	0.64	12	311.94	311.48	326.14	0.0014	42.4%	FRUI	0.013	CL2			0.250	1.724	0.785	1.354	607.719	0.875	0.234
1979	32320	4.617	1.001	0.64	27	299.88	299.29	609	0.0010	21.7%	CHES	0.013				0.563	2.440	3.976	9.703	4354.606	6.271	1.654
2015	36193	1.075	0.522	0.64	15	297.02	296.82	166.27	0.0012	48.6%	CHES	0.013				0.313	1.845	1.227	2.264	1016.049	1.463	0.388
2017	36195	1.086	0.537	0.64	15	296.26	296.05	169.99	0.0012	49.4%	CHES	0.013				0.313	1.870	1.227	2.294	1029.686	1.483	0.397
296	17038	16.246	4.636	0.64	39	286.42	286.13	288.75	0.0010	28.5%	MRKS	0.010	REHAB			0.813	4.117	8.296	34.156	15329.117	22.074	5.828
298	17042	16.455	4.634	0.64	39	286.07	285.35	698	0.0010	28.2%	MRKS	0.010	REHAB			0.813	4.173	8.296	34.615	15535.230	22.371	5.916
299	17040	16.464	4.64	0.64	39	285.35	284.75	580.99	0.0010	28.2%	MRKS	0.010	REHAB			0.813	4.175	8.296	34.635	15544.274	22.384	5.920
1969	30760	4.328	1.001	0.64	27	303.85	303.68	200	0.0009	23.1%	CHES	0.013				0.563	2.299	3.976	9.142	4102.804	5.908	1.580
262	17568	10.612	3.337	0.64	33	301.94	301.25	657.09	0.0011	31.4%	MRKS	0.010	REHAB			0.688	3.770	5.940	22.395	10050.935	14.473	3.861
821	17476	0.668	0.301	0.64	12	301.72	300.70	658.3	0.0015	45.1%	MRKS	0.013				0.250	1.807	0.785	1.419	636.963	0.917	0.249
1357	16025	1.499	0.52	0.64	18	317.06	316.52	600.47	0.0009	34.7%	ORAN	0.013				0.375	1.799	1.767	3.179	1426.856	2.055	0.556
1867	13464	1.082	0.727	0.64	15	287.74	287.06	551	0.0012	67.2%	CORN	0.013				0.313	1.869	1.227	2.293	1029.166	1.482	0.400
1970	30822	4.324	0.999	0.64	27	303.68	303.28	462	0.0009	23.1%	CHES	0.013				0.563	2.301	3.976	9.150	4106.313	5.913	1.589
1972	30704	4.422	1.01	0.64	27	302.75	302.15	666	0.0009	22.8%	CHES	0.013				0.563	2.353	3.976	9.357	4199.234	6.047	1.625
773	349985	3.716	1.075	0.64	24	280.38	280.20	254	0.0007	28.9%	NCEN	0.010	SDR35			0.500	2.510	3.142	7.886	3539.391	5.097	1.381
987	39817	7.494	0.271	0.64	30	270.47	270.26	142	0.0015	3.6%	SCEN	0.013				0.625	3.232	4.909	15.866	7120.524	10.254	2.760
988	39816	7.492	0.271	0.64	30	270.26	270.01	169	0.0015	3.6%	SCEN	0.013				0.625	3.233	4.909	15.868	7121.527	10.255	2.763
20	328485	18.628	1.938	0.64	45	319.47	319.08	623	0.0006	10.4%	HERN	0.010	REHAB			0.938	3.573	11.045	39.457	17708.462	25.500	6.872
563	30989	15.301	2.758	0.64	42	272.64	272.44	328.86	0.0006	18.0%	FRUI	0.010	REHAB			0.875	3.365	9.621	32.370	14527.801	20.920	5.619
985	39819	7.5	0.271	0.64	30	271.05	270.70	235	0.0015	3.6%	SCEN	0.013				0.625	3.244	4.909	15.922	7145.729	10.290	2.790
1914	34551	0.48	0.033	0.64	10	313.47	313.13	159	0.0021	6.9%	CHES	0.013				0.208	1.882	0.545	1.027	460.728	0.663	0.183
166	16655	18.755	4.197	0.63	42	269.42	268.84	372.48	0.0016	22.4%	CORN	0.013				0.875	4.141	9.621	39.843	17881.731	25.750	6.995
295	17044	16.251	4.637	0.63	39	286.70	286.42	271.3	0.0010	28.5%	MRKS	0.010	REHAB			0.813	4.174	8.296	34.624	15539.365	22.377	6.126
986	39818	7.497	0.271	0.63	30	270.70	270.47	153	0.0015	3.6%	SCEN	0.013				0.625	3.259	4.909	15.996	7179.012	10.338	2.841
1967	30758	4.269	1.003	0.63	27	304.41	303.99	492	0.0009	23.5%	CHES	0.013				0.563	2.291	3.976	9.108	4087.649	5.886	1.617
26	8551	19.006	1.918	0.63	45	317.45	317.14	469	0.0007	10.1%	HERN	0.010	REHAB			0.938	3.671	11.045	40.545	18196.464	26.203	7.197
264	17570	10.715	3.4	0.63	33	300.70	300.34	328.66	0.0011	31.7%	MRKS	0.010	REHAB			0.688	3.851	5.940	22.873	10265.313	14.782	4.067
440	12753	0.45	0.45	0.63	10	314.04	312.88	610	0.0019	100.0%	MRKS	0.013				0.208	1.775	0.545	0.968	434.478	0.626	0.176
892	22056	3.584	0.847	0.63	21	304.14	303.17	420.15	0.0023	23.6%	ORAN	0.013	1500D	Yes		0.438	3.191	2.405	7.676	3445.014	4.961	1.377
1076	317426	60.355	15.065	0.63	60	236.32	230.40	2446	0.0024	25.0%	WWTP	0.013				1.250	6.533	19.635	128.282	57573.004	82.905	22.550
36	283058	19.155	1.934	0.63	39	311.91	310.82	446	0.0024	10.1%	HERN	0.013				0.813	4.941	8.296	40.985	18394.230	26.488	7.333
293	17039	16.243	4.637	0.63	39	286.99	286.72	260	0.0010	28.5%	MRKS	0.010	REHAB			0.813	4.187	8.296	34.731	15587.424	22.446	6.203
1426	18270	0.529	0.282	0.63	12	321.87	321.74	130	0.0010	53.3%	ORAN	0.013				0.250	1.452	0.785	1.140	511.713	0.737	0.208
1863	13531	0.626	0.28	0.63	10	294.21	291.75	665.4	0.0037	44.7%	CORN	0.013				0.208	2.475	0.545	1.350	605.801	0.872	0.246
1923	36348	1.046	0.578	0.63	15	308.81	308.27	453.8	0.0012	55.3%	CHES	0.013				0.313	1.835	1.227	2.252	1010.581	1.455	0.409
1259	35500	1.203	0	0.63	16	281.39	281.18	191.42	0.0011	0.0%	SCEN	0.013				0.333	1.856	1.396	2.591	1162.991	1.675	0.472
1924	36349	1.06	0.593	0.63	15	308.27	307.88	318.93	0.0012	55.9%	CHES	0.013				0.313	1.860	1.227	2.283	1024.451	1.475	0.415
2010	34334	0.709	0.04	0.63	12	298.76	298.17	328	0.0018	5.6%	CHES	0.013				0.250	1.947	0.785	1.529	686.302	0.988	0.279
619	38302	39.874	5.63	0.63	60	258.04	257.71	517.13	0.0006	14.1%	FRUI	0.010	REHAB			1.250	4.361	19.635	85.632	38431.445	55.341	15.467
1083	40738	8.695	0.056	0.63	36	265.76	265.57	410	0.0005	0.6%	NORT	0.010	REHAB			0.750	2.653	7.069	18.752	8415.827	12.119	3.424
1682	286600	45.712	11.887	0.63	66	264.06	263.89	199.25	0.0009	26.0%	NORT	0.013				1.375	4.131	23.758	98.144	44046.976	63.428	17.716
1706	15841	0.583	0.055	0.63	12	309.82	309.52	244.53	0.0012	9.4%	FRUI	0.013				0.250	1.608	0.785	1.263	566.788	0.816	0.233
424	322146	5.653	0.202	0.63	27	312.91	312.90	11	0.0009	3.6%	MRKS	0.010	REHAB			0.563	3.073	3.976	12.219	5483.762	7.897	2.244
613	38384	28.442	4.301	0.63	54	259.73	259.71	20.66	0.0010	15.1%	FRUI	0.013				1.125	3.854	15.904	61.301	27511.938	39.617	11.175

													ADV = ADVERSE PIPE							Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1090	41152	10.296	0.056	0.63	36	264.02	263.66	551.32	0.0007	0.5%	NORT	0.010	REHAB			0.750	3.149	7.069	22.259	9989.904	14.385	4.089
1457	18308	0.58	0.063	0.63	12	324.67	324.34	270	0.0012	10.9%	CHES	0.013				0.250	1.605	0.785	1.261	565.719	0.815	0.235
1685	286597	45.631	11.876	0.63	66	263.40	262.86	630.56	0.0009	26.0%	NORT	0.013				1.375	4.139	23.758	98.327	44129.040	63.546	17.915
716	33384	0.485	0	0.63	10	277.28	277.24	17.5	0.0023	0.0%	NCEN	0.013				0.208	1.946	0.545	1.061	476.338	0.686	0.201
1074	339328	60.372	15.074	0.63	60	237.21	236.87	229	0.0015	25.0%	WWTP	0.010	REHAB			1.250	6.652	19.635	130.617	58620.745	84.414	24.042
1227	37380	1.855	0.002	0.63	18	279.95	279.51	510	0.0009	0.1%	SCEN	0.010	REHAB			0.375	2.291	1.767	4.048	1816.826	2.616	0.761
257	15646	10.341	3.228	0.62	30	304.35	303.77	328.65	0.0018	31.2%	MRKS	0.010	REHAB			0.625	4.590	4.909	22.531	10111.999	14.561	4.220
618	38301	39.916	5.638	0.62	60	258.51	258.04	720.12	0.0007	14.1%	FRUI	0.010	REHAB			1.250	4.411	19.635	86.601	38866.560	55.968	16.052
621	38257	40.631	6.205	0.62	60	257.70	257.61	133.61	0.0007	15.3%	FRUI	0.010	REHAB			1.250	4.481	19.635	87.979	39484.931	56.858	16.227
29	283066	19.056	1.913	0.62	45	316.78	316.42	521	0.0007	10.0%	HERN	0.010	REHAB			0.938	3.753	11.045	41.455	18604.798	26.791	7.735
1602	39015	2.955	0.13	0.62	21	279.10	278.38	440	0.0016	4.4%	ORAN	0.013				0.438	2.687	2.405	6.462	2900.328	4.176	1.221
1976	32384	4.558	1.005	0.62	27	300.64	300.36	275	0.0010	22.0%	CHES	0.013				0.563	2.502	3.976	9.947	4464.206	6.428	1.870
208	317417	105.891	22.878	0.62	84	233.00	230.80	1694	0.0013	21.6%	WWTP	0.013				1.750	5.976	38.485	229.979	103214.681	148.629	42.738
304	19023	21.297	5.837	0.62	42	280.91	280.86	39.83	0.0013	27.4%	MRKS	0.010	REHAB			0.875	4.834	9.621	46.507	20872.297	30.056	8.759
273	17496	11.695	3.72	0.62	36	296.92	296.35	660.47	0.0009	31.8%	MRKS	0.010	II	Yes		0.750	3.620	7.069	25.590	11484.784	16.538	4.843
432	14308	5.488	0.201	0.62	27	310.12	309.20	616.7	0.0015	3.7%	MRKS	0.013				0.563	3.028	3.976	12.040	5403.666	7.781	2.293
614	38299	38.153	5.446	0.62	60	259.28	259.01	448	0.0006	14.3%	FRUI	0.010	REHAB			1.250	4.238	19.635	83.218	37348.442	53.782	15.629
682	27936	3.138	0.684	0.62	20	288.50	287.59	635.96	0.0014	21.8%	NCEN	0.010	REHAB			0.417	3.163	2.182	6.900	3096.655	4.459	1.321
861	20055	5.454	1.516	0.62	24	307.84	307.48	130.53	0.0028	27.8%	ORAN	0.013	D1500			0.500	3.809	3.142	11.968	5371.084	7.734	2.280
1705	15840	0.557	0.055	0.62	12	310.15	309.82	284.08	0.0012	9.9%	FRUI	0.013				0.250	1.565	0.785	1.229	551.522	0.794	0.237
163	16715	18.446	4.146	0.62	42	271.49	270.79	435.22	0.0016	22.5%	CORN	0.013				0.875	4.209	9.621	40.494	18173.629	26.170	7.724
995	39811	7.791	0.271	0.62	42	269.11	268.99	419	0.0003	3.5%	SCEN	0.013	ELL 34X5			0.875	1.776	9.621	17.087	7668.857	11.043	3.252
1665	277023	45.764	12.023	0.62	57	272.83	272.37	401	0.0011	26.3%	JENS	0.010	REHAB			1.188	5.653	17.721	100.168	44955.324	64.736	18.972
168	16657	18.954	4.195	0.62	42	267.88	267.06	481.78	0.0017	22.1%	CORN	0.013				0.875	4.330	9.621	41.656	18695.177	26.921	7.967
303	19022	21.303	5.838	0.62	42	281.28	280.91	290.14	0.0013	27.4%	MRKS	0.010	REHAB			0.875	4.872	9.621	46.874	21037.177	30.294	8.991
357	38220	33.174	10.025	0.62	60	256.10	255.47	809	0.0008	30.2%	MRKS	0.013				1.250	3.703	19.635	72.708	32631.522	46.989	13.815
1082	40737	8.688	0.056	0.62	36	265.83	265.77	124	0.0005	0.6%	NORT	0.010	REHAB			0.750	2.711	7.069	19.161	8599.570	12.383	3.695
940	31866	8.837	0.902	0.62	30	283.27	282.51	570.68	0.0013	10.2%	ORAN	0.010	REHAB	Yes		0.625	3.987	4.909	19.573	8784.161	12.649	3.812
2009	34333	0.688	0.014	0.62	12	299.35	298.76	326	0.0018	2.0%	CHES	0.013				0.250	1.953	0.785	1.534	688.404	0.991	0.303
226	8760	16.979	1.729	0.62	45	322.16	321.90	458	0.0006	10.2%	HERN	0.010	REHAB			0.938	3.402	11.045	37.575	16863.453	24.283	7.304
300	19024	21.314	5.842	0.62	42	283.17	282.02	891.02	0.0013	27.4%	MRKS	0.010	REHAB			0.875	4.901	9.621	47.157	21163.895	30.476	9.162
627	38250	41.817	8.108	0.62	60	255.85	255.27	779	0.0007	19.4%	MRKS	0.010	REHAB			1.250	4.711	19.635	92.496	41512.117	59.777	17.960
1089	41153	8.743	0.056	0.62	36	264.36	264.02	686	0.0005	0.6%	NORT	0.010	REHAB			0.750	2.743	7.069	19.393	8703.408	12.533	3.790
301	19025	21.306	5.84	0.62	42	282.02	281.47	422.47	0.0013	27.4%	MRKS	0.010	REHAB			0.875	4.923	9.621	47.361	21255.622	30.608	9.302
1258	35431	1.203	0	0.62	16	281.42	281.39	24.97	0.0012	0.0%	SCEN	0.013				0.333	1.924	1.396	2.686	1205.631	1.736	0.533
305	18962	21.304	5.836	0.61	42	280.86	279.78	826.27	0.0013	27.4%	MRKS	0.010	REHAB			0.875	4.932	9.621	47.456	21298.121	30.669	9.365
318	23087	23.112	6.028	0.61	45	273.50	272.58	866.5	0.0011	26.1%	MRKS	0.010	REHAB			0.938	4.653	11.045	51.387	23062.278	33.210	10.098
615	285452	38.124	5.441	0.61	60	259.01	258.73	449	0.0006	14.3%	FRUI	0.010	REHAB			1.250	4.311	19.635	84.651	37991.414	54.708	16.584
668	25893	0.751	0.08	0.61	12	294.36	293.80	434	0.0013	10.7%	NCEN	0.010	REHAB			0.250	2.144	0.785	1.684	755.646	1.088	0.337
281	17335	15.245	4.15	0.61	39	292.45	292.22	230.21	0.0010	27.2%	MRKS	0.010	REHAB			0.813	4.106	8.296	34.067	15289.066	22.016	6.771
283	17263	15.276	4.14	0.61	39	291.52	290.84	680.4	0.0010	27.1%	MRKS	0.010	REHAB			0.813	4.107	8.296	34.072	15291.548	22.020	6.744
297	17041	16.24	4.635	0.61	39	286.13	286.07	53	0.0011	28.5%	MRKS	0.010	REHAB			0.813	4.371	8.296	36.263	16274.844	23.436	7.196
224	305164	16.901	1.725	0.61	45	321.77	321.51	454	0.0006	10.2%	HERN	0.010	REHAB			0.938	3.417	11.045	37.740	16937.579	24.390	7.489
277	17433	11.987	3.703	0.61	36	294.58	293.46	1177	0.0010	30.9%	MRKS	0.010	III	Yes		0.750	3.801	7.069	26.871	12059.595	17.366	5.379
284	17264	15.257	4.132	0.61	39	290.84	290.15	688	0.0010	27.1%	MRKS	0.010	REHAB			0.813	4.114	8.296	34.132	15318.261	22.058	6.801
665	23827	0.732	0.081	0.61	12	295.40	295.18	177.5	0.0012	11.1%	NCEN	0.010	REHAB			0.250	2.101	0.785	1.650	740.596	1.066	0.334
943	31937	12.815	0.937	0.61	36	281.63	281.33	276	0.0011	7.3%	ORAN	0.010	REHAB	Yes		0.750	4.063	7.069	28.719	12888.965	18.560	5.745
2077	28658	1.492	0.292	0.61	18	304.02	303.62	400	0.0010	19.6%	CHES	0.013	CL2			0.375	1.897	1.767	3.353	1504.627	2.167	0.675
165	16654	18.636	4.2	0.61	42	270.22	269.42	468.14	0.0017	22.5%	CORN	0.013				0.875	4.338	9.621	41.740	18732.863	26.975	8.339
294	17043	16.254	4.637	0.61	39	286.72	286.70	17.447	0.0011	28.5%	MRKS	0.010	REHAB			0.813	4.399	8.296	36.491	16376.978	23.583	7.329
664	23826	0.741	0.082	0.61	12	295.63	295.40	180	0.0013	11.1%	NCEN	0.010	REHAB			0.250	2.133	0.785	1.675	751.964	1.083	0.342
164	16653	18.506	4.202	0.61	42	270.79	270.22	335.41	0.0017	22.7%	CORN	0.013				0.875	4.326	9.621	41.624	18680.843	26.900	8.394
282	17336	15.237	4.148	0.61	39	292.22	291.52	693.24	0.0010	27.2%	MRKS	0.010	REHAB			0.813	4.128	8.296	34.248	15370.442	22.133	6.896
556	29245	15.321	2.762	0.61	42	274.03	273.81	319.45	0.0007	18.0%	FRUI	0.010	REHAB			0.875	3.580	9.621	34.447	15459.673	22.262	6.941
162	14766	18.44	4.151	0.61	42	273.14	271.49	971.76	0.0017	22.5%	CORN	0.013				0.875	4.324	9.621	41.606	18672.803	26.889	8.449
325	27156	24.607	6.01	0.61	45	270.38	269.63	608	0.0012	24.4%	MRKS	0.010	REHAB			0.938	5.015	11.045	55.388	24858.300	35.796	11.189
782	23987	0.32	0.123	0.61	10	297.53	297.18	325.5	0.0011	38.4%	NCEN	0.013				0.208	1.335	0.545	0.728	326.710	0.470	0.150
117	36418	30.074	12.1	0.61	72	238.43	238.29	548	0.0003	40.2%	WWTP	0.013	D1850			1.500	2.394	28.274	67.691	30379.605	43.747	13.673
167	16656	18.892	4.195	0.61	42	268.84	267.88	536.84	0.0018	22.2%	CORN	0.013				0.875	4.438	9.621	42.698	19162.856	27.595	8.703
272	17498	11.003	3.438	0.61	36	297.34	296.92	513.7	0.0008	31.2%	MRKS	0.010	II	Yes		0.750	3.524	7.069	24.907	11178.456	16.097	5.094
302	18965	21.296	5.839	0.61	42	281.47	281.28	141.21	0.0013	27.4%	MRKS	0.010	REHAB			0.875	5.004	9.621	48.148	21608.990	31.117	9.821
994	39812	7.783	0.271	0.61	42	269.13	269.11	66	0.0003	3.5%	SCEN	0.013	BOX 34X5			0.875	1.827	9.621	17.577	7888.421	11.359	3.576
1086	272615	8.704	0.056	0.61	36	264.89	264.87	39.11	0.0005	0.6%	NORT	0.010	REHAB			0.750	2.787	7.069	19.698	8840.626	12.731	4.027
278	345052	11.979	3.696	0.61	36	293.46	293.36	103	0.0010	30.9%	MRKS	0.010	III	Yes		0.750	3.840	7.069	27.142	12181.291	17.541	5.562
1814	307239	2.801	0.403	0.61	24	292.30	292.14	345.2	0.0005	14.4%	MRKS	0.010	SDR35			0.500	2.030	3.142	6.378	2862.423	4.122	1.321
1228	37361	2.439	0.001	0.61	18	279.51	278.96	335	0.0016	0.0%	SCEN	0.010	REHAB			0.375	3.160	1.767	5.584	2506.289	3.609	1.170
159	13338	16.938	3.471	0.60	39	278.71	276.52	1008.7	0.0022	20.5%	CORN	0.013				0.813	4.657	8.296	38.630	17337.115	24.965	8.027
1603	39016	2.964	0.141	0.60	21	278.38	277.62	421	0.0018	4.8%	ORAN	0.013				0.438	2.822	2.405	6.788	3046.302	4.387	1.423
750	36639	16.292	2.111	0.60	48	263.61	263.24	553.64	0.0007	13.0%	NCEN	0.013				1.000	2.963	12.566	37.234	16710.628	24.063	7.771
1021	39459	18.046	2.453	0.60	48	261.89	261.57	656	0.0005	13.6%	JENS	0.010	REHAB			1.000	3.286	12.566	41.289	18530.725	26.684	8.638
1189	39864	18.201	0.847	0.60	48	268.73	268.45	566.5	0.0005	4.7%	JENS	0.010	REHAB	Yes		1.000	3.313	12.566	41.627	18682.201	26.902	8.701
1425	18269	0.495	0.285	0.60	12	322.40	321.87	529.94	0.0010	57.6%	ORAN	0.013				0.250	1.452	0.785	1.140	511.741	0.737	0.242
1905	14828	1.246	1.147	0.60	18	283.17	282.89	383	0.0007	92.1%	CORN	0.013				0.375	1.622	1.767	2.867	1286.496	1.853	0.607
180	25134	24.935	4.853	0.60	45	255.93	255.56	166.86	0.0022	19.5%	CORN	0.013	2500D			0.938	5.179	11.045	57.201	25672.021	36.968	12.033
784	23989	0.33	0.118	0.60	10	297.17	296.44	614	0.0012	35.8%	NCEN	0.013				0.208	1.403	0.545	0.765	343.543	0.495	0.165
817	15511	0.333	0.305	0.60	10	306.31	305.91	332	0.0012	91.6%	MRKS	0.013				0.208	1.413	0.545	0.771	345.832	0.498	0.165
1188	39863	18.184	0.848	0.60	48	269.12	268.73	788	0.0005	4.7%	JENS	0.010	REHAB	Yes		1.000	3.315	12.566	41.655	18694.686	26.920	8.736
1925	36350	1.093	0.627	0.60	15	307.88	307.49	261.6	0.0015	57.4%	CHES	0.013				0.313	2.054	1.227	2.520	1131.150	1.629	0.536
271	17495	11.006	3.453	0.60	36	298.02	297.34	804.63	0.0008	31.4%	MRKS	0.010	II	Yes		0.750	3.582	7.069	25.323	11364.970	16.366	5.360
322	25327	23.557	6.011	0.60	45	271.55	270.73	695.4	0.0012	25.5%	MRKS	0.010	REHAB			0.938	4.903	11.045	54.154	24304.246	34.998	11.441

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1092	286566	10.292	0.056	0.60	36	263.61	263.60	8	0.0012	0.5%	NORT	0.013				0.750	3.351	7.069	23.690	10632.211	15.310	5.018
2048	30912	3.02	0.69	0.60	27	307.06	306.99	140	0.0005	22.8%	CHES	0.013				0.563	1.753	3.976	6.970	3128.359	4.505	1.485
133	39396	29.087	11.614	0.60	72	233.26	233.05	842.54	0.0002	39.9%	WWTP	0.013	D2350			1.500	2.365	28.274	66.861	30007.013	43.210	14.123
212	3638	0.695	0.156	0.60	12	336.22	335.48	368	0.0020	22.4%	HERN	0.013				0.250	2.059	0.785	1.617	725.635	1.045	0.350
321	25328	23.471	6.011	0.60	45	271.96	271.55	347.4	0.0012	25.6%	MRKS	0.010	REHAB			0.938	4.905	11.045	54.177	24314.738	35.013	11.542
338	327833	8.755	1.392	0.60	36	263.89	263.87	37	0.0005	15.9%	MRKS	0.010				0.750	2.865	7.069	20.252	9089.209	13.088	4.333
1018	39462	17.986	2.424	0.60	48	262.77	262.54	476	0.0005	13.5%	JENS	0.010	REHAB			1.000	3.304	12.566	41.515	18631.741	26.830	8.844
1019	39461	17.98	2.403	0.60	48	262.54	262.21	670.2	0.0005	13.4%	JENS	0.010	REHAB			1.000	3.301	12.566	41.485	18618.501	26.811	8.831
1080	40735	8.68	0.057	0.60	36	266.42	266.15	507	0.0005	0.7%	NORT	0.010	REHAB			0.750	2.844	7.069	20.102	9021.730	12.991	4.311
1187	39862	18.208	0.848	0.60	48	269.46	269.12	674.4	0.0005	4.7%	JENS	0.010	REHAB	Yes		1.000	3.346	12.566	42.041	18868.165	27.170	8.962
1789	13898	2.071	0.125	0.60	24	301.17	301.00	382	0.0004	6.0%	MRKS	0.013				0.500	1.530	3.142	4.807	2157.539	3.107	1.036
1882	13345	5.446	2.391	0.60	27	280.91	280.75	97	0.0016	43.9%	CORN	0.013				0.563	3.184	3.976	12.661	5682.058	8.182	2.736
24	328478	18.605	1.925	0.60	45	318.42	317.95	622	0.0008	10.3%	HERN	0.010	REHAB			0.938	3.925	11.045	43.350	19455.675	28.016	9.411
751	277709	16.259	2.11	0.60	48	263.24	262.86	550	0.0007	13.0%	NCEN	0.013				1.000	3.013	12.566	37.858	16990.888	24.467	8.208
1446	18028	1.471	0.339	0.60	18	312.63	312.43	320.2	0.0006	23.0%	ORAN	0.010	REHAB			0.375	1.949	1.767	3.444	1545.883	2.226	0.755
669	25894	0.76	0.08	0.60	12	293.80	293.32	330	0.0015	10.5%	NCEN	0.010	REHAB			0.250	2.276	0.785	1.788	802.293	1.155	0.395
1020	39460	17.969	2.375	0.60	48	262.21	261.89	637.65	0.0005	13.2%	JENS	0.010	REHAB			1.000	3.333	12.566	41.879	18795.468	27.065	9.096
352	36431	32.293	8.435	0.59	60	259.57	258.83	882	0.0008	26.1%	MRKS	0.013				1.250	3.847	19.635	75.529	33897.513	48.812	16.519
1073	317427	60.373	15.075	0.59	60	237.43	237.21	75	0.0029	25.0%	WWTP	0.013				1.250	7.193	19.635	141.226	63382.151	91.270	30.897
2078	28577	1.5	0.291	0.59	18	303.62	302.88	663.01	0.0011	19.4%	CHES	0.013	CL2			0.375	2.004	1.767	3.542	1589.588	2.289	0.789
254	15643	10.279	3.079	0.59	30	305.76	305.16	293.53	0.0020	30.0%	MRKS	0.010	REHAB			0.625	4.940	4.909	24.249	10882.764	15.671	5.392
663	23825	0.721	0.083	0.59	12	296.07	295.63	330.2	0.0013	11.5%	NCEN	0.010	REHAB			0.250	2.179	0.785	1.711	767.904	1.106	0.385
355	38218	33.254	10.086	0.59	60	257.48	256.70	863.73	0.0009	30.3%	MRKS	0.013				1.250	3.991	19.635	78.360	35167.748	50.642	17.388
1160	38434	4.373	0.004	0.59	30	264.25	263.87	606.37	0.0006	0.1%	SCEN	0.013				0.625	2.104	4.909	10.328	4635.210	6.675	2.302
1162	38436	4.492	0.004	0.59	30	263.83	263.39	665.44	0.0007	0.1%	SCEN	0.013				0.625	2.161	4.909	10.609	4761.221	6.856	2.364
1317	14387	0.417	0.232	0.59	10	314.63	313.97	329	0.0020	55.6%	FRUI	0.013				0.208	1.823	0.545	0.994	446.250	0.643	0.226
2013	36191	0.954	0.358	0.59	15	297.22	297.17	41.43	0.0012	37.5%	CHES	0.013				0.313	1.848	1.227	2.268	1017.734	1.466	0.512
540	25520	11.995	2.715	0.59	42	277.05	277.04	21.3	0.0005	22.6%	FRUI	0.010	REHAB			0.875	2.956	9.621	28.441	12764.406	18.381	6.386
662	23824	0.688	0.083	0.59	12	296.48	296.07	331.5	0.0012	12.1%	NCEN	0.010	REHAB			0.250	2.099	0.785	1.648	739.809	1.065	0.377
1597	39032	2.665	0.131	0.59	21	281.95	281.43	330	0.0016	4.9%	ORAN	0.013				0.438	2.637	2.405	6.342	2846.112	4.098	1.433
270	17575	10.915	3.463	0.59	36	298.65	298.06	660.75	0.0009	31.7%	MRKS	0.010	II	Yes		0.750	3.673	7.069	25.963	11652.320	16.779	5.864
1161	38435	4.494	0.004	0.59	30	263.87	263.83	59.26	0.0007	0.1%	SCEN	0.013				0.625	2.184	4.909	10.719	4810.560	6.927	2.433
1599	39012	2.748	0.131	0.59	21	280.91	280.37	320	0.0017	4.8%	ORAN	0.013				0.438	2.728	2.405	6.563	2945.297	4.241	1.493
2045	30901	2.417	0.225	0.59	21	309.90	308.30	1227	0.0013	9.3%	CHES	0.013				0.438	2.398	2.405	5.769	2589.077	3.728	1.311
222	305161	17.487	1.721	0.59	45	321.10	320.73	530	0.0007	9.8%	HERN	0.010	REHAB			0.938	3.773	11.045	41.668	18700.598	26.929	9.442
894	21938	3.574	0.844	0.59	24	302.51	302.23	198.77	0.0014	23.6%	ORAN	0.013	1350D	Yes		0.500	2.722	3.142	8.553	3838.570	5.528	1.954
1081	40736	8.692	0.057	0.59	36	266.15	265.85	529	0.0006	0.7%	NORT	0.010	REHAB			0.750	2.935	7.069	20.744	9309.894	13.406	4.714
1626	40923	21.565	4.159	0.59	48	281.27	280.86	546	0.0008	19.3%	JENS	0.010	REHAB			1.000	4.083	12.566	51.309	23027.383	33.159	11.594
312	21000	21.946	6.054	0.59	42	276.64	276.08	350.84	0.0016	27.6%	MRKS	0.010	REHAB			0.875	5.451	9.621	52.442	23535.849	33.892	11.946
2070	28799	1.222	0.298	0.59	18	306.47	306.27	259.94	0.0008	24.4%	CHES	0.013	CL2			0.375	1.664	1.767	2.941	1319.797	1.901	0.679
1088	41150	8.748	0.056	0.59	36	264.48	264.36	207	0.0006	0.6%	NORT	0.010	REHAB			0.750	2.967	7.069	20.973	9412.769	13.554	4.806
1154	38618	3.27	0.005	0.59	30	265.63	265.57	165.29	0.0004	0.2%	SCEN	0.013				0.625	1.601	4.909	7.860	3527.758	5.080	1.810
1555	32311	13.218	1.339	0.59	42	295.22	295.02	343	0.0006	10.1%	CHES	0.010	REHAB			0.875	3.294	9.621	31.696	14225.199	20.484	7.266
1910	13341	1.543	1.448	0.59	18	281.93	281.29	519	0.0012	93.8%	CORN	0.013				0.375	2.107	1.767	3.723	1670.841	2.406	0.863
1017	39474	17.517	2.277	0.58	48	262.87	262.77	200	0.0005	13.0%	JENS	0.010	REHAB			1.000	3.348	12.566	42.077	18884.029	27.193	9.676
25	328479	18.6	1.922	0.58	45	317.95	317.45	620.41	0.0008	10.3%	HERN	0.010	REHAB			0.938	4.054	11.045	44.770	20092.695	28.933	10.333
171	18778	19.843	4.216	0.58	45	266.12	265.32	518.17	0.0015	21.2%	CORN	0.013	3000D			0.938	4.321	11.045	47.725	21419.053	30.843	11.000
269	17574	10.891	3.469	0.58	36	298.95	298.65	330	0.0009	31.9%	MRKS	0.010	II	Yes		0.750	3.716	7.069	26.264	11787.334	16.974	6.083
919	30122	8.085	0.909	0.58	30	288.46	288.10	160.57	0.0022	11.2%	ORAN	0.013	1350D	Yes		0.625	3.980	4.909	19.535	8767.293	12.625	4.540
1361	16028	1.618	0.539	0.58	18	315.58	315.04	668	0.0008	33.3%	ORAN	0.010	REHAB			0.375	2.217	1.767	3.919	1758.656	2.532	0.914
1790	13895	2.042	0.125	0.58	24	300.15	299.92	490	0.0005	6.1%	MRKS	0.013				0.500	1.572	3.142	4.937	2215.806	3.191	1.149
815	15504	0.313	0.308	0.58	10	307.40	307.11	245.1	0.0012	98.4%	MRKS	0.013				0.208	1.400	0.545	0.764	342.714	0.494	0.181
1032	40579	18.46	2.681	0.58	51	258.37	258.01	876.97	0.0004	14.5%	NORT	0.010	REHAB			1.063	3.142	14.186	44.575	20005.197	28.807	10.347
112	32925	30.453	12.391	0.58	72	240.11	239.87	797.69	0.0003	40.7%	WWTP	0.013	D1850			1.500	2.598	28.274	73.459	32968.328	47.474	17.021
161	14765	17.186	3.469	0.58	42	273.78	273.14	376.24	0.0017	20.2%	CORN	0.013				0.875	4.328	9.621	41.644	18689.796	26.913	9.727
1319	14375	0.547	0.276	0.58	12	312.87	311.94	678	0.0014	50.5%	FRUI	0.013	CL2			0.250	1.700	0.785	1.335	599.312	0.863	0.316
1598	39011	2.664	0.131	0.58	21	281.43	280.91	315	0.0017	4.9%	ORAN	0.013				0.438	2.699	2.405	6.491	2913.088	4.195	1.531
1871	13470	1.16	0.792	0.58	15	285.93	285.68	133	0.0019	68.3%	CORN	0.013				0.313	2.306	1.227	2.830	1270.138	1.829	0.669
1878	13384	4.206	0.842	0.58	24	282.58	282.30	139	0.0020	20.0%	CORN	0.013				0.500	3.256	3.142	10.228	4590.262	6.610	2.404
1916	34553	0.761	0.314	0.58	12	313.00	312.83	64	0.0027	41.3%	CHES	0.013				0.250	2.366	0.785	1.858	833.989	1.201	0.440
11	5228	1.504	0.283	0.58	21	330.70	330.38	607.55	0.0005	18.8%	HERN	0.013				0.438	1.524	2.405	3.666	1645.475	2.369	0.865
1031	40578	18.376	2.581	0.58	51	258.73	258.37	876.97	0.0004	14.0%	NORT	0.010	REHAB			1.063	3.142	14.186	44.575	20005.197	28.807	10.431
1595	37654	2.665	0.131	0.58	21	283.19	282.67	314	0.0017	4.9%	ORAN	0.013				0.438	2.703	2.405	6.501	2917.723	4.202	1.537
565	30991	15.376	2.756	0.58	42	272.29	272.00	356	0.0008	17.9%	FRUI	0.010	REHAB			0.875	3.894	9.621	37.464	16813.743	24.212	8.836
1596	350118	2.657	0.131	0.58	21	282.67	282.06	368	0.0017	4.9%	ORAN	0.013				0.438	2.704	2.405	6.504	2919.095	4.203	1.546
1078	40732	8.68	0.057	0.58	36	266.83	266.77	101	0.0006	0.7%	JENS	0.010	REHAB			0.750	3.004	7.069	21.231	9528.551	13.721	5.041
1087	41149	8.703	0.056	0.58	36	264.77	264.48	486.7	0.0006	0.6%	NORT	0.010	REHAB			0.750	3.008	7.069	21.263	9542.898	13.742	5.039
1094	286573	56.204	11.923	0.58	66	262.86	262.66	120.84	0.0017	21.2%	NORT	0.013				1.375	5.754	23.758	136.693	61348.005	88.341	32.137
1437	18123	0.983	0.318	0.58	15	318.19	317.99	146	0.0014	32.3%	ORAN	0.013				0.313	1.969	1.227	2.416	1084.290	1.561	0.578
211	3637	0.652	0.156	0.58	12	336.96	336.22	371	0.0020	23.9%	HERN	0.013				0.250	2.050	0.785	1.610	722.695	1.041	0.389
274	17497	11.733	3.708	0.58	36	296.35	295.63	660.47	0.0011	31.6%	MRKS	0.010	II	Yes		0.750	4.069	7.069	28.761	12907.783	18.587	6.854
120	36415	29.911	12.043	0.58	72	237.52	237.31	703.85	0.0003	40.3%	WWTP	0.013	D1850			1.500	2.587	28.274	73.152	32830.536	47.276	17.365
250	14242	9.993	2.651	0.58	30	307.85	307.17	324	0.0021	26.5%	MRKS	0.010	REHAB			0.625	5.006	4.909	24.571	11027.366	15.879	5.886
316	23112	22.187	6.038	0.58	45	273.99	273.66	277	0.0012	27.2%	MRKS	0.010	REHAB			0.938	4.928	11.045	54.432	24429.223	35.178	12.991
771	350005	3.734	1.077	0.58	24	280.87	280.50	384	0.0010	28.8%	NCEN	0.010	SDR35			0.500	2.927	3.142	9.196	4127.095	5.943	2.209
1453	16373	0.323	0.059	0.58	10	327.23	326.37	660.08	0.0013	18.3%	CHES	0.013				0.208	1.469	0.545	0.801	359.629	0.518	0.195
846	15928	1.008	0.366	0.58	18	314.14	313.99	270	0.0006	36.3%	ORAN	0.013				0.375	1.414	1.767	2.499	1121.483	1.615	0.607
1612	37830	19.009	3.871	0.58	45	288.81	288.03	887.98	0.0009	20.4%	CHES	0.010	REHAB			0.938	4.232	11.045	46.740	20976.754	30.207	11.198
1818	15056	3.021	0.744	0.58	21	291.49	290.74	580	0.0013	24.6%	MRKS	0.010	REHAB			0.438	3.105	2.405	7.468	3351.716	4.826	1.805
1015	39587	16.953	1.713	0.57	48	263.53	263.20	660.43	0.0005	10.1%	JENS	0.010	REHAB			1.000	3.331	12.566	41.854	18784.194	27.049	10.096

														ADV = ADVERSE PIPE						Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1016	39586	16.96	1.725	0.57	48	263.20	262.87	660.57	0.0005	10.2%	JENS	0.010	REHAB			1.000	3.330	12.566	41.850	18782.203	27.046	10.086
470	286044	0.576	0.513	0.57	12	302.88	302.57	330	0.0009	89.1%	FRUI	0.010	REHAB			0.250	1.829	0.785	1.437	644.753	0.928	0.352
701	345242	4.328	1.2	0.57	24	279.07	279.02	38	0.0013	27.7%	NCEN	0.010	SDR35			0.500	3.421	3.142	10.746	4822.835	6.945	2.617
19	328484	18.665	1.94	0.57	45	320.00	319.47	615	0.0009	10.4%	HERN	0.010	REHAB			0.938	4.192	11.045	46.296	20777.484	29.920	11.255
1030	40577	17.963	2.437	0.57	51	259.09	258.73	876.97	0.0004	13.6%	NORT	0.010	REHAB			1.063	3.142	14.186	44.575	20005.197	28.807	10.844
1424	16296	0.378	0.29	0.57	10	323.77	322.57	660	0.0018	76.7%	ORAN	0.013				0.208	1.736	0.545	0.947	424.837	0.612	0.234
1196	39800	18.213	0.846	0.57	48	267.27	267.05	375.37	0.0006	4.6%	JENS	0.010	REHAB	Yes		1.000	3.607	12.566	45.329	20343.728	29.295	11.082
27	283063	18.985	1.915	0.57	45	317.14	316.69	498	0.0009	10.1%	HERN	0.010	REHAB			0.938	4.292	11.045	47.406	21275.715	30.637	11.652
127	39385	29.465	11.74	0.57	72	235.27	235.02	834.78	0.0003	39.8%	WWTP	0.013	D1350			1.500	2.592	28.274	73.289	32892.158	47.365	17.900
666	23828	0.752	0.081	0.57	12	295.05	294.43	380	0.0016	10.8%	NCEN	0.010	REHAB			0.250	2.411	0.785	1.893	849.715	1.224	0.472
223	8761	17.51	1.723	0.57	45	321.51	321.10	531	0.0008	9.8%	HERN	0.010	REHAB			0.938	3.968	11.045	43.821	19666.960	28.320	10.810
1224	35622	1.727	0	0.57	18	281.19	280.99	199.12	0.0010	0.0%	SCEN	0.010	REHAB			0.375	2.472	1.767	4.368	1960.332	2.823	1.096
1014	39588	16.688	1.395	0.57	48	263.86	263.53	663.03	0.0005	8.4%	JENS	0.010	REHAB			1.000	3.339	12.566	41.962	18832.350	27.119	10.431
1701	15960	0.327	0.054	0.57	10	312.05	311.12	660	0.0014	16.5%	FRUI	0.013				0.208	1.527	0.545	0.833	373.800	0.538	0.211
2030	34332	0.508	0.003	0.57	12	299.73	299.35	298	0.0013	0.6%	CHES	0.013				0.250	1.639	0.785	1.288	577.843	0.832	0.324
160	14764	17.178	3.471	0.57	42	276.38	273.78	1410.62	0.0018	20.2%	CORN	0.013				0.875	4.506	9.621	43.349	19454.887	28.015	10.837
2031	34331	0.491	0.003	0.57	12	299.79	299.73	50	0.0012	0.6%	CHES	0.013				0.250	1.590	0.785	1.249	560.553	0.807	0.316
1423	16295	0.367	0.293	0.57	10	324.94	323.77	653.7	0.0018	79.8%	ORAN	0.013				0.208	1.722	0.545	0.939	421.510	0.607	0.240
1678	293644	45.682	11.903	0.57	66	266.54	265.86	575.66	0.0012	26.1%	NORT	0.013				1.375	4.861	23.758	115.481	51827.736	74.632	28.950
895	21939	3.589	0.843	0.56	24	302.23	301.46	476.96	0.0016	23.5%	ORAN	0.013	1350D	Yes		0.500	2.915	3.142	9.156	4109.322	5.917	2.328
2076	28657	1.485	0.293	0.56	18	304.58	304.02	437	0.0013	19.7%	CHES	0.013	CL2			0.375	2.148	1.767	3.795	1703.265	2.453	0.968
129	39383	29.408	11.729	0.56	72	234.78	234.51	870.94	0.0003	39.9%	WWTP	0.013	D1350			1.500	2.637	28.274	74.566	33465.409	48.190	18.782
330	29081	25.864	5.979	0.56	45	267.76	267.38	217.82	0.0017	23.1%	MRKS	0.010	REHAB			0.938	5.964	11.045	65.869	29562.115	42.569	16.705
744	36557	15.445	2.078	0.56	48	264.68	264.51	228.19	0.0007	13.5%	WALN	0.013				1.000	3.128	12.566	39.312	17643.380	25.406	9.961
1013	39589	16.483	1.156	0.56	48	264.19	263.86	657.97	0.0005	7.0%	JENS	0.010	REHAB			1.000	3.337	12.566	41.932	18819.276	27.100	10.617
102	27122	30.723	13.151	0.56	72	243.84	243.54	881	0.0003	42.8%	GRNT	0.013	D2350			1.500	2.764	28.274	78.150	35073.657	50.506	19.783
660	23822	0.601	0.084	0.56	12	296.79	296.61	165.16	0.0011	14.0%	NCEN	0.010	REHAB			0.250	1.970	0.785	1.547	694.470	1.000	0.399
661	23823	0.602	0.084	0.56	12	296.61	296.43	165.07	0.0011	14.0%	NCEN	0.010	REHAB			0.250	1.971	0.785	1.548	694.659	1.000	0.398
1605	39909	3.897	0.145	0.56	24	277.20	276.77	378.63	0.0011	3.7%	ORAN	0.010	REHAB			0.500	3.178	3.142	9.984	4480.597	6.452	2.555
1619	40279	21.138	4.147	0.56	48	284.57	284.18	469	0.0008	19.6%	CHES	0.010	REHAB			1.000	4.297	12.566	53.994	24232.313	34.895	13.757
1294	33783	0.704	0	0.56	14	283.74	283.54	178.5	0.0011	0.0%	SCEN	0.013				0.292	1.701	1.069	1.819	816.207	1.175	0.471
582	285631	4.243	0.858	0.56	36	267.02	266.99	113	0.0003	20.2%	MRKS	0.013	SDR35			0.750	1.545	7.069	10.918	4899.931	7.056	2.813
1012	39634	16.179	1.101	0.56	48	264.52	264.19	663.82	0.0005	6.8%	JENS	0.010	REHAB			1.000	3.302	12.566	41.493	18622.270	26.816	10.637
1318	14374	0.528	0.279	0.56	12	313.80	312.87	648	0.0014	52.8%	FRUI	0.013	CL2			0.250	1.739	0.785	1.366	613.028	0.883	0.355
1362	16029	1.614	0.533	0.56	18	314.97	314.77	218	0.0009	33.0%	ORAN	0.010	REHAB			0.375	2.362	1.767	4.175	1873.522	2.698	1.084
1604	39908	3.868	0.145	0.56	24	277.62	277.20	369.93	0.0011	3.7%	ORAN	0.010	REHAB			0.500	3.177	3.142	9.982	4479.959	6.451	2.583
1819	15055	3.072	0.834	0.56	21	290.74	290.23	350	0.0015	27.1%	MRKS	0.010	REHAB			0.438	3.296	2.405	7.928	3557.965	5.123	2.051
22	328476	18.607	1.929	0.56	45	318.94	318.51	464	0.0009	10.4%	HERN	0.010	REHAB			0.938	4.347	11.045	48.008	21546.057	31.026	12.419
1193	277623	18.211	0.846	0.56	48	267.65	267.36	461.6	0.0006	4.6%	JENS	0.010	REHAB	Yes		1.000	3.735	12.566	46.931	21062.750	30.330	12.119
2051	30888	3.143	0.806	0.56	27	306.43	305.98	661	0.0007	25.6%	CHES	0.013				0.563	2.046	3.976	8.134	3650.372	5.257	2.114
383	293062	18.575	5.093	0.56	48	261.63	261.18	680.89	0.0007	27.4%	MRKS	0.010	REHAB			1.000	3.830	12.566	48.135	21603.134	31.109	12.534
480	286051	0.991	0.922	0.56	15	298.90	298.66	259.02	0.0009	93.0%	FRUI	0.010	REHAB			0.313	2.105	1.227	2.583	1159.282	1.669	0.678
820	15520	0.381	0.296	0.56	10	302.92	301.89	509.8	0.0020	77.7%	MRKS	0.013				0.208	1.830	0.545	0.998	447.840	0.645	0.264
982	305137	5.635	0.268	0.56	24	272.93	271.69	507.83	0.0024	4.8%	SCEN	0.010	REHAB			0.500	4.660	3.142	14.639	6569.932	9.461	3.826
1608	39912	3.915	0.144	0.56	24	275.64	275.05	500	0.0012	3.7%	ORAN	0.010	REHAB			0.500	3.239	3.142	10.176	4567.202	6.577	2.662
360	38211	75.001	18.047	0.56	66	255.08	255.02	17.91	0.0034	24.1%	MRKS	0.013	CL5			1.375	8.186	23.758	194.476	87280.784	125.684	50.683
1144	39603	4.106	0.547	0.56	30	264.38	263.48	1331	0.0007	13.3%	SCEN	0.013				0.625	2.186	4.909	10.728	4814.805	6.933	2.827
1811	13626	2.479	0.08	0.56	21	293.83	292.82	612	0.0017	3.2%	MRKS	0.013				0.438	2.698	2.405	6.490	2912.676	4.194	1.715
893	21937	3.586	0.845	0.55	24	303.17	302.51	387.92	0.0017	23.6%	ORAN	0.013	1350D	Yes		0.500	2.992	3.142	9.400	4218.584	6.075	2.489
1621	40268	21.145	4.145	0.55	48	283.31	282.82	563.61	0.0009	19.6%	CHES	0.010	REHAB			1.000	4.393	12.566	55.208	24777.511	35.680	14.535
1985	34408	0.273	0.086	0.55	10	305.23	305.04	180	0.0011	31.5%	CHES	0.013				0.208	1.322	0.545	0.721	323.701	0.466	0.193
101	27123	30.91	13.263	0.55	72	244.16	243.84	881.15	0.0004	42.9%	GRNT	0.013	D2350			1.500	2.854	28.274	80.706	36220.834	52.158	21.248
1011	39633	16.116	1.063	0.55	48	264.85	264.52	656.58	0.0005	6.6%	JENS	0.010	REHAB			1.000	3.361	12.566	42.230	18953.019	27.292	11.176
1275	37066	1.351	0	0.55	18	274.51	274.25	230.45	0.0011	0.0%	SCEN	0.013				0.375	2.015	1.767	3.561	1598.185	2.301	0.950
1315	14385	0.377	0.187	0.55	10	315.98	314.97	500	0.0020	49.6%	FRUI	0.013				0.208	1.829	0.545	0.998	447.795	0.645	0.268
106	29052	30.838	12.65	0.55	72	242.34	242.02	881	0.0004	41.0%	GRNT	0.013	D1850			1.500	2.855	28.274	80.713	36223.917	52.162	21.324
243	350150	3.446	1.525	0.55	24	311.55	311.21	360	0.0009	44.3%	MRKS	0.010	SDR35			0.500	2.898	3.142	9.104	4085.991	5.884	2.438
1600	39013	2.748	0.131	0.55	21	280.37	279.67	340	0.0021	4.8%	ORAN	0.013				0.438	3.014	2.405	7.249	3253.245	4.685	1.937
1613	37829	18.948	3.868	0.55	45	288.03	287.36	671.97	0.0010	20.4%	CHES	0.010	REHAB			0.938	4.509	11.045	49.797	22348.843	32.182	13.234
1265	344597	1.207	0	0.55	16	279.59	279.58	14.87	0.0010	0.0%	SCEN	0.010				0.333	2.292	1.396	3.200	1436.139	2.068	0.861
1316	14386	0.372	0.187	0.55	10	314.97	314.63	171	0.0020	50.3%	FRUI	0.013				0.208	1.815	0.545	0.990	444.268	0.640	0.268
1354	14569	1.268	0.228	0.55	18	318.46	317.86	596.8	0.0010	18.0%	ORAN	0.013				0.375	1.902	1.767	3.362	1508.655	2.172	0.904
1434	18192	1	0.323	0.55	15	319.43	318.79	654	0.0010	32.3%	CHES	0.010	SDR35			0.313	2.163	1.227	2.655	1191.382	1.716	0.716
1617	39161	20.293	4.156	0.55	48	285.92	285.27	796.25	0.0008	20.5%	CHES	0.010	REHAB			1.000	4.257	12.566	53.497	24009.380	34.574	14.281
343	327828	8.725	1.388	0.55	36	262.64	262.45	270	0.0007	15.9%	MRKS	0.010				0.750	3.269	7.069	23.108	10370.671	14.934	6.209
209	317416	105.706	22.845	0.55	84	230.80	230.40	209	0.0019	21.6%	WWTP	0.013				1.750	7.254	38.485	279.184	125297.871	180.429	74.723
420	12788	1.487	0.035	0.55	18	314.67	314.39	339	0.0008	2.4%	MRKS	0.010	REHAB			0.375	2.241	1.767	3.961	1777.671	2.560	1.073
1700	15907	0.312	0.054	0.55	10	312.24	312.05	135.32	0.0014	17.3%	FRUI	0.013				0.208	1.529	0.545	0.834	374.317	0.539	0.227
620	294121	39.92	5.701	0.55	60	257.71	257.70	10.24	0.0010	14.3%	FRUI	0.010	REHAB			1.250	5.395	19.635	105.932	47542.240	68.461	28.541
570	33035	15.468	2.751	0.55	42	270.64	270.62	20.26	0.0010	17.8%	FRUI	0.010	REHAB			0.875	4.287	9.621	41.241	18509.116	26.653	11.185
1190	39865	18.199	0.846	0.55	48	268.45	268.30	223.51	0.0007	4.6%	JENS	0.010	REHAB	Yes		1.000	3.860	12.566	48.506	21769.384	31.348	13.149
1902	14809	1.059	0.959	0.55	18	283.89	283.79	139	0.0007	90.6%	CORN	0.013				0.375	1.609	1.767	2.844	1276.208	1.838	0.779
85	14600	22.474	6.469	0.55	60	262.20	261.85	659.46	0.0005	28.8%	GRNT	0.013	D3000			1.250	3.059	19.635	60.072	26960.383	38.823	16.349
472	286043	0.572	0.508	0.55	12	301.98	301.62	332	0.0011	88.8%	FRUI	0.010	REHAB			0.250	1.965	0.785	1.543	692.710	0.998	0.426
1816	307237	2.783	0.4	0.55	21	292.10	291.86	185	0.0013	14.4%	MRKS	0.010	REHAB			0.438	3.110	2.405	7.480	3357.147	4.834	2.051
1991	34414	0.314	0.146	0.55	10	302.13	302.06	48	0.0015	46.5%	CHES	0.013	CL23			0.208	1.554	0.545	0.848	380.480	0.548	0.234
738	36820	9.302	1.166	0.55	40	266.51	265.62	1121.18	0.0008	12.5%	NCEN	0.013				0.833	2.863	8.727	24.985	11213.491	16.147	6.845
998	39793	6.294	0.156	0.55	36	268.62	268.59	47	0.0006	2.5%	JENS	0.013	CL3			0.750	2.395	7.069	16.929	7597.668	10.941	4.647
1225	37320	1.77	0.001	0.55	18	280.99	280.76	190.98	0.0012	0.1%	SCEN	0.010	REHAB			0.375	2.707	1.767	4.783	2146.556	3.091	1.321
244	350149	3.486	1.526	0.54	24	311.21	310.58	623	0.0010	43.8%	MRKS	0.010	SDR35			0.500	2.999	3.142	9.421	4228.005	6.088	2.602

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
381	32963	18.035	4.551	0.54	48	262.08	261.66	625.18	0.0007	25.2%	MRKS	0.010	REHAB			1.000	3.862	12.566	48.531	21780.663	31.364	13.329
737	35028	9.273	1.18	0.54	40	267.29	266.51	981.29	0.0008	12.7%	NCEN	0.013				0.833	2.865	8.727	25.002	11221.015	16.158	6.885
845	15927	1.001	0.368	0.54	18	314.31	314.14	260	0.0007	36.8%	ORAN	0.013				0.375	1.534	1.767	2.711	1216.653	1.752	0.751
1295	33647	0.702	0	0.54	14	283.54	283.34	163.28	0.0012	0.0%	SCEN	0.013				0.292	1.779	1.069	1.902	853.401	1.229	0.527
1607	39911	3.922	0.144	0.54	24	276.28	275.64	500	0.0013	3.7%	ORAN	0.010	REHAB			0.500	3.374	3.142	10.599	4756.792	6.850	2.928
1676	286626	45.497	11.905	0.54	66	267.25	266.73	393.51	0.0013	26.2%	NORT	0.013				1.375	5.141	23.758	122.141	54816.915	78.936	33.439
546	27243	15.252	2.767	0.54	42	276.09	275.85	244.52	0.0010	18.1%	FRUI	0.010	REHAB			0.875	4.274	9.621	41.123	18456.053	26.577	11.325
997	39792	6.307	0.156	0.54	36	268.89	268.62	418	0.0006	2.5%	JENS	0.013	CL3			0.750	2.409	7.069	17.030	7642.973	11.006	4.699
700	29691	4.342	1.203	0.54	24	279.63	279.07	352	0.0016	27.7%	NCEN	0.010				0.500	3.761	3.142	11.816	5303.125	7.637	3.295
735	34988	9.26	1.187	0.54	40	267.79	267.47	399.91	0.0008	12.8%	NCEN	0.013				0.833	2.875	8.727	25.086	11258.418	16.212	6.952
818	15514	0.346	0.303	0.54	10	305.61	304.40	666.5	0.0018	87.6%	MRKS	0.013				0.208	1.734	0.545	0.946	424.518	0.611	0.265
855	18025	3.578	1.211	0.54	21	311.99	311.01	445	0.0022	33.8%	ORAN	0.010	REHAB			0.438	4.052	2.405	9.746	4374.049	6.299	2.721
1293	33782	0.673	0	0.54	14	284.20	283.74	401.5	0.0011	0.0%	SCEN	0.013				0.292	1.720	1.069	1.839	825.355	1.189	0.516
1440	18126	0.992	0.318	0.54	15	316.38	316.35	17.43	0.0017	32.1%	ORAN	0.013				0.313	2.207	1.227	2.708	1215.398	1.750	0.758
1606	39910	3.926	0.145	0.54	24	276.77	276.28	378.63	0.0013	3.7%	ORAN	0.010	REHAB			0.500	3.392	3.142	10.657	4782.993	6.888	2.962
1886	13532	0.436	0.435	0.54	10	292.32	290.51	628.8	0.0029	99.8%	CORN	0.013				0.208	2.184	0.545	1.191	534.548	0.770	0.334
1906	349797	1.239	1.141	0.54	18	282.89	282.50	385	0.0010	92.1%	CORN	0.013				0.375	1.909	1.767	3.374	1514.366	2.181	0.942
423	277696	5.663	0.202	0.54	27	313.45	312.91	372.06	0.0015	3.6%	MRKS	0.010	REHAB			0.563	3.883	3.976	15.439	6928.916	9.978	4.315
549	29252	15.343	2.764	0.54	42	275.47	274.98	486	0.0010	18.0%	FRUI	0.010	REHAB			0.875	4.332	9.621	41.679	18705.542	26.936	11.593
772	349984	3.722	1.076	0.54	24	280.50	280.38	102	0.0012	28.9%	NCEN	0.010	SDR35			0.500	3.234	3.142	10.161	4560.366	6.567	2.845
1441	286457	0.991	0.318	0.54	15	316.35	315.28	620.57	0.0017	32.1%	ORAN	0.013				0.313	2.209	1.227	2.711	1216.475	1.752	0.761
1675	286627	45.513	11.906	0.54	66	267.78	267.25	394.7	0.0013	26.2%	NORT	0.013				1.375	5.182	23.758	123.124	55258.002	79.572	34.059
104	29054	31.145	12.903	0.54	72	243.19	242.84	880.52	0.0004	41.4%	GRNT	0.013	D1850			1.500	2.986	28.274	84.435	37894.204	54.568	23.423
108	30953	30.845	12.587	0.54	72	241.59	241.28	795.16	0.0004	40.8%	GRNT	0.013	D1850			1.500	2.957	28.274	83.620	37528.565	54.041	23.196
1143	39602	3.887	0.277	0.54	30	265.26	264.38	1332	0.0007	7.1%	SCEN	0.013				0.625	2.160	4.909	10.604	4759.219	6.853	2.966
1422	16294	0.361	0.295	0.54	10	325.51	324.97	270	0.0020	81.7%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.281
377	32962	18.099	4.559	0.54	48	263.53	263.12	589.45	0.0007	25.2%	MRKS	0.010	REHAB			1.000	3.930	12.566	49.382	22162.432	31.914	13.815
918	30121	7.163	0.901	0.54	30	289.22	288.46	335.83	0.0023	12.6%	ORAN	0.013	1350D			0.625	3.998	4.909	19.626	8808.329	12.684	5.521
1147	285457	4.263	0.518	0.54	30	262.70	262.55	317	0.0005	12.2%	SCEN	0.010	REHAB			0.625	2.377	4.909	11.667	5236.075	7.540	3.277
1625	40922	21.631	4.161	0.54	48	282.10	281.27	835.18	0.0010	19.2%	JENS	0.010	REHAB			1.000	4.697	12.566	59.026	26490.978	38.147	16.516
736	34977	9.284	1.183	0.54	40	267.47	267.29	218.36	0.0008	12.7%	NCEN	0.013				0.833	2.918	8.727	25.461	11427.026	16.455	7.171
1226	37382	1.867	0.002	0.54	18	280.76	279.95	579.69	0.0014	0.1%	SCEN	0.010	REHAB			0.375	2.915	1.767	5.152	2312.154	3.330	1.463
1448	334920	1.464	0.338	0.54	18	311.75	311.25	582	0.0009	23.1%	ORAN	0.010	REHAB			0.375	2.286	1.767	4.040	1812.991	2.611	1.147
1084	40739	8.692	0.056	0.54	36	265.57	265.12	596	0.0008	0.6%	NORT	0.010	REHAB			0.750	3.386	7.069	23.935	10742.245	15.469	6.777
1192	39798	18.213	0.846	0.54	48	268.17	267.70	658	0.0007	4.6%	JENS	0.010	REHAB	Yes		1.000	3.982	12.566	50.042	22458.718	32.341	14.128
1435	18194	0.995	0.321	0.54	15	318.79	318.75	38	0.0011	32.3%	CHES	0.010	SDR35			0.313	2.243	1.227	2.753	1235.629	1.779	0.784
2052	30889	3.143	0.797	0.54	27	305.98	305.46	672	0.0008	25.4%	CHES	0.013				0.563	2.181	3.976	8.672	3891.783	5.604	2.461
88	16443	23.267	6.745	0.54	60	260.57	260.04	880	0.0006	29.0%	GRNT	0.013	D3000			1.250	3.259	19.635	63.993	28719.896	41.357	18.090
349	34738	32.157	8.128	0.54	60	260.28	260.23	73.34	0.0007	25.3%	MRKS	0.010	REHAB			1.250	4.508	19.635	88.510	39723.194	57.201	25.044
1353	14578	1.214	0.151	0.54	18	319.12	318.46	653.8	0.0010	12.4%	ORAN	0.013				0.375	1.906	1.767	3.368	1511.744	2.177	0.963
1627	40921	21.528	4.157	0.54	48	280.86	280.47	389	0.0010	19.3%	JENS	0.010	REHAB			1.000	4.718	12.566	59.286	26607.648	38.315	16.787
734	34991	9.284	1.192	0.54	40	268.13	267.79	399.92	0.0008	12.8%	NCEN	0.013				0.833	2.941	8.727	25.666	11519.121	16.588	7.304
1159	38433	4.105	0.005	0.54	30	265.04	264.25	1038.28	0.0008	0.1%	SCEN	0.013				0.625	2.318	4.909	11.380	5107.434	7.355	3.250
1454	18378	0.45	0.065	0.54	12	326.27	325.47	660	0.0012	14.4%	CHES	0.013				0.250	1.598	0.785	1.255	563.377	0.811	0.361
103	27121	30.528	13.031	0.53	72	243.54	243.19	880.35	0.0004	42.7%	GRNT	0.013	D1350			1.500	2.987	28.274	84.443	37897.862	54.573	24.045
115	34717	30.125	12.166	0.53	72	239.12	238.81	800.58	0.0004	40.4%	WWTP	0.013	D1850			1.500	2.947	28.274	83.336	37401.314	53.858	23.733
1672	41208	45.525	11.906	0.53	60	268.42	267.55	372	0.0023	26.2%	NORT	0.013	CL2			1.250	6.422	19.635	126.102	56594.525	81.496	35.971
1992	34431	0.65	0.261	0.53	12	302.06	301.89	67	0.0025	40.2%	CHES	0.013				0.250	2.312	0.785	1.816	815.104	1.174	0.524
354	36430	32.221	8.593	0.53	60	258.52	257.48	882.47	0.0012	26.7%	MRKS	0.013				1.250	4.559	19.635	89.516	40174.729	57.852	25.631
479	19656	0.995	0.927	0.53	15	299.20	298.81	360.98	0.0011	93.2%	FRUI	0.010	REHAB			0.313	2.273	1.227	2.789	1251.817	1.803	0.808
561	30987	15.286	2.76	0.53	42	273.46	272.73	695	0.0011	18.1%	FRUI	0.010	REHAB			0.875	4.422	9.621	42.541	19092.352	27.493	12.207
658	23820	0.552	0.085	0.53	12	297.16	296.98	165.22	0.0011	15.4%	NCEN	0.010	REHAB			0.250	1.970	0.785	1.547	694.343	1.000	0.448
1421	16293	0.356	0.297	0.53	10	326.32	325.51	400.25	0.0020	83.4%	ORAN	0.013				0.208	1.831	0.545	0.999	448.209	0.645	0.289
1817	344752	2.778	0.4	0.53	21	291.86	291.49	265	0.0014	14.4%	MRKS	0.010	REHAB			0.438	3.226	2.405	7.760	3482.800	5.015	2.237
659	23821	0.563	0.085	0.53	12	296.98	296.79	165.16	0.0012	15.1%	NCEN	0.010	REHAB			0.250	2.024	0.785	1.590	713.500	1.027	0.464
743	36556	15.408	2.078	0.53	48	264.73	264.68	55.76	0.0009	13.5%	WALN	0.013				1.000	3.432	12.566	43.130	19356.608	27.874	12.466
1611	286844	19.04	3.873	0.53	45	289.34	288.81	465	0.0011	20.3%	CHES	0.010	REHAB			0.938	4.821	11.045	53.242	23894.835	34.409	15.369
1616	286842	20.04	4.159	0.53	48	286.36	285.92	490	0.0009	20.8%	CHES	0.010	REHAB			1.000	4.465	12.566	56.108	25181.250	36.261	16.221
1622	40284	21.196	4.144	0.53	48	282.82	282.45	368.9	0.0010	19.6%	CHES	0.010	REHAB			1.000	4.719	12.566	59.298	26613.103	38.323	17.127
1142	39650	3.762	0.114	0.53	30	266.13	265.26	1318	0.0007	3.0%	SCEN	0.013				0.625	2.159	4.909	10.600	4757.167	6.850	3.088
1278	37107	1.348	0	0.53	18	273.23	272.74	380.08	0.0013	0.0%	SCEN	0.013				0.375	2.154	1.767	3.807	1708.399	2.460	1.112
267	17576	10.761	3.401	0.53	33	299.50	299.39	57	0.0019	31.6%	MRKS	0.010	REHAB			0.688	5.111	5.940	30.360	13625.526	19.621	8.860
350	309595	32.149	8.127	0.53	60	260.23	259.61	873.22	0.0007	25.3%	MRKS	0.010	REHAB			1.250	4.600	19.635	90.326	40538.122	58.375	26.226
1419	16292	0.348	0.298	0.53	10	326.84	326.50	170	0.0020	85.6%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.294
1420	346911	0.348	0.297	0.53	10	326.50	326.32	90	0.0020	85.3%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.294
1456	18380	0.442	0.064	0.53	12	325.31	324.67	524.5	0.0012	14.5%	CHES	0.013				0.250	1.604	0.785	1.259	565.254	0.814	0.372
1007	39690	15.914	0.96	0.53	48	265.00	264.92	137.8	0.0006	6.0%	JENS	0.010	REHAB			1.000	3.590	12.566	45.115	20247.405	29.156	13.242
1620	40269	21.123	4.146	0.53	48	284.18	283.31	852.15	0.0010	19.6%	CHES	0.010	REHAB			1.000	4.761	12.566	59.827	26850.389	38.665	17.542
1001	39796	6.302	0.155	0.53	36	267.74	267.60	330	0.0004	2.5%	JENS	0.010	REHAB			0.750	2.538	7.069	17.942	8052.282	11.595	5.293
1299	33643	0.788	0	0.53	16	282.66	282.51	176.71	0.0008	0.0%	SCEN	0.013				0.333	1.617	1.396	2.258	1013.394	1.459	0.671
1590	37659	1.411	0.099	0.53	18	286.79	286.58	145	0.0014	7.0%	ORAN	0.013				0.375	2.283	1.767	4.035	1810.733	2.607	1.196
136	39405	28.99	11.465	0.53	72	232.23	231.91	842.71	0.0004	39.5%	CORN	0.013	D1850			1.500	2.919	28.274	82.526	37037.724	53.334	24.344
207	317418	105.932	22.886	0.53	84	233.75	233.00	338	0.0022	21.6%	CORN	0.013				1.750	7.811	38.485	300.612	134914.653	194.277	88.345
221	305159	17.412	1.714	0.52	45	320.58	320.05	530	0.0010	9.8%	HERN	0.010	REHAB			0.938	4.515	11.045	49.870	22381.675	32.230	14.818
341	327830	8.751	1.391	0.52	36	263.37	263.13	290	0.0008	15.9%	MRKS	0.010				0.750	3.545	7.069	25.059	11246.530	16.195	7.444
1	3642	0.556	0.016	0.52	12	336.61	335.94	335	0.0020	2.9%	HERN	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.486
726	282639	7.892	1.206	0.52	33	270.43	269.99	240.63	0.0018	15.3%	NCEN	0.013				0.688	3.827	5.940	22.733	10202.403	14.691	6.799
819	15516	0.354	0.3	0.52	10	304.40	302.99	658.5	0.0021	84.7%	MRKS	0.013				0.208	1.883	0.545	1.027	461.037	0.664	0.310
1360	16027	1.616	0.542	0.52	18	316.01	315.58	374	0.0011	33.5%	ORAN	0.010	REHAB			0.375	2.645	1.767	4.673	2097.348	3.020	1.404
1545	286078	2.966	0.038	0.52	24	286.78	286.49	348.53	0.0008	1.3%	ORAN	0.010	REHAB			0.500	2.720	3.142	8.545	3835.201	5.523	2.557

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1610	37831	19.065	3.875	0.52	45	289.90	289.34	464	0.0012	20.3%	CHES	0.010	REHAB			0.938	4.960	11.045	54.787	24588.249	35.407	16.342
2	3631	0.556	0.016	0.52	12	335.94	335.62	160	0.0020	2.9%	HERN	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.486
3	3632	0.555	0.016	0.52	12	335.62	334.65	485	0.0020	2.9%	HERN	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.487
157	13379	11.617	1.323	0.52	39	281.28	280.56	440.8	0.0016	11.4%	CORN	0.013				0.813	4.039	8.296	33.506	15037.694	21.654	10.037
725	35133	7.893	1.209	0.52	33	271.21	270.43	424.54	0.0018	15.3%	NCEN	0.013				0.688	3.836	5.940	22.787	10226.782	14.727	6.834
727	35134	7.975	1.204	0.52	36	269.99	269.53	390.06	0.0012	15.1%	NCEN	0.013				0.750	3.255	7.069	23.011	10327.181	14.871	6.896
1006	39689	15.896	0.96	0.52	48	265.19	265.00	319	0.0006	6.0%	JENS	0.010	REHAB			1.000	3.636	12.566	45.696	20508.337	29.532	13.636
1699	15906	0.288	0.054	0.52	10	312.61	312.24	260	0.0014	18.8%	FRUI	0.013				0.208	1.535	0.545	0.837	375.853	0.541	0.253
4	3633	0.554	0.016	0.52	12	334.65	334.41	120	0.0020	2.9%	HERN	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.488
113	32924	30.31	12.318	0.52	72	239.87	239.53	800.44	0.0004	40.6%	WWTP	0.013	D1850			1.500	3.087	28.274	87.283	39172.694	56.409	26.099
342	327829	8.743	1.39	0.52	36	263.13	262.64	580	0.0008	15.9%	MRKS	0.010				0.750	3.582	7.069	25.319	11363.078	16.363	7.620
1000	39795	6.303	0.155	0.52	36	267.91	267.74	388	0.0004	2.5%	JENS	0.010	REHAB			0.750	2.579	7.069	18.233	8183.151	11.784	5.481
1003	39686	15.829	0.944	0.52	48	266.48	265.59	1491.65	0.0006	6.0%	JENS	0.010	REHAB			1.000	3.640	12.566	45.736	20526.293	29.558	13.729
1833	13621	0.206	0.187	0.52	10	300.73	300.50	313	0.0007	90.8%	MRKS	0.013				0.208	1.103	0.545	0.602	270.082	0.389	0.183
1004	39687	15.844	0.944	0.52	48	265.59	265.39	332	0.0006	6.0%	JENS	0.010	REHAB			1.000	3.657	12.566	45.956	20625.047	29.700	13.856
1005	39688	15.879	0.96	0.52	48	265.39	265.19	332	0.0006	6.0%	JENS	0.010	REHAB			1.000	3.657	12.566	45.956	20625.047	29.700	13.821
731	35001	9.243	1.197	0.52	42	268.43	268.41	28.25	0.0007	13.0%	NCEN	0.013				0.875	2.792	9.621	26.866	12057.376	17.363	8.120
1609	39913	3.908	0.144	0.52	24	275.11	274.36	506.77	0.0015	3.7%	ORAN	0.010	REHAB			0.500	3.628	3.142	11.397	5114.867	7.365	3.457
2071	28800	1.236	0.297	0.52	18	306.27	306.23	58	0.0007	24.0%	CHES	0.010	REHAB			0.375	2.048	1.767	3.619	1624.382	2.339	1.103
5	3641	0.553	0.016	0.52	12	334.41	333.86	270	0.0020	2.9%	HERN	0.013				0.250	2.072	0.785	1.627	730.341	1.052	0.499
306	21003	21.693	5.833	0.52	42	279.78	278.73	450	0.0023	26.9%	MRKS	0.010	REHAB			0.875	6.590	9.621	63.405	28456.324	40.977	19.284
1576	36036	0.389	0.079	0.52	12	294.86	294.19	667.2	0.0010	20.3%	CHES	0.013				0.250	1.455	0.785	1.143	512.785	0.738	0.349
1577	36037	0.386	0.079	0.52	12	294.19	293.53	663.3	0.0010	20.5%	CHES	0.013				0.250	1.448	0.785	1.137	510.438	0.735	0.349
1909	13342	1.523	1.428	0.52	18	282.11	281.93	101	0.0018	93.8%	CORN	0.013				0.375	2.533	1.767	4.476	2008.650	2.892	1.369
932	346947	8.447	0.903	0.52	42	285.16	285.06	167	0.0006	10.7%	ORAN	0.013				0.875	2.568	9.621	24.708	11088.909	15.968	7.521
2058	30908	0.52	0.38	0.52	12	310.30	309.83	260	0.0018	73.1%	CHES	0.013				0.250	1.952	0.785	1.533	688.000	0.991	0.471
678	26071	1.757	0.531	0.52	20	290.27	289.55	527	0.0014	30.2%	NCEN	0.013				0.417	2.377	2.182	5.186	2327.580	3.352	1.595
1813	307240	2.749	0.319	0.52	24	292.39	292.30	120	0.0007	11.6%	MRKS	0.010	SDR35			0.500	2.582	3.142	8.113	3641.161	5.243	2.494
1853	14902	0.408	0.394	0.52	12	295.02	294.92	89	0.0011	96.6%	MRKS	0.013				0.250	1.539	0.785	1.209	542.414	0.781	0.373
86	16444	23.413	6.783	0.52	60	261.85	261.24	877.28	0.0007	29.0%	GRNT	0.013	D3400			1.250	3.502	19.635	68.759	30859.015	44.437	21.024
1677	286625	45.532	11.904	0.52	66	266.73	266.54	119.79	0.0016	26.1%	NORT	0.013				1.375	5.632	23.758	133.815	60056.127	86.481	40.949
83	14602	21.731	5.887	0.51	60	263.54	263.01	879.69	0.0006	27.1%	GRNT	0.013	D3000			1.250	3.260	19.635	64.004	28724.956	41.364	19.633
131	39381	29.263	11.684	0.51	72	234.10	233.75	842.7	0.0004	39.9%	WWTP	0.013	D1350			1.500	3.053	28.274	86.308	38735.209	55.779	26.516
242	350151	3.409	1.491	0.51	24	311.93	311.55	327	0.0012	43.7%	MRKS	0.010	SDR35			0.500	3.215	3.142	10.099	4532.388	6.527	3.118
931	346948	8.427	0.904	0.51	42	285.36	285.16	329	0.0006	10.7%	ORAN	0.013				0.875	2.588	9.621	24.895	11172.853	16.089	7.662
1156	38620	3.5	0.005	0.51	30	265.42	265.21	331.84	0.0006	0.1%	SCEN	0.013				0.625	2.114	4.909	10.379	4657.917	6.707	3.207
1181	39622	3.484	0.114	0.51	30	266.45	266.13	504.18	0.0006	3.3%	SCEN	0.013				0.625	2.101	4.909	10.312	4628.166	6.665	3.181
1679	286624	45.658	11.901	0.51	66	265.86	264.78	673.11	0.0016	26.1%	NORT	0.013				1.375	5.665	23.758	134.588	60403.160	86.981	41.323
468	286045	0.497	0.436	0.51	12	303.89	303.55	337.61	0.0010	87.7%	FRUI	0.010	REHAB			0.250	1.894	0.785	1.487	667.577	0.961	0.464
1551	32315	12.921	1.339	0.51	42	296.10	295.94	188	0.0009	10.4%	CHES	0.010	REHAB			0.875	3.980	9.621	38.293	17185.868	24.748	11.827
123	38198	29.691	11.949	0.51	72	236.70	236.44	600	0.0004	40.2%	WWTP	0.013	D1850			1.500	3.118	28.274	88.159	39565.752	56.975	27.284
476	277348	0.898	0.831	0.51	15	300.37	300.05	318.04	0.0010	92.5%	FRUI	0.010	REHAB			0.313	2.193	1.227	2.692	1208.048	1.740	0.842
1356	16024	1.5	0.523	0.51	18	317.74	317.06	380.5	0.0018	34.9%	ORAN	0.013				0.375	2.536	1.767	4.482	2011.435	2.896	1.396
1560	34207	13.508	1.343	0.51	45	293.24	293.01	355	0.0006	9.9%	CHES	0.010	REHAB			0.938	3.634	11.045	40.141	18015.334	25.942	12.434
2072	28748	1.24	0.297	0.51	18	306.32	305.88	608	0.0007	24.0%	CHES	0.010	REHAB			0.375	2.098	1.767	3.708	1663.975	2.396	1.156
1157	38621	3.58	0.005	0.51	30	265.21	265.10	163	0.0007	0.1%	SCEN	0.013				0.625	2.183	4.909	10.718	4810.044	6.926	3.346
1417	16291	0.327	0.299	0.51	10	327.36	327.08	142	0.0020	91.4%	ORAN	0.013				0.208	1.807	0.545	0.986	442.424	0.637	0.310
1455	18379	0.423	0.064	0.51	12	325.47	325.31	128.05	0.0012	15.1%	CHES	0.013				0.250	1.623	0.785	1.275	572.000	0.824	0.401
1589	37660	1.39	0.099	0.51	18	287.28	286.79	317.14	0.0015	7.1%	ORAN	0.013				0.375	2.358	1.767	4.167	1870.257	2.693	1.303
1787	13896	2.061	0.125	0.51	24	300.67	300.15	710	0.0007	6.1%	MRKS	0.013				0.500	1.963	3.142	6.167	2767.823	3.986	1.925
477	19657	0.93	0.863	0.51	15	300.05	299.69	329.79	0.0011	92.8%	FRUI	0.010	REHAB			0.313	2.285	1.227	2.804	1258.295	1.812	0.882
732	34995	9.286	1.196	0.51	42	268.41	268.15	342	0.0008	12.9%	NCEN	0.013				0.875	2.894	9.621	27.840	12494.551	17.992	8.706
1178	39651	3.406	0.114	0.51	30	266.95	266.86	146.37	0.0006	3.3%	SCEN	0.013				0.625	2.084	4.909	10.230	4591.364	6.612	3.206
344	327827	8.716	1.387	0.51	36	262.45	262.00	497	0.0009	15.9%	MRKS	0.010				0.750	3.708	7.069	26.211	11763.593	16.940	8.224
382	34736	18.514	5.019	0.51	48	261.66	261.63	34	0.0009	27.1%	MRKS	0.010	REHAB			1.000	4.426	12.566	55.618	24961.470	35.945	17.431
390	11055	0.425	0.425	0.51	10	319.11	318.53	172.29	0.0034	100.0%	MRKS	0.013				0.208	2.362	0.545	1.288	578.080	0.832	0.407
1035	41012	19.151	3.244	0.51	51	256.75	256.13	909.69	0.0007	16.9%	NORT	0.010	REHAB			1.063	4.049	14.186	57.435	25777.043	37.119	17.968
1277	37113	1.351	0	0.51	18	273.59	273.23	242	0.0015	0.0%	SCEN	0.013				0.375	2.314	1.767	4.089	1835.153	2.643	1.292
1704	15839	0.408	0.055	0.51	12	310.31	310.15	136.17	0.0012	13.5%	FRUI	0.013				0.250	1.574	0.785	1.236	554.684	0.799	0.391
1984	34407	0.28	0.079	0.51	10	306.18	305.23	650.3	0.0015	28.2%	CHES	0.013				0.208	1.556	0.545	0.849	380.810	0.548	0.268
933	346946	8.439	0.903	0.51	42	285.06	284.94	189	0.0006	10.7%	ORAN	0.013				0.875	2.644	9.621	25.442	11418.440	16.443	8.004
938	346934	8.462	0.902	0.51	42	284.25	284.12	204	0.0006	10.7%	ORAN	0.013				0.875	2.649	9.621	25.489	11439.410	16.473	8.011
1592	37657	1.529	0.103	0.51	18	285.94	285.11	435	0.0019	6.7%	ORAN	0.013				0.375	2.621	1.767	4.631	2078.372	2.993	1.464
1618	39160	20.294	4.151	0.51	48	285.27	284.57	657.69	0.0011	20.5%	CHES	0.010	REHAB			1.000	4.861	12.566	61.085	27414.945	39.478	19.184
1635	277019	21.451	4.142	0.51	54	274.15	273.86	456	0.0006	19.3%	JENS	0.010	REHAB			1.125	4.061	15.904	64.592	28988.869	41.744	20.293
122	38199	29.767	11.983	0.51	72	236.97	236.70	600	0.0005	40.3%	WWTP	0.013	D1850			1.500	3.177	28.274	89.838	40319.453	58.060	28.293
153	294075	11.464	1.324	0.51	39	285.06	284.84	125.28	0.0018	11.5%	CORN	0.013				0.813	4.188	8.296	34.742	15592.159	22.453	10.989
1179	39623	3.404	0.114	0.51	30	266.86	266.64	350.65	0.0006	3.3%	SCEN	0.013				0.625	2.105	4.909	10.334	4637.895	6.679	3.275
1180	325569	3.399	0.114	0.51	30	266.64	266.45	312.17	0.0006	3.4%	SCEN	0.013				0.625	2.101	4.909	10.311	4627.732	6.664	3.265
1594	37655	2.424	0.131	0.51	21	284.59	283.19	659.09	0.0021	5.4%	ORAN	0.013				0.438	3.061	2.405	7.363	3304.448	4.758	2.334
2034	34428	0.316	0.044	0.51	10	304.51	303.80	376	0.0019	13.9%	CHES	0.013				0.208	1.769	0.545	0.965	432.951	0.623	0.307
1418	346912	0.327	0.298	0.51	10	327.08	326.84	118	0.0020	91.1%	ORAN	0.013				0.208	1.836	0.545	1.001	449.333	0.647	0.320
1427	18271	0.527	0.282	0.51	12	321.74	321.48	130	0.0020	53.5%	ORAN	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.515
1587	37662	1.37	0.099	0.51	18	288.63	287.98	418	0.0016	7.2%	ORAN	0.013				0.375	2.366	1.767	4.181	1876.279	2.702	1.332
1591	37658	1.473	0.099	0.51	18	286.58	285.94	356.59	0.0018	6.7%	ORAN	0.013				0.375	2.542	1.767	4.491	2015.739	2.903	1.430
1702	15838	0.409	0.055	0.51	12	311.12	310.67	375	0.0012	13.4%	FRUI	0.013				0.250	1.590	0.785	1.249	560.553	0.807	0.398
1990	34413	0.311	0.144	0.51	10	303.26	302.13	611	0.0018	46.3%	CHES	0.013	CL23			0.208	1.750	0.545	0.955	428.472	0.617	0.306
119	36416	29.992	12.073	0.51	72	237.90	237.52	824.2	0.0005	40.3%	WWTP	0.013	D1850			1.500	3.216	28.274	90.935	40811.623	58.769	28.777
1512	28603	7.54	0.091	0.51	39	300.87	300.72	330.81	0.0005	1.2%	CHES	0.010	REHAB			0.813	2.766	8.296	22.950	10299.958	14.832	7.292
1628	40920	21.534	4.155	0.51	48	280.47	279.42	855.16	0.0012	19.3%	JENS	0.010	REHAB			1.000	5.221	12.566	65.610	29445.568	42.402	20.868

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
351	36429	32.088	8.125	0.50	60	259.61	259.57	28.5	0.0014	25.3%	MRKS	0.013				1.250	4.975	19.635	97.688	43842.350	63.133	31.045
414	12839	1.165	0.036	0.50	18	317.81	317.31	438.95	0.0011	3.1%	MRKS	0.013				0.375	2.025	1.767	3.578	1605.855	2.312	1.147
776	349988	3.705	1.073	0.50	24	280.20	279.79	278	0.0015	29.0%	NCEN	0.010	SDR35			0.500	3.621	3.142	11.377	5105.975	7.353	3.648
155	11822	11.624	1.323	0.50	39	283.29	281.96	717	0.0019	11.4%	CORN	0.013				0.813	4.304	8.296	35.707	16025.147	23.076	11.452
547	27244	15.251	2.767	0.50	42	275.85	275.61	189.32	0.0013	18.1%	FRUI	0.010	REHAB			0.875	4.858	9.621	46.735	20974.797	30.204	14.953
930	346949	8.355	0.905	0.50	42	285.56	285.36	310	0.0006	10.8%	ORAN	0.013				0.875	2.666	9.621	25.647	11510.156	16.575	8.220
1703	15865	0.404	0.055	0.50	12	310.67	310.31	300.4	0.0012	13.6%	FRUI	0.013				0.250	1.589	0.785	1.248	560.180	0.807	0.403
137	39404	28.954	11.461	0.50	72	231.91	231.54	842.7	0.0004	39.6%	CORN	0.013	D2350			1.500	3.139	28.274	88.740	39826.555	57.350	28.396
152	11814	11.468	1.324	0.50	39	285.80	285.06	408.8	0.0018	11.5%	CORN	0.013				0.813	4.252	8.296	35.273	15830.557	22.796	11.328
1298	33642	0.79	0	0.50	16	282.86	282.66	200	0.0010	0.0%	SCEN	0.013				0.333	1.755	1.396	2.451	1099.925	1.584	0.794
1550	32316	12.922	1.34	0.50	42	296.38	296.10	306	0.0009	10.4%	CHES	0.010	REHAB			0.875	4.127	9.621	39.706	17820.041	25.661	12.739
87	16442	23.352	6.769	0.50	60	261.24	260.57	881.41	0.0008	29.0%	GRNT	0.013	D3000			1.250	3.661	19.635	71.892	32265.223	46.462	23.110
415	293186	1.164	0.036	0.50	18	317.31	316.80	439.19	0.0012	3.1%	MRKS	0.013				0.375	2.044	1.767	3.613	1621.391	2.335	1.171
816	15508	0.327	0.307	0.50	10	307.10	306.31	375.3	0.0021	93.9%	MRKS	0.013				0.208	1.867	0.545	1.019	457.118	0.658	0.331
1588	37661	1.384	0.099	0.50	18	287.98	287.28	427	0.0016	7.2%	ORAN	0.013				0.375	2.429	1.767	4.293	1926.477	2.774	1.390
1177	39732	3.354	0.114	0.50	30	267.28	266.95	517	0.0006	3.4%	SCEN	0.013				0.625	2.123	4.909	10.423	4677.978	6.736	3.382
1553	32313	13.202	1.339	0.50	42	295.63	295.49	144.75	0.0010	10.1%	CHES	0.010	REHAB			0.875	4.243	9.621	40.822	18320.830	26.382	13.180
1615	39159	20.073	4.162	0.50	48	286.90	286.36	491	0.0011	20.7%	CHES	0.010	REHAB			1.000	4.941	12.566	62.094	27867.956	40.130	20.057
1724	14057	0.621	0.069	0.50	15	306.91	306.62	329	0.0009	11.1%	MRKS	0.013				0.313	1.579	1.227	1.938	869.777	1.252	0.631
465	17629	0.501	0.442	0.50	12	305.08	304.72	321.38	0.0011	88.2%	FRUI	0.010	REHAB			0.250	1.997	0.785	1.569	704.063	1.014	0.513
467	285484	0.499	0.438	0.50	12	304.26	303.89	331.74	0.0011	87.8%	FRUI	0.010	REHAB			0.250	1.993	0.785	1.565	702.540	1.012	0.513
942	31870	8.788	0.901	0.50	36	282.42	282.13	290.19	0.0010	10.3%	ORAN	0.010	REHAB	Yes		0.750	3.869	7.069	27.346	12273.085	17.673	8.885
1034	41013	18.95	3.103	0.50	51	257.37	256.75	867.42	0.0007	16.4%	NORT	0.010	REHAB			1.063	4.146	14.186	58.818	26397.639	38.013	19.063
1176	39731	3.33	0.114	0.50	30	267.49	267.28	332	0.0006	3.4%	SCEN	0.013				0.625	2.114	4.909	10.376	4656.795	6.706	3.376
1479	22352	1.025	0.061	0.50	18	313.82	313.22	657.97	0.0009	6.0%	CHES	0.013				0.375	1.812	1.767	3.201	1436.817	2.069	1.044
1911	34548	0.274	0	0.50	10	314.68	314.58	67	0.0015	0.0%	CHES	0.013				0.208	1.572	0.545	0.858	384.917	0.554	0.280
2075	28656	1.438	0.294	0.50	18	305.10	304.58	490	0.0011	20.4%	CHES	0.010	REHAB			0.375	2.541	1.767	4.490	2015.003	2.902	1.464
156	13380	11.615	1.323	0.50	39	281.96	281.58	198.45	0.0019	11.4%	CORN	0.013				0.813	4.373	8.296	36.278	16281.786	23.446	11.831
1149	285458	4.25	0.515	0.50	30	262.14	261.79	572	0.0006	12.1%	SCEN	0.010	REHAB			0.625	2.703	4.909	13.267	5954.233	8.574	4.324
1552	32314	12.944	1.339	0.50	42	295.94	295.63	328	0.0009	10.3%	CHES	0.010	REHAB			0.875	4.194	9.621	40.354	18110.662	26.079	13.135
268	17573	10.897	3.472	0.50	36	299.39	298.95	287	0.0015	31.9%	MRKS	0.010	II	Yes		0.750	4.825	7.069	34.107	15307.255	22.042	11.145
814	21396	0.677	0.144	0.50	18	294.09	294.03	251	0.0002	21.3%	FRUI	0.010	REHAB			0.375	1.206	1.767	2.131	956.337	1.377	0.700
1175	39730	3.308	0.115	0.50	30	267.70	267.49	332	0.0006	3.5%	SCEN	0.013				0.625	2.114	4.909	10.376	4656.795	6.706	3.398
1901	14808	1.06	0.96	0.50	18	283.97	283.89	81	0.0010	90.6%	CORN	0.013				0.375	1.885	1.767	3.332	1495.310	2.153	1.093
130	39382	29.34	11.71	0.50	72	234.51	234.10	871.08	0.0005	39.9%	WWTP	0.013	D1350			1.500	3.250	28.274	91.879	41235.502	59.379	30.039
1900	14807	0.925	0.825	0.50	18	284.03	283.97	79	0.0008	89.2%	CORN	0.013				0.375	1.653	1.767	2.922	1311.266	1.888	0.963
2049	30886	3.045	0.714	0.50	27	306.99	306.63	380	0.0009	23.4%	CHES	0.013				0.563	2.413	3.976	9.595	4306.168	6.201	3.156
2050	30887	3.055	0.722	0.50	27	306.63	306.43	210	0.0010	23.6%	CHES	0.013				0.563	2.420	3.976	9.620	4317.545	6.217	3.162
2059	30909	0.526	0.379	0.50	12	309.83	309.47	169	0.0021	72.1%	CHES	0.013				0.250	2.119	0.785	1.664	746.851	1.075	0.549
84	14601	22.471	6.478	0.50	60	263.01	262.20	1100.24	0.0007	28.8%	GRNT	0.013	D3000			1.250	3.603	19.635	70.751	31753.021	45.724	23.253
135	39406	29.015	11.516	0.50	72	232.62	232.23	842.7	0.0005	39.7%	CORN	0.013	D1850			1.500	3.222	28.274	91.107	40888.783	58.880	29.865
1174	39729	3.288	0.115	0.50	30	268.34	267.70	1007	0.0006	3.5%	SCEN	0.013				0.625	2.119	4.909	10.401	4667.902	6.722	3.434
1274	37067	1.322	0	0.50	18	274.85	274.51	218.45	0.0016	0.0%	SCEN	0.013				0.375	2.367	1.767	4.183	1877.121	2.703	1.381
1439	18125	0.989	0.318	0.50	15	317.73	316.38	584.32	0.0023	32.2%	ORAN	0.013				0.313	2.557	1.227	3.138	1408.148	2.028	1.039
2053	30890	3.141	0.788	0.50	27	305.46	304.80	651	0.0010	25.1%	CHES	0.013				0.563	2.496	3.976	9.926	4454.644	6.415	3.274
240	350153	2.961	1.398	0.49	24	312.92	312.28	635	0.0010	47.2%	MRKS	0.010	SDR35			0.500	2.994	3.142	9.405	4220.970	6.078	3.117
646	19637	0.288	0.288	0.49	10	301.83	300.70	662.26	0.0017	100.0%	FRUI	0.013				0.208	1.681	0.545	0.917	411.556	0.593	0.305
1197	276116	18.211	0.846	0.49	48	267.05	266.57	510	0.0009	4.6%	JENS	0.010	REHAB	Yes		1.000	4.571	12.566	57.442	25780.095	37.123	18.912
1272	37050	1.329	0	0.49	18	275.90	275.61	182.62	0.0016	0.0%	SCEN	0.013				0.375	2.391	1.767	4.225	1896.067	2.730	1.401
1614	39158	20.004	4.163	0.49	48	287.32	286.90	367.8	0.0011	20.8%	CHES	0.010	REHAB			1.000	5.035	12.566	63.272	28396.693	40.891	20.887
67	9716	14.949	2.086	0.49	48	277.00	276.78	203.11	0.0011	14.0%	GRNT	0.013	D3250			1.000	3.772	12.566	47.402	21274.106	30.635	15.686
107	30954	30.891	12.606	0.49	72	242.02	241.59	800.94	0.0005	40.8%	GRNT	0.013	D1850			1.500	3.471	28.274	98.127	44039.524	63.417	32.526
241	350152	3.033	1.462	0.49	24	312.28	311.93	328	0.0011	48.2%	MRKS	0.010	SDR35			0.500	3.080	3.142	9.677	4343.165	6.254	3.221
348	34737	32.174	8.095	0.49	60	261.18	260.28	989.96	0.0009	25.2%	MRKS	0.010	REHAB			1.250	5.205	19.635	102.209	45871.405	66.055	33.881
1218	35616	1.054	0	0.49	16	283.18	282.97	186.77	0.0011	0.0%	SCEN	0.010	REHAB			0.333	2.420	1.396	3.378	1516.221	2.183	1.129
1273	37068	1.327	0	0.49	18	275.61	274.85	474.68	0.0016	0.0%	SCEN	0.013				0.375	2.401	1.767	4.242	1903.861	2.742	1.415
1416	16290	0.309	0.299	0.49	10	327.62	327.36	130	0.0020	96.8%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.333
114	34718	30.166	12.243	0.49	72	239.53	239.12	797.07	0.0005	40.6%	WWTP	0.013	D1850			1.500	3.397	28.274	96.050	43107.424	62.075	31.909
934	346945	8.434	0.902	0.49	42	284.94	284.92	28	0.0007	10.7%	ORAN	0.013				0.875	2.805	9.621	26.985	12111.084	17.440	9.006
1129	38740	2.261	0	0.49	27	267.92	267.74	333.24	0.0005	0.0%	SCEN	0.013				0.563	1.822	3.976	7.245	3251.541	4.682	2.421
1415	16289	0.309	0.3	0.49	10	327.97	327.62	174	0.0020	97.1%	ORAN	0.013				0.208	1.826	0.545	0.996	446.852	0.643	0.334
109	30952	30.787	12.56	0.49	72	241.28	240.85	797.74	0.0005	40.8%	WWTP	0.013	D1850			1.500	3.477	28.274	98.324	44127.764	63.544	32.757
158	13378	11.62	1.323	0.49	39	280.56	278.71	912.62	0.0020	11.4%	CORN	0.013				0.813	4.500	8.296	37.327	16752.386	24.123	12.503
1449	18030	1.613	0.337	0.49	18	311.25	311.01	169	0.0014	20.9%	ORAN	0.010	REHAB			0.375	2.939	1.767	5.194	2330.958	3.357	1.744
340	327831	8.761	1.392	0.49	36	263.80	263.37	411	0.0010	15.9%	MRKS	0.010				0.750	3.986	7.069	28.176	12645.187	18.209	9.448
1033	41011	18.584	2.772	0.49	51	258.01	257.37	867.42	0.0007	14.9%	NORT	0.010	REHAB			1.063	4.212	14.186	59.759	26820.028	38.621	20.037
1270	37052	1.283	0	0.49	18	276.86	276.51	228	0.0015	0.0%	SCEN	0.013				0.375	2.351	1.767	4.154	1864.212	2.684	1.401
1725	14012	0.662	0.1	0.49	15	306.62	306.30	297	0.0011	15.1%	MRKS	0.013				0.313	1.746	1.227	2.143	961.620	1.385	0.723
92	20677	27.306	9.682	0.49	60	255.43	254.42	890.97	0.0011	35.5%	GRNT	0.013	D3000			1.250	4.471	19.635	87.794	39401.741	56.739	29.433
386	10983	0.547	0.547	0.49	12	315.40	314.60	327	0.0024	100.0%	MRKS	0.013				0.250	2.271	0.785	1.783	800.382	1.153	0.606
391	11054	0.397	0.397	0.49	10	319.61	319.11	147.8	0.0034	100.0%	MRKS	0.013				0.208	2.367	0.545	1.291	579.498	0.834	0.437
1146	285456	4.269	0.518	0.49	30	263.03	262.70	498	0.0007	12.1%	SCEN	0.010	REHAB			0.625	2.813	4.909	13.806	6196.296	8.923	4.654
1221	35619	1.452	0	0.49	16	282.12	281.71	186.71	0.0022	0.0%	SCEN	0.010	REHAB			0.333	3.381	1.396	4.721	2118.920	3.051	1.599
1297	33649	0.698	0	0.49	16	283.01	282.86	175	0.0009	0.0%	SCEN	0.013				0.333	1.625	1.396	2.269	1018.333	1.466	0.768
1629	41269	21.545	4.152	0.49	51	279.36	278.16	1208	0.0010	19.3%	JENS	0.010	REHAB			1.063	4.888	14.186	69.341	31120.109	44.813	23.268
679	26070	1.752	0.524	0.49	20	289.55	288.97	350.65	0.0017	29.9%	NCEN	0.013				0.417	2.616	2.182	5.706	2561.066	3.688	1.936
806	29912	0.482	0.149	0.49	12	283.07	282.71	188	0.0019	30.9%	NCEN	0.013				0.250	2.009	0.785	1.578	708.106	1.020	0.538
1271	37053	1.282	0	0.49	18	276.51	275.90	392.1	0.0016	0.0%	SCEN	0.013				0.375	2.366	1.767	4.182	1876.702	2.702	1.420
1895	14803	0.935	0.833	0.49	18	285.21	284.70	617	0.0008	89.1%	CORN	0.013				0.375	1.725	1.767	3.048	1367.953	1.970	1.035
99	25087	30.536	13.407	0.49	72	245.13	244.65	882	0.0005	43.9%	GRNT	0.013	D2350			1.500	3.494	28.274	98.797	44339.899	63.849	33.313

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
786	333149	0.315	0.122	0.49	10	296.22	296.00	171	0.0013	38.7%	NCEN	0.010	SDR35			0.208	1.898	0.545	1.035	464.580	0.669	0.354
1296	33648	0.7	0	0.49	16	283.18	283.01	195	0.0009	0.0%	SCEN	0.013				0.333	1.639	1.396	2.288	1027.000	1.479	0.779
1465	18286	0.384	0.045	0.49	12	321.42	320.85	468	0.0012	11.7%	CHES	0.013				0.250	1.602	0.785	1.258	564.730	0.813	0.429
1466	18287	0.381	0.044	0.49	12	320.85	320.35	417	0.0012	11.5%	CHES	0.013				0.250	1.590	0.785	1.249	560.329	0.807	0.426
1562	34209	13.488	1.342	0.49	45	292.70	292.44	336	0.0008	9.9%	CHES	0.010	REHAB			0.938	3.972	11.045	43.869	19688.363	28.351	14.863
999	39794	6.301	0.156	0.49	36	268.59	267.91	722.1	0.0009	2.5%	JENS	0.013	CL3			0.750	2.909	7.069	20.562	9228.357	13.289	6.988
2079	28604	1.609	0.291	0.49	18	302.88	301.90	668	0.0015	18.1%	CHES	0.010	REHAB			0.375	2.987	1.767	5.279	2369.174	3.412	1.803
105	29053	30.95	12.775	0.48	72	242.84	242.34	881	0.0006	41.3%	GRNT	0.013	D1850			1.500	3.568	28.274	100.891	45279.896	65.203	34.253
1851	14900	0.399	0.396	0.48	12	295.70	295.54	120	0.0013	99.2%	MRKS	0.013				0.250	1.676	0.785	1.317	590.875	0.851	0.452
1002	39797	6.31	0.155	0.48	36	267.60	267.25	617.17	0.0006	2.5%	JENS	0.010	REHAB			0.750	2.935	7.069	20.744	9309.869	13.406	7.096
1467	18288	0.378	0.044	0.48	12	320.35	319.83	429.6	0.0012	11.6%	CHES	0.013				0.250	1.597	0.785	1.254	562.983	0.811	0.433
1572	36143	13.996	1.569	0.48	45	290.49	290.21	330.22	0.0008	11.2%	CHES	0.010	REHAB			0.938	4.158	11.045	45.922	20609.616	29.678	15.682
98	25088	30.649	13.442	0.48	72	245.63	245.13	881.61	0.0006	43.9%	GRNT	0.013	D2350			1.500	3.567	28.274	100.856	45264.229	65.180	34.531
100	25086	30.403	13.352	0.48	72	244.65	244.16	881.67	0.0006	43.9%	GRNT	0.013	D2350			1.500	3.531	28.274	99.839	44807.776	64.523	34.120
126	39386	29.501	11.764	0.48	72	235.73	235.27	880	0.0005	39.9%	WWTP	0.013	D1350			1.500	3.425	28.274	96.826	43455.621	62.576	33.075
1152	38616	3.269	0	0.48	30	265.97	265.86	160.64	0.0007	0.0%	SCEN	0.013				0.625	2.199	4.909	10.796	4845.248	6.977	3.708
1516	30623	9.043	0.39	0.48	39	299.69	299.61	104.5	0.0008	4.3%	CHES	0.010	REHAB			0.813	3.595	8.296	29.820	13383.386	19.272	10.229
1847	14913	0.509	0.374	0.48	12	292.32	290.87	658	0.0022	73.5%	MRKS	0.013				0.250	2.155	0.785	1.693	759.621	1.094	0.585
134	39395	29.026	11.562	0.48	72	233.05	232.62	842.7	0.0005	39.8%	WWTP	0.013	D2350			1.500	3.383	28.274	95.665	42934.470	61.826	32.800
807	29694	0.517	0.146	0.48	12	282.24	280.81	627	0.0023	28.2%	NCEN	0.013				0.250	2.192	0.785	1.722	772.788	1.113	0.596
1527	32128	1.746	0.039	0.48	21	295.02	294.80	281	0.0008	2.2%	ORAN	0.010	REHAB			0.438	2.416	2.405	5.811	2608.007	3.756	2.010
1887	13521	0.379	0.377	0.48	10	294.37	292.32	628.8	0.0033	99.5%	CORN	0.013				0.208	2.324	0.545	1.268	568.885	0.819	0.440
1912	34549	0.482	0.033	0.48	10	314.58	314.03	105	0.0052	6.8%	CHES	0.013				0.208	2.946	0.545	1.607	721.092	1.038	0.556
145	7756	9.093	1.127	0.48	45	295.31	295.15	258.54	0.0006	12.4%	CORN	0.013				0.938	2.732	11.045	30.178	13543.950	19.503	10.410
1153	38617	3.268	0	0.48	30	265.86	265.63	331.38	0.0007	0.0%	SCEN	0.013				0.625	2.214	4.909	10.869	4878.061	7.024	3.756
1269	37069	1.271	0	0.48	18	277.27	276.86	256.49	0.0016	0.0%	SCEN	0.013				0.375	2.399	1.767	4.239	1902.328	2.739	1.468
1854	14903	0.413	0.393	0.48	12	294.90	294.58	217	0.0015	95.2%	MRKS	0.013				0.250	1.763	0.785	1.385	621.400	0.895	0.482
417	12840	1.482	0.035	0.48	18	315.98	315.51	361	0.0013	2.4%	MRKS	0.010	REHAB			0.375	2.814	1.767	4.973	2231.863	3.214	1.732
438	12760	0.287	0.287	0.48	10	315.25	314.42	438	0.0019	100.0%	MRKS	0.013				0.208	1.772	0.545	0.966	433.716	0.625	0.338
1480	22351	1.081	0.061	0.48	18	313.22	312.46	651.42	0.0012	5.6%	CHES	0.013				0.375	2.049	1.767	3.621	1625.193	2.340	1.259
1897	14804	0.928	0.826	0.48	18	284.48	284.45	35	0.0009	89.0%	CORN	0.013				0.375	1.756	1.767	3.104	1393.014	2.006	1.078
150	11815	11.464	1.324	0.48	39	286.84	286.00	393.28	0.0021	11.5%	CORN	0.013				0.813	4.619	8.296	38.315	17195.884	24.762	13.298
657	23819	0.458	0.065	0.48	12	297.34	297.16	165.33	0.0011	14.2%	NCEN	0.010	REHAB			0.250	1.969	0.785	1.547	694.112	1.000	0.542
680	26069	1.748	0.524	0.48	20	288.97	288.65	307.51	0.0010	30.0%	NCEN	0.010	REHAB			0.417	2.697	2.182	5.884	2640.781	3.803	2.055
1915	34552	0.48	0.033	0.48	10	313.08	313.00	15	0.0053	6.9%	CHES	0.013				0.208	2.973	0.545	1.621	727.618	1.048	0.568
439	12761	0.286	0.286	0.48	10	314.42	314.04	200	0.0019	100.0%	MRKS	0.013				0.208	1.774	0.545	0.968	434.291	0.625	0.339
1303	33781	0.533	0	0.48	14	284.65	284.20	410	0.0011	0.0%	SCEN	0.013				0.292	1.684	1.069	1.800	807.828	1.163	0.630
1836	13614	0.27	0.25	0.48	10	299.23	298.79	258	0.0017	92.6%	MRKS	0.013				0.208	1.681	0.545	0.917	411.453	0.592	0.322
118	36417	30.042	12.091	0.48	72	238.29	237.90	686	0.0006	40.2%	WWTP	0.013	D1850			1.500	3.571	28.274	100.978	45318.823	65.259	35.217
121	38200	29.835	12.013	0.48	72	237.31	236.97	607.15	0.0006	40.3%	WWTP	0.013	D1850			1.500	3.544	28.274	100.218	44977.969	64.768	34.933
1148	39495	4.258	0.517	0.48	30	262.55	262.14	572	0.0007	12.1%	SCEN	0.010	REHAB			0.625	2.925	4.909	14.359	6444.419	9.280	5.022
1698	15905	0.244	0.055	0.48	10	313.22	312.61	435	0.0014	22.5%	FRUI	0.013				0.208	1.524	0.545	0.831	373.099	0.537	0.293
1862	14911	0.437	0.38	0.48	12	292.68	292.46	129.94	0.0017	87.0%	MRKS	0.013				0.250	1.889	0.785	1.484	665.834	0.959	0.522
151	294076	11.461	1.324	0.48	39	286.00	285.80	91.2	0.0022	11.6%	CORN	0.013				0.813	4.680	8.296	38.824	17424.221	25.091	13.630
380	327825	18.058	4.554	0.48	48	262.60	262.08	490.25	0.0011	25.2%	MRKS	0.010	REHAB			1.000	4.853	12.566	60.980	27367.924	39.410	21.352
418	349844	1.471	0.035	0.48	18	315.51	315.12	297	0.0013	2.4%	MRKS	0.010	REHAB			0.375	2.826	1.767	4.994	2241.435	3.228	1.757
116	34716	30.109	12.106	0.47	72	238.81	238.43	656	0.0006	40.2%	WWTP	0.013	D1850			1.500	3.605	28.274	101.928	45745.487	65.874	35.765
379	32961	18.069	4.555	0.47	48	262.91	262.60	289.75	0.0011	25.2%	MRKS	0.010	REHAB			1.000	4.874	12.566	61.244	27486.415	39.580	21.511
699	349993	4.345	1.204	0.47	24	279.56	279.51	20	0.0025	27.7%	NCEN	0.010	SDR35			0.500	4.715	3.142	14.812	6647.819	9.573	5.228
843	15925	0.981	0.374	0.47	18	315.19	314.90	286	0.0010	38.1%	ORAN	0.013				0.375	1.897	1.767	3.353	1504.627	2.167	1.186
1543	286077	2.981	0.038	0.47	24	287.55	287.20	298.42	0.0012	1.3%	ORAN	0.010	REHAB			0.500	3.229	3.142	10.146	4553.331	6.557	3.576
1573	36144	13.996	1.567	0.47	45	290.21	289.91	330.22	0.0009	11.2%	CHES	0.010	REHAB			0.938	4.304	11.045	47.533	21332.980	30.719	16.723
1812	13625	2.524	0.08	0.47	21	292.82	292.48	197.38	0.0017	3.2%	MRKS	0.010	REHAB			0.438	3.584	2.405	8.620	3868.463	5.571	3.047
1860	14909	0.431	0.381	0.47	12	293.05	292.85	120	0.0017	88.4%	MRKS	0.013				0.250	1.874	0.785	1.472	660.618	0.951	0.520
1139	38614	3.039	0	0.47	30	266.29	266.08	332.86	0.0006	0.0%	SCEN	0.013				0.625	2.111	4.909	10.363	4650.775	6.697	3.658
1536	32010	2.371	0.038	0.47	24	290.43	290.18	332.79	0.0008	1.6%	ORAN	0.010	REHAB			0.500	2.585	3.142	8.120	3644.132	5.248	2.877
2029	34325	0.356	0.003	0.47	12	301.56	300.77	685	0.0012	0.8%	CHES	0.013				0.250	1.559	0.785	1.224	549.534	0.791	0.435
81	13099	18.857	3.41	0.47	60	264.65	264.11	886	0.0006	18.1%	GRNT	0.013	D3400			1.250	3.279	19.635	64.374	28891.247	41.603	22.746
483	286064	1.405	1.336	0.47	24	297.42	297.33	339.72	0.0003	95.1%	FRUI	0.010	REHAB			0.500	1.535	3.142	4.822	2164.063	3.116	1.711
929	346950	8.342	0.905	0.47	42	285.58	285.56	25	0.0008	10.8%	ORAN	0.013				0.875	2.968	9.621	28.559	12817.167	18.457	10.115
1761	15442	0.795	0.296	0.47	15	304.37	303.57	454	0.0018	37.2%	MRKS	0.013				0.313	2.233	1.227	2.740	1229.770	1.771	0.976
1861	14910	0.438	0.381	0.47	12	292.85	292.68	96.97	0.0018	87.0%	MRKS	0.013				0.250	1.922	0.785	1.510	677.535	0.976	0.538
239	350154	2.956	1.404	0.47	24	313.33	312.92	347	0.0012	47.5%	MRKS	0.010	SDR35			0.500	3.241	3.142	10.183	4570.212	6.581	3.625
471	277346	0.574	0.511	0.47	12	302.57	301.98	328	0.0018	89.0%	FRUI	0.010	REHAB			0.250	2.531	0.785	1.988	892.192	1.285	0.711
787	333148	0.315	0.122	0.47	10	295.90	295.52	267	0.0014	38.7%	NCEN	0.010	SDR35			0.208	1.996	0.545	1.089	488.634	0.704	0.389
844	15926	1.005	0.372	0.47	18	314.90	314.31	551.22	0.0011	37.0%	ORAN	0.013				0.375	1.963	1.767	3.468	1556.655	2.242	1.237
1133	38801	2.268	0	0.47	27	267.39	267.29	158.96	0.0006	0.0%	SCEN	0.013				0.563	1.966	3.976	7.819	3509.034	5.053	2.785
1541	286076	3	0.038	0.47	24	288.46	288.03	352.35	0.0012	1.3%	ORAN	0.010	REHAB			0.500	3.294	3.142	10.349	4644.685	6.688	3.688
2066	28959	0.566	0.298	0.47	15	308.12	307.78	379	0.0009	52.7%	CHES	0.013				0.313	1.593	1.227	1.955	877.458	1.264	0.698
10	5227	1.506	0.285	0.47	21	331.34	330.70	601	0.0011	18.9%	HERN	0.013				0.438	2.167	2.405	5.213	2339.699	3.369	1.863
378	327824	18.075	4.556	0.47	48	263.12	262.91	190.19	0.0011	25.2%	MRKS	0.010	REHAB			1.000	4.951	12.566	62.217	27923.174	40.209	22.134
569	33078	15.474	2.751	0.47	42	270.90	270.64	157.69	0.0016	17.8%	FRUI	0.010	REHAB			0.875	5.540	9.621	53.299	23920.761	34.446	18.972
1134	38743	2.282	0	0.47	27	267.29	267.18	171.91	0.0006	0.0%	SCEN	0.013				0.563	1.983	3.976	7.885	3538.974	5.096	2.814
1140	38615	3.036	0	0.47	30	266.08	265.97	170.82	0.0006	0.0%	SCEN	0.013				0.625	2.133	4.909	10.469	4698.654	6.766	3.730
1504	26802	1.554	0.061	0.47	24	304.68	304.57	335	0.0003	3.9%	CHES	0.010	REHAB			0.500	1.709	3.142	5.368	2409.257	3.469	1.915
143	7751	9.03	1.128	0.47	45	296.23	296.21	30.23	0.0007	12.5%	CORN	0.013				0.938	2.825	11.045	31.203	14003.776	20.165	11.135
1524	32307	9.221	0.387	0.47	39	296.92	296.63	331	0.0009	4.2%	CHES	0.010	REHAB			0.813	3.846	8.296	31.902	14317.400	20.617	11.396
94	20675	27.752	10.178	0.47	60	253.17	251.98	875.59	0.0014	36.7%	GRNT	0.013	D2450			1.250	4.896	19.635	96.129	43142.901	62.126	34.374
419	12778	1.479	0.035	0.47	18	315.12	314.67	320	0.0014	2.4%	MRKS	0.010	REHAB			0.375	2.925	1.767	5.168	2319.548	3.340	1.861
1547	286079	2.958	0.038	0.47	24	285.65	284.95	580.22	0.0012	1.3%	ORAN	0.010	REHAB			0.500	3.275	3.142	10.290	4618.084	6.650	3.692

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1852	14901	0.406	0.395	0.47	12	295.48	295.02	296	0.0016	97.3%	MRKS	0.013				0.250	1.810	0.785	1.421	637.910	0.919	0.513
478	286052	0.926	0.859	0.47	15	299.69	299.20	335.21	0.0015	92.8%	FRUI	0.010	REHAB			0.313	2.644	1.227	3.244	1456.095	2.097	1.171
752	36640	16.225	2.108	0.47	48	262.86	262.58	182.06	0.0015	13.0%	NCEN	0.013				1.000	4.495	12.566	56.484	25349.966	36.504	20.279
452	14195	0.421	0.421	0.47	12	308.85	308.24	608.18	0.0010	100.0%	MRKS	0.010	REHAB			0.250	1.890	0.785	1.484	666.221	0.959	0.538
841	15923	0.956	0.376	0.47	18	315.57	315.37	197.64	0.0010	39.3%	ORAN	0.013				0.375	1.899	1.767	3.356	1505.997	2.169	1.213
842	15924	0.956	0.375	0.47	18	315.37	315.19	185.57	0.0010	39.2%	ORAN	0.013				0.375	1.899	1.767	3.356	1506.369	2.169	1.213
1219	35617	1.138	0	0.47	16	282.97	282.38	373.44	0.0016	0.0%	SCEN	0.010	REHAB			0.333	2.868	1.396	4.005	1797.306	2.588	1.450
1521	30614	9.141	0.388	0.47	39	298.05	297.76	330.7	0.0009	4.2%	CHES	0.010	REHAB			0.813	3.847	8.296	31.916	14323.892	20.626	11.485
1697	15904	0.236	0.056	0.47	10	313.73	313.22	364.22	0.0014	23.7%	FRUI	0.013				0.208	1.523	0.545	0.831	372.827	0.537	0.301
1859	14908	0.431	0.382	0.47	12	293.37	293.05	180	0.0018	88.6%	MRKS	0.013				0.250	1.936	0.785	1.520	682.283	0.982	0.551
2047	30911	3.021	0.695	0.47	27	307.70	307.06	555	0.0012	23.0%	CHES	0.013				0.563	2.662	3.976	10.586	4750.891	6.841	3.820
132	39397	29.177	11.653	0.47	72	233.75	233.26	842.7	0.0006	39.9%	WWTP	0.013	D1850			1.500	3.612	28.274	102.121	45832.117	65.998	36.821
466	286046	0.5	0.44	0.47	12	304.72	304.26	322.11	0.0014	88.0%	FRUI	0.010	REHAB			0.250	2.255	0.785	1.771	794.962	1.145	0.645
656	23818	0.438	0.056	0.47	12	297.52	297.34	165.11	0.0011	12.8%	NCEN	0.010	REHAB			0.250	1.970	0.785	1.548	694.575	1.000	0.562
1128	38739	2.261	0	0.47	27	267.97	267.92	76.94	0.0006	0.0%	SCEN	0.013				0.563	1.999	3.976	7.947	3566.485	5.136	2.875
1785	13893	2.077	0.122	0.47	24	301.50	301.17	320	0.0010	5.9%	MRKS	0.013				0.500	2.329	3.142	7.318	3284.338	4.729	2.652
2046	30902	2.417	0.221	0.47	21	308.30	308.26	14	0.0029	9.1%	CHES	0.013				0.438	3.550	2.405	8.539	3832.421	5.519	3.102
2057	30907	0.496	0.382	0.47	12	311.48	310.30	497	0.0024	77.0%	CHES	0.013				0.250	2.237	0.785	1.757	788.477	1.135	0.639
2074	28758	1.27	0.295	0.47	18	305.51	305.15	340	0.0011	23.2%	CHES	0.010	REHAB			0.375	2.538	1.767	4.485	2012.723	2.898	1.628
475	277349	0.902	0.835	0.46	15	300.88	300.37	359.75	0.0014	92.6%	FRUI	0.010	REHAB			0.313	2.604	1.227	3.195	1433.952	2.065	1.163
729	35217	8.106	1.199	0.46	40	269.32	269.11	203	0.0010	14.8%	NCEN	0.013				0.833	3.268	8.727	28.523	12801.037	18.433	10.327
847	16031	3.415	1.219	0.46	21	314.14	313.93	62	0.0034	35.7%	ORAN	0.010	REHAB			0.438	5.025	2.405	12.087	5424.559	7.811	4.396
2055	30905	0.497	0.384	0.46	12	312.90	311.62	534	0.0024	77.3%	CHES	0.013				0.250	2.248	0.785	1.765	792.247	1.141	0.644
93	20676	27.815	10.19	0.46	60	254.42	253.17	880	0.0014	36.6%	GRNT	0.013	D2450			1.250	5.005	19.635	98.276	44106.230	63.513	35.698
728	35152	8.115	1.201	0.46	40	269.53	269.32	200	0.0010	14.8%	NCEN	0.013				0.833	3.293	8.727	28.736	12896.687	18.571	10.456
1115	39809	5.36	0.115	0.46	42	268.90	268.87	85	0.0004	2.1%	SCEN	0.013	ELL 34X5			0.875	1.972	9.621	18.969	8513.305	12.259	6.899
1138	38624	2.928	0	0.46	30	266.50	266.29	332.04	0.0006	0.0%	SCEN	0.013				0.625	2.114	4.909	10.375	4656.514	6.705	3.777
1155	38619	3.505	0.005	0.46	30	265.57	265.42	165.96	0.0009	0.1%	SCEN	0.013				0.625	2.527	4.909	12.403	5566.605	8.016	4.511
1563	34210	13.54	1.405	0.46	45	292.44	292.32	130	0.0009	10.4%	CHES	0.010	REHAB			0.938	4.338	11.045	47.914	21503.617	30.965	17.425
441	12754	0.446	0.446	0.46	10	312.88	312.62	50	0.0052	100.0%	MRKS	0.013				0.208	2.935	0.545	1.601	718.465	1.035	0.589
745	36558	15.455	2.078	0.46	48	264.51	264.02	337.44	0.0015	13.4%	WALN	0.013				1.000	4.368	12.566	54.885	24632.324	35.471	20.016
2035	34427	0.277	0	0.46	10	305.10	304.51	296	0.0020	0.0%	CHES	0.013				0.208	1.817	0.545	0.991	444.820	0.641	0.364
80	13100	18.542	3.176	0.46	60	265.20	264.65	864	0.0006	17.1%	GRNT	0.013	D3400			1.250	3.351	19.635	65.790	29526.416	42.518	23.976
1267	35339	1.277	0	0.46	18	279.21	278.47	397	0.0019	0.0%	SCEN	0.013				0.375	2.594	1.767	4.583	2057.006	2.962	1.685
1569	36142	13.981	1.571	0.46	45	291.06	290.73	330.22	0.0010	11.2%	CHES	0.010	REHAB			0.938	4.514	11.045	49.853	22374.218	32.219	18.238
1850	14899	0.398	0.397	0.46	12	296.11	295.70	260	0.0016	99.7%	MRKS	0.013				0.250	1.823	0.785	1.432	642.586	0.925	0.527
1961	36151	5.354	2.398	0.46	24	291.41	291.37	9.59	0.0042	44.8%	CHES	0.010	REHAB			0.500	6.090	3.142	19.133	8586.771	12.365	7.011
1982	32317	4.641	0.991	0.46	27	298.28	296.38	671	0.0028	21.4%	CHES	0.013				0.563	4.172	3.976	16.588	7444.698	10.720	6.079
837	15919	0.864	0.38	0.46	18	316.25	316.00	290	0.0009	44.0%	ORAN	0.013				0.375	1.761	1.767	3.113	1397.011	2.012	1.148
1540	32008	3.006	0.038	0.46	24	288.87	288.46	309.35	0.0013	1.3%	ORAN	0.010	REHAB			0.500	3.433	3.142	10.785	4840.342	6.970	3.964
1568	36141	13.963	1.572	0.46	45	291.39	291.06	329.2	0.0010	11.3%	CHES	0.010	REHAB			0.938	4.521	11.045	49.931	22408.853	32.269	18.306
1898	14805	0.929	0.829	0.46	18	284.45	284.25	201	0.0010	89.2%	CORN	0.013				0.375	1.892	1.767	3.344	1500.879	2.161	1.232
838	15920	0.867	0.379	0.46	18	316.00	315.80	229.7	0.0009	43.7%	ORAN	0.013				0.375	1.770	1.767	3.128	1403.988	2.022	1.155
1542	32007	2.991	0.038	0.46	24	288.03	287.55	363.38	0.0013	1.3%	ORAN	0.010	REHAB			0.500	3.427	3.142	10.767	4832.249	6.958	3.967
124	38197	29.612	11.914	0.46	72	236.44	235.89	869.91	0.0006	40.2%	WWTP	0.013	D1850			1.500	3.766	28.274	106.488	47791.709	68.820	39.208
1126	38737	2.227	0	0.46	27	268.15	268.04	165.53	0.0007	0.0%	SCEN	0.013				0.563	2.021	3.976	8.036	3606.530	5.193	2.966
1561	34208	13.49	1.342	0.46	45	293.01	292.70	326	0.0010	9.9%	CHES	0.010	REHAB			0.938	4.403	11.045	48.631	21825.521	31.429	17.939
1662	41244	21.432	4.141	0.46	57	273.17	273.14	44	0.0007	19.3%	JENS	0.010	REHAB			1.188	4.358	17.721	77.225	34658.415	49.908	28.476
9	5229	1.51	0.287	0.46	21	331.97	331.34	534	0.0012	19.0%	HERN	0.013				0.438	2.281	2.405	5.487	2462.674	3.546	2.036
8	5226	1.512	0.288	0.46	21	332.05	331.97	67	0.0012	19.0%	HERN	0.013				0.438	2.295	2.405	5.520	2477.507	3.568	2.056
1630	41270	21.53	4.146	0.46	51	278.16	276.60	1239.95	0.0013	19.3%	JENS	0.010	REHAB			1.063	5.501	14.186	78.035	35022.260	50.432	28.902
1988	34411	0.301	0.128	0.46	10	304.28	303.67	247	0.0025	42.5%	CHES	0.013	CL23			0.208	2.023	0.545	1.103	495.131	0.713	0.412
2069	28798	0.952	0.298	0.46	18	306.81	306.47	315.67	0.0011	31.3%	CHES	0.013	CL2			0.375	1.969	1.767	3.479	1561.535	2.249	1.297
78	11567	17.427	2.814	0.46	60	266.51	265.99	880	0.0006	16.1%	GRNT	0.013	D3000			1.250	3.228	19.635	63.386	28447.663	40.965	23.538
246	14235	4.096	2.201	0.46	30	309.75	309.36	297	0.0013	53.7%	MRKS	0.013				0.625	3.046	4.909	14.950	6709.661	9.662	5.566
413	11160	0.967	0.022	0.46	18	318.37	317.81	501	0.0011	2.3%	MRKS	0.013				0.375	2.006	1.767	3.544	1590.757	2.291	1.324
469	17630	0.578	0.516	0.46	12	303.55	302.88	326.68	0.0021	89.3%	FRUI	0.010	REHAB			0.250	2.703	0.785	2.123	952.677	1.372	0.794
580	32994	4.106	0.704	0.46	33	267.69	267.42	572.5	0.0005	17.1%	MRKS	0.010	REHAB			0.688	2.527	5.940	15.008	6735.789	9.700	5.594
1137	38623	2.845	0	0.46	30	266.71	266.50	331.48	0.0006	0.0%	SCEN	0.013				0.625	2.115	4.909	10.384	4660.446	6.711	3.866
1722	14055	0.528	0.035	0.46	15	307.91	307.33	656.93	0.0009	6.6%	MRKS	0.013				0.313	1.581	1.227	1.940	870.485	1.253	0.725
154	11818	11.471	1.324	0.45	39	284.84	283.29	603.19	0.0026	11.5%	CORN	0.013				0.813	5.066	8.296	42.026	18861.428	27.160	15.689
1903	14810	1.057	0.957	0.45	18	283.79	283.48	230	0.0013	90.5%	CORN	0.013				0.375	2.203	1.767	3.892	1746.810	2.515	1.458
111	32926	30.578	12.457	0.45	72	240.67	240.11	799.68	0.0007	40.7%	WWTP	0.013	D1850			1.500	3.964	28.274	112.071	50297.254	72.428	41.850
645	19640	0.242	0.242	0.45	10	302.22	301.83	237	0.0016	100.0%	FRUI	0.013				0.208	1.651	0.545	0.901	404.168	0.582	0.340
1008	39691	16.016	1.063	0.45	48	264.96	264.90	36	0.0017	6.6%	JENS	0.013	CL3			1.000	4.679	12.566	58.800	26389.430	38.001	21.985
292	17037	16.234	4.638	0.45	39	288.44	286.99	469.65	0.0031	28.6%	MRKS	0.010	REHAB			0.813	7.219	8.296	59.886	26876.702	38.702	22.468
385	10984	0.556	0.545	0.45	15	314.51	314.18	329.5	0.0010	98.0%	MRKS	0.013				0.313	1.683	1.227	2.066	927.120	1.335	0.779
464	15719	0.285	0.21	0.45	10	306.77	305.25	665	0.0023	73.7%	FRUI	0.013				0.208	1.946	0.545	1.061	476.338	0.686	0.401
1544	31895	2.974	0.038	0.45	24	287.20	286.78	303.47	0.0014	1.3%	ORAN	0.010	REHAB			0.500	3.508	3.142	11.021	4946.249	7.123	4.149
1116	39808	5.358	0.115	0.45	42	268.87	268.61	689	0.0004	2.1%	SCEN	0.013	ELL 34X5			0.875	2.058	9.621	19.802	8887.106	12.797	7.439
2037	34429	0.328	0.086	0.45	10	303.80	302.40	458	0.0031	26.2%	CHES	0.013				0.208	2.250	0.545	1.227	550.852	0.793	0.465
1558	34205	13.504	1.345	0.45	45	294.06	293.40	653	0.0010	10.0%	CHES	0.010	REHAB			0.938	4.539	11.045	50.137	22501.318	32.402	18.898
835	15917	0.846	0.382	0.45	18	316.51	316.38	145	0.0009	45.2%	ORAN	0.013				0.375	1.796	1.767	3.174	1424.677	2.052	1.206
1242	37416	2.37	0.001	0.45	30	274.58	274.12	997	0.0005	0.0%	SCEN	0.013				0.625	1.805	4.909	8.862	3977.203	5.727	3.357
1557	34204	13.27	1.346	0.45	45	294.71	294.06	661	0.0010	10.1%	CHES	0.010	REHAB			0.938	4.478	11.045	49.453	22194.661	31.960	18.690
1173	39728	3.288	0.115	0.45	30	268.42	268.41	11.18	0.0009	3.5%	SCEN	0.013				0.625	2.514	4.909	12.339	5537.651	7.974	4.686
1478	334922	0.973	0.05	0.45	18	314.80	314.00	670.36	0.0012	5.1%	CHES	0.013				0.375	2.072	1.767	3.662	1643.689	2.367	1.394
142	7758	9.033	1.128	0.45	45	296.43	296.23	254.95	0.0008	12.5%	CORN	0.013				0.938	3.076	11.045	33.977	15248.837	21.958	12.925
1477	22403	0.973	0.05	0.45	18	315.61	314.80	672.02	0.0012	5.1%	CHES	0.013				0.375	2.083	1.767	3.681	1651.887	2.379	1.406
1786	13907	2.059	0.123	0.45	24	301.69	301.50	163	0.0012	6.0%	MRKS	0.013				0.500	2.477	3.142	7.780	3491.796	5.028	2.969

													ADV = ADVERSE PIPE							Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
82	13098	18.818	3.402	0.45	60	264.19	263.54	880	0.0007	18.1%	GRNT	0.013	D3000			1.250	3.609	19.635	70.868	31805.454	45.800	26.982
248	14241	4.182	2.185	0.45	30	308.84	307.87	657	0.0015	52.2%	MRKS	0.013	III			0.625	3.229	4.909	15.852	7114.586	10.245	6.063
1291	33802	0.078	0	0.45	6	287.64	286.35	473.52	0.0027	0.0%	SCEN	0.013				0.125	1.516	0.196	0.298	133.632	0.192	0.114
1571	36133	13.987	1.569	0.45	45	290.68	290.49	168.88	0.0011	11.2%	CHES	0.010	REHAB			0.938	4.789	11.045	52.897	23739.975	34.186	20.199
1546	31896	2.959	0.038	0.45	24	286.49	285.65	579.52	0.0014	1.3%	ORAN	0.010	REHAB			0.500	3.590	3.142	11.279	5061.912	7.289	4.330
1565	36138	13.817	1.444	0.45	45	291.96	291.60	325.15	0.0011	10.5%	CHES	0.010	REHAB			0.938	4.751	11.045	52.475	23550.598	33.913	20.096
834	15916	0.814	0.338	0.44	18	316.76	316.51	290	0.0009	41.5%	ORAN	0.013				0.375	1.761	1.767	3.113	1397.011	2.012	1.198
996	39810	11.679	0.271	0.44	57	268.99	268.90	236.61	0.0004	2.3%	SCEN	0.013	BOX 36X7			1.188	2.504	17.721	44.369	19912.957	28.675	16.996
1251	341006	0.246	0	0.44	10	283.32	283.11	115.55	0.0018	0.0%	SCEN	0.013				0.208	1.735	0.545	0.946	424.745	0.612	0.366
1292	297897	0.077	0	0.44	6	286.35	285.02	489.46	0.0027	0.0%	SCEN	0.013				0.125	1.515	0.196	0.297	133.461	0.192	0.115
1634	41267	21.468	4.142	0.44	54	274.61	274.15	454	0.0010	19.3%	JENS	0.010	REHAB			1.125	5.126	15.904	81.529	36590.276	52.690	31.222
90	18680	26.625	9.024	0.44	60	258.38	257.05	880	0.0015	33.9%	GRNT	0.013	D3000			1.250	5.163	19.635	101.372	45495.741	65.514	38.889
1117	39726	5.341	0.115	0.44	42	268.59	268.55	98	0.0004	2.2%	SCEN	0.013	ELL 34X5			0.875	2.120	9.621	20.399	9155.119	13.183	7.842
1214	35623	0.809	0	0.44	16	284.63	284.23	418.52	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.231	1.396	3.115	1397.907	2.013	1.204
1849	14898	0.331	0.331	0.44	12	296.49	296.11	303.11	0.0013	100.0%	MRKS	0.013				0.250	1.625	0.785	1.277	572.951	0.825	0.494
2073	28757	1.219	0.296	0.44	18	305.88	305.51	320	0.0012	24.3%	CHES	0.010	REHAB			0.375	2.652	1.767	4.686	2103.285	3.029	1.810
210	317415	105.706	22.841	0.44	84	230.40	230.00	100	0.0040	21.6%	WWTP	0.013				1.750	10.488	38.485	403.612	181141.030	260.843	155.137
840	15922	0.866	0.377	0.44	18	315.70	315.57	130.57	0.0010	43.5%	ORAN	0.013				0.375	1.893	1.767	3.345	1501.339	2.162	1.296
1723	14056	0.6	0.07	0.44	15	307.33	306.91	333	0.0013	11.7%	MRKS	0.013				0.313	1.889	1.227	2.318	1040.421	1.498	0.898
97	22717	30.012	13.098	0.44	60	248.34	246.62	880	0.0020	43.6%	GRNT	0.013	D2450			1.250	5.871	19.635	115.281	51737.942	74.503	44.491
839	15921	0.866	0.377	0.44	18	315.80	315.70	100	0.0010	43.5%	ORAN	0.013				0.375	1.897	1.767	3.353	1504.627	2.167	1.301
936	346923	8.49	0.902	0.44	42	284.75	284.41	548	0.0006	10.6%	ORAN	0.010	SDR35			0.875	3.398	9.621	32.695	14673.698	21.130	12.640
1215	35613	0.829	0	0.44	16	284.23	284.04	186.72	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.302	1.396	3.214	1442.407	2.077	1.248
1216	35614	0.827	0	0.44	16	284.04	283.85	186.71	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.302	1.396	3.214	1442.446	2.077	1.250
1281	38747	3.847	0.176	0.44	36	271.36	271.17	388	0.0005	4.6%	SCEN	0.013				0.750	2.098	7.069	14.828	6654.716	9.583	5.736
1452	16372	0.215	0.059	0.44	10	327.60	327.23	260	0.0014	27.4%	CHES	0.013				0.208	1.535	0.545	0.837	375.853	0.541	0.326
1714	14234	0.263	0.044	0.44	12	309.83	309.30	658.8	0.0008	16.7%	MRKS	0.013				0.250	1.302	0.785	1.023	458.973	0.661	0.398
2033	34426	0.256	0	0.44	10	305.40	305.10	148	0.0020	0.0%	CHES	0.013				0.208	1.833	0.545	0.999	448.574	0.646	0.390
539	25465	11.99	2.715	0.44	42	277.06	277.05	8	0.0012	22.6%	FRUI	0.010	REHAB			0.875	4.824	9.621	46.408	20827.896	29.992	18.002
1118	39727	5.343	0.115	0.44	42	268.55	268.42	311	0.0004	2.2%	SCEN	0.013	ELL 34X5			0.875	2.146	9.621	20.644	9264.853	13.341	7.998
1212	33769	0.751	0	0.44	16	284.84	284.83	7	0.0014	0.0%	SCEN	0.013				0.333	2.098	1.396	2.929	1314.662	1.893	1.142
1474	22356	0.937	0.051	0.44	18	316.79	316.40	330	0.0012	5.4%	CHES	0.013				0.375	2.062	1.767	3.645	1635.702	2.355	1.418
1492	26793	1.282	0.06	0.44	21	308.23	308.12	191	0.0006	4.7%	CHES	0.010	REHAB			0.438	2.072	2.405	4.984	2236.816	3.221	1.939
215	7027	1.174	0.069	0.44	18	327.72	327.10	560.5	0.0011	5.9%	HERN	0.010				0.375	2.594	1.767	4.584	2057.217	2.962	1.788
1282	38748	3.84	0.175	0.44	36	271.17	271.14	60.4	0.0005	4.6%	SCEN	0.013				0.750	2.113	7.069	14.933	6702.098	9.651	5.811
1476	22358	0.939	0.051	0.44	18	316.00	315.61	326	0.0012	5.4%	CHES	0.013				0.375	2.075	1.767	3.667	1645.706	2.370	1.431
1496	26797	1.291	0.06	0.44	21	307.44	307.41	51	0.0006	4.6%	CHES	0.010	REHAB			0.438	2.094	2.405	5.037	2260.613	3.255	1.964
407	7026	1.159	0.064	0.44	18	328.33	327.72	560	0.0011	5.5%	HERN	0.010				0.375	2.574	1.767	4.549	2041.470	2.940	1.781
1136	38622	2.843	0	0.44	30	266.84	266.71	178.64	0.0007	0.0%	SCEN	0.013				0.625	2.267	4.909	11.130	4994.923	7.193	4.350
1443	18026	1.372	0.34	0.44	18	314.74	313.80	618.5	0.0015	24.8%	ORAN	0.010	REHAB			0.375	3.040	1.767	5.373	2411.383	3.472	2.100
2067	28796	0.889	0.299	0.44	18	307.63	307.00	581.53	0.0011	33.6%	CHES	0.013	CL2			0.375	1.975	1.767	3.489	1566.077	2.255	1.366
95	22719	29.977	13.19	0.44	60	251.98	250.20	885.63	0.0020	44.0%	GRNT	0.013	D2450			1.250	5.954	19.635	116.901	52465.052	75.550	45.573
416	293187	1.163	0.036	0.44	18	316.80	315.98	438.86	0.0019	3.1%	MRKS	0.013				0.375	2.593	1.767	4.583	2056.708	2.962	1.799
937	346922	8.475	0.902	0.44	42	284.41	284.25	251	0.0006	10.6%	ORAN	0.010	SDR35			0.875	3.445	9.621	33.141	14873.512	21.418	12.943
1279	37108	3.856	0.181	0.44	36	271.82	271.61	414.09	0.0005	4.7%	SCEN	0.013	CL3			0.750	2.135	7.069	15.090	6772.217	9.752	5.896
1280	38745	3.845	0.177	0.44	36	271.61	271.36	495.06	0.0005	4.6%	SCEN	0.013				0.750	2.130	7.069	15.058	6757.868	9.731	5.886
1475	22357	0.935	0.051	0.44	18	316.40	316.00	332	0.0012	5.5%	CHES	0.013				0.375	2.082	1.767	3.680	1651.543	2.378	1.443
358	38216	33.125	9.992	0.44	66	255.54	255.20	227.32	0.0015	30.2%	MRKS	0.013				1.375	5.469	23.758	129.945	58319.184	83.980	50.855
655	23817	0.391	0.046	0.44	12	297.70	297.52	165.43	0.0011	11.8%	NCEN	0.010	REHAB			0.250	1.969	0.785	1.546	693.903	0.999	0.608
1145	39494	4.274	0.519	0.44	30	263.52	263.03	498	0.0010	12.1%	SCEN	0.010	REHAB			0.625	3.427	4.909	16.824	7550.456	10.873	6.599
1473	22355	0.942	0.051	0.44	18	317.19	316.79	325	0.0012	5.4%	CHES	0.013				0.375	2.105	1.767	3.719	1669.234	2.404	1.462
1519	30612	9.028	0.389	0.44	39	298.83	298.11	660.34	0.0011	4.3%	CHES	0.010	REHAB			0.813	4.290	8.296	35.588	15972.084	23.000	13.972
1633	277018	21.483	4.143	0.44	54	275.17	274.61	517	0.0011	19.3%	JENS	0.010	REHAB			1.125	5.300	15.904	84.297	37832.360	54.479	32.996
836	15918	0.845	0.381	0.44	18	316.38	316.25	130	0.0010	45.1%	ORAN	0.013				0.375	1.897	1.767	3.353	1504.627	2.167	1.322
2068	28797	0.894	0.299	0.44	18	307.00	306.81	169.86	0.0011	33.4%	CHES	0.013	CL2			0.375	2.006	1.767	3.546	1591.329	2.292	1.398
935	346924	8.503	0.902	0.43	42	284.92	284.75	258.18	0.0007	10.6%	ORAN	0.010	SDR35			0.875	3.501	9.621	33.682	15116.581	21.768	13.265
1529	32130	1.79	0.039	0.43	21	294.74	294.35	331	0.0012	2.2%	ORAN	0.010	REHAB			0.438	2.964	2.405	7.129	3199.403	4.607	2.817
7	5230	1.444	0.23	0.43	21	332.66	332.05	467	0.0013	15.9%	HERN	0.013				0.438	2.400	2.405	5.774	2591.276	3.731	2.287
552	29249	15.347	2.762	0.43	42	274.57	273.77	368.4	0.0022	18.0%	FRUI	0.010	REHAB			0.875	6.358	9.621	61.168	27452.101	39.531	24.184
1567	36140	13.936	1.572	0.43	45	291.53	291.39	112.81	0.0012	11.3%	CHES	0.010	REHAB			0.938	5.030	11.045	55.556	24933.474	35.904	21.968
69	9715	14.935	2.07	0.43	48	275.61	274.52	633.21	0.0017	13.9%	GRNT	0.013	D3250			1.000	4.755	12.566	59.757	26819.149	38.620	23.685
247	14236	4.107	2.194	0.43	30	309.36	308.84	327	0.0016	53.4%	MRKS	0.013				0.625	3.352	4.909	16.452	7383.704	10.633	6.526
405	7024	1.138	0.065	0.43	18	329.65	328.99	600	0.0011	5.7%	HERN	0.010				0.375	2.587	1.767	4.571	2051.486	2.954	1.816
578	32992	3.888	0.706	0.43	33	268.85	268.52	647.5	0.0005	18.2%	MRKS	0.010	REHAB			0.688	2.627	5.940	15.602	7002.151	10.083	6.195
96	22718	29.953	13.098	0.43	60	250.20	248.34	880	0.0021	43.7%	GRNT	0.013	D2450			1.250	6.105	19.635	119.881	53802.369	77.475	47.522
387	10982	0.436	0.436	0.43	12	315.77	315.40	154.5	0.0024	100.0%	MRKS	0.013				0.250	2.247	0.785	1.764	791.886	1.140	0.704
1283	38750	3.851	0.175	0.43	36	271.14	270.94	376.47	0.0005	4.5%	SCEN	0.013				0.750	2.185	7.069	15.444	6931.359	9.981	6.130
1554	32312	13.198	1.339	0.43	42	295.49	295.22	166	0.0016	10.1%	CHES	0.010	REHAB			0.875	5.502	9.621	52.938	23758.457	34.212	21.014
1582	36041	0.392	0.079	0.43	12	292.11	291.49	320	0.0019	20.2%	ORAN	0.013				0.250	2.021	0.785	1.587	712.274	1.026	0.634
406	7025	1.129	0.065	0.43	18	328.99	328.33	600	0.0011	5.8%	HERN	0.010				0.375	2.587	1.767	4.571	2051.486	2.954	1.825
1522	32309	9.156	0.387	0.43	39	297.76	297.37	331	0.0012	4.2%	CHES	0.010	REHAB			0.813	4.460	8.296	36.995	16603.416	23.909	14.753
1835	13619	0.203	0.183	0.43	10	299.44	299.23	152	0.0014	90.1%	MRKS	0.013				0.208	1.513	0.545	0.825	370.332	0.533	0.330
72	9712	14.878	2.025	0.43	54	272.41	272.17	258.42	0.0009	13.6%	GRNT	0.013	D3050			1.125	3.775	15.904	60.043	26947.216	38.804	23.926
1559	34206	13.5	1.344	0.43	45	293.40	293.24	133	0.0012	10.0%	CHES	0.010	REHAB			0.938	4.952	11.045	54.698	24548.601	35.350	21.850
733	34994	9.269	1.193	0.43	42	268.15	268.10	36	0.0014	12.9%	NCEN	0.013				0.875	3.911	9.621	37.629	16888.100	24.319	15.050
1127	38738	2.227	0	0.43	27	268.04	267.97	82.3	0.0009	0.0%	SCEN	0.013				0.563	2.287	3.976	9.091	4080.192	5.875	3.648
1517	30610	9.039	0.39	0.43	39	299.61	299.22	330.97	0.0012	4.3%	CHES	0.010	REHAB			0.813	4.460	8.296	36.997	16604.169	23.910	14.871
1631	41268	21.508	4.143	0.43	54	276.42	275.82	512	0.0012	19.3%	JENS	0.010	REHAB			1.125	5.513	15.904	87.680	39350.960	56.665	35.157
6	5225	1.453	0.231	0.43	21	333.20	332.57	450	0.0014	15.9%	HERN	0.013				0.438	2.485	2.405	5.977	2682.695	3.863	2.410
71	9713	14.9	2.04	0.43	54	273.17	272.41	790.52	0.0010	13.7%	GRNT	0.013	D3050			1.125	3.841	15.904	61.090	27417.112	39.481	24.581

ADV = ADVERSE PIPE

Full Pipe Flow

Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
77	11568	17.021	2.816	0.43	60	267.10	266.51	828.71	0.0007	16.5%	GRNT	0.013	D3000			1.250	3.543	19.635	69.576	31225.613	44.965	27.944
388	10981	0.424	0.424	0.43	12	316.08	315.77	131	0.0024	100.0%	MRKS	0.013				0.250	2.233	0.785	1.754	787.175	1.134	0.710
1518	30611	9.032	0.39	0.43	39	299.22	298.83	330.67	0.0012	4.3%	CHES	0.010	REHAB			0.813	4.462	8.296	37.014	16611.699	23.921	14.889
654	23816	0.373	0.043	0.43	12	297.88	297.70	164.96	0.0011	11.5%	NCEN	0.010	REHAB			0.250	1.971	0.785	1.548	694.890	1.001	0.628
1121	38732	2.054	0	0.43	27	268.66	268.53	175.13	0.0007	0.0%	SCEN	0.013				0.563	2.136	3.976	8.493	3811.737	5.489	3.435
1124	38735	2.054	0	0.43	27	268.40	268.29	148.8	0.0007	0.0%	SCEN	0.013				0.563	2.132	3.976	8.476	3803.877	5.478	3.424
1314	14384	0.24	0.021	0.43	10	316.52	315.98	266	0.0020	8.8%	FRUI	0.013				0.208	1.834	0.545	1.000	448.911	0.646	0.406
1578	36038	0.39	0.079	0.43	12	293.53	293.41	59.4	0.0020	20.3%	ORAN	0.013				0.250	2.063	0.785	1.621	727.317	1.047	0.657
1579	36039	0.39	0.079	0.43	12	293.41	293.07	167.8	0.0020	20.3%	ORAN	0.013				0.250	2.066	0.785	1.623	728.399	1.049	0.659
1125	38799	2.053	0	0.42	27	268.29	268.16	174.54	0.0007	0.0%	SCEN	0.013				0.563	2.140	3.976	8.508	3818.174	5.498	3.445
1288	38938	3.924	0.161	0.42	36	269.73	269.51	374	0.0006	4.1%	SCEN	0.013				0.750	2.299	7.069	16.251	7293.637	10.503	6.579
1528	32129	1.749	0.039	0.42	21	294.80	294.74	49	0.0012	2.2%	ORAN	0.010	REHAB			0.438	3.021	2.405	7.267	3261.581	4.697	2.948
1580	325474	0.39	0.079	0.42	12	293.07	292.77	147.58	0.0020	20.3%	ORAN	0.013				0.250	2.070	0.785	1.626	729.580	1.051	0.661
144	7757	9.065	1.128	0.42	45	296.21	295.31	939.87	0.0010	12.4%	CORN	0.013				0.938	3.399	11.045	37.539	16847.543	24.260	15.195
1250	35440	0.247	0	0.42	10	283.64	283.32	147.55	0.0022	0.0%	SCEN	0.013				0.208	1.896	0.545	1.034	463.991	0.668	0.421
1287	38761	3.919	0.165	0.42	36	270.08	269.73	594.15	0.0006	4.2%	SCEN	0.013				0.750	2.301	7.069	16.263	7298.852	10.510	6.591
1581	36040	0.392	0.079	0.42	12	292.77	292.11	320	0.0021	20.2%	ORAN	0.013				0.250	2.085	0.785	1.637	734.891	1.058	0.666
68	289015	14.945	2.083	0.42	48	276.78	275.61	627.49	0.0019	13.9%	GRNT	0.013	D3250			1.000	4.949	12.566	62.193	27912.270	40.194	25.249
141	7749	8.717	1.034	0.42	45	297.36	296.43	1034	0.0009	11.9%	CORN	0.013				0.938	3.294	11.045	36.381	16327.904	23.512	14.795
473	19658	0.91	0.845	0.42	15	301.62	300.98	316.78	0.0020	92.9%	FRUI	0.010	REHAB			0.313	3.108	1.227	3.814	1711.832	2.465	1.555
1583	36042	0.413	0.078	0.42	12	291.49	290.75	320	0.0023	18.9%	ORAN	0.013				0.250	2.208	0.785	1.734	778.156	1.121	0.708
1122	38733	2.054	0	0.42	27	268.53	268.41	156.63	0.0008	0.0%	SCEN	0.013				0.563	2.170	3.976	8.628	3872.440	5.576	3.522
1232	37406	1.021	0.005	0.42	20	277.70	277.62	85	0.0009	0.5%	SCEN	0.013				0.417	1.973	2.182	4.305	1931.876	2.782	1.761
1233	37405	1.021	0.005	0.42	20	277.62	276.79	885.36	0.0009	0.5%	SCEN	0.013				0.417	1.969	2.182	4.296	1928.070	2.776	1.755
1284	38753	3.854	0.173	0.42	36	270.94	270.68	447.69	0.0006	4.5%	SCEN	0.013				0.750	2.284	7.069	16.148	7247.139	10.436	6.582
1514	30608	8.808	0.387	0.42	39	300.35	299.96	331.23	0.0012	4.4%	CHES	0.010	REHAB			0.813	4.458	8.296	36.982	16597.650	23.901	15.093
1036	286532	19.136	3.24	0.42	51	256.13	256.10	13.31	0.0023	16.9%	NORT	0.013				1.063	5.664	14.186	80.345	36058.878	51.925	32.789
1150	39496	4.242	0.513	0.42	30	261.79	261.62	153	0.0011	12.1%	SCEN	0.010	REHAB			0.625	3.642	4.909	17.878	8023.587	11.554	7.312
1230	37359	2.786	0.001	0.42	18	278.31	274.67	499.68	0.0073	0.0%	SCEN	0.010	REHAB			0.375	6.657	1.767	11.763	5279.306	7.602	4.816
1285	38754	3.842	0.171	0.42	36	270.68	270.44	412.45	0.0006	4.5%	SCEN	0.013				0.750	2.287	7.069	16.164	7254.184	10.446	6.604
1289	39790	3.914	0.158	0.42	36	269.51	269.31	330	0.0006	4.0%	SCEN	0.013	CL3			0.750	2.334	7.069	16.496	7403.322	10.661	6.747
1498	26798	1.399	0.06	0.42	21	307.38	306.94	545	0.0008	4.3%	CHES	0.010	REHAB			0.438	2.453	2.405	5.901	2648.370	3.814	2.415
1534	32134	2.385	0.039	0.42	24	291.25	290.87	330.23	0.0012	1.6%	ORAN	0.010	REHAB			0.500	3.199	3.142	10.049	4510.168	6.495	4.110
70	9714	14.921	2.057	0.42	54	273.97	273.17	783.5	0.0010	13.8%	GRNT	0.013	D3050			1.125	3.958	15.904	62.957	28255.099	40.687	25.766
91	18679	26.585	9.02	0.42	60	257.05	255.43	879.92	0.0018	33.9%	GRNT	0.013	D3000			1.250	5.698	19.635	111.884	50213.694	72.308	45.723
583	285630	4.243	0.857	0.42	36	266.99	266.58	573	0.0007	20.2%	MRKS	0.013	SDR35			0.750	2.536	7.069	17.924	8044.206	11.584	7.341
1444	18027	1.366	0.34	0.42	18	313.80	313.19	344	0.0018	24.9%	ORAN	0.010	REHAB			0.375	3.284	1.767	5.804	2604.701	3.751	2.385
1515	30609	8.816	0.39	0.42	39	299.96	299.69	225.84	0.0012	4.4%	CHES	0.010	REHAB			0.813	4.492	8.296	37.266	16724.787	24.084	15.268
1539	286075	2.359	0.038	0.42	24	289.27	288.87	350.28	0.0011	1.6%	ORAN	0.010	REHAB			0.500	3.187	3.142	10.011	4492.949	6.470	4.111
1632	277017	21.497	4.143	0.42	54	275.82	275.17	517	0.0013	19.3%	JENS	0.010	REHAB			1.125	5.710	15.904	90.818	40759.242	58.693	37.196
1834	13620	0.205	0.185	0.42	10	300.50	299.44	687	0.0015	90.2%	MRKS	0.013				0.208	1.599	0.545	0.872	391.362	0.564	0.359
2044	30900	2.418	0.19	0.42	18	310.47	310.15	34	0.0094	7.9%	CHES	0.013				0.375	5.820	1.767	10.285	4615.984	6.647	4.229
1213	33770	0.751	0	0.42	16	284.83	284.63	198	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.293	1.396	3.202	1437.106	2.069	1.318
1445	346638	1.362	0.339	0.42	18	313.19	312.63	316	0.0018	24.9%	ORAN	0.010	REHAB			0.375	3.283	1.767	5.802	2603.890	3.750	2.388
592	285621	4.82	1.563	0.42	36	262.66	262.06	640	0.0009	32.4%	MRKS	0.013	SDR35			0.750	2.902	7.069	20.516	9207.765	13.259	8.439
830	319202	0.733	0.228	0.42	18	318.67	318.35	363.14	0.0009	31.1%	ORAN	0.013	CL 2			0.375	1.781	1.767	3.147	1412.429	2.034	1.301
1832	13622	0.198	0.18	0.42	10	301.24	300.73	345	0.0015	90.9%	MRKS	0.013				0.208	1.565	0.545	0.854	383.071	0.552	0.354
451	309094	0.419	0.419	0.42	12	308.24	307.33	614.82	0.0015	100.0%	MRKS	0.010	REHAB			0.250	2.296	0.785	1.803	809.312	1.165	0.746
793	26072	0.795	0.287	0.42	15	292.97	291.69	464	0.0028	36.1%	NCEN	0.013				0.313	2.794	1.227	3.428	1538.695	2.216	1.421
1286	38756	3.872	0.169	0.42	36	270.44	270.08	586.13	0.0006	4.4%	SCEN	0.013				0.750	2.349	7.069	16.606	7452.858	10.732	6.860
1760	15441	0.742	0.287	0.42	15	305.24	304.37	362	0.0024	38.7%	MRKS	0.013				0.313	2.608	1.227	3.200	1436.190	2.068	1.326
1788	13897	2.058	0.125	0.42	24	301.00	300.67	220	0.0015	6.1%	MRKS	0.013				0.500	2.809	3.142	8.826	3961.060	5.704	3.646
805	29913	0.497	0.148	0.42	12	282.71	282.19	146	0.0036	29.8%	NCEN	0.013				0.250	2.740	0.785	2.152	965.720	1.391	0.894
833	15915	0.732	0.227	0.42	18	316.90	316.76	154.62	0.0009	31.0%	ORAN	0.013				0.375	1.792	1.767	3.167	1421.463	2.047	1.315
591	285619	4.82	1.569	0.41	36	263.29	262.66	650	0.0010	32.6%	MRKS	0.013	SDR35			0.750	2.951	7.069	20.861	9362.292	13.482	8.662
1290	39791	3.912	0.155	0.41	36	269.31	269.24	110	0.0006	4.0%	SCEN	0.013	CL3			0.750	2.391	7.069	16.903	7586.147	10.924	7.012
1531	32132	2.075	0.039	0.41	21	293.76	293.14	330	0.0019	1.9%	ORAN	0.010	REHAB			0.438	3.743	2.405	9.002	4040.076	5.818	3.743
401	5264	0.754	0.067	0.41	15	332.28	331.38	600	0.0015	8.9%	HERN	0.010	SDR35			0.313	2.678	1.227	3.287	1475.012	2.124	1.370
408	11157	0.762	0.005	0.41	18	320.73	320.25	486.29	0.0010	0.7%	MRKS	0.013				0.375	1.885	1.767	3.331	1494.864	2.153	1.391
829	14476	0.734	0.229	0.41	18	318.90	318.67	251.86	0.0009	31.2%	ORAN	0.013	CL 2			0.375	1.813	1.767	3.204	1437.848	2.071	1.337
1523	32308	9.165	0.387	0.41	39	297.37	296.92	330	0.0014	4.2%	CHES	0.010	REHAB			0.813	4.798	8.296	39.799	17861.932	25.721	16.556
402	5265	0.749	0.066	0.41	15	331.38	330.48	600	0.0015	8.8%	HERN	0.010	SDR35			0.313	2.678	1.227	3.287	1475.012	2.124	1.375
1509	28570	7.53	0.075	0.41	39	302.28	302.07	227	0.0009	1.0%	CHES	0.010	REHAB			0.813	3.952	8.296	32.781	14712.140	21.185	13.655
76	11569	15.074	2.175	0.41	54	267.71	267.62	80.815	0.0011	14.4%	GRNT	0.013	D3050			1.125	4.134	15.904	65.750	29508.464	42.492	27.418
792	26073	0.74	0.29	0.41	15	293.38	292.97	164.99	0.0025	39.2%	NCEN	0.013				0.313	2.652	1.227	3.254	1460.393	2.103	1.363
1239	38890	1.849	0.005	0.41	30	274.72	274.53	490.97	0.0004	0.3%	SCEN	0.013				0.625	1.653	4.909	8.116	3642.468	5.245	3.396
1306	33779	0.409	0	0.41	14	285.26	285.15	100	0.0011	0.0%	SCEN	0.013				0.292	1.686	1.069	1.802	808.725	1.165	0.756
1855	14904	0.422	0.392	0.41	12	294.58	294.43	56	0.0027	92.9%	MRKS	0.013				0.250	2.376	0.785	1.866	837.486	1.206	0.784
643	19643	0.174	0.174	0.41	10	303.35	302.95	331.13	0.0012	100.0%	FRUI	0.013				0.208	1.415	0.545	0.772	346.286	0.499	0.325
1132	38742	2.268	0	0.41	27	267.56	267.39	165.07	0.0010	0.0%	SCEN	0.013				0.563	2.516	3.976	10.004	4489.748	6.465	4.197
1696	15903	0.189	0.056	0.41	10	314.10	313.73	260	0.0014	29.6%	FRUI	0.013				0.208	1.535	0.545	0.837	375.853	0.541	0.352
89	18681	25.677	8.153	0.41	60	260.04	258.38	885.86	0.0019	31.8%	GRNT	0.013	D3000			1.250	5.749	19.635	112.877	50659.134	72.949	47.272
404	7023	1.037	0.066	0.41	18	330.11	329.65	412	0.0011	6.4%	HERN	0.010				0.375	2.606	1.767	4.605	2066.819	2.976	1.939
1727	14022	0.742	0.176	0.41	15	305.49	305.24	97.6	0.0026	23.7%	MRKS	0.013				0.313	2.692	1.227	3.304	1482.695	2.135	1.393
1824	17031	4.384	1.21	0.41	24	287.99	287.91	11	0.0073	27.6%	MRKS	0.013				0.500	6.186	3.142	19.434	8721.968	12.560	8.176
384	10985	0.574	0.543	0.41	15	314.18	313.67	331	0.0015	94.6%	MRKS	0.013				0.313	2.088	1.227	2.562	1149.947	1.656	1.082
1151	39497	4.376	0.648	0.41	30	261.62	261.57	38	0.0013	14.8%	FRUI	0.010	REHAB			0.625	3.963	4.909	19.455	8731.383	12.573	8.197
1240	344507	1.835	0.005	0.41	30	274.53	274.47	167.03	0.0004	0.3%	SCEN	0.013				0.625	1.658	4.909	8.139	3652.632	5.260	3.425
1831	13623	0.198	0.18	0.41	10	301.80	301.24	350	0.0016	90.9%	MRKS	0.013				0.208	1.628	0.545	0.888	398.533	0.574	0.376
1432	18196	0.627	0.281	0.41	15	320.83	320.11	657	0.0011	44.8%	CHES	0.010	SDR35			0.313	2.289	1.227	2.809	1260.763	1.815	1.188

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1510	28601	7.533	0.075	0.41	39	302.07	301.60	483.86	0.0010	1.0%	CHES	0.010	REHAB			0.813	4.049	8.296	33.590	15075.378	21.709	14.176
79	11566	17.507	2.834	0.41	60	265.99	265.20	879.76	0.0009	16.2%	GRNT	0.013	D3000			1.250	3.980	19.635	78.138	35068.541	50.499	32.992
739	36583	9.634	1.153	0.41	46	265.62	265.55	62.55	0.0011	12.0%	WALN	0.013				0.958	3.728	11.541	43.025	19309.682	27.806	18.172
1131	38800	2.261	0	0.41	27	267.59	267.56	28.43	0.0011	0.0%	SCEN	0.013				0.563	2.547	3.976	10.126	4544.685	6.544	4.283
1431	18195	0.627	0.281	0.41	15	320.85	320.83	18	0.0011	44.8%	CHES	0.010	SDR35			0.313	2.305	1.227	2.829	1269.489	1.828	1.201
1660	41241	21.436	4.141	0.41	57	273.43	273.29	134	0.0010	19.3%	JENS	0.010	REHAB			1.188	5.395	17.721	95.595	42902.838	61.780	40.344
644	19641	0.23	0.23	0.41	10	302.95	302.22	331.13	0.0022	100.0%	FRUI	0.013				0.208	1.911	0.545	1.042	467.806	0.674	0.444
741	36554	10.169	1.153	0.41	48	265.25	264.85	399.94	0.0010	11.3%	WALN	0.013				1.000	3.625	12.566	45.550	20442.698	29.437	19.268
1584	37703	1.126	0.1	0.41	18	290.73	290.13	439	0.0014	8.9%	ORAN	0.010	REHAB			0.375	2.883	1.767	5.095	2286.733	3.293	2.167
1535	286067	2.378	0.039	0.40	24	290.87	290.43	331.27	0.0013	1.6%	ORAN	0.010	REHAB			0.500	3.437	3.142	10.797	4845.566	6.978	4.600
1986	34409	0.277	0.093	0.40	10	305.04	304.51	165	0.0032	33.6%	CHES	0.013				0.208	2.307	0.545	1.258	564.677	0.813	0.536
1130	38741	2.261	0	0.40	27	267.74	267.59	137.71	0.0011	0.0%	SCEN	0.013				0.563	2.588	3.976	10.288	4617.367	6.649	4.388
1899	14806	0.927	0.827	0.40	18	284.25	284.03	138	0.0016	89.2%	CORN	0.013				0.375	2.395	1.767	4.233	1899.768	2.736	1.809
589	285618	4.609	1.297	0.40	36	264.63	263.99	649	0.0010	28.1%	MRKS	0.013	SDR35			0.750	2.977	7.069	21.042	9443.571	13.599	8.990
742	36555	10.184	1.153	0.40	48	264.85	264.73	116	0.0010	11.3%	WALN	0.013				1.000	3.686	12.566	46.325	20790.611	29.938	19.754
1433	18197	0.627	0.28	0.40	15	320.11	319.68	376	0.0011	44.7%	CHES	0.010	SDR35			0.313	2.338	1.227	2.870	1287.924	1.855	1.228
1532	32133	2.07	0.039	0.40	21	292.96	292.30	317	0.0021	1.9%	ORAN	0.010	REHAB			0.438	3.940	2.405	9.476	4252.976	6.124	4.054
1726	14021	0.727	0.154	0.40	15	306.30	305.49	310.9	0.0026	21.2%	MRKS	0.013				0.313	2.715	1.227	3.332	1495.336	2.153	1.426
2056	30906	0.493	0.383	0.40	12	311.62	311.48	60	0.0023	77.7%	CHES	0.010				0.250	2.883	0.785	2.264	1016.150	1.463	0.970
481	19655	0.988	0.919	0.40	15	298.66	298.53	45	0.0029	93.0%	FRUI	0.010	REHAB			0.313	3.717	1.227	4.561	2046.989	2.948	1.960
790	26075	0.705	0.283	0.40	15	294.20	293.79	165	0.0025	40.1%	NCEN	0.013				0.313	2.652	1.227	3.254	1460.349	2.103	1.398
1307	33780	0.408	0	0.40	14	285.15	284.65	413.82	0.0012	0.0%	SCEN	0.013				0.292	1.767	1.069	1.889	847.586	1.221	0.813
1451	16365	0.18	0.059	0.40	10	327.80	327.60	142.04	0.0014	32.8%	CHES	0.013				0.208	1.527	0.545	0.833	373.864	0.538	0.358
791	26074	0.698	0.28	0.40	15	293.79	293.38	165.25	0.0025	40.1%	NCEN	0.013				0.313	2.650	1.227	3.251	1459.244	2.101	1.403
1564	36137	13.79	1.423	0.40	45	292.32	291.96	220.37	0.0016	10.3%	CHES	0.010	REHAB			0.938	5.771	11.045	63.740	28606.689	41.194	27.404
1695	15902	0.178	0.056	0.40	10	314.61	314.10	362.32	0.0014	31.5%	FRUI	0.013				0.208	1.527	0.545	0.833	373.803	0.538	0.360
1987	34410	0.276	0.093	0.40	10	304.51	304.28	69	0.0033	33.7%	CHES	0.013	CL23			0.208	2.350	0.545	1.282	575.232	0.828	0.552
828	14515	0.649	0.089	0.40	18	319.40	318.90	615	0.0008	13.7%	ORAN	0.013	CL 2			0.375	1.711	1.767	3.023	1356.676	1.954	1.305
1530	32131	1.881	0.039	0.40	21	294.35	293.76	331	0.0018	2.1%	ORAN	0.010	REHAB			0.438	3.645	2.405	8.768	3935.162	5.667	3.786
1276	37114	1.355	0	0.40	21	274.25	273.59	418	0.0016	0.0%	SCEN	0.013				0.438	2.639	2.405	6.348	2848.991	4.103	2.748
148	10109	9.258	1.126	0.40	39	291.33	289.13	806.28	0.0027	12.2%	CORN	0.013				0.813	5.220	8.296	43.306	19435.879	27.988	18.730
1491	26792	1.283	0.06	0.40	21	308.57	308.29	330	0.0008	4.7%	CHES	0.010	REHAB			0.438	2.515	2.405	6.050	2715.018	3.910	2.627
1537	286074	2.362	0.038	0.40	24	290.18	289.72	329.01	0.0014	1.6%	ORAN	0.010	REHAB			0.500	3.526	3.142	11.077	4971.456	7.159	4.797
1713	14233	0.261	0.031	0.40	12	310.60	309.83	658.8	0.0012	11.9%	MRKS	0.013				0.250	1.569	0.785	1.233	553.216	0.797	0.536
1533	286066	2.065	0.038	0.40	21	292.30	291.54	344.6	0.0022	1.8%	ORAN	0.010	REHAB			0.438	4.055	2.405	9.753	4377.234	6.303	4.238
588	285633	4.409	0.997	0.39	36	265.27	264.63	661	0.0010	22.6%	MRKS	0.013	SDR35			0.750	2.950	7.069	20.850	9357.457	13.475	9.066
1983	34406	0.192	0.039	0.39	10	307.30	306.18	661.7	0.0017	20.3%	CHES	0.013				0.208	1.675	0.545	0.913	409.904	0.590	0.398
149	10085	9.281	1.125	0.39	39	289.13	286.84	811.56	0.0028	12.1%	CORN	0.013				0.813	5.309	8.296	44.039	19764.836	28.461	19.180
652	21625	0.31	0.009	0.39	12	298.25	298.24	10	0.0010	2.9%	NCEN	0.010	REHAB			0.250	1.887	0.785	1.482	665.226	0.958	0.648
770	350006	3.746	1.079	0.39	24	282.46	280.87	438	0.0036	28.8%	NCEN	0.010	SDR35			0.500	5.682	3.142	17.849	8010.704	11.535	7.789
1442	18127	1.374	0.34	0.39	18	315.28	314.74	141	0.0038	24.7%	ORAN	0.013				0.375	3.713	1.767	6.561	2944.531	4.240	2.866
1511	28602	7.525	0.075	0.39	39	301.60	300.87	660.99	0.0011	1.0%	CHES	0.010	REHAB			0.813	4.318	8.296	35.817	16074.709	23.148	15.623
1538	32009	2.359	0.038	0.39	24	289.72	289.27	311.42	0.0014	1.6%	ORAN	0.010	REHAB			0.500	3.585	3.142	11.261	5054.081	7.278	4.919
1837	345480	0.27	0.249	0.39	10	298.79	298.70	45	0.0020	92.2%	MRKS	0.010	SDR35			0.208	2.366	0.545	1.291	579.245	0.834	0.564
409	293182	0.754	0.005	0.39	18	320.25	319.78	402.7	0.0012	0.7%	MRKS	0.013				0.375	2.050	1.767	3.622	1625.500	2.341	1.587
587	285635	4.415	0.997	0.39	36	265.76	265.27	495	0.0010	22.6%	MRKS	0.013	SDR35			0.750	2.982	7.069	21.082	9461.588	13.625	9.210
590	285620	4.606	1.294	0.39	36	263.99	263.29	650	0.0011	28.1%	MRKS	0.013	SDR35			0.750	3.111	7.069	21.989	9868.722	14.211	9.605
1378	16045	0.75	0.337	0.39	18	315.68	315.20	418.25	0.0011	44.9%	ORAN	0.013				0.375	2.032	1.767	3.592	1611.875	2.321	1.571
1513	28608	7.547	0.091	0.39	39	300.72	300.35	331.46	0.0011	1.2%	CHES	0.010	REHAB			0.813	4.341	8.296	36.009	16160.859	23.272	15.725
1556	32310	13.252	1.339	0.39	42	295.02	294.66	156	0.0023	10.1%	CHES	0.010	REHAB			0.875	6.554	9.621	63.056	28299.538	40.751	27.499
1791	15448	2.054	0.129	0.39	27	299.92	299.34	581.85	0.0010	6.3%	MRKS	0.013				0.563	2.475	3.976	9.842	4417.128	6.361	4.307
1119	38723	2.054	0	0.39	27	268.66	268.65	10	0.0010	0.0%	SCEN	0.013				0.563	2.479	3.976	9.858	4424.167	6.371	4.317
1120	38731	2.054	0	0.39	27	268.65	268.64	10	0.0010	0.0%	SCEN	0.013				0.563	2.479	3.976	9.858	4424.167	6.371	4.317
1370	16143	0.402	0.344	0.39	18	319.27	319.17	300	0.0003	85.6%	ORAN	0.013				0.375	1.095	1.767	1.936	868.697	1.251	0.849
1793	15449	2.051	0.129	0.39	27	298.76	298.32	440.35	0.0010	6.3%	MRKS	0.013				0.563	2.478	3.976	9.854	4422.409	6.368	4.317
65	7409	13.611	1.415	0.39	48	280.84	279.27	760.43	0.0021	10.4%	GRNT	0.013	D3250			1.000	5.208	12.566	65.444	29371.480	42.295	28.684
410	293183	0.748	0.005	0.39	18	319.78	319.30	412.19	0.0012	0.7%	MRKS	0.013				0.375	2.047	1.767	3.618	1623.681	2.338	1.590
1438	18121	0.982	0.318	0.39	15	317.99	317.73	49	0.0053	32.4%	ORAN	0.013				0.313	3.875	1.227	4.755	2134.004	3.073	2.091
1792	277702	2.05	0.129	0.39	27	299.34	298.76	577	0.0010	6.3%	MRKS	0.013				0.563	2.486	3.976	9.883	4435.654	6.387	4.337
1794	277703	2.045	0.128	0.39	27	298.32	297.88	440.35	0.0010	6.3%	MRKS	0.013				0.563	2.478	3.976	9.854	4422.409	6.368	4.323
1795	277704	2.039	0.128	0.39	27	297.88	297.44	440.35	0.0010	6.3%	MRKS	0.013				0.563	2.478	3.976	9.854	4422.409	6.368	4.329
147	10108	9.214	1.126	0.39	39	293.84	291.33	865.4	0.0029	12.2%	CORN	0.013				0.813	5.382	8.296	44.649	20038.454	28.855	19.641
653	23815	0.322	0.02	0.39	12	298.24	298.05	170.12	0.0011	6.2%	NCEN	0.010	REHAB			0.250	1.994	0.785	1.566	703.021	1.012	0.690
146	10107	9.165	1.126	0.39	39	295.15	293.84	455.37	0.0029	12.3%	CORN	0.013				0.813	5.360	8.296	44.467	19956.723	28.738	19.573
1494	26795	1.294	0.06	0.39	21	307.92	307.66	280	0.0009	4.6%	CHES	0.010	REHAB			0.438	2.631	2.405	6.329	2840.261	4.090	2.796
1838	345479	0.27	0.249	0.39	10	298.70	297.38	627	0.0021	92.2%	MRKS	0.010	SDR35			0.208	2.428	0.545	1.324	594.293	0.856	0.586
55	7595	11.784	0.917	0.39	45	297.49	297.45	17.798	0.0022	7.8%	CORN	0.013	D3000			0.938	5.207	11.045	57.510	25810.334	37.167	25.383
789	26076	0.673	0.28	0.39	15	295.04	294.20	325.25	0.0026	41.6%	NCEN	0.013				0.313	2.703	1.227	3.317	1488.805	2.144	1.471
1447	18029	1.468	0.339	0.39	18	312.43	311.75	248.37	0.0027	23.1%	ORAN	0.010	REHAB			0.375	4.081	1.767	7.211	3236.511	4.661	3.193
1507	28600	7.523	0.075	0.39	39	303.09	302.37	619	0.0012	1.0%	CHES	0.010	REHAB			0.813	4.431	8.296	36.758	16496.814	23.755	16.232
1694	15901	0.17	0.057	0.39	10	314.98	314.61	260	0.0014	33.5%	FRUI	0.013				0.208	1.535	0.545	0.837	375.853	0.541	0.371
1377	16044	0.757	0.337	0.39	18	316.45	315.68	620.55	0.0012	44.5%	ORAN	0.013				0.375	2.113	1.767	3.735	1676.045	2.414	1.657
1839	345478	0.268	0.247	0.39	10	297.38	297.32	28.5	0.0021	92.2%	MRKS	0.010	SDR35			0.208	2.428	0.545	1.324	594.293	0.856	0.588
586	285636	4.242	0.857	0.39	36	266.17	265.76	421	0.0010	20.2%	MRKS	0.013	SDR35			0.750	2.958	7.069	20.911	9384.680	13.514	9.272
249	14237	4.445	2.227	0.38	30	307.87	307.85	7	0.0029	50.1%	MRKS	0.013				0.625	4.493	4.909	22.053	9897.202	14.252	9.807
1495	26796	1.292	0.06	0.38	21	307.66	307.44	229	0.0010	4.6%	CHES	0.010	REHAB			0.438	2.676	2.405	6.437	2888.978	4.160	2.868
1585	37704	1.125	0.1	0.38	18	290.13	289.40	440	0.0017	8.9%	ORAN	0.010	REHAB			0.375	3.177	1.767	5.614	2519.459	3.628	2.503
1844	15099	0.197	0.045	0.38	10	295.65	294.63	522	0.0020	22.8%	MRKS	0.013				0.208	1.799	0.545	0.981	440.422	0.634	0.437
1840	307241	0.268	0.247	0.38	10	297.32	297.27	23	0.0022	92.2%	MRKS	0.010	SDR35			0.208	2.467	0.545	1.346	603.905	0.870	0.602
2062	30751	0.402	0.294	0.38	15	309.98	309.42	590.29	0.0009	73.1%	CHES	0.013				0.313	1.638	1.227	2.011	902.335	1.299	0.897

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1410	20066	0.596	0.145	0.38	18	307.56	306.93	782.5	0.0008	24.3%	ORAN	0.013				0.375	1.702	1.767	3.008	1350.072	1.944	1.348
1778	15220	0.282	0.253	0.38	12	301.19	300.67	329.3	0.0016	89.7%	MRKS	0.013				0.250	1.824	0.785	1.433	643.031	0.926	0.644
64	7501	12.343	0.911	0.38	45	283.21	281.14	781.65	0.0026	7.4%	GRNT	0.013	D3600			0.938	5.652	11.045	62.427	28017.426	40.345	28.002
1243	37415	2.338	0.001	0.38	30	274.12	273.56	678.32	0.0008	0.0%	SCEN	0.013				0.625	2.415	4.909	11.854	5320.141	7.661	5.323
60	7591	12.353	0.914	0.38	45	290.56	289.80	284.19	0.0027	7.4%	GRNT	0.013	D3000			0.938	5.680	11.045	62.733	28154.747	40.543	28.190
63	7500	12.344	0.912	0.38	45	285.31	283.21	791.08	0.0027	7.4%	GRNT	0.013	D3000			0.938	5.659	11.045	62.502	28051.021	40.393	28.049
2063	30782	0.421	0.29	0.38	15	309.42	308.55	804	0.0011	68.9%	CHES	0.013				0.313	1.750	1.227	2.147	963.692	1.388	0.967
740	36636	9.634	1.153	0.38	48	265.27	265.25	17.18	0.0012	12.0%	WALN	0.013				1.000	3.911	12.566	49.142	22055.101	31.759	22.125
1586	37705	1.125	0.099	0.38	18	289.40	288.63	440	0.0017	8.8%	ORAN	0.010	REHAB			0.375	3.263	1.767	5.766	2587.564	3.726	2.601
1776	15218	0.283	0.256	0.38	12	302.48	301.34	704.2	0.0016	90.5%	MRKS	0.013				0.250	1.851	0.785	1.454	652.500	0.940	0.657
61	7498	12.348	0.914	0.38	45	289.80	287.43	873.28	0.0027	7.4%	GRNT	0.013	D3000			0.938	5.722	11.045	63.197	28362.639	40.842	28.494
1762	15443	0.801	0.295	0.38	15	303.57	301.74	455	0.0040	36.8%	MRKS	0.013				0.313	3.373	1.227	4.140	1857.918	2.675	1.874
58	7593	11.782	0.916	0.38	45	294.14	292.49	657.08	0.0025	7.8%	GRNT	0.013	D3600			0.938	5.504	11.045	60.790	27282.369	39.287	27.505
399	5262	0.633	0.068	0.38	15	334.28	333.28	665	0.0015	10.7%	HERN	0.010	SDR35			0.313	2.681	1.227	3.291	1476.860	2.127	1.494
1487	24577	1.228	0.06	0.38	21	310.15	309.84	332	0.0009	4.9%	CHES	0.010	REHAB			0.438	2.638	2.405	6.346	2848.147	4.101	2.873
1490	285968	1.278	0.06	0.38	21	309.00	308.57	423.63	0.0010	4.7%	CHES	0.010	REHAB			0.438	2.751	2.405	6.617	2969.556	4.276	2.998
62	7499	12.345	0.913	0.38	45	287.43	285.31	768.04	0.0028	7.4%	GRNT	0.013	D3000			0.938	5.771	11.045	63.734	28603.899	41.190	28.845
1810	13629	0.306	0.005	0.38	15	294.19	294.07	201	0.0006	1.6%	MRKS	0.013				0.313	1.300	1.227	1.595	715.813	1.031	0.725
139	317412	28.906	11.453	0.37	84	231.56	230.40	2102	0.0006	39.6%	WWTP	0.013				1.750	3.895	38.485	149.916	67282.090	96.886	67.980
400	5263	0.629	0.067	0.37	15	333.28	332.28	663.43	0.0015	10.7%	HERN	0.010	SDR35			0.313	2.685	1.227	3.295	1478.606	2.129	1.500
1963	34585	0.307	0.307	0.37	12	309.93	309.73	100	0.0020	100.0%	CHES	0.013				0.250	2.053	0.785	1.612	723.671	1.042	0.735
2061	30752	0.403	0.297	0.37	15	310.60	309.98	590.29	0.0011	73.7%	CHES	0.013				0.313	1.724	1.227	2.116	949.445	1.367	0.964
1123	38734	2.054	0	0.37	27	268.41	268.40	8.4	0.0012	0.0%	SCEN	0.013				0.563	2.705	3.976	10.756	4827.162	6.951	4.897
1779	15222	0.282	0.251	0.37	12	300.67	300.11	329.3	0.0017	89.0%	MRKS	0.013				0.250	1.893	0.785	1.487	667.305	0.961	0.679
1780	15224	0.281	0.25	0.37	12	300.11	299.55	329.3	0.0017	89.0%	MRKS	0.013				0.250	1.893	0.785	1.487	667.305	0.961	0.680
1904	14811	1.143	1.043	0.37	18	283.56	283.17	122	0.0032	91.3%	CORN	0.013				0.375	3.392	1.767	5.994	2690.179	3.874	2.731
1376	16043	0.695	0.338	0.37	18	317.06	316.45	508.96	0.0012	48.6%	ORAN	0.013				0.375	2.077	1.767	3.670	1647.221	2.372	1.677
1673	41209	45.518	11.906	0.37	60	268.05	267.81	28.29	0.0085	26.2%	NORT	0.013	CL2			1.250	12.232	19.635	240.172	107789.240	155.217	109.699
1843	15098	0.206	0.045	0.37	10	297.21	295.65	634	0.0025	21.8%	MRKS	0.013				0.208	2.019	0.545	1.101	494.221	0.712	0.506
16	6998	1.488	0.282	0.37	21	325.31	323.83	600	0.0025	19.0%	HERN	0.013				0.438	3.299	2.405	7.934	3560.922	5.128	3.640
449	14193	0.275	0.275	0.37	12	309.25	309.13	122	0.0010	100.0%	MRKS	0.010	REHAB			0.250	1.872	0.785	1.470	659.751	0.950	0.675
768	33373	0.343	0	0.37	12	275.13	274.61	200.2	0.0026	0.0%	NCEN	0.013				0.250	2.340	0.785	1.838	824.699	1.188	0.845
66	7408	13.598	1.408	0.37	48	279.27	277.00	899.45	0.0025	10.4%	GRNT	0.013	D3250			1.000	5.758	12.566	72.356	32473.571	46.762	33.164
801	29869	0.805	0.237	0.37	18	283.32	283.31	6	0.0017	29.4%	NCEN	0.013				0.375	2.449	1.767	4.328	1942.465	2.797	1.992
2065	28958	0.416	0.285	0.37	15	308.45	308.12	281	0.0012	68.5%	CHES	0.013				0.313	1.823	1.227	2.237	1003.946	1.446	1.030
74	11571	15.121	2.177	0.37	54	270.74	269.25	880.03	0.0017	14.4%	GRNT	0.013	D3050			1.125	5.097	15.904	81.071	36384.443	52.394	37.273
579	32995	4.101	0.705	0.37	33	268.52	267.69	814.1	0.0010	17.2%	MRKS	0.010	REHAB			0.688	3.715	5.940	22.067	9903.633	14.261	10.160
1489	26791	1.283	0.06	0.37	21	309.45	309.00	408.29	0.0011	4.7%	CHES	0.010	REHAB			0.438	2.867	2.405	6.895	3094.372	4.456	3.173
1374	16041	0.679	0.338	0.37	18	317.49	317.21	232.48	0.0012	49.8%	ORAN	0.013				0.375	2.082	1.767	3.679	1651.258	2.378	1.699
1408	20064	0.546	0.145	0.37	18	307.99	307.78	269.98	0.0008	26.6%	ORAN	0.013				0.375	1.673	1.767	2.957	1327.005	1.911	1.365
2054	30904	0.327	0.149	0.37	12	314.23	312.90	550	0.0024	45.6%	CHES	0.013				0.250	2.258	0.785	1.773	795.739	1.146	0.819
1313	14383	0.182	0.021	0.37	10	317.06	316.52	270	0.0020	11.5%	FRUI	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.460
1661	276634	21.433	4.141	0.37	57	273.29	273.17	78	0.0015	19.3%	JENS	0.010	REHAB			1.188	6.546	17.721	116.002	52061.626	74.969	53.536
73	11572	15.14	2.19	0.37	54	272.17	270.74	817.08	0.0018	14.5%	GRNT	0.013	D3050			1.125	5.182	15.904	82.424	36991.936	53.268	38.128
75	11570	15.097	2.176	0.36	54	269.25	267.71	880.13	0.0017	14.4%	GRNT	0.013	D3050			1.125	5.182	15.904	82.415	36987.782	53.262	38.165
788	26077	0.63	0.269	0.36	15	295.52	295.04	170	0.0028	42.7%	NCEN	0.013				0.313	2.826	1.227	3.469	1556.693	2.242	1.612
1486	24576	1.209	0.06	0.36	21	310.49	310.15	331	0.0010	5.0%	CHES	0.010	REHAB			0.438	2.767	2.405	6.656	2987.281	4.302	3.093
1409	20065	0.546	0.145	0.36	18	307.78	307.56	270	0.0008	26.6%	ORAN	0.013				0.375	1.713	1.767	3.026	1358.183	1.956	1.410
730	35153	9.203	1.198	0.36	40	269.11	268.43	204.3	0.0033	13.0%	NCEN	0.013				0.833	5.863	8.727	51.162	22961.687	33.065	23.862
1247	35439	0.247	0	0.36	8	284.39	283.91	37.18	0.0129	0.0%	SCEN	0.013				0.167	3.991	0.349	1.393	625.301	0.900	0.653
1375	16042	0.675	0.338	0.36	18	317.21	317.06	118.69	0.0013	50.1%	ORAN	0.013				0.375	2.133	1.767	3.769	1691.482	2.436	1.761
59	7592	11.779	0.915	0.36	45	292.49	290.56	656.19	0.0029	7.8%	GRNT	0.013	D3600			0.938	5.957	11.045	65.790	29526.575	42.518	30.739
1484	24574	1.152	0.061	0.36	21	311.22	310.89	337	0.0010	5.3%	CHES	0.010	REHAB			0.438	2.702	2.405	6.499	2916.706	4.200	3.048
12	6994	1.496	0.282	0.36	21	330.38	329.01	488	0.0028	18.9%	HERN	0.013				0.438	3.519	2.405	8.465	3798.898	5.470	3.974
1241	38924	1.869	0.005	0.36	30	274.47	274.03	664.43	0.0007	0.3%	SCEN	0.013				0.625	2.151	4.909	10.556	4737.688	6.822	4.953
1488	24578	1.248	0.06	0.36	21	309.84	309.45	336.7	0.0012	4.8%	CHES	0.010	REHAB			0.438	2.939	2.405	7.068	3172.206	4.568	3.320
57	7594	11.783	0.917	0.36	45	296.14	294.14	656.32	0.0030	7.8%	CORN	0.013	D3000			0.938	6.063	11.045	66.966	30054.285	43.278	31.495
1072	344524	60.374	15.075	0.36	66	237.95	237.43	85.26	0.0061	25.0%	WWTP	0.010	REHAB			1.375	14.358	23.758	341.122	153095.761	220.458	160.084
695	29664	0.685	0.137	0.36	18	282.29	281.63	478.2	0.0014	20.0%	NCEN	0.013				0.375	2.229	1.767	3.939	1767.649	2.545	1.860
1483	24573	1.123	0.061	0.36	21	311.54	311.22	332	0.0010	5.4%	CHES	0.010	REHAB			0.438	2.681	2.405	6.448	2893.720	4.167	3.044
577	32993	3.883	0.706	0.35	33	269.54	268.85	647.22	0.0011	18.2%	MRKS	0.010	REHAB			0.688	3.799	5.940	22.565	10127.283	14.583	10.700
1777	15219	0.281	0.253	0.35	12	301.34	301.19	72	0.0021	90.0%	MRKS	0.013				0.250	2.095	0.785	1.646	738.593	1.064	0.783
1502	26801	1.507	0.06	0.35	24	305.64	305.29	396.96	0.0009	4.0%	CHES	0.010	REHAB			0.500	2.800	3.142	8.797	3947.934	5.685	4.178
812	19446	0.673	0.145	0.35	18	294.72	294.30	506	0.0008	21.5%	FRUI	0.010	REHAB			0.375	2.247	1.767	3.971	1782.057	2.566	1.893
1312	14382	0.165	0.021	0.35	10	317.34	317.06	142.696	0.0020	12.7%	FRUI	0.013				0.208	1.803	0.545	0.983	441.344	0.636	0.471
767	33374	0.308	0	0.35	12	276.17	275.13	400.37	0.0026	0.0%	NCEN	0.013				0.250	2.340	0.785	1.838	824.730	1.188	0.880
1482	24572	1.085	0.061	0.35	21	311.86	311.54	331	0.0010	5.6%	CHES	0.010	REHAB			0.438	2.685	2.405	6.457	2898.088	4.173	3.088
2080	29003	0.329	0.287	0.35	15	311.86	311.32	599.52	0.0009	87.2%	CHES	0.013				0.313	1.596	1.227	1.959	879.228	1.266	0.937
2081	334926	0.326	0.285	0.35	15	311.32	310.77	616.48	0.0009	87.4%	CHES	0.013				0.313	1.589	1.227	1.950	875.041	1.260	0.934
482	21713	1.414	1.345	0.35	24	297.69	297.42	326.88	0.0008	95.1%	FRUI	0.010	REHAB			0.500	2.710	3.142	8.514	3821.175	5.502	4.088
1468	18193	0.375	0.044	0.35	15	319.44	319.43	14	0.0007	11.7%	CHES	0.010	SDR35			0.313	1.848	1.227	2.268	1017.855	1.466	1.091
581	285632	4.243	0.858	0.35	36	267.13	267.02	76	0.0014	20.2%	MRKS	0.013	SDR35			0.750	3.606	7.069	25.492	11440.846	16.475	12.232
813	21393	0.673	0.145	0.35	18	294.30	294.09	240	0.0009	21.5%	FRUI	0.010	REHAB			0.375	2.307	1.767	4.077	1829.684	2.635	1.962
1481	24571	1.078	0.061	0.35	21	312.17	311.86	314	0.0010	5.7%	CHES	0.010	REHAB			0.438	2.713	2.405	6.525	2928.644	4.217	3.139
1501	285965	1.401	0.06	0.35	24	306.09	305.64	550.46	0.0008	4.3%	CHES	0.010	REHAB			0.500	2.696	3.142	8.470	3801.479	5.474	4.073
1693	15900	0.125	0.057	0.35	10	315.17	315.15	17	0.0012	45.6%	FRUI	0.013				0.208	1.396	0.545	0.761	341.739	0.492	0.367
634	15709	0.157	0.157	0.35	10	306.51	305.28	656.73	0.0019	100.0%	FRUI	0.013				0.208	1.762	0.545	0.961	431.184	0.621	0.464
56	7590	11.784	0.917	0.34	45	297.45	296.14	375.5	0.0035	7.8%	CORN	0.013	D3000			0.938	6.487	11.045	71.652	32157.324	46.307	34.523
1857	14906	0.429	0.389	0.34	12	294.32	293.68	120	0.0053	90.7%	MRKS	0.013				0.250	3.353	0.785	2.633	1181.749	1.702	1.273
17	6999	1.478	0.281	0.34	21	323.83	322.22	500	0.0032	19.0%	HERN	0.013				0.438	3.769	2.405	9.065	4068.508	5.859	4.381

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1198	39801	18.207	0.845	0.34	48	266.57	266.48	15	0.0060	4.6%	JENS	0.013	CL3	Yes		1.000	8.878	12.566	111.565	50070.422	72.101	53.894
1382	16201	0.149	0.146	0.34	10	321.38	320.73	380	0.0017	98.0%	ORAN	0.013				0.208	1.683	0.545	0.918	412.068	0.593	0.444
13	6995	1.489	0.282	0.34	21	329.01	327.40	487	0.0033	18.9%	HERN	0.013				0.438	3.819	2.405	9.186	4122.453	5.936	4.447
403	5266	0.743	0.066	0.34	18	330.23	330.11	107.93	0.0011	8.9%	HERN	0.010	SDR35			0.375	2.601	1.767	4.596	2062.489	2.970	2.227
1372	16145	0.476	0.345	0.34	18	318.50	318.04	598.25	0.0008	72.5%	ORAN	0.013				0.375	1.664	1.767	2.940	1319.369	1.900	1.424
1485	24575	1.18	0.06	0.34	21	310.89	310.49	326	0.0012	5.1%	CHES	0.010	REHAB			0.438	3.024	2.405	7.275	3264.914	4.701	3.521
576	33008	3.883	0.706	0.34	30	269.64	269.54	29.5	0.0034	18.2%	MRKS	0.013				0.625	4.893	4.909	24.021	10780.415	15.524	11.641
1067	344517	18.796	4.414	0.34	72	236.57	236.11	602	0.0008	23.5%	WWTP	0.013				1.500	4.140	28.274	117.067	52539.877	75.657	56.861
1493	26794	1.293	0.06	0.34	21	308.10	307.92	117	0.0015	4.6%	CHES	0.010	REHAB			0.438	3.387	2.405	8.146	3655.897	5.264	3.971
694	29663	0.664	0.115	0.34	18	282.52	282.29	145	0.0016	17.3%	NCEN	0.013				0.375	2.389	1.767	4.222	1894.998	2.729	2.065
1352	14519	0.44	0	0.34	18	320.60	320.19	587.4	0.0007	0.0%	ORAN	0.013	CL 2			0.375	1.585	1.767	2.801	1257.053	1.810	1.370
453	14194	0.409	0.409	0.34	12	309.13	308.85	89	0.0031	100.0%	MRKS	0.010	REHAB			0.250	3.347	0.785	2.629	1179.922	1.699	1.290
696	29665	0.679	0.137	0.34	18	281.63	280.49	680	0.0017	20.2%	NCEN	0.013				0.375	2.456	1.767	4.341	1948.170	2.805	2.126
802	29876	0.656	0.053	0.34	18	284.04	283.32	459.32	0.0016	8.1%	NCEN	0.013				0.375	2.375	1.767	4.197	1883.811	2.713	2.057
1135	38744	2.303	0	0.34	27	267.18	266.84	152.89	0.0022	0.0%	SCEN	0.013				0.563	3.697	3.976	14.700	6597.531	9.500	7.197
1238	38892	1.811	0.005	0.34	30	274.89	274.72	365	0.0005	0.3%	SCEN	0.010	REHAB			0.625	2.358	4.909	11.575	5194.788	7.480	5.669
1302	33796	0.046	0	0.34	6	286.38	285.24	420	0.0027	0.0%	SCEN	0.013				0.125	1.514	0.196	0.297	133.387	0.192	0.146
1764	15445	0.931	0.317	0.34	18	300.81	299.58	661	0.0019	34.0%	MRKS	0.010	REHAB			0.375	3.364	1.767	5.945	2668.234	3.842	2.911
1766	15447	0.961	0.313	0.34	18	298.12	297.47	328	0.0020	32.6%	MRKS	0.010	REHAB			0.375	3.472	1.767	6.135	2753.543	3.965	3.004
692	29864	0.667	0.115	0.34	18	283.31	282.76	336.84	0.0016	17.2%	NCEN	0.013				0.375	2.424	1.767	4.284	1922.642	2.769	2.102
831	14481	0.733	0.227	0.33	18	318.35	318.29	30	0.0020	31.0%	ORAN	0.013	CL 2			0.375	2.683	1.767	4.741	2127.864	3.064	2.331
1301	33795	0.047	0	0.33	6	287.82	286.38	508.82	0.0028	0.0%	SCEN	0.013				0.125	1.546	0.196	0.303	136.203	0.196	0.149
1500	26800	1.408	0.06	0.33	24	306.55	306.09	487.43	0.0009	4.3%	CHES	0.010	REHAB			0.500	2.897	3.142	9.101	4084.435	5.882	4.474
1469	20209	0.388	0.017	0.33	15	321.49	320.45	692.05	0.0015	4.4%	CHES	0.013				0.313	2.062	1.227	2.530	1135.676	1.635	1.247
1508	28571	7.531	0.075	0.33	39	302.37	302.28	44	0.0020	1.0%	CHES	0.010	REHAB			0.813	5.876	8.296	48.744	21876.310	31.502	23.971
1712	14124	0.152	0.017	0.33	12	310.85	310.60	328.72	0.0008	11.2%	MRKS	0.013				0.250	1.266	0.785	0.994	446.255	0.643	0.491
642	19646	0.151	0.151	0.33	10	304.09	303.42	331	0.0020	100.0%	FRUI	0.013				0.208	1.831	0.545	0.999	448.257	0.645	0.494
1373	16040	0.556	0.341	0.33	18	318.04	317.49	459.14	0.0012	61.3%	ORAN	0.013				0.375	2.076	1.767	3.669	1646.788	2.371	1.815
1470	20210	0.384	0.017	0.33	15	320.45	319.41	693	0.0015	4.4%	CHES	0.013				0.313	2.061	1.227	2.529	1134.898	1.634	1.250
128	39384	29.429	11.736	0.33	72	235.02	234.78	115.56	0.0021	39.9%	WWTP	0.013	D1350			1.500	6.826	28.274	193.000	86618.415	124.731	95.302
826	14517	0.561	0	0.33	18	319.82	319.58	195	0.0012	0.0%	ORAN	0.013	CL 2			0.375	2.105	1.767	3.719	1669.234	2.404	1.843
827	14516	0.573	0	0.33	18	319.58	319.40	140	0.0013	0.0%	ORAN	0.013	CL 2			0.375	2.151	1.767	3.801	1706.086	2.457	1.884
1407	20063	0.531	0.146	0.33	18	308.98	308.24	669.7	0.0011	27.5%	ORAN	0.013				0.375	1.994	1.767	3.524	1581.629	2.278	1.747
2036	34430	0.343	0.115	0.33	10	302.40	302.06	32	0.0106	33.5%	CHES	0.013				0.208	4.196	0.545	2.288	1026.995	1.479	1.136
803	29887	0.636	0.015	0.33	18	285.09	284.04	661.27	0.0016	2.4%	NCEN	0.013				0.375	2.391	1.767	4.225	1895.981	2.730	2.094
1471	20211	0.379	0.016	0.33	15	319.41	318.42	661.1	0.0015	4.2%	CHES	0.013				0.313	2.058	1.227	2.526	1133.681	1.633	1.254
2032	34425	0.16	0.001	0.33	10	306.78	305.46	558	0.0024	0.6%	CHES	0.013				0.208	1.980	0.545	1.080	484.589	0.698	0.538
15	6997	1.495	0.282	0.33	21	327.29	325.31	498	0.0040	18.9%	HERN	0.013				0.438	4.188	2.405	10.073	4520.903	6.510	5.015
1304	33775	0.098	0	0.33	10	286.59	286.16	484	0.0009	0.0%	SCEN	0.013				0.208	1.213	0.545	0.662	296.972	0.428	0.330
1691	15898	0.127	0.057	0.33	10	316.14	316.10	27	0.0015	44.9%	FRUI	0.013				0.208	1.567	0.545	0.854	383.488	0.552	0.425
1414	16307	0.146	0.146	0.33	10	328.62	327.97	326	0.0020	100.0%	ORAN	0.013				0.208	1.817	0.545	0.991	444.889	0.641	0.495
1472	20212	0.373	0.016	0.33	15	318.42	317.42	662	0.0015	4.3%	CHES	0.013				0.313	2.067	1.227	2.537	1138.617	1.640	1.267
1765	15446	0.94	0.315	0.33	18	299.58	298.17	657	0.0021	33.5%	MRKS	0.010	REHAB			0.375	3.613	1.767	6.385	2865.491	4.126	3.186
1892	14799	0.516	0.412	0.33	18	286.73	286.21	480	0.0011	79.8%	CORN	0.013				0.375	1.975	1.767	3.489	1566.065	2.255	1.739
425	14315	5.653	0.202	0.33	27	312.90	312.82	8.9	0.0090	3.6%	MRKS	0.010	REHAB			0.563	9.663	3.976	38.421	17243.479	24.831	19.178
1692	15899	0.126	0.057	0.33	10	316.10	315.17	611	0.0015	45.2%	FRUI	0.013				0.208	1.588	0.545	0.866	388.709	0.560	0.434
1305	344708	0.096	0	0.32	10	286.16	285.73	484	0.0009	0.0%	SCEN	0.013				0.208	1.213	0.545	0.662	296.972	0.428	0.332
1068	344516	18.789	4.409	0.32	72	236.11	235.56	601	0.0009	23.5%	WWTP	0.013				1.500	4.531	28.274	128.115	57497.967	82.797	64.008
1781	15226	0.281	0.248	0.32	12	299.55	298.61	322	0.0029	88.3%	MRKS	0.013				0.250	2.480	0.785	1.948	874.303	1.259	0.978
766	33500	0.262	0	0.32	12	276.79	276.17	242.59	0.0026	0.0%	NCEN	0.013				0.250	2.319	0.785	1.821	817.401	1.177	0.915
1763	15444	0.92	0.318	0.32	18	301.51	300.81	327	0.0021	34.6%	MRKS	0.010	REHAB			0.375	3.608	1.767	6.377	2861.853	4.121	3.201
1064	344519	18.808	4.42	0.32	72	237.99	237.85	148	0.0009	23.5%	WWTP	0.013				1.500	4.607	28.274	130.253	58457.675	84.179	65.371
2082	29004	0.324	0.282	0.32	15	310.77	310.60	142	0.0012	87.0%	CHES	0.013				0.313	1.840	1.227	2.259	1013.648	1.460	1.136
1845	15100	0.188	0.045	0.32	10	294.63	292.92	482	0.0035	23.9%	MRKS	0.013				0.208	2.424	0.545	1.322	593.442	0.855	0.667
1711	15629	0.119	0.065	0.32	10	306.42	305.47	659.54	0.0014	54.6%	MRKS	0.013				0.208	1.545	0.545	0.843	378.134	0.545	0.426
2060	30910	0.535	0.378	0.32	12	309.37	308.34	93	0.0111	70.7%	CHES	0.013				0.250	4.831	0.785	3.794	1702.955	2.452	1.917
1211	33768	0.441	0	0.32	16	285.03	284.84	196.55	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.244	1.396	3.133	1405.875	2.024	1.583
1885	13381	5.34	2.385	0.32	27	279.67	279.42	17	0.0147	44.7%	CORN	0.013				0.563	9.508	3.976	37.803	16965.907	24.431	19.091
769	350007	3.747	1.079	0.32	24	283.18	282.46	88	0.0082	28.8%	NCEN	0.010	SDR35			0.500	8.530	3.142	26.797	12026.357	17.318	13.571
825	14518	0.492	0	0.32	18	320.19	319.82	330	0.0011	0.0%	ORAN	0.013	CL 2			0.375	2.001	1.767	3.536	1586.737	2.285	1.793
1384	16164	0.149	0.146	0.32	10	322.04	321.38	278	0.0024	98.0%	ORAN	0.013				0.208	1.983	0.545	1.082	485.460	0.699	0.550
412	11159	0.912	0.014	0.31	18	319.26	318.37	222	0.0040	1.5%	MRKS	0.013				0.375	3.799	1.767	6.713	3012.641	4.338	3.426
1893	14800	0.514	0.41	0.31	18	286.10	285.55	432	0.0013	79.8%	CORN	0.013				0.375	2.141	1.767	3.783	1697.729	2.445	1.931
1217	35615	0.596	0	0.31	16	283.85	283.49	186.77	0.0019	0.0%	SCEN	0.010	REHAB			0.333	3.168	1.396	4.423	1985.199	2.859	2.263
1406	20062	0.469	0.146	0.31	18	309.71	308.98	669.7	0.0011	31.1%	ORAN	0.013				0.375	1.981	1.767	3.500	1570.906	2.262	1.793
1526	32155	0.991	0.039	0.31	21	295.86	295.02	661	0.0013	3.9%	ORAN	0.010	REHAB			0.438	3.078	2.405	7.403	3322.688	4.785	3.794
279	17439	11.978	3.695	0.31	36	293.36	292.57	75	0.0105	30.8%	MRKS	0.010	REHAB	Yes		0.750	12.648	7.069	89.401	40123.135	57.777	45.799
1503	285964	1.502	0.06	0.31	24	305.29	304.68	422.3	0.0014	4.0%	CHES	0.010	REHAB			0.500	3.584	3.142	11.259	5053.166	7.277	5.775
1210	33767	0.419	0	0.31	16	285.44	285.03	410	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.282	1.396	3.186	1429.903	2.059	1.640
1809	13633	0.296	0.005	0.31	15	294.77	294.19	481.8	0.0012	1.7%	MRKS	0.013				0.313	1.846	1.227	2.265	1016.453	1.464	1.168
1962	34584	0.211	0.211	0.31	12	310.44	309.93	253	0.0020	100.0%	CHES	0.013				0.250	2.061	0.785	1.619	726.526	1.046	0.835
1066	344518	18.802	4.417	0.31	72	237.26	236.57	603	0.0011	23.5%	WWTP	0.013				1.500	5.067	28.274	143.259	64294.566	92.584	73.782
1371	16144	0.411	0.342	0.31	18	319.17	318.58	661.25	0.0009	83.2%	ORAN	0.013				0.375	1.792	1.767	3.167	1421.255	2.047	1.636
1525	32153	0.921	0.039	0.31	21	296.63	295.86	661.46	0.0012	4.2%	ORAN	0.010	REHAB			0.438	2.946	2.405	7.086	3180.125	4.579	3.658
584	275170	4.242	0.857	0.30	36	266.58	266.35	161.14	0.0014	20.2%	MRKS	0.010	SDR35			0.750	4.656	7.069	32.910	14769.785	21.268	17.026
765	33499	0.262	0	0.30	12	277.31	276.79	158	0.0033	0.0%	NCEN	0.013				0.250	2.636	0.785	2.070	929.215	1.338	1.076
1065	344848	18.807	4.419	0.30	72	237.85	237.26	493	0.0012	23.5%	WWTP	0.013				1.500	5.182	28.274	146.507	65752.296	94.683	75.876
1989	34412	0.299	0.127	0.30	10	303.67	303.26	35	0.0117	42.5%	CHES	0.013	CL23			0.208	4.405	0.545	2.403	1078.355	1.553	1.254
1300	33794	0.047	0	0.30	6	287.97	287.82	34.15	0.0044	0.0%	SCEN	0.013				0.125	1.926	0.196	0.378	169.682	0.244	0.197
450	14306	0.13	0.13	0.30	10	310.07	309.50	251	0.0023	100.0%	MRKS	0.013				0.208	1.940	0.545	1.058	474.793	0.684	0.554

													ADV = ADVERSE PIPE							Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
2064	28957	0.416	0.285	0.30	15	308.61	308.45	60	0.0027	68.5%	CHES	0.013				0.313	2.747	1.227	3.371	1512.833	2.178	1.762
1209	33766	0.391	0	0.30	16	285.96	285.44	513.82	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.296	1.396	3.205	1438.476	2.071	1.680
1690	15897	0.127	0.058	0.30	10	317.79	316.32	663	0.0022	45.7%	FRUI	0.013				0.208	1.917	0.545	1.045	469.144	0.676	0.549
832	15914	0.733	0.227	0.30	18	318.29	317.83	142	0.0032	31.0%	ORAN	0.013	CL4			0.375	3.415	1.767	6.034	2708.093	3.900	3.167
1808	13640	0.274	0.005	0.29	15	295.16	294.77	322	0.0012	1.8%	MRKS	0.013				0.313	1.851	1.227	2.272	1019.556	1.468	1.194
640	17565	0.104	0.078	0.29	10	302.17	301.56	400	0.0015	75.0%	MRKS	0.013				0.208	1.589	0.545	0.867	389.080	0.560	0.456
428	14312	5.57	0.202	0.29	27	311.30	311.08	9.9	0.0222	3.6%	MRKS	0.013				0.563	11.687	3.976	46.470	20855.725	30.032	24.462
1499	26799	1.392	0.06	0.29	24	306.94	306.55	253	0.0015	4.3%	CHES	0.010	REHAB			0.500	3.702	3.142	11.631	5220.129	7.517	6.125
1807	13642	0.27	0.005	0.29	15	295.38	295.16	182	0.0012	1.9%	MRKS	0.013				0.313	1.849	1.227	2.269	1018.550	1.467	1.197
633	337736	0.152	0.152	0.29	10	307.77	306.46	657	0.0020	100.0%	FRUI	0.010	SDR35			0.208	2.363	0.545	1.289	578.363	0.833	0.681
1798	13894	0.169	0.143	0.29	12	303.66	302.60	659	0.0016	84.6%	MRKS	0.013				0.250	1.841	0.785	1.446	648.987	0.935	0.766
1363	16030	1.614	0.532	0.29	18	314.77	314.09	68	0.0100	33.0%	ORAN	0.010	REHAB			0.375	7.799	1.767	13.782	6185.462	8.907	7.293
693	29865	0.665	0.115	0.29	18	282.76	282.52	82.07	0.0029	17.3%	NCEN	0.013				0.375	3.244	1.767	5.733	2573.014	3.705	3.040
1800	13800	0.182	0.006	0.29	12	298.09	297.76	174	0.0019	3.3%	MRKS	0.013				0.250	1.999	0.785	1.570	704.707	1.015	0.833
1022	39464	18.037	2.438	0.29	48	261.57	260.89	58	0.0117	13.5%	JENS	0.013	CL2			1.000	12.401	12.566	155.838	69940.143	100.714	82.677
1364	16037	0.121	0.112	0.29	10	319.96	318.46	658	0.0023	92.6%	ORAN	0.013				0.208	1.943	0.545	1.060	475.704	0.685	0.564
1497	286006	1.401	0.06	0.29	21	307.41	307.38	8.66	0.0035	4.3%	CHES	0.010	REHAB			0.438	5.082	2.405	12.224	5485.956	7.900	6.499
635	15641	0.121	0.058	0.28	12	304.12	303.53	655	0.0009	47.9%	MRKS	0.013				0.250	1.378	0.785	1.082	485.659	0.699	0.578
1379	16046	0.796	0.336	0.28	18	315.20	313.93	285	0.0045	42.2%	ORAN	0.013				0.375	4.005	1.767	7.077	3176.203	4.574	3.778
1721	15604	0.079	0.175	0.28	10	307.80	307.12	660	0.0010	221.5%	MRKS	0.013				0.208	1.306	0.545	0.713	319.806	0.461	0.382
1774	13900	0.109	0.109	0.28	10	306.54	306.16	190.52	0.0020	100.0%	MRKS	0.013				0.208	1.818	0.545	0.991	444.965	0.641	0.532
1896	349795	0.929	0.828	0.28	18	284.48	282.50	317	0.0062	89.1%	CORN	0.013				0.375	4.741	1.767	8.379	3760.380	5.415	4.486
393	11052	0.132	0.132	0.28	10	324.03	322.94	373	0.0029	100.0%	MRKS	0.013				0.208	2.200	0.545	1.200	538.596	0.776	0.644
1689	15951	0.091	0	0.28	10	316.45	316.24	153.16	0.0014	0.0%	ORAN	0.013				0.208	1.521	0.545	0.830	372.424	0.536	0.445
1775	316184	0.109	0.109	0.28	10	306.16	305.20	480.78	0.0020	100.0%	MRKS	0.013				0.208	1.819	0.545	0.992	445.211	0.641	0.532
585	275169	4.242	0.857	0.28	36	266.35	266.17	90.86	0.0020	20.2%	MRKS	0.010	SDR35			0.750	5.485	7.069	38.771	17400.504	25.057	20.815
1806	13649	0.241	0.005	0.28	15	295.54	295.38	137	0.0012	2.1%	MRKS	0.013				0.313	1.818	1.227	2.231	1001.167	1.442	1.201
1805	13650	0.244	0.005	0.28	15	295.74	295.54	164	0.0012	2.0%	MRKS	0.013				0.313	1.858	1.227	2.280	1023.057	1.473	1.229
1637	41237	0.071	0	0.28	10	285.10	284.50	660	0.0009	0.0%	JENS	0.013				0.208	1.227	0.545	0.669	300.405	0.433	0.362
1688	15950	0.089	0	0.28	10	316.89	316.45	308.54	0.0014	0.0%	ORAN	0.013				0.208	1.530	0.545	0.835	374.534	0.539	0.450
14	6996	1.483	0.282	0.27	21	327.40	327.29	14	0.0079	19.0%	HERN	0.013				0.438	5.887	2.405	14.161	6355.352	9.152	7.669
1710	15625	0.086	0.037	0.27	10	307.34	306.42	657	0.0014	43.0%	MRKS	0.013				0.208	1.523	0.545	0.831	372.834	0.537	0.451
1311	14410	0.082	0	0.27	10	317.83	317.33	391	0.0013	0.0%	FRUI	0.013				0.208	1.456	0.545	0.794	356.287	0.513	0.431
1405	22191	0.225	0.112	0.27	15	310.69	309.96	660.6	0.0011	49.8%	ORAN	0.013				0.313	1.768	1.227	2.170	973.865	1.402	1.177
392	11053	0.131	0.131	0.27	10	322.94	322.29	197	0.0033	100.0%	MRKS	0.013				0.208	2.338	0.545	1.275	572.305	0.824	0.693
724	35130	7.706	1.209	0.27	33	271.71	271.21	25	0.0200	15.7%	NCEN	0.013				0.688	12.658	5.940	75.182	33741.627	48.588	40.882
1413	16306	0.1	0.1	0.27	10	329.26	328.62	320	0.0020	100.0%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.542
245	350148	3.495	1.514	0.27	24	310.58	310.14	32	0.0137	43.3%	MRKS	0.010	SDR35			0.500	11.058	3.142	34.738	15590.518	22.450	18.955
1368	16141	0.314	0.3	0.27	18	320.06	319.77	330.13	0.0009	95.5%	ORAN	0.013				0.375	1.778	1.767	3.142	1410.215	2.031	1.717
1804	13651	0.225	0.005	0.27	15	296.36	295.74	518	0.0012	2.2%	MRKS	0.013				0.313	1.840	1.227	2.258	1013.532	1.459	1.234
637	15638	0.091	0.045	0.27	10	305.60	305.34	150.62	0.0017	49.5%	MRKS	0.013				0.208	1.691	0.545	0.922	413.951	0.596	0.505
1801	13654	0.223	0.006	0.27	15	297.44	297.04	336	0.0012	2.7%	MRKS	0.013				0.313	1.835	1.227	2.252	1010.804	1.456	1.233
636	15639	0.09	0.044	0.26	10	305.34	304.46	506.23	0.0017	48.9%	MRKS	0.013				0.208	1.697	0.545	0.926	415.405	0.598	0.508
1069	344513	18.782	4.405	0.26	72	231.89	231.45	355	0.0012	23.5%	WWTP	0.010	SDR35			1.500	6.855	28.274	193.826	86988.910	125.264	106.482
717	33339	0.598	0	0.26	20	276.27	275.47	400	0.0020	0.0%	NCEN	0.013				0.417	2.876	2.182	6.275	2816.169	4.055	3.457
1802	13653	0.216	0.006	0.26	15	297.04	296.82	180	0.0012	2.8%	MRKS	0.013				0.313	1.860	1.227	2.282	1024.193	1.475	1.259
1070	344512	18.779	4.404	0.26	72	231.45	230.83	474	0.0013	23.5%	WWTP	0.010	SDR35			1.500	7.042	28.274	199.116	89363.137	128.683	109.904
1369	16142	0.368	0.333	0.26	18	319.77	319.27	360.25	0.0014	90.5%	ORAN	0.013				0.375	2.235	1.767	3.950	1772.604	2.553	2.185
1388	16156	0.149	0.123	0.26	15	322.77	322.57	330	0.0006	82.6%	ORAN	0.013				0.313	1.309	1.227	1.607	721.215	1.039	0.890
638	17564	0.091	0.078	0.25	10	302.98	302.17	400	0.0020	85.7%	MRKS	0.013				0.208	1.832	0.545	0.999	448.349	0.646	0.555
1235	38891	1.313	0.005	0.25	30	275.49	275.17	433	0.0007	0.4%	SCEN	0.010	REHAB			0.625	2.970	4.909	14.580	6543.662	9.423	8.110
639	17566	0.164	0.078	0.25	10	301.56	301.26	42.9	0.0070	47.6%	MRKS	0.013				0.208	3.404	0.545	1.856	833.174	1.200	1.036
1236	340993	1.306	0.005	0.25	30	275.17	274.85	425	0.0008	0.4%	SCEN	0.010	REHAB			0.625	2.998	4.909	14.717	6604.962	9.511	8.205
1310	14504	0.074	0	0.25	10	318.21	317.83	268	0.0014	0.0%	FRUI	0.013				0.208	1.533	0.545	0.836	375.170	0.540	0.466
1349	14400	0.087	0.021	0.25	10	317.60	317.34	127.88	0.0020	24.1%	FRUI	0.013				0.208	1.835	0.545	1.001	449.251	0.647	0.560
1803	13652	0.221	0.005	0.25	15	296.82	296.36	300	0.0015	2.3%	MRKS	0.013				0.313	2.083	1.227	2.556	1147.163	1.652	1.431
723	33343	0.72	0	0.25	24	272.81	272.19	462	0.0013	0.0%	NCEN	0.013				0.500	2.657	3.142	8.348	3746.629	5.395	4.675
811	19447	0.487	0.146	0.25	18	295.28	294.72	331	0.0017	30.0%	FRUI	0.010	REHAB			0.375	3.208	1.767	5.669	2544.205	3.664	3.177
593	33034	11.758	2.04	0.24	42	269.64	269.43	18.56	0.0113	17.3%	FRUI	0.010	REHAB			0.875	14.512	9.621	139.623	62662.983	90.235	78.477
681	305141	1.745	0.523	0.24	20	288.65	288.50	11.49	0.0131	30.0%	NCEN	0.010	REHAB			0.417	9.553	2.182	20.841	9353.469	13.469	11.724
1404	22190	0.179	0.113	0.24	15	311.41	310.69	660.3	0.0011	63.1%	ORAN	0.013				0.313	1.756	1.227	2.156	967.392	1.393	1.214
1505	26854	1.549	0.061	0.24	24	304.57	303.93	151	0.0042	3.9%	CHES	0.010	REHAB			0.500	6.139	3.142	19.287	8655.870	12.464	10.915
1717	14109	0.051	0.03	0.24	10	309.41	309.31	120	0.0008	58.8%	MRKS	0.013				0.208	1.175	0.545	0.641	287.616	0.414	0.363
1891	14798	0.258	0.153	0.24	18	287.17	286.73	480	0.0009	59.3%	CORN	0.013				0.375	1.816	1.767	3.210	1440.571	2.074	1.816
810	19450	0.31	0.008	0.24	18	295.54	295.28	330	0.0008	2.6%	FRUI	0.010	REHAB			0.375	2.189	1.767	3.869	1736.208	2.500	2.190
1773	13901	0.059	0.059	0.24	10	306.60	306.54	54	0.0011	100.0%	MRKS	0.013				0.208	1.357	0.545	0.740	332.111	0.478	0.419
1720	15603	0.065	0.163	0.23	10	308.73	307.78	630	0.0015	250.8%	MRKS	0.013				0.208	1.581	0.545	0.862	386.897	0.557	0.492
632	337737	0.098	0.098	0.23	10	309.10	307.74	657	0.0021	100.0%	FRUI	0.010	SDR35			0.208	2.407	0.545	1.313	589.297	0.849	0.751
722	284621	0.721	0	0.23	24	272.85	272.81	22	0.0018	0.0%	NCEN	0.013				0.500	3.093	3.142	9.717	4360.984	6.280	5.559
718	33340	0.606	0	0.23	22	275.30	274.46	399	0.0021	0.0%	NCEN	0.013				0.458	3.143	2.640	8.296	3723.072	5.361	4.755
1841	307243	0.268	0.247	0.23	10	297.27	294.60	163.3	0.0164	92.2%	MRKS	0.010	SDR35			0.208	6.766	0.545	3.690	1656.189	2.385	2.117
1890	14797	0.209	0.103	0.22	18	287.55	287.17	486	0.0008	49.3%	CORN	0.013				0.375	1.678	1.767	2.964	1330.462	1.916	1.707
140	317414	28.789	11.427	0.22	84	230.40	230.00	95	0.0042	39.7%	WWTP	0.013				1.750	10.760	38.485	414.097	185846.776	267.619	238.830
1389	16209	0.155	0.122	0.22	15	322.57	321.78	659.91	0.0012	78.7%	ORAN	0.013				0.313	1.844	1.227	2.263	1015.549	1.462	1.307
641	19649	0.066	0.066	0.22	10	304.74	304.09	335	0.0019	100.0%	FRUI	0.013				0.208	1.793	0.545	0.978	438.872	0.632	0.566
1350	14399	0.067	0.021	0.22	10	318.14	317.60	270	0.0020	31.3%	FRUI	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.575
1309	14505	0.056	0	0.22	10	318.59	318.21	270	0.0014	0.0%	FRUI	0.013				0.208	1.527	0.545	0.833	373.778	0.538	0.482
721	33342	0.724	0	0.22	24	273.92	272.85	476	0.0022	0.0%	NCEN	0.013				0.500	3.439	3.142	10.804	4849.023	6.983	6.259
1390	16208	0.163	0.121	0.22	15	321.78	320.85	643.42	0.0014	74.2%	ORAN	0.013				0.313	2.022	1.227	2.482	1113.784	1.604	1.441
720	33395	0.627	0	0.22	24	274.27	273.92	195	0.0018	0.0%	NCEN	0.013				0.500	3.073	3.142	9.654	4332.939	6.239	5.612

													ADV = ADVERSE PIPE							Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1842	307242	0.267	0.246	0.22	10	294.60	293.37	60.1	0.0205	92.1%	MRKS	0.010	SDR35			0.208	7.570	0.545	4.129	1852.945	2.668	2.401
648	19654	0.366	0.366	0.21	21	299.55	298.79	579	0.0013	100.0%	FRUI	0.013				0.438	2.406	2.405	5.788	2597.615	3.741	3.375
1888	14795	0.131	0.066	0.21	12	289.85	288.51	667	0.0020	50.4%	CORN	0.010				0.250	2.675	0.785	2.101	942.885	1.358	1.227
1797	13906	0.099	0.049	0.21	12	304.54	303.82	361.53	0.0020	49.5%	MRKS	0.013				0.250	2.049	0.785	1.609	722.138	1.040	0.941
809	19453	0.248	0.008	0.21	18	295.83	295.54	330	0.0009	3.2%	FRUI	0.010	REHAB			0.375	2.312	1.767	4.086	1833.640	2.640	2.392
649	293095	0.363	0.363	0.21	21	298.79	297.76	695	0.0015	100.0%	FRUI	0.013				0.438	2.557	2.405	6.150	2760.155	3.975	3.612
1383	16163	0.058	0.058	0.21	10	323.35	322.81	272	0.0020	100.0%	ORAN	0.013				0.208	1.822	0.545	0.994	445.982	0.642	0.584
1380	16202	0.058	0.058	0.20	10	322.33	322.04	142.36	0.0020	100.0%	ORAN	0.013				0.208	1.821	0.545	0.993	445.792	0.642	0.584
1381	16203	0.058	0.058	0.20	10	322.81	322.33	240	0.0020	100.0%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.584
445	12678	0.727	0.691	0.20	30	310.13	309.80	342	0.0010	95.0%	MRKS	0.013	III			0.625	2.611	4.909	12.816	5751.623	8.282	7.555
647	19615	0.285	0.285	0.20	21	299.80	299.55	250.51	0.0010	100.0%	FRUI	0.013				0.438	2.107	2.405	5.067	2274.024	3.275	2.990
1651	274754	0.862	0.03	0.20	30	278.21	278.00	256.89	0.0008	3.5%	JENS	0.010	REHAB			0.625	3.124	4.909	15.335	6882.178	9.910	9.048
1650	40025	0.863	0.023	0.20	30	278.60	278.21	472.91	0.0008	2.7%	JENS	0.010	REHAB			0.625	3.138	4.909	15.402	6912.464	9.954	9.091
1649	40024	0.832	0.01	0.20	30	278.90	278.60	383.6	0.0008	1.2%	JENS	0.010	REHAB			0.625	3.056	4.909	14.999	6731.489	9.693	8.861
1718	15602	0.051	0.152	0.20	10	309.31	308.83	275	0.0017	298.0%	MRKS	0.013				0.208	1.701	0.545	0.927	416.254	0.599	0.548
1549	32306	8.293	0.349	0.20	42	296.63	296.38	19	0.0132	4.2%	CHES	0.010	REHAB			0.875	15.650	9.621	150.567	67574.619	97.307	89.014
443	12676	0.698	0.698	0.20	30	311.04	310.55	507.5	0.0010	100.0%	MRKS	0.013	CL3			0.625	2.612	4.909	12.820	5753.425	8.285	7.587
444	12677	0.694	0.694	0.20	30	310.55	310.13	432.62	0.0010	100.0%	MRKS	0.013	CL3			0.625	2.619	4.909	12.855	5769.230	8.308	7.614
1411	16304	0.054	0.054	0.20	10	329.89	329.61	140	0.0020	100.0%	ORAN	0.013				0.208	1.820	0.545	0.993	445.573	0.642	0.588
1412	16305	0.054	0.054	0.20	10	329.61	329.26	174	0.0020	100.0%	ORAN	0.013				0.208	1.826	0.545	0.996	446.852	0.643	0.589
1141	38571	0.285	0	0.20	20	266.85	266.84	7	0.0014	0.0%	SCEN	0.013				0.417	2.431	2.182	5.303	2380.097	3.427	3.142
1367	14574	0.167	0.156	0.20	18	320.63	320.06	659.7	0.0009	93.4%	ORAN	0.013				0.375	1.763	1.767	3.116	1398.598	2.014	1.847
1657	39944	1.21	0.062	0.20	36	276.50	276.15	521	0.0007	5.1%	JENS	0.010	REHAB			0.750	3.194	7.069	22.577	10132.745	14.591	13.381
1658	277851	1.199	0.061	0.19	36	276.15	275.80	523.04	0.0007	5.1%	JENS	0.010	REHAB			0.750	3.188	7.069	22.533	10112.965	14.563	13.364
1715	14115	0.052	0.03	0.19	10	309.93	309.63	155	0.0019	57.7%	MRKS	0.013				0.208	1.791	0.545	0.977	438.327	0.631	0.579
719	33341	0.615	0	0.19	24	274.29	274.27	7.5	0.0027	0.0%	NCEN	0.013				0.500	3.746	3.142	11.768	5281.414	7.605	6.990
1642	40918	0.409	0	0.19	24	281.60	280.87	610	0.0012	0.0%	JENS	0.013				0.500	2.509	3.142	7.883	3538.037	5.095	4.686
794	24028	0.108	0.034	0.19	15	295.70	295.52	171.14	0.0011	31.5%	NCEN	0.013				0.313	1.725	1.227	2.117	950.095	1.368	1.260
1656	39943	1.151	0.062	0.19	36	276.70	276.50	300	0.0007	5.4%	JENS	0.010	REHAB			0.750	3.182	7.069	22.491	10094.070	14.535	13.384
1772	13902	0.059	0.059	0.19	10	308.22	306.60	593	0.0027	100.0%	MRKS	0.013				0.208	2.127	0.545	1.160	520.756	0.750	0.691
1391	281633	0.161	0.119	0.19	15	320.83	319.89	660	0.0014	73.9%	ORAN	0.010	SDR35			0.313	2.610	1.227	3.203	1437.282	2.070	1.909
1716	14108	0.052	0.03	0.19	10	309.63	309.41	105	0.0021	57.7%	MRKS	0.013				0.208	1.863	0.545	1.016	456.059	0.657	0.605
1392	281632	0.16	0.118	0.19	15	319.89	319.00	625	0.0014	73.8%	ORAN	0.010	SDR35			0.313	2.609	1.227	3.202	1437.160	2.070	1.910
1393	281638	0.159	0.117	0.19	15	319.00	318.07	660	0.0014	73.6%	ORAN	0.010	SDR35			0.313	2.596	1.227	3.185	1429.616	2.059	1.900
1397	281640	0.159	0.115	0.19	15	316.81	315.88	661	0.0014	72.3%	ORAN	0.010	SDR35			0.313	2.594	1.227	3.183	1428.535	2.057	1.898
1394	281643	0.159	0.116	0.19	15	318.07	317.64	303	0.0014	73.0%	ORAN	0.010	SDR35			0.313	2.605	1.227	3.197	1434.706	2.066	1.907
1395	281642	0.159	0.115	0.19	15	317.64	317.27	257	0.0014	72.3%	ORAN	0.010	SDR35			0.313	2.624	1.227	3.220	1445.055	2.081	1.922
1396	281641	0.159	0.115	0.19	15	317.27	316.81	322	0.0014	72.3%	ORAN	0.010	SDR35			0.313	2.614	1.227	3.207	1439.465	2.073	1.914
1398	281639	0.158	0.115	0.19	15	315.88	315.42	322	0.0014	72.8%	ORAN	0.010	SDR35			0.313	2.614	1.227	3.207	1439.465	2.073	1.915
1399	281650	0.158	0.115	0.19	15	315.42	315.20	156	0.0014	72.8%	ORAN	0.010	SDR35			0.313	2.597	1.227	3.187	1430.208	2.059	1.901
1400	281654	0.158	0.115	0.19	15	315.20	314.26	660	0.0014	72.8%	ORAN	0.010	SDR35			0.313	2.610	1.227	3.203	1437.282	2.070	1.912
1401	281653	0.158	0.115	0.19	15	314.26	313.32	660	0.0014	72.8%	ORAN	0.010	SDR35			0.313	2.610	1.227	3.203	1437.282	2.070	1.912
1402	281652	0.157	0.114	0.19	15	313.32	312.39	651	0.0014	72.6%	ORAN	0.010	SDR35			0.313	2.614	1.227	3.207	1439.465	2.073	1.916
1403	281651	0.157	0.114	0.19	15	312.39	311.45	661	0.0014	72.6%	ORAN	0.010	SDR35			0.313	2.608	1.227	3.200	1436.194	2.068	1.911
1644	40916	0.447	0	0.19	27	280.30	280.11	380	0.0005	0.0%	JENS	0.010	REHAB			0.563	2.279	3.976	9.062	4066.866	5.856	5.409
1385	16169	0.048	0	0.19	10	321.75	320.44	654.5	0.0020	0.0%	ORAN	0.013				0.208	1.821	0.545	0.993	445.743	0.642	0.594
1646	40022	0.551	0.01	0.19	30	279.90	279.60	664.66	0.0005	1.8%	JENS	0.010	REHAB			0.625	2.321	4.909	11.395	5113.882	7.364	6.813
1647	40021	0.546	0.01	0.19	30	279.60	279.30	664.64	0.0005	1.8%	JENS	0.010	REHAB			0.625	2.321	4.909	11.395	5113.959	7.364	6.818
1029	38343	9.915	1.204	0.18	48	260.67	260.00	55	0.0122	12.1%	FRUI	0.010	REHAB			1.000	16.445	12.566	206.658	92748.103	133.557	123.642
2025	34229	0.086	0.077	0.18	10	296.30	295.83	70	0.0067	89.5%	CHES	0.013				0.208	3.335	0.545	1.819	816.402	1.176	1.090
1351	14398	0.047	0.021	0.18	10	318.67	318.14	261.72	0.0020	44.7%	FRUI	0.013				0.208	1.832	0.545	0.999	448.356	0.646	0.599
1654	39941	1.115	0.061	0.18	36	277.20	276.90	378.62	0.0008	5.5%	JENS	0.010	REHAB			0.750	3.469	7.069	24.520	11004.512	15.846	14.731
1894	14801	0.511	0.409	0.18	18	285.55	285.21	30	0.0113	80.0%	CORN	0.013				0.375	6.387	1.767	11.286	5065.329	7.294	6.783
799	27932	0.06	0.055	0.18	12	288.76	288.38	274.77	0.0014	91.7%	NCEN	0.013				0.250	1.707	0.785	1.341	601.774	0.867	0.807
1645	40915	0.462	0	0.18	27	280.11	279.90	326	0.0006	0.0%	JENS	0.010	REHAB			0.563	2.587	3.976	10.285	4616.106	6.647	6.185
1652	39939	0.895	0.03	0.18	36	277.70	277.50	369.92	0.0005	3.4%	JENS	0.010	REHAB			0.750	2.865	7.069	20.254	9090.192	13.090	12.195
1386	16154	0.098	0.087	0.18	15	323.76	323.36	330	0.0012	88.8%	ORAN	0.013				0.313	1.852	1.227	2.273	1019.952	1.469	1.371
1655	39942	1.154	0.062	0.18	36	276.90	276.70	214.88	0.0009	5.4%	JENS	0.010	REHAB			0.750	3.760	7.069	26.575	11926.937	17.175	16.021
1387	16155	0.115	0.1	0.17	15	323.36	322.77	330	0.0018	87.0%	ORAN	0.013				0.313	2.249	1.227	2.760	1238.727	1.784	1.669
1848	14897	0.053	0.053	0.17	12	297.10	296.49	494.01	0.0012	100.0%	MRKS	0.013				0.250	1.613	0.785	1.267	568.621	0.819	0.766
1889	14796	0.189	0.085	0.17	18	288.05	287.55	254	0.0020	45.0%	CORN	0.013				0.375	2.662	1.767	4.704	2111.042	3.040	2.851
1308	14506	0.033	0	0.17	10	318.97	318.59	270	0.0014	0.0%	FRUI	0.013				0.208	1.527	0.545	0.833	373.778	0.538	0.505
1640	41234	0.143	0	0.17	24	282.80	282.70	400	0.0003	0.0%	JENS	0.013				0.500	1.147	3.142	3.603	1617.096	2.329	2.186
1653	39940	0.932	0.038	0.17	36	277.50	277.20	378.63	0.0008	4.1%	JENS	0.010	REHAB			0.750	3.469	7.069	24.520	11004.367	15.846	14.914
1719	15642	0.051	0.152	0.16	10	308.83	308.73	27	0.0037	298.0%	MRKS	0.013				0.208	2.477	0.545	1.351	606.348	0.873	0.822
1365	14584	0.041	0.041	0.16	10	322.91	321.82	448	0.0024	100.0%	ORAN	0.013				0.208	2.008	0.545	1.095	491.449	0.708	0.667
2008	32261	0.051	0.001	0.16	12	300.47	299.45	640.7	0.0016	2.0%	CHES	0.013				0.250	1.832	0.785	1.439	645.652	0.930	0.879
800	27930	0.049	0.044	0.16	12	289.32	288.76	368	0.0015	89.8%	NCEN	0.013				0.250	1.791	0.785	1.407	631.242	0.909	0.860
1648	40023	0.808	0.01	0.16	30	279.30	278.90	214.9	0.0019	1.2%	JENS	0.010	REHAB			0.625	4.714	4.909	23.139	10384.883	14.954	14.146
1643	40917	0.44	0	0.16	27	280.87	280.30	577	0.0010	0.0%	JENS	0.010	REHAB			0.563	3.203	3.976	12.737	5716.424	8.232	7.792
1548	31897	2.957	0.038	0.16	24	284.95	282.51	28.5	0.0856	1.3%	ORAN	0.010	REHAB			0.500	27.592	3.142	86.682	38902.873	56.020	53.063
2023	326103	0.023	0.017	0.15	8	298.73	298.08	327	0.0020	73.9%	CHES	0.010	SDR35			0.167	2.036	0.349	0.711	318.970	0.459	0.436
1071	344510	18.778	4.402	0.15	84	230.00	229.12	110	0.0080	23.4%	WWTP	0.013				1.750	14.832	38.485	570.793	256172.102	368.888	350.110
795	23977	0.11	0.035	0.15	15	296.68	295.70	324.21	0.0030	31.8%	NCEN	0.013				0.313	2.924	1.227	3.589	1610.670	2.319	2.209
442	12755	0.639	0.639	0.14	30	311.36	311.04	96	0.0033	100.0%	MRKS	0.013	III			0.625	4.852	4.909	23.820	10690.200	15.394	14.755
1638	41236	0.088	0	0.14	18	283.80	283.30	495	0.0010	0.0%	JENS	0.013				0.375	1.907	1.767	3.369	1512.207	2.178	2.090
1639	41235	0.088	0	0.14	18	283.30	282.80	495	0.0010	0.0%	JENS	0.013				0.375	1.907	1.767	3.369	1512.207	2.178	2.090
1796	13915	0.052	0.042	0.14	12	305.35	304.54	261.47	0.0031	80.8%	MRKS	0.013				0.250	2.555	0.785	2.007	900.653	1.297	1.245
1348	14402	0.024	0.021	0.13	10	319.19	318.67	258	0.0020	87.5%	FRUI	0.013				0.208	1.827	0.545	0.997	447.297	0.644	0.620
1770	13899	0.026	0.026	0.13	10	308.80	308.26	225	0.0024	100.0%	MRKS	0.013				0.208	1.994	0.545	1.088	488.101	0.703	0.677

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1769	13903	0.027	0.027	0.13	10	309.88	308.80	415.86	0.0026	100.0%	MRKS	0.013				0.208	2.074	0.545	1.131	507.741	0.731	0.704
2024	34228	0.023	0.017	0.13	10	297.18	296.30	428	0.0021	73.9%	CHES	0.013				0.208	1.846	0.545	1.007	451.776	0.651	0.628
1799	13793	0.023	0.006	0.13	12	298.15	298.04	142	0.0008	26.1%	MRKS	0.013				0.250	1.278	0.785	1.004	450.379	0.649	0.626
1366	14570	0.069	0.069	0.12	18	321.21	320.63	547.3	0.0011	100.0%	ORAN	0.013				0.375	1.953	1.767	3.451	1548.924	2.230	2.161
2039	30897	0.018	0.164	0.12	10	314.50	314.45	30	0.0017	911.1%	CHES	0.013				0.208	1.695	0.545	0.924	414.806	0.597	0.579
2041	344533	0.018	0.163	0.12	10	314.24	313.31	534.15	0.0017	905.6%	CHES	0.013				0.208	1.698	0.545	0.926	415.732	0.599	0.581
796	23976	0.061	0.02	0.12	15	297.51	296.68	330.41	0.0025	32.8%	NCEN	0.013				0.313	2.666	1.227	3.272	1468.315	2.114	2.053
2040	30903	0.018	0.164	0.12	10	314.45	314.24	116.85	0.0018	911.1%	CHES	0.013				0.208	1.713	0.545	0.934	419.348	0.604	0.586
631	337738	0.028	0.028	0.12	10	309.98	309.10	301	0.0029	100.0%	FRUI	0.010	SDR35			0.208	2.861	0.545	1.560	700.334	1.008	0.980
2026	34227	0.023	0.017	0.12	10	297.46	297.18	147	0.0019	73.9%	CHES	0.010	SDR35			0.208	2.309	0.545	1.260	565.285	0.814	0.791
2027	326104	0.023	0.017	0.12	10	298.08	297.46	325	0.0019	73.9%	CHES	0.010	SDR35			0.208	2.311	0.545	1.261	565.720	0.815	0.792
448	12758	0.193	0.193	0.12	27	311.81	311.36	656.15	0.0007	100.0%	MRKS	0.010	REHAB			0.563	2.669	3.976	10.613	4762.989	6.859	6.666
1027	39467	0.408	0.408	0.12	48	261.06	260.90	642	0.0002	100.0%	FRUI	0.013				1.000	1.809	12.566	22.738	10204.650	14.695	14.287
1641	40919	0.149	0	0.11	24	282.70	281.60	647	0.0017	0.0%	JENS	0.013				0.500	2.991	3.142	9.396	4217.063	6.073	5.924
1659	39882	1.195	0.061	0.11	36	271.54	271.45	11.31	0.0080	5.1%	JENS	0.010	REHAB			0.750	10.993	7.069	77.705	34874.010	50.219	49.024
2038	30896	0.018	0.164	0.11	10	314.78	314.52	94	0.0028	911.1%	CHES	0.013				0.208	2.141	0.545	1.168	523.994	0.755	0.737
1207	33764	0.042	0	0.11	16	286.35	286.22	164.55	0.0008	0.0%	SCEN	0.010	REHAB			0.333	2.028	1.396	2.832	1270.952	1.830	1.788
1208	33765	0.042	0	0.10	16	286.22	285.96	259.95	0.0010	0.0%	SCEN	0.010	REHAB			0.333	2.282	1.396	3.186	1430.040	2.059	2.017
630	15705	0.018	0.018	0.09	8	312.94	310.06	140	0.0206	100.0%	FRUI	0.013				0.167	5.038	0.349	1.759	789.324	1.137	1.119
1234	38889	1.1	0.005	0.08	30	275.83	275.49	6	0.0567	0.5%	SCEN	0.010	REHAB			0.625	26.009	4.909	127.674	57299.873	82.512	81.412
1768	13905	0.014	0.014	0.08	10	312.30	310.23	400	0.0052	100.0%	MRKS	0.013				0.208	2.928	0.545	1.597	716.736	1.032	1.018
446	12756	0.1	0.1	0.07	27	312.61	312.24	308.18	0.0012	100.0%	MRKS	0.010	REHAB			0.563	3.532	3.976	14.042	6301.929	9.075	8.975
447	12757	0.1	0.1	0.07	27	312.24	311.81	296.55	0.0015	100.0%	MRKS	0.010	REHAB			0.563	3.881	3.976	15.431	6925.644	9.973	9.873
1028	39498	0.547	0.521	0.05	48	260.90	260.67	19	0.0121	95.2%	FRUI	0.013	1750D			1.000	12.610	12.566	158.467	71120.163	102.413	101.866
1771	13904	0.013	0.013	0.05	10	310.23	309.88	9.5	0.0368	100.0%	MRKS	0.013				0.208	7.813	0.545	4.261	1912.389	2.754	2.741
1024	39458	0.065	0	0.04	48	261.55	261.38	630.36	0.0003	0.0%	NORT	0.010	REHAB			1.000	2.425	12.566	30.476	13677.694	19.696	19.631
1025	39457	0.062	0	0.04	48	261.38	261.22	630.34	0.0003	0.0%	NORT	0.010	REHAB			1.000	2.396	12.566	30.109	13513.111	19.459	19.397
1026	39466	0.059	0	0.04	48	261.22	261.06	660	0.0002	0.0%	NORT	0.010	REHAB			1.000	2.320	12.566	29.153	13083.894	18.841	18.782
1023	39465	0.066	0	0.02	48	261.44	260.89	87	0.0063	0.0%	NORT 2	0.010	REHAB			1.000	11.847	12.566	148.874	66814.496	96.213	96.147
217	282962	0	0	0.00	8	328.40	328.15	8.6	0.0291		HERN	0.010	SDR35			0.167	7.786	0.349	2.718	1219.797	1.757	1.757
218	282961	0	0	0.00	8	329.50	329.33	50	0.0034		HERN	0.010	SDR35			0.167	2.663	0.349	0.930	417.163	0.601	0.601
219	282960	0	0	0.00	8	329.33	329.23	29.86	0.0033		HERN	0.010	SDR35			0.167	2.643	0.349	0.923	414.020	0.596	0.596
394	3737	0	0	0.00	8	341.15	338.98	636.58	0.0034		HERN	0.010	SDR35			0.167	2.666	0.349	0.931	417.705	0.601	0.601
395	3736	0	0	0.00	8	338.98	337.37	473.83	0.0034		HERN	0.010	SDR35			0.167	2.662	0.349	0.929	417.031	0.601	0.601
396	3735	0	0	0.00	8	337.37	336.34	303.48	0.0034		HERN	0.010	SDR35			0.167	2.660	0.349	0.929	416.793	0.600	0.600
397	3734	0	0	0.00	8	336.34	335.33	295.02	0.0034		HERN	0.010	SDR35			0.167	2.672	0.349	0.933	418.602	0.603	0.603
398	3733	0	0	0.00	8	335.33	334.86	137	0.0034		HERN	0.010	SDR35			0.167	2.675	0.349	0.934	419.040	0.603	0.603
454	15704	0	0	0.00	8	313.04	312.01	517	0.0020		FRUI	0.013				0.167	1.568	0.349	0.547	245.639	0.354	0.354
455	15703	0	0	0.00	8	312.01	311.74	135	0.0020		FRUI	0.013				0.167	1.571	0.349	0.548	246.115	0.354	0.354
456	15711	0	0	0.00	8	311.58	310.66	464	0.0020		FRUI	0.013				0.167	1.564	0.349	0.546	245.052	0.353	0.353
457	15712	0	0	0.00	8	310.66	309.66	500	0.0020		FRUI	0.013				0.167	1.571	0.349	0.548	246.115	0.354	0.354
458	15713	0	0	0.00	8	309.66	309.40	130	0.0020		FRUI	0.013				0.167	1.571	0.349	0.548	246.115	0.354	0.354
459	15714	0	0	0.00	8	309.40	308.88	260.6	0.0020		FRUI	0.013				0.167	1.569	0.349	0.548	245.832	0.354	0.354
460	15715	0	0	0.00	8	308.88	308.36	259.8	0.0020		FRUI	0.013				0.167	1.572	0.349	0.549	246.210	0.355	0.355
461	15716	0	0	0.00	8	308.36	307.84	259.9	0.0020		FRUI	0.013				0.167	1.571	0.349	0.548	246.162	0.354	0.354
462	15717	0	0	0.00	8	307.84	307.35	252.14	0.0019		FRUI	0.013				0.167	1.549	0.349	0.541	242.605	0.349	0.349
463	15718	0	0	0.00	8	307.35	306.77	282.16	0.0021		FRUI	0.013				0.167	1.593	0.349	0.556	249.511	0.359	0.359
762	286089	0	0	0.00	6	280.95	280.84	13.25	0.0083		NCEN	0.013				0.125	2.647	0.196	0.520	233.278	0.336	0.336
763	33498	0	0	0.00	8	280.59	280.15	236.36	0.0019		NCEN	0.013				0.167	1.512	0.349	0.528	236.905	0.341	0.341
764	317495	0	0	0.00	8	280.15	279.71	236.88	0.0019		NCEN	0.013				0.167	1.514	0.349	0.528	237.184	0.342	0.342
778	25903	0	0	0.00	6	299.75	299.08	336	0.0020		NCEN	0.013				0.125	1.297	0.196	0.255	114.328	0.165	0.165
779	25905	0	0	0.00	6	299.08	297.47	330	0.0049		NCEN	0.013				0.125	2.029	0.196	0.398	178.831	0.258	0.258
780	25906	0	0	0.00	6	299.08	298.60	159.5	0.0030		NCEN	0.013				0.125	1.594	0.196	0.313	140.452	0.202	0.202
781	25908	0	0	0.00	6	298.60	296.17	330	0.0074		NCEN	0.013				0.125	2.493	0.196	0.490	219.701	0.316	0.316
804	345241	0	0	0.00	24	279.02	278.99	7	0.0043		NCEN	0.010	SDR35			0.500	6.173	3.142	19.394	8704.038	12.534	12.534
1199	33960	0	0	0.00	15	289.31	288.85	470	0.0010		ORAN	0.013				0.313	1.659	1.227	2.035	913.515	1.315	1.315
1200	343074	0	0	0.00	15	288.85	288.37	480	0.0010		ORAN	0.013				0.313	1.682	1.227	2.064	926.417	1.334	1.334
1201	33759	0	0	0.00	15	288.37	288.24	136	0.0010		ORAN	0.013				0.313	1.645	1.227	2.018	905.751	1.304	1.304
1202	33760	0	0	0.00	15	288.22	287.76	435	0.0011		ORAN	0.013				0.313	1.737	1.227	2.132	956.800	1.378	1.378
1203	33761	0	0	0.00	15	287.76	287.55	209	0.0010		ORAN	0.013				0.313	1.682	1.227	2.064	926.417	1.334	1.334
1204	33762	0	0	0.00	15	287.55	287.07	485	0.0010		ORAN	0.013				0.313	1.668	1.227	2.047	918.745	1.323	1.323
1205	344706	0	0	0.00	15	287.07	286.58	485	0.0010		ORAN	0.013				0.313	1.691	1.227	2.075	931.180	1.341	1.341
1206	33763	0	0	0.00	15	286.58	286.35	209.1	0.0011		SCEN	0.013				0.313	1.764	1.227	2.165	971.614	1.399	1.399
1450	16364	0	0	0.00	10	327.88	327.85	16	0.0019		CHES	0.010	SDR35			0.208	2.291	0.545	1.250	560.852	0.808	0.808
1636	41238	0	0	0.00	10	285.53	285.10	570	0.0008		JENS	0.013				0.208	1.118	0.545	0.610	273.653	0.394	0.394
1728	15410	0	0	0.00	8	311.84	310.36	604	0.0025		MRKS	0.013				0.167	1.739	0.349	0.607	272.418	0.392	0.392
1729	15411	0	0	0.00	8	310.36	310.24	52	0.0023		MRKS	0.013				0.167	1.688	0.349	0.589	264.370	0.381	0.381
1730	15296	0	0	0.00	8	310.28	308.70	656.9	0.0024		MRKS	0.013				0.167	1.723	0.349	0.601	269.900	0.389	0.389
1731	15297	0	0	0.00	8	308.70	307.13	656	0.0024		MRKS	0.013				0.167	1.719	0.349	0.600	269.229	0.388	0.388
1732	15298	0	0	0.00	8	307.13	307.09	15	0.0027		MRKS	0.013				0.167	1.814	0.349	0.633	284.189	0.409	0.409
1733	15299	0	0	0.00	8	307.09	306.40	306	0.0023		MRKS	0.013				0.167	1.668	0.349	0.582	261.329	0.376	0.376
1734	15302	0	0	0.00	8	306.40	305.65	310	0.0024		MRKS	0.013				0.167	1.728	0.349	0.603	270.691	0.390	0.390
1735	15305	0	0	0.00	8	305.65	304.84	338.1	0.0024		MRKS	0.013				0.167	1.719	0.349	0.600	269.366	0.388	0.388
1736	15310	0	0	0.00	8	304.84	304.05	329.39	0.0024		MRKS	0.013				0.167	1.720	0.349	0.601	269.514	0.388	0.388
1737	15315	0	0	0.00	8	304.05	303.19	329.38	0.0026		MRKS	0.013				0.167	1.795	0.349	0.627	281.206	0.405	0.405
1738	15316	0	0	0.00	8	303.19	302.34	329.37	0.0026		MRKS	0.013				0.167	1.785	0.349	0.623	279.570	0.403	0.403
1739	15329	0	0	0.00	8	302.34	301.49	329.39	0.0026		MRKS	0.013				0.167	1.785	0.349	0.623	279.562	0.403	0.403
1740	15330	0	0	0.00	8	301.49	300.63	329.37	0.0026		MRKS	0.013				0.167	1.795	0.349	0.627	281.210	0.405	0.405
1741	15331	0	0	0.00	8	300.76	299.60	655	0.0018		MRKS	0.013				0.167	1.478	0.349	0.516	231.596	0.333	0.333
1747	15332	0	0	0.00	8	300.76	299.34	644.47	0.0022		MRKS	0.013				0.167	1.649	0.349	0.576	258.325	0.372	0.372

														ADV = ADVERSE PIPE					Full Pipe Flow			
Sort	ID	All Loads Maximum Flow (mgd)	Land Use Changes Maximum Flow (mgd)	Maximum d/D	DIAMETER	FROM_INV	TO_INV	LENGTH	SLOPE	% Flow From New PLU	SWRBASIN	n	SWRCLASS	Mentioned in Old MP	At Capacity	R (ft)	V_{full} (ft/sec)	Area (ft^2)	Q_{full} (ft^3/sec)	Q_{full} (GPM)	Q_{full} (MGD)	MGD Excess Capacity (MGD)
1748	15333	0	0	0.00	8	299.34	298.10	622.66	0.0020		MRKS	0.013				0.167	1.568	0.349	0.547	245.589	0.354	0.354
2028	286491	0	0	0.00	10	297.63	297.61	8	0.0020		CHES	0.010	SDR35			0.208	2.366	0.545	1.291	579.245	0.834	0.834